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# **RURAL DEVELOPMENT – CONTEMPORARY ISSUES AND PRACTICES**

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Edited by **Rashid Solagberu Adisa**

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## **Rural Development – Contemporary Issues and Practices**

Edited by Rashid Solagberu Adisa

### **Published by InTech**

Janeza Trdine 9, 51000 Rijeka, Croatia

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**Publishing Process Manager** Romina Skomersic

**Technical Editor** Teodora Smiljanic

**Cover Designer** InTech Design Team

First published March, 2012

Printed in Croatia

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Additional hard copies can be obtained from [orders@intechopen.com](mailto:orders@intechopen.com)

Rural Development – Contemporary Issues and Practices,

Edited by Rashid Solagberu Adisa

p. cm.

ISBN 978-953-51-0461-2

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# Contents

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**Preface IX**

**Section 1 Introduction 1**

- Introductory Chapter **Rural Development in the Twenty-First Century as a Global Necessity 3**  
Rashid Solagberu Adisa

**Section 2 Issues and Concepts 15**

- Chapter 1 **Sustainable Agriculture – A Panacea for Achieving Biodiversity Conservation and Rural Development in Sub-Saharan Africa? 17**  
Simon M. Munthali, Richard M. Mkandawire and Nasson Tembo
- Chapter 2 **Renewable Energy for Rural Development – A Namibian Experience 33**  
Ravinder Rena
- Chapter 3 **The Multi-Functionality of Agriculture and Territorial Governance – A Learning Process in an Island Environment (Réunion) 55**  
Michel Dulcire, Eduardo Chia and Marc Piraux
- Chapter 4 **New Insights into the Assessment of Protected Areas – Integrating Rural Development 75**  
Iker Etxano
- Chapter 5 **Land Use Conflict Between Farmers and Herdsmen – Implications for Agricultural and Rural Development in Nigeria 99**  
Rashid Solagberu Adisa
- Chapter 6 **Technological Model and Sustainable Rural Development for Rainy-Spell Corn Producers in Mexico 119**  
Miguel A. Damián-Huato, Artemio Cruz-León, Benito Ramírez-Valverde, Agustín Aragón-García, A. Patricia Ramírez-Carrasco and Jesús F. López-Olguín

- Chapter 7 **Gender Issues in Agricultural Extension and Rural Development in Nigeria** 139  
Stella O. Odebode
- Chapter 8 **Social Marginality and Subsistence Agriculture – Way of Life in Rural Communities in Central Mexico** 157  
María Estela Orozco Hernández
- Chapter 9 **From Tsetse Control to Sustainable Rural Development – Progress and Opportunities for an Ethiopian Community** 173  
Johann Baumgärtner and Getachew Tikubet
- Section 3 Policy and Practices** 197
- Chapter 10 **Strategic Environmental Assessment (SEA) of Rural Development Programs in the European Union – Towards a More Efficient Monitoring of the Environmental Effects of Agricultural Policies** 199  
Agata Spaziante, Carlo Rega, Mirko Carbone and Chiara Murano
- Chapter 11 **Financial Resources in Rural Development – An Analysis of Relational Capital in Credit Cooperatives** 223  
Elies Seguí-Mas and Ricardo J. Server Izquierdo
- Chapter 12 **Statistics for Rural Development Policy** 241  
Berkeley Hill
- Chapter 13 **Integrated Marketing Approach as a Rural Development Tool** 257  
Yavuz Topcu
- Chapter 14 **Development Potentials of Rural Areas – The Case of Slovenia** 283  
Anton Perpar and Andrej Udovč
- Chapter 15 **Tracing the Consequences of Economic Crisis in Rural Areas – Evidence from Greece** 311  
Stavros Zografakis and Pavlos Karanikolas
- Chapter 16 **Direct Food Marketing at Farm Level and Its Impacts on Rural Development** 337  
István Fehér
- Chapter 17 **The African Experience with ICT for Rural Women’s Development** 355  
Meera K. Joseph

- Chapter 18 **When Life Style Entrepreneurs  
Establish Micro-Businesses in Rural Areas –  
The Case of Women in the Danish Countryside** 375  
Lise Herslund and Hanne Tanvig
- Chapter 19 **A Chronicle of the Timber  
Industry in East Arnhem Land, Australia** 393  
Cecil A.L. Pearson and Klaus Helms



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## Preface

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Meeting the challenge of attaining overall development has for a long time been the preoccupation of all nations of the world. Because of the multi-faceted and all-encompassing nature of 'development', even the most advanced nations of the world today are battling with many 'developmental' challenges. Suffice it to agree with the notion that development is a process and not a destination. Increase in per capita/real income, enhanced sources and distributive mechanisms of wealth, and advancement in technological and administrative manpower are *sine qua non*, but not sufficient in the developmental process. Development also entails some environmental, cultural, social, psychological, and political requisites.

Another crucial index of development is 'balanced development of both urban and rural centers' (Umeabu, 2008). No nation would achieve any meaningful success in the development process without deliberately and fairly paying attention to the developmental needs and prospects of its rural communities. A realization of this perhaps explains the increasing policy and research focus on rural development worldwide. Unfortunately, rural communities in most parts of the world are still mired in poverty, disease and other forms of backwardness.

Although the population of the developing world is still more rural than urban (IFAD, 2011), the twentieth century witnessed a significant decrease in the percentage of people inhabiting rural areas worldwide. Global rural population declined from about 87% in 1900 to 71% in 1950, and 51% 2005. At the beginning of the 21<sup>st</sup> century, just about 76 countries worldwide had above 50% rural population. According to Wimberley (2008), what was referred to as the 'day of transition' or 'urban millennium'- when global urban population exceeded rural population for the first time, was reached on December 16, 2008. What are the implications of this scenario for rural communities? Is the world moving towards total de-ruralization? Are we having more cities and less rural communities? Are rural communities becoming urbanized? Is rural development becoming more attainable or less relevant? These questions are perhaps easier to ask than answered. But there are yet more questions. For instance, what are the contemporary challenges of rural communities; who or what created them; how are they being met, and to what degree of success or failure? Again, there is no consensus among stakeholders on the answers to these questions. It is almost certain that there would never be. In other words, rural development and its attributes

and tributaries shall continue to be controversial in the policy and professional realms. But given man's infinite quest for, and acquisition of knowledge and solutions, rural development, like every other field of human venture must evolve and employ realistic approaches while confronting perennial and emerging issues.

Rural development issues are crucial to the attainment of the Millennium Development Goals (MDGs). The aim of this book is to provide a wide-ranging single volume that addresses the major issues, concepts and practices concerning rural development across the globe. The book also aims to fill the knowledge gaps and offer evidence-based policy recommendations on contemporary problems associated with overall management and development of rural communities in both developed and developing countries. Particularly, as developing countries continue to battle with perennial developmental problems such as poverty and illiteracy, while grappling with emerging ones such as shortage of energy, climate change and increasing resource-use conflict, there is need to offer practicable models that would provide rapid and lasting responses. This book seeks to contribute to the promotion of this process.

There are three sections in this book of 20 chapters. The first section consists of one chapter (Chapter 1) – the introductory chapter. Chapter 1 is a general overview of rural development and argues that for the world to witness meaningful overall progress in the 21<sup>st</sup> century and get near achieving the MDGs, rural development efforts must take the center stage. The chapter, which should be of interest to the non-specialist reader as well, consists of sub-topics that discuss 'rural'; rural development; factors affecting rural development; and importance, problems, and indicators of rural development. The chapter concludes with suggestions on strategies that developing countries can use to overcome rural development challenges.

The remaining 19 chapters are grouped in to two sections: (1) Issues and Concepts, and (2) Policy and Practices. The former consists of 9 chapters (Chapters 2 - 10), while the latter is made up of 10 chapters (Chapters 11 - 20). The section on issues and concepts in rural development begins with Chapter 2, which addressed sustainable agriculture and its potentials to enhance biodiversity conservation and rural development in sub-Saharan Africa (SSA). The chapter offered a conceptual overview of sustainable agriculture and its performance in SSA. It also discussed the conditions under which sustainable agriculture could contribute to improved food production, biodiversity conservation & rural development in SSA. Chapter 3 chronicles the Namibian experience in renewable energy technologies for rural development. The chapter provides an overview of the pertinent issues surrounding the use of renewable energy technologies (RETs) to increase access to modern energy services in rural areas of Namibia. Chapter 4 focuses on territorial governance and multi-functionality of agriculture. The chapter also addressed sustainable agriculture in relation to territorial governance and analyzed the tools and institutional arrangements of stakeholders in order to ensure territorial management, with emphasis on the learning processes.

Chapter 5 examines land use conflicts between cattle herdsmen and arable crop farmers in Nigeria and its implication for agriculture and rural development. The

chapter discusses the causes of farmer-herder conflict, its effects on rural household welfare, and the determinants of conflict coping strategies among both groups. Chapter 6 provides new insights into the assessment of protected areas (PAs). It addresses salient issues in economic valuation of PAs, environmental sustainability, and innovative assessment framework for PAs. The chapter also provides a case study of the Basque country towards incorporating PA assessment into rural development. Chapter 7 is on technological models for sustainable rural development in a rainy corn-producing region in Mexico. The chapter focuses on modern technology appropriation and rural technology use. It further discusses sustainable rural development, and rural technology model in relation efficient corn handling. Chapter 8 discusses gender issues in agricultural extension and rural development in Nigeria. The chapter further examines the importance of gender analysis and offers some insights into the role and constraints of Nigerian women in agriculture.

Social and marginality and subsistence agriculture in rural Mexico is the focus of Chapter 9. The authors captured and analyzed statistical and cartographic data as well as regulatory laws in sixteen rural communities and discussed production systems, and economic and territorial contexts in relation to social marginality. The final chapter (Chapter 10) in the section focuses on progress and opportunities for sustainable rural development in the control of tsetse fly. The chapter discusses technology system selection and implementation, animal health improvement and human development, and opportunities for enhancement of sustainable rural development in Ethiopia.

Section II begins with Chapter 11. Owing to the importance of monitoring rural development policies and programmes, Chapter 11 is on strategic environmental assessment (SEA) of rural development programmes in the European Union (EU). The chapter discussed the new EU strategies for agriculture and the Common Agricultural Policy (CAP), environmental indicators and monitoring, and spatial analysis of environmental measures. The chapter further presented an Italian SEA case study of rural development programmes and concluded by discussing the need for integration of environmental policies. Chapter 12 is an analysis of relational capital of credit cooperatives. The chapter examines cooperative banking in a financial crisis context and discusses the characterization of relational capital by means of the Delphi analytical procedure. The chapter also examines strong points and weak points of relational capital in credit cooperatives.

Effective rural policy depends on accurate data. Chapter 13 focuses on statistics for rural development policy. The chapter examines quantitative thresholds and gradients, typology of rural areas in UK, and OECD as an example of regional classification. It also discussed the sets of stage-related indicators to evaluate rural development policies. Chapter 14 discussed integrated marketing as a rural development tool. The chapter, with the aid of robust data analysis, discussed integrated marketing tactics as a tool for rural development in Turkey. Chapter 15 examines the development potentials of rural areas in Slovenia. The chapter discusses

exogenous and endogenous rural development models, agriculture in Slovenia and its potential for development, organic farming and rural development, forestry and rural development, and rural tourism.

Chapter 16 deals with the consequences of rural economic crisis in Greece. From the data collected, the authors discussed the importance of rural areas, the structure of rural economy, rural labour markets, poverty incidence and in-work poverty risks, as well as farm structure and rural labour. Chapter 17 is on direct food marketing at farm level and how it affects rural development in Hungary. It discussed direct sales practice, regressive and subservient consumer trends, links between direct sales and rural development, legal regulations and lessons to learn.

Information and communication technology (ICT) for rural women's development in Africa is the focus of Chapter 18. The chapter presented case studies from South Africa, and further discussed use of visual methodologies such as photos and videos. It also examines strategies for African rural women's development, and the application of the Capability Approach for the conceptualization of African women's development through ICT. Chapter 19 discusses new models of rural entrepreneurship by examining the establishment of micro-business in rural areas and its impact on women in Denmark. It discusses previous research on the issue, lifestyle entrepreneurship, rurality and the new rural space, as well as locals and newcomers in rural lifestyle micro-business. Finally, Chapter 20 chronicles the timber industry in Australia. It discussed the historical and contemporary features of timber milling in the Northern Territory of Australia. It also focuses on accommodation construction, furniture manufacture and building of strategic capabilities.

This book is addressed to all stakeholders in the study and practice of rural development at all levels, as well as the general reader who wishes to know more about contemporary issues in rural development. It is hoped that the book would be of immense benefit to its readers and inspire them to be part of the effort needed in the rural development process.

It is with deep sense of responsibility and honour that I accepted the invitation to edit this book. I therefore wish to acknowledge and appreciate the experience and expertise of the distinguished scholars who have contributed to this book, while believing that they have offered significant contributions to the body of knowledge in the field through their respective chapters. I also express profound gratitude to Professor Shuaib Oba AbdulRaheem, Chair of Nigeria's Federal Character Commission, for the moral impetus that propels my career achievements. Finally, I am grateful to the Publishers for inviting me to serve as Editor of this book.

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# **Section 1**

## **Introduction**



# Introductory Chapter

## Rural Development in the Twenty-First Century as a Global Necessity

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### 1. Introduction

In most of the world, the areas designated as 'rural' share a number of common attributes that include overwhelming involvement in primary production (agriculture mostly) that supply food and raw materials for the larger society. In most cases, rural centers are the seed beds of national population and conservatory of pristine national culture, manpower, patriotism and tradition (Ekong, 2010). And despite also constituting the majority population in most countries of the world, the rural world is unfortunately mired in perennial poverty and backwardness. This perhaps explains why eradication of poverty is given top priority in the Millennium Development Goals (MDGs).

Although notable progress has been achieved in rural poverty reduction in many countries over the last 10-20 years, available statistics indicate that there is still much more to be done in order to arrest the trend, especially in developing countries. According to IFAD (2011), rural people constitute about 72% of the people living in extreme poverty (less than US\$1.25 per day) in these countries, down from about 80% ten years ago. About 51% of all the people in these countries live in poverty (less than US\$2/day); while 27% live in extreme poverty. Absolute poverty levels are generally low in the developed countries. For instance, about 37 out of 42 European countries have less than 2% of their population living in poverty (<US\$2), and rural poverty is virtually non-existent in EU and northern Europe (FAO, 2009, IFAD, 2009). Hence the onus is on the developing world to find their way out of poverty and curtail its effects on the well-being of their citizens by striving towards the attainment of the MDGs.

But how can developing countries attain the MDGs? Several scholars, agencies and world bodies have turned out useful frameworks for the mitigation of rural poverty in particular and achievement of the MDGs generally. Most of these frameworks emphasized the rural development process as being a veritable option (Bage, 2004; IFAD, 2005; Avila and Gasperini, 2005; and Rural 21, 2010). The goals of the MDGs are all important items in the rural development agenda of developing countries. It is thus expedient for rural development issues, policy and practices to take priority position in intellectual discourse among researchers and other stakeholders.

The purpose of this chapter is to introduce this book by presenting a general overview on rural development. By so doing, the chapter discusses the 'rural' concept and examines

what is meant by 'rural development' - its importance and indicators. Furthermore the chapter looks at the determinants of rural development. Finally suggestions are offered on how to enhance the rural development process in developing countries.

## 2. What is 'rural'?

It is not surprising that the term 'rural' does not have a conventional definition, unlike 'poverty line' whose definition has been made easier by the World Bank (although some countries still have their own poverty benchmarks). While 'poverty' or 'poverty line' could be easily monetized, 'rural' or 'rurality' cannot. This thus makes it expedient for each country to have its own rural threshold, using its self-determined criteria. The term rural evades consensual definition to the extent that even within some countries, there are deferring definitions of 'rural'. For instance in the US, the 'three most common Federal definitions of rural' are those by Department of Commerce's Bureau of the Census based on the 2000 census criteria, that of the White House's Office of Management and Budget (OMB), and that of the Department of Agriculture's Economic Research Service USDA-ERS (Reynnells and John, 2008). In essence, rural could be defined in varying contexts depending on where and what criteria are used. Using some sociologically idealized models of differentiation, Ekong (2010) identified what was referred to as 'very general' differences in the rural-urban typology:

1. Size of place; rural communities tend to be generally smaller in size of area inhabited than urban communities
2. Population density and composition: number of inhabitants per unit area of land in rural communities is always smaller than for urban centers. Rural populations also tend to be less heterogeneous than urban populations.
3. Closeness to nature: rural environment permits greater and more direct closeness to physical environmental elements such as soil, wind, radiation, parasites and micro-organisms.
4. Occupation: farming and other primary production activities are generally the major occupations in rural communities, unlike urban centers where organization, commerce and industry take the centre stage.
5. Cultural simplicity: complex culture, high fashion, music and literature are more associated with urban areas than rural ones.
6. Social interaction: primary group contacts form the main feature of social interaction in rural areas, while secondary contacts define most interactions in urban centers.
7. Social stratification: there are generally fewer social classes in rural areas than urban areas.
8. Social mobility: urban dwellers often move more rapidly from one social stratum to the other than their rural counterparts.
9. Social differentiation: rural areas tend to have very little division of labour and specialization and are thus made up of several similar independent units, unlike urban centers.
10. Social control: there is usually greater internalization of societal values and norms in rural areas, thereby leading to higher levels of social control than in urban centers which relies more on formal institutions.
11. Levels and standards of living: although this is not true for all places and periods, urban centers, due to the presence of a variety of infrastructures, goods, and services

tend to offer higher levels of living than rural centers. Especially in developing countries, urban centers tend to offer higher standards of living due to better housing, education, health and communication facilities.

The above differences, according to Ekong (2010) are extremities in the rural-urban divide and do not exclusively typify any real-life communities. Indeed, all the listed items cannot be true for all rural areas around the world. They are mostly true for rural area in developing countries. For instance, while most rural areas across the developing world remain typically agrarian, in the US, the rural economy has become diverse and is no longer dominated by agriculture because less than 10% of rural populace lives on farming (USDA, 2006). It should however be noted that because the population criterion is the easiest and perhaps most practical one, most nations use it to delineate rural-urban thresholds. For instance, any community inhabited by less than 5000 people was deemed rural in Nigeria based on the 1953 census. But 2006 Census classifies a rural area as having less than 20 000 inhabitants. Rural-urban thresholds vary from time to time and from one nation to another. Sweden and Denmark perhaps have the lowest urban threshold of 200 people. In South Africa, a population below 500 is rural, while in Australia and Canada a population of 1000 and below is regarded as rural. Mexico and the US classify a population of below 25 000 as rural; while in Japan, a population below 30 000 is rural (Ekong, 2010 citing several sources).

Ashley and Maxwell (2001) defines 'rural' as constituting a 'space where human settlement and infrastructure occupy only small patches of the landscape, most of which is dominated by fields, pastures, woods, water, mountains and deserts'; but conceded that the term 'rural' is ambiguous and echoed IFAD (2001) submission that 'national distinctions between rural and urban are arbitrary and varied'.

### **3. What is rural development?**

There is neither a shortage of definitions nor a single conventional definition or 'narrative' of - or prescription - on rural development (Maxwell, Urey, and Ashley, 2001). According to van der Ploeg (1998), rural development consists of a 'balance of changing and stable elements' and that continuity and change have always characterized rural development. In other words, rural development must be conceptualized in both contexts in order to have a 'balanced' and practical definition. Rural development must consist of activities that address both elements. Just as van der Ploeg (1998) observed, the 'changing' elements in the study of rural development continue to attract more attention than the 'stable' elements. Maxwell et al illustrated the changing rural development scenario by listing a number of occurrences that illustrated the changing contexts (Table 1).

Despite the above changing contexts, the necessity for greater and deliberate efforts targeting development of rural areas and their inhabitants has continued growing, especially in Africa and other developing countries.

Before the 1970s, rural development was seen to be synonymous with agricultural development. Rural development, defined in the 1980s by the World Bank as a strategy designed to improve the economic and social life of the rural poor, has since been variously defined. For instance the USDA defines it as 'improvement in the overall rural community conditions, including economic and other quality of life considerations such as environment, health, infrastructure, and housing' (USDA 2006). Apart from the changing context of rural

Changing context	Illustrative Data
Diversification is taking place in rural incomes	Studies for Africa show a range of 15 to 93% reliance on non-farm income (WDR).
More of the poor are in low potential areas	66% of the rural poor live in less favored area (IFPRI).
There are growing environmental concerns	Loss of 2 billion hectares of land to degradation since 1945 (Conway)
Changing geographical distribution of poverty and underdevelopment	23% of Africans fail to reach age 40 compared 8% of East Asians (UNDP)
HIV/AIDS is having dramatic impact in SSA	Life expectancy has fallen by 9 and 6 years in Botswana and Zambia (UN)
The share of population in rural area is falling	by 2035 50% of the world's population would live in cities (IFPRI)
The importance of agriculture is declining	Agriculture would account for less than 10% GDP of developing countries in 2020 (IFPRI)
Urbanization and rising income are changing the pattern of food demand	Milk demand would rise by 15 times in 2020 (IFPRI)
The world economy is increasingly globalized	international trade has grown 2-3 times as global value added in the last decade (WB)
International trade expansion is not uniform	Africa's share of world exports fell from 11% In 1960 to 4% in 1998 (WB)
Access to FDI is uneven	Africa's access to FDI is only 1.9% of GDP (WB)
Increasing liberalization, though slowly in agriculture	Effective protection fell from 12% in 1960s to 3% in 1990s

Source: Maxwell, Urey, and Ashley (2001).

Table 1. The Changing context of Rural Development

development, increasing incidence of poverty/extreme poverty and recognition of its non-income derivative have contributed significantly to the evolution of new narratives of rural development. A major non-income need of rural people, the dearth of which contributes to their backwardness is political participation - which was used to define what is known as inclusive rural development - when combined with the pursuit of their economic and social needs. Another concept is that of integrated rural development, which favours the amalgamation of development activities in various economic sectors (agriculture, commerce, industry, etc) in the rural development process. It also includes the integration of the traditionally disadvantaged groups (such as children, the youth, women, the elderly, minorities, etc) into the rural development process.

Changing understanding of the concept of 'development' itself in relation to sustainability gave rise to the concept of sustainable development. FAO (1988) defined sustainable development as: "the management and conservation of the natural resources base and the orientation of technological and institutional change in such a manner as to ensure the attainment and continued satisfaction of human needs for present and future generations. Such sustainable development in the agriculture, forestry and fisheries sectors conserves land, water, plant and animal genetic resources, is environmentally non-degrading, technically appropriate, economically viable and socially acceptable." According to Avila and Gasperini (2005), sustainable rural development is understood as a process of constant



change and transformation of the rural areas, encompassing a wide scope of processes and programmes such as:

- Enhancement of governance at the local, district and provincial levels, including linkages with the private sector, civil society and government line agencies.
- Development of productive sectors: agriculture, non-agricultural industry, mining, tourism, natural resources, environmental management, etc.
- Development of institutions and their capacities in key areas, i.e. education and training, health, research and extension, marketing, savings and credit, environment, transportation, etc.
- Development of rural infrastructure for roads, electricity, telecommunications, housing, water, sanitation, etc.

Contemporary 'narratives', 'definitions' or 'prescriptions' concerning rural development characteristically tend to address everything that affects rural people and the quality of their life as entities and as integral members of the larger society and, indeed, the world.

#### **4. Rural development indicators**

Because the 'term' rural has many features and that the concept of 'rural development' is also a multi-dimensional concept, it is impossible to have a single benchmark that would describe rural situation and trends. Several sets of rural indicators and rural development indicators have been put forward by some international organizations such as World Bank, Organization for Economic Cooperation and Development (OECD), European Union (EU), and Food and Agriculture Organization (FAO). These sets of indicators share similar background arguments and address 'rural' and 'rural development' from similar angles.

The World Bank recommends five themes from which core indicators should be selected in developing countries. The themes are: Basic socio-economic data; enabling environment for rural development; broad based economic growth for rural poverty reduction; natural resource management and biodiversity; - social well-being (education and health). Each theme consists of several indicators determined based on the issues addressed.

The World Conference on Agrarian Reforms and Rural Development (WCARRD) present a set of primary indicators focusing on six themes that is also applicable in developing countries.

The six themes, as shown in Table 2 and the selected indicators are very important in determining rurality and rural development in developing countries. The WCARRD list of primary indicators incorporates rural poverty parameters such as nutrition, health, housing, and education. However, unlike the World Bank list of indicators, WCARRD list in Table 2 did not address natural resource management and biodiversity - whose importance cannot be overlooked from sustainable rural development viewpoint.

#### **5. Determinants of rural development**

The pace and level of rural development is determined by a number of factors that could be social, economic, institutional, cultural, technological, natural, or technological. These factors often interact and could operate to exhibit multi-level effects on rural development,

---

**I. Poverty alleviation with equity**
*Income/consumption*

1. Percentage of population in households with per capita income below the poverty line \*
2. Percentage of income accruing to each fractile (decile/quartile) of the population \*

*Nutrition*

3. Percentage of children aged 1-5 years in groups less than: \*
  - 80% weight-for-age
  - 90% height-for-age
  - 80% weight-for-height
4. Percentage of under-nourished population \*

*Health*

5. Infant and child mortality rate \*
6. Percentage of the population in villages/communities with at least one health auxiliary

*Education*

7. Adult literacy rate \*
8. Primary school enrolment and completion rates

*Housing*

9. Percentage of rural household with specified housing facilities, e.g. piped water, electricity and sanitation facilities

*Access to community services*

10. Percentage of population living in villages/communities with access to: potable water, public health services, primary schools \*

**II. Access to land, water and other natural resources***Access to community services*

11. Percentage of number and area of agricultural holdings by size groups and tenure\*
12. Percentage of heads of rural households without land \*
13. Average wage rate of agricultural labourers \*
14. Rate of unemployment and under-employment
15. Percentage of landless agricultural labourers to the population economically active in agriculture \*

**III. Access to inputs, markets and services**

16. Percentage of rural households receiving institutional credit

**IV. Development of non-farm rural activities**

17. Percentage of economically active population engaged in non-agricultural activities in the rural areas

**V. Education, training and extension**

18. Number of rural (including agricultural) extension personnel per 1,000 holdings/households.

**VI. Growth rate**

19. Annual rate of population growth
- 

*Note: Core Indicators are asterisked*

Source: FAO

Table 2. The WCARRD list of primary indicators

be it village, provincial, national or even global levels. The following includes some of the important factors that determine rural development:

1. Availability and efficient utilization of natural resources: Where a community is endowed with mineral and other natural resources in commercial quantities, there is a tendency for that community to experience rapid development. However, the sheer availability of natural resources without proper management of the proceeds would not bring about commensurate development. Indeed there are numerous examples of naturally endowed nations that remain under-developed, while less-endowed ones have moved higher in the development ladder as a result of efficient resource utilization.
2. Production and employment capacities: The higher the employment and production capacities of an area, the higher the income and growth it attracts. Increases in output and number of people employed enhance household welfare and drive the rural economy. Production must continue to increase, not only to satisfy increasing demand, but also because of the necessity to maintain capital stock of the rural economy's productive base.
3. Manpower and technology: Improvement in the means of production of goods and services, *ceteris paribus*, leads to higher and more efficient production. Use of modern and efficient means of farming for instance has demonstrated great potential in the achievement of food security. Societies that have adopted modern technological production modes have witnessed more rapid pace and higher levels of rural development than those that have not.
4. Good and responsible leadership: Competent and patriotic administration and management of national and rural resources have led to rapid transformation of many rural communities in the western world. Development would most certainly remain a pipedream as long as national and rural resources are mismanaged by wrong hands. Rural inhabitants need to not only to participate in the leadership process but must also ensure accountability and competency in leadership. Furthermore, according Avila and Gasperini (2005):

The leadership role of government is important in rural development in three key areas.

- Firstly, government must articulate long-term vision and strategy for the sustainable development of sector that is coherent, integrated, and complementary and supported by the national development vision and strategy of the country.
- Secondly, government must provide an enabling policy environment in terms of specific sectoral policies, legislation, and supply of public goods (e.g. budget priority, capacity building and education, empower women & girls, strengthen R&D, remove barrier to trade, increase effectiveness of donors, and improve the infrastructure of roads, electricity, telecommunication, irrigation and markets).
- Thirdly, government must be a key actor for leading in creating opportunities and protecting those who are poor, marginalized and vulnerable in society, by strengthening their access to land and other productive resources (e.g. land, water, technology), basic services (e.g. education, health and sanitation), productive opportunities (e.g. markets, jobs and income generation) and safety nets for those who cannot take care of themselves. At present, due to the weakness of governments, those with very limited resources depend mostly on NGOs.

5. Basic infrastructure: Some basic infrastructures such as roads, health, water, and schools are needed to kick-start and propel rural development. The absence or dearth of these facilities has continued to perpetuate rurality and underdevelopment in Africa and other developing countries.
6. Peace and political stability: No meaningful development would take place in the absence of peace and stability. For instance Messer, Cohen and D'Costa (1998) posited that agricultural production drops by about 12% per annum in conflict areas. Developing countries need to evolve and apply effective conflict prevention and resolution mechanisms.
7. Literacy level: Development is truly a 'moving target', and one of its drivers is knowledge. There is so much knowledge on rural development strategies, technologies, capital resources, natural resources, and the commitment of stakeholders, especially the rural poor, which can be marshaled to eliminate poverty and hunger (Avila and Gasperini, 2005). When rural inhabitants are literate they would be able to decode and apply production, marketing and other useful information needed to enhance their living standards.
8. Other factors: Several other factors bordering on specific rural community characteristics were identified by Yilmal et al (2010). These are (1) geographical location, (2) size of a village, (3) productivity of land, (4) type of land use, (5) active population, (6) popular production areas, (7) proximity to a river, (8) housing comfort, (9) characteristics of drinking water, (10) productive fruit areas, (11) cooperativization, and (12) social infrastructure investments.

## 6. Importance of rural development

There is a current argument that, owing to near-total modernization, globalization, increased industrialization and application of technological means in America and the rest of the western world, 'programs designed to meet the needs of rural residents are no longer necessary and no longer have an audience to serve' (Brennan, 2009). Although this argument seems logical on its face value, a deeper look at cessation of rural development programmes, anywhere in the world, portends grave global consequences. Brennan (2009) succinctly echoes the counter-arguments from extension and rural development specialists that the current scenario in the developed world even makes it more expedient to continue with rural development programmes, especially because of the new challenges occasioned by declining 'rurality' of western world's countrysides.

The world today has not reached, and perhaps may never reach a stage whereby rural development programmes become absolutely irrelevant. Rural development, because of its multidimensionality, transcends sheer availability of infrastructure, technology and industrialization. It encompasses all needs of rural inhabitants, including the enviro-cultural and psycho-social needs. According to Ackerman (2002), a study by a University of Virginia professor revealed 'that persons living in rural areas .... have a higher risk of dying in a traffic accident or being murdered by a stranger than residents of a metropolitan area.' How do we situate this kind of new development? As observed by Ekong (2010), rural areas are considered to be safe and, indeed, places of refuge from dangers associated with urban life. But the way out is simple and it has been adopted by the developed countries: continuous rural development programming. Despite their respectable levels of advancement in human development, the developed economies of the world are still credited with elaborate rural

development systems. Contrary to the belief in some quarters, it is however not in the interest of the developed world for developing countries to continue to grapple with pervasive underdevelopment. Therein lays another importance of rural development. The more underdeveloped Africa and other poor regions remain, the more the developed countries would need to grapple with drug and human trafficking, terrorism, immigration, transcontinental organized fraud and other related crimes. Underdevelopment and poverty in developing countries are partly responsible for breeding criminals and terrorists. A 'very rich neighbour, very poor neighbour' scenario does not augur well for global peace and progress.

Rural development would continue to be a frontline issue in global development agenda, for both traditional, well known reasons and the emerging ones. Whatever view is held on the future of rural development, it is still difficult to deny the immortal contribution of the rural environment and its people to global agriculture, food security and the perpetuation of the human race. In most developing countries, rural communities are home to majority of the citizens and still produce the bulk of the food and fibre.

Rural development is a crucial tool for combating global poverty, disease, human slavery and inequality. It not only creates a new level of self-sufficiency and satisfaction for members of a society who may have never experienced such development, but as a consequence of globalization and the new associated challenges in the developing world, rural development is more necessary and pressing than ever before (GAPS, 2007). Rural development is also important in arresting rural-urban migration that has become the bane of many developing countries. It would ensure optimum utilization of human and natural resources in rural communities and reduce pressure on already overloaded utilities in the urban centers.

It should go without saying that rural development *is* the essence of national development in developing countries. The kind of pleasant arguments earlier mentioned that is taking place in the West may never be witnessed this century in Africa and other poor regions of the world, going by predictions in available statistics. The pace and level of rural development in Third World countries would continue to define their overall socioeconomic development as sovereign states. Western countries got to where they are today as a result of implementation of deliberate rural development planning and programmes, among other factors. Virile rural development processes would give rise to development at national and regional levels and contribute to global progress.

## **7. Toward enhancing rural development in the 21<sup>ST</sup> century**

With the setting of the MDGs in 2000, the stage was set, by implication, to give rural development a priority place in global development agenda. Lofty as the aims of the MDGs are, many developing countries are yet to fully and realistically integrate them into their national development agenda; even though they have offices devoted to the MDGs. Development of rural areas requires deliberate planning and execution of wide ranging activities and programmes that focus on the needs of the rural people. Ashley and Maxwell (2001) posit that a successful rural development strategy should:

- i. Recognize the great diversity of the rural society and its institutions;
- ii. Respond to past and future changes in rural areas;
- iii. Be consistent with wider poverty reduction policy;

- iv. Reflect wider moves to democratic decentralization; and
- v. Make case for productive sectors in rural development in order to maximize growth and reduce poverty.

The above are necessary principles that governments and rural development agencies need to bear in mind. Governments should identify the potential development resources and challenges of rural communities. Even though primary production might be the predominant livelihood alternative of rural people, there is always room for diversification. A recognition and exploitation of rural diversity or development would significantly contribute to poverty reduction. All productive sectors of the rural economy should be supported to enhance their capacities. Based on the 5 principles above, Ashley and Maxwell (2001) gave ten recommendations that are as well worthy of mention here, as they are applicable to rural development in Third World countries. A successful rural development strategy should:

1. Offer different development options to rural, peri-urban, and remote locations. No single approach fits all situations,
2. Provide livelihood-strengthening options for multi-occupational and multi-locational households. In increasingly noticeable feature of rural occupations is that household members tend to be engaged in more than one income-generating activity.
3. Put in place market institutions, with government playing key roles,
4. Combat inequalities in income and assets targets, timetables and concrete measures,
5. Demonstrate that agricultural development strategies would be compatible with natural resource management,
6. Recognize the importance of investment in infrastructure and human capital.
7. Respond to the obligation of protecting the poor with new social protection measures,
8. Propose pragmatic steps towards greater de-concentration and devolution,
9. Identify (and ensure) the place of rural development in sectoral programmes, and
10. Recognize the need for support for research.

The above is however not an automatic key to rural development in developing countries. Much more needs to be done. A crucial obstacle to development in Third World countries is corruption. According to Ogah (2006), 'Corruption in developing countries is perpetrated in the main, by their respective governments. The said governments apply incredible ingenuity in suppressing their own people with the support of developed countries'. As long as Third World leaders continue to corner the wealth of their countries with the connivance of their 'accomplices' in the developed world, the battle for rural development might continue to be a lost battle. When corruption and mismanagement of public funds are brought to the barest minimum, an enabling environment would be created for economic progress and global peace (Ogah, 2006). The role of the developed world and the international community in the rural development process of Third World cannot be overlooked. From trade liberalization that favours goods and services produced in the Third World to increased cooperation and contributions towards the entrenchment of responsible and accountable leadership, the developed world owes their developing counterpart much more. Foreign direct investment and aid to developing countries should favour activities and programmes relating to rural development.

Since rural development is a common necessity, regional and sub-regional state organizations in the Third World should take a cue from the EU by formulating and implementing a

common rural development policy. Such a policy would, like in EU, help 'to achieve valuable goals for countryside and for the people who live and work there.' Poverty and underdevelopment are common problems of developing countries and could be combated more effectively when the countries come together at regional and continental levels.

## 8. Conclusion

This chapter is meant to provide a general overview of rural development. It discussed the 'rural' and 'rural development' concepts as well as the determinants and importance of rural development. Importantly too, the chapter emphasizes the necessity for the world to pay more attention to the needs of the rural people. The quality of their life should concern the rest of the world not only because of their conditions are pitiable and have potential global negative consequences, but because the future of the world is also threatened by continuing poverty and misery of the rural world.

Rural development would not be effectively pursued until everything affecting the quality of rural life is addressed. Just as it is the aim of this book, policy makers and leaders of third world countries, other world leaders and the entire international community must intensify the efforts towards addressing all issues affecting the welfare of rural areas across the globe, and strive towards the achievement of the MDGs. This would go a long way in the development of the rural world.

The twenty-first century witnesses the beginning of the first global effort to combat poverty and other derivatives of underdevelopment. It is envisaged that the generations that would inherit the world in the twenty-second century would not need to create MDGs that are similar to ours.

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## **Section 2**

### **Issues and Concepts**



# Sustainable Agriculture – A Panacea for Achieving Biodiversity Conservation and Rural Development in Sub-Saharan Africa?

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## 1. Introduction

There is inseparable link between agriculture and biodiversity (broadly referring to the variation and richness of wild species of plants, animals and micro-organisms existing and interacting within an ecosystem). Natural biodiversity provides the foundation for agricultural plants and domesticated animals, on which humans rely for food and livelihood sustenance. Biodiversity also performs many ecological services, including pollination of agricultural crops such as fruit trees and major staple crops, recycling of nutrients, controls local microclimate, regulates local hydrological processes, controls abundance of undesirable organisms, and detoxifies noxious chemicals (Altieri, 1999). Additionally, the vegetative cover of forests and grasslands prevents soil erosion, replenishes ground water and controls flooding by enhancing infiltration and reducing water runoff. Furthermore, biodiversity provides a wide variety of food (wild vegetables, game meat, fish, fruits, nuts etc.), fibre, herbal medicine, and fuelwood on which rural people depend.

Dependence on extractive use of biodiversity is more prominent in semi-arid areas, where due to erratic and insufficient rainfall ( $\leq 400\text{mm/annum}$ ); yields from agricultural production are generally poor - impelling rural communities in these areas to largely rely on natural resources to satisfy their nutritional needs. This reliance is aggravated by limited and unexploited economic opportunities in most rural areas; hence poverty in all its manifestation, such as undeveloped human capital, and lack of physical, economic and social capital assets is entrenched in the rural SSA. Dependence on natural resources, coupled with shifting cultivation, which prevails in these areas, contributes to degradation of biodiversity due to encroachment of agricultural activities into wildlife habitats, leading to undesirable depredation of agricultural crops and livestock by wild animals. Consequently, rural communities often consider wildlife, an important component of the region's biodiversity, as a cost and not as an asset for enhancing their livelihoods through, for instance, ecotourism development.

To address these challenges, some conservation non-governmental organisations (NGOs) are developing and implementing strategies - focused at integrating sustainable agricultural practices into biodiversity conservation programmes, both at local and large landscape

scales - primarily to improve food security, reduce agriculture encroachment into wildlife habitats and minimise rural communities' over-use of biodiversity resources; and thus, contribute to biodiversity conservation.

In this chapter, we review the performance of conventional agriculture in sustaining food security and as a driver of rural development in Sub-Saharan Africa (SSA); examine the performance of current attempts to integrate sustainable agriculture and biodiversity conservation efforts; and discuss conditions under which sustainable agriculture could improve food security, and contribute to biodiversity conservation outcomes and rural development, especially in SSA.

## 2. Performance of conventional agriculture in SSA

Agriculture plays a pivotal role in sustaining economic growth and food security in the SSA countries, accounting for 30 per cent of the gross domestic product (GDP) and employs on average, 75 per cent of the population (Commission for Africa 2005). Total agricultural output in SSA consists primarily of food crops, with export crops accounting for only 8 per cent of the total agricultural production (Peacock, et.al 2007). A reflection on agricultural performance indicators however shows SSA falling well below other developing regions in the proportion of the area irrigated, value added per worker, fertilizer use levels, and productivity growth in both crops and livestock sectors. SSA currently lags behind all other regions in agriculture productivity. For example, in 2001, cereal yield in Africa averaged 1,230kg/ha compared to 3,090 kg/ha for Asia, 3040kg/ha for Latin America and 5470 kg/ha for European Union (NEPAD 2004). This is a reflection, amongst other constraints, of the degradation of the natural resource base and limited access to, and use of, improved technologies. These problems can be addressed through investment in soil fertility, greater use of fertilizers and cheaper organic inputs, as well as better management and use of improved seed varieties. The limited growth in agricultural production in SSA, accounting for about one per cent per annum has been achieved through expansion of cultivated area – resulting in declining labour productivity (Sanders *et al.*, 1996), and encroachment into valuable wildlife habitats, and destruction of biodiversity in some of the countries in the region (Munthali & Mkanda 2002).

Notwithstanding agriculture's prominence in the SSA socioeconomic discourse, its performance over the past 30 years has been marginal; with cereal yields of about 1,230kg/ha (Ruben & PETERS 2005) being inadequate to cope with the region's ever-increasing human population, which is currently estimated at about 8000 million, and growing at about 2.2 per cent per annum (IEG 2007). This population doubled between 1975 and 2002, and is projected to increase to 902 million by 2015 and 1.56 billion by 2050 (FAO 2005).

One of the manifestation of poor agriculture production and increasing human population in SSA is food insecurity, with about 33 per cent of the region's population (approx. 200 million people) being undernourished. SSA is currently the only region of the world where hunger is projected to worsen unless some drastic measures are taken to improve food production (NEPAD 2005). In most countries, access to food by households has further been undermined by: (i) the inability of countries to generate the resources required to import food; (ii) a high and increasing level of poverty (50 per cent in 2003) resulting from

overdependence on subsistence agriculture; (iii) limited access to off-farm employment; and (iv) sluggish development in urban areas and skewed income distribution (IEG 2007). Furthermore, bilateral and multilateral donor aid for development of agriculture has declined from \$1,921 million in 1981 to \$997 million in 2001 (IEG 2007). Similarly, private commercial investment in agriculture has been largely limited to export crops and higher potential zones (IEG 2007).

Other factors that have constrained agriculture production include prevalence of poor soils, highly variable rainfall, frequent droughts, poor infrastructure, and limited access to irrigation resulting in chronic food insecurity for millions of small farmers (IEG 2007), and this situation is worst in the semi-arid areas. To survive in such harsh environments, most rural communities rely on consumption of biodiversity resources, such as game meat, tubers, etc., as demonstrated by an example from Banhine, Mozambique (Fig. 1).

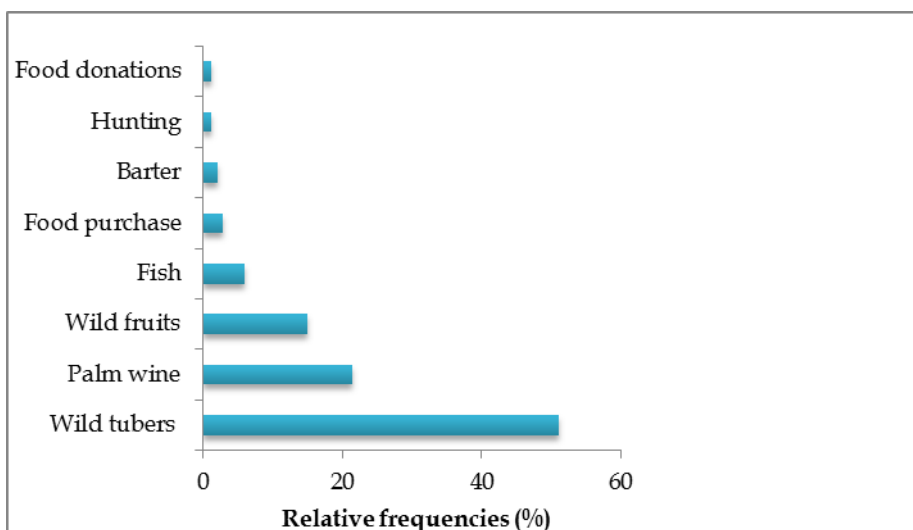


Fig. 1. Hunger coping strategies by the Banhine communities, Mozambique (Munthali, et.al 2010)

To address the underperformance of agriculture, the New Partnership for Africa Development (NEPAD) Secretariat prepared the Comprehensive Africa Agriculture Development Programme (CAADP) in 2002, “presenting broad themes of primary opportunity for investments to reverse the crisis situation facing Africa’s agriculture, which has made the continent import-dependent; vulnerable to even small variations of climate, and dependent to an inordinate degree on food aid” (NEPAD, 2002). In July 2003, the Heads of State and Government of the African Union (AU) considered the CAADP and resolved, *inter alia*, to “revitalize the agriculture sector by adopting sound polices for agricultural and rural development and committed themselves to allocating at least 10% of national budgetary resources to these critical endeavours within five years”. Translating this commitment into political action has however been a great challenge due to a number of factors, including: paucity of resources available to most SSA countries to revitalise their

agriculture sector against the needs of other priority sectors (especially health and education); the general perception that the performance of agriculture in SSA has been poor, particularly in the context of globalized markets and the dominance in the region of small-scale farming systems; lack of confidence in the potential of agriculture to reduce poverty; and the decline or disappearance of national development banks and the difficulties met with in establishing a well-performing financial sector (NEPAD, 2004; FAO 2005).

Against the backdrop of conventional agriculture's underperformance, and its general failure to sustain food security and meaningfully contribute to the socioeconomic development in SSA, would sustainable agricultural practices be a panacea to enhancing agriculture productivity and achieving improved food security, and contribution to biodiversity conservation and the ever-elusive rural development in SSA? In responding to this question we briefly review the performance of sustainable agriculture and discuss conditions under which it could contribute to food security, biodiversity conservation; and rural development.

### **3. Sustainable agriculture: A conceptual overview**

Sustainable agricultural practices in SSA encompass a wide range of farming systems, including conservation agriculture, organic farming, eco-farming, permaculture, etc. Principally, these agricultural production systems involve designing and management procedures that work with natural processes to conserve all resources and minimise waste and environmental damage, while maintaining or improving farm profitability (MacRae 1997). They are designed to take maximum advantage of existing soil nutrients, water cycles, energy flows, beneficial soil organisms, and natural pest controls.

Sustainable agricultural production systems reduce or avoid the use of synthetically compounded fertilizers, pesticides, growth regulators, and livestock feed additives, and thus aim to produce food that is nutritious, and uncontaminated with products that might harm the environment and human health (MacRae 1997). These production systems rely more on crop rotations, crop residues, animal manures, legumes, green manures, off-farm organic wastes, appropriate mechanical cultivation and minimal tillage to optimize soil biological and natural pest control activity, and thereby maintain soil fertility and crop productivity (African Conservation Tillage Network, 2008; Stoorvogel and Smaling, 1998). In addition, resistant varieties, and biological and cultural controls are used to manage pests, weeds and diseases.

Sustainable agricultural production systems are also considered to have a biodiversity conservation utility, and have gained popularity among conservation organisations as tools for project managers to combat deforestation, and dependence on biodiversity assets to sustain subsistence needs of the rural communities. Promotion of these farming systems by conservation NGOs is driven by the concern that the present conventional agricultural practices are having negative impacts on biodiversity conservation, environmental quality and on resources availability and use. The general assumption in promoting sustainable agricultural practices is that these farming practices could lead to improved land husbandry and intensification of agriculture, which would lead to improved crop yields per unit area of land, and hence; decrease the likelihood of cutting down forested areas to plant new agriculture fields. Additionally, there would be reduced reliance on natural resources to

sustain subsistence livelihoods, as communities would produce sufficient food to sustain their nutritional needs. This assumption is applicable to areas that are located near valuable wildlife habitats or protected areas, where sustainable agriculture could be implemented as a tool to achieve biodiversity conservation goals (see Salafsky, et. al 2001).

Numerous studies have assessed the socioeconomic benefits of sustainable agriculture projects. These studies have looked primarily at variables such as changes in household agricultural productivity and yield, returns to labour, and income (Salafsky et. al 2001). One such study was carried out by Pretty et .al (2006) who reviewed 286 sustainable agriculture projects between 1999 and 2000 across eight categories of farming systems in 57 developing countries in Africa, Asia and Latin America. They confirmed that farmers increased yields by an average of 79% by adopting sustainable agricultural practices. These increases were attributed to efficient use of water both in dry-land and irrigated farming systems; improvement in organic matter accumulation in the soil, carbon sequestration; and pest, weed and disease control. Very few studies, however, have addressed the conservation benefits of sustainable agriculture projects. Even fewer studies have attempted to quantitatively measure the impacts of sustainable agriculture on biodiversity conservation goals (Salafsky, et.al 2001).

Our exposition on the application and performance of sustainable agriculture in SSA is based on group discussions we have had with smallholder farmers in the Democratic Republic of Congo, Malawi, Mozambique, Zambia and Zimbabwe. We have also reviewed literature on sustainable agricultural practices within and outside the African region.

#### **4. Application and performance of sustainable agriculture in SSA**

Sustainable agricultural practices in SSA are being promoted by a variety of agencies (NGOs & governments - mostly influenced by availability of donor funding), under a wide rubric of input and extension support. The primary objective of these initiatives is to increase agriculture production, and improve food security. Only those being promoted by conservation NGOs are latently linked to biodiversity conservation through promotion of agriculture intensification, improved food production, and by inference, reduce deforestation and encroachment into valuable wildlife habitats. Performance of sustainable farming practices in SSA differs widely, typified by:

##### **4.1 Inadequate scale and level of adoption**

Adoption of sustainable agricultural practices is characterised by inadequate scale, both spatially (on average <0.5ha, e.g., Banhine, Mozambique; Siavonga, Zambia & Kanyemba, Zimbabwe) and quantity, in terms of number of farmers (on average < 5%) at a village level. Furthermore, adoption is often limited to the middle age class (20-45 years). Older farmers are sceptical of these farming techniques, preferring conventional agricultural practices and use of unimproved crop varieties, which families have inherited and used for several past generations. At least 75% of the crop varieties grown by smallholder farmers who have embraced sustainable agricultural practices are local varieties - a preference that is influenced by the customary belief in the local crop varieties, which they consider taste and store better than genetically improved varieties. Preference for traditional unimproved and low yielding crop varieties is a universal phenomenon in SSA, which defeats the objective of improving yields and combating food insecurity.

## 4.2 Presence of multiple support agencies

There are multiple agencies supporting sustainable agricultural practices (African Wildlife Foundation, Wildlife Conservation Society, Golden Valley Agricultural Research, CIRAD, FAO, WWF, etc.) whose approach and techniques have not been harmonised, often confusing farmers, more especially as farmers have to navigate through various approaches to make choices on the best approach that suits their local environments. Provision of free inputs and extension services, which characterises these programmes, creates farmers' dependence on farm input subsidies, and therefore the sustainable agricultural practices being promoted cannot be sustained beyond the periods of free donations, and in the long-term, would not meet the objectives of improving food production and contributing to reduction of rural communities' dependence on natural resources use, and encroachment into wildlife habitats.

## 4.3 Nutrient recycling

One of the basic tenets of sustainable agriculture is nutrient recycling through fallowing to maintain soil productivity; use of crop residues which upon decomposition replace nutrients utilized by crops back into the soil; and intercropping with leguminous crops to enrich the soil with nitrogen. Additionally, there is a well-known linkage between livestock and soil productivity in the cycling of biomass (natural vegetation, crop residues) through animals (cattle, sheep, goats) into excreta (manure, urine) that fertilizes the soil (Powell & Williams, 1995). Manure application increases soil organic matter, improves nutrient exchange and water holding capacities, and increases crop and forage yields (Powell & Williams, 1995). In SSA this functional linkage is being challenged by the continuous removal of crop residues by grazing, degradation by termites, and removals for fuel - leaving soil surfaces unprotected during the dry seasons, resulting in high soil temperatures, and wind erosion; hence posing severe limitations to crop production in some of the SSA countries. The practice of fallowing has also decreased dramatically, or disappeared in many areas (Powell & Williams 1995). Consequently, nutrient balances for many cropping systems are negative, with off-take greater than input, demonstrating that farmers are over-mining the soils (Stoorvogel & Smaling, 1990).

The depletion of soil nutrients without adequate replacement has caused cereal yields to decline over time, and as more land is brought under cultivation in order to maintain production levels, farmers have had to cultivate more marginal areas, aggravating environmental degradation. Consequently, communal grazing lands have diminished and livestock have become more dependent on crop residues, especially during the six to eight months of the dry season (Powell & Williams 1995); hence limiting use of crop residues to enrich the soils.

Where farmers have opportunity to use crop residues, decomposition and release of nutrients usually takes long, particularly in arid and semi-arid areas. Farmers therefore tend to apply donated chemical fertilisers to boost crop yields.

## 4.4 Human-wildlife conflicts

Human-wildlife conflicts are profound problems, especially at the frontiers that divide land devoted to agriculture and land that remains as intact natural areas, causing massive crop



and livestock losses, and occasionally loss of human life due to wildlife depredation. A number of human-wildlife mitigation techniques are being implemented alongside sustainable agricultural practices, including use of chilli-pepper to repel the African elephant; and erection of two-wire strand solar electric fences to repel large mammals<sup>1</sup>. These techniques though effective to some degree are ineffective in deterring crop predation by other wildlife species which raid crops, such as baboons, monkeys, bush pigs and birds. Besides these, crop disease and pests (e.g., stalk borer, aphids, crickets and termites) are major problems farmers face, and there are no locally adopted techniques to prevent these problems. There is, therefore, need for the development and adoption of multiple human-wildlife conflict mitigation techniques, as well as an integrated approach to pest and disease control. Failure to do so, any gain in the yields from the promoted sustainable farming practices will be lost and farmers will lose confidence in the NGOs that promote these farming practices. Throughout all the group discussions we had with farmers they wished all problem wild animals could be shot and eliminated from their areas, and this contradicts the expectation of conservation NGOs.

#### **4.5 Economic viability**

Farmers are generally unaware about performance of their farming enterprises, in terms of whether they are break-evening or making profitable gains. Most NGOs promoting sustainable farming activities are generally not assisting smallholder farmers in applying tools, such as "*Gross Margin*" analyses to measure each farming enterprise's economic viability and performance. Gross margin is defined as the enterprise's output minus the variable costs (e.g., labour, inputs, etc.) associated with it, expressed in money terms (Roberts 1973). The challenge to measure farming enterprises' viability and performance is aggravated by lack of linkages to markets. This was the case in Ituri and Epulu, D.R. Congo, where although the Wildlife Conservation Society is promoting goat farming, raising ducks, and growing of the high value Cocoa, by early 2011, farmers were not yet linked to markets; hence benefits from these farming activities were not yet understood and realised by the communities. Determining economic performance of the commercial agricultural activities is a must, and should be aligned with inculcating responsibility among the farmers to re-invest part of their profits back into their farming businesses, as a way of ensuring sustainability of their farming businesses.

#### **4.6 Sustainability**

Most sustainable farming practices being implemented in SSA are donor-funded and have limited time-span, and generally lack mechanisms for sustaining them beyond the projects' funded lives. Encouraging sustainability of these farming practices is also challenged by the limited scale at which sustainable farming systems are being adopted, and cultural aspects which influence their adoption and preference of traditional local crop varieties. Furthermore as the farming practices being promoted are predominantly focussed at meeting subsistence needs, there is limited opportunity to raise the required funds to procure the essential agriculture inputs. There is need, therefore for a good mix of cash and food crops so that part of profits from cash crops can assist to finance sustainable farming

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<sup>1</sup> This technique is expensive; its adoption is mainly based on availability of donor funds.

practices. The Simamba Goat Producers Association, in Siavonga, Zambia, supported by the African Wildlife Foundation has formed a *Trust Account* into which members contribute part of profits they make from goat sales and these funds are used in various aspects of goat husbandry, including paying for veterinary services. This is one good example of ensuring sustainability that need to be encouraged by NGOs supporting sustainable farming practices in SSA.

#### **4.7 Weak link between sustainable agricultural practices and biodiversity conservation**

In promoting adoption of sustainable agricultural practices, conservation NGOs assume that these practices would lead to improved land husbandry and intensification of agriculture, which would lead to improved crop yields – resulting in reduced reliance on natural resources to sustain subsistence livelihoods and hence; decrease the likelihood of cutting down forested areas to plant new agriculture fields. This link is however poorly understood among the local farmers, more especially as there is limited concrete evidence of sustainable agricultures' conservation utility in SSA. Generally, farmers perceive the support associated with sustainable agricultural practices provided by conservation NGOs and others as free hand-outs of inputs and extension services to boost food production. With exception of the Wildlife Conservation Society's supported projects in Ituri and Epulu, Democratic Republic of Congo, where land has been zoned and physically demarcated into protected forest areas and agriculture land, the situation in other countries where we have reviewed sustainable agricultural practices, farmers can freely expand their agricultural activities as long as free land is available. Land in most SSA countries is a common pool resource, which can be acquired upon obtaining traditional leaders' consent. Hence, sustainable agricultural practices where land has not been clearly zoned and demarcated do not necessarily restrain deforestation and encroachment into valuable wildlife habitats. Lack of linkage to markets is also a disincentive for farmers to engage in intensive commercial farming.

#### **4.8 Monitoring and evaluation of sustainable agricultural practices**

The purpose of monitoring and evaluation is to provide comprehensive information on efficiency, relevance, sustainability, impact and effectiveness of sustainable farming practices. In most areas where these farming practices are being implemented in SSA, unless imposed by the donors funding them, there is generally lack of reliable baseline data to evaluate gains made in crop yields due to adoption of sustainable farming practices. Similarly indicators to guide assessment of sustainable agricultural practices' biodiversity conservation utility are either lacking or vaguely established, allowing only for conjecture on the link between sustainable farming practices and biodiversity conservation.

Although our prognosis of sustainable farming practices in some SSA countries shows that they have been mildly satisfactory, these farming practices have great potential to revamp the agricultural sector, by promoting land use intensification, and use of environmentally acceptable techniques to increase agriculture production, and meet the food demand, and restrain encroachment into protected wildlife areas. However to achieve these objectives, a number of conditions should be considered (see section 5 below).

## **5. Conditions under which sustainable agriculture could contribute to improved food production, biodiversity conservation and rural development**

Much of the biodiversity loss in developing countries results from lack of advanced technologies, which in turn leads to expansion of farm areas to compensate for low yields. As earlier stated in this chapter, the overarching hypothesis in promoting sustainable agricultural practices is that these farming practices could lead to improved land husbandry, intensification of agriculture, improved crop yields per unit area of land, and hence; decrease the likelihood of cutting down forested areas to plant new agriculture fields. Additionally, there would be reduced reliance on natural resources to sustain subsistence livelihoods, as communities would produce sufficient food to sustain their nutritional needs. This assumption is however applicable to areas that are located near valuable wildlife habitats or protected areas, where sustainable agriculture could be implemented as a tool to achieve biodiversity conservation goals (see Salafsky et al 2001), under the following interrelated principles:

### **5.1 Design**

#### **5.1.1 Clearly define the threats to conservation that sustainable agriculture is designed to address**

Sustainable agriculture is effective as a conservation tool only if it is appropriately directed at addressing a particular threat, such as deforestation and encroachment into wildlife habitats, or protected area.

#### **5.1.2 Land use planning and zoning**

Promotion of sustainable agriculture should be guided by land use planning that incorporates agro-ecological attributes in zoning process of the land into various uses, such as: (i) settlements; (ii) agriculture; (iii) livestock production; and (iv) biodiversity conservation, where applicable. Such zoning should be legally binding and be able to help rural communities to develop optimal uses of their land, and reduce human wildlife conflict through better spatial planning and separation.

#### **5.1.3 Land tenure security**

Sustainable agriculture should be promoted where farmers have security to land, in the form of legally registered usufruct rights; as such farmers are more inclined to adopt intensive agriculture production systems than farmers who have open access to land. Free access to land encourages shifting cultivation, which contradicts the principles of sustainable agriculture.

### **5.2 Implementation**

#### **5.2.1 Scoping and due diligence**

Many sustainable farming approaches (conservation farming, organic farming, permaculture, etc.) are being implemented under the umbrella of sustainable agriculture. A due diligence is required to assess the feasibility of these farming systems to select the best,

based on the agro-ecological conditions of the area where sustainable agriculture is intended to be implemented. Crop varieties should be carefully selected, primarily focusing on drought resistance early maturing, and high yielding.

### **5.2.2 Adopt appropriate systems and crop husbandry practices associated with sustainable farming, including:**

- Crop rotations that mitigate weed, disease, and insect problems; increase available soil nitrogen and reduce the need for synthetic fertilisers; and in conjunction with conservation tillage practices, reduce soil erosion;
- Improved scale, both spatially (number hectares) and quantity (number of farmers at a village level, participating in sustainable agriculture);
- Harmonised sustainable farming approaches and techniques;
- Integrated pest management (IPM), which reduces the need for pesticides by crop rotations, scouting, timing of planting, and biological pest controls;
- Management systems to improve plant health and crops' abilities to resist pests and disease;
- Water conservation and water harvesting practices;
- Planting of leguminous crops and use of organic fertiliser or compost to improve soil fertility;
- Diversification of farming activities (food crops, agroforestry, cash crops, livestock mix);
- Adoption of multiple human-wildlife conflict mitigation techniques;
- Application of tools, such as "Gross Margin" in analysing and measuring farming enterprises' economic viability and performance.

### **5.2.3 Patience**

The effects of sustainable agriculture take time to become apparent, as investments are often incremental over multiple years, so results might be slow in coming or difficult to discern (Salafsky, et.al 2001). Improvements in yields may require significant amounts of time, e.g., >15 years in arid and semi-arid areas (Mazvimavi, K. *Pers. Com*). Hence, contributions to biodiversity conservation take long before benefits are apparent.

### **5.2.4 Adapt to local conditions**

Sustainable agriculture projects must be based on the needs of local farmers, such as promoting crop cultivars/ varieties that meet the local communities' expectations, in terms of taste and resistance to pests both during the growing and storage periods. These needs should form part of the plant breeding and research associated with sustainable agriculture in SSA.

### **5.2.5 Subcontract expert partners**

Agriculture is not the core business of conservation NGOs; it is appropriate, therefore, that competent partners are identified and subcontracted by conservation NGOs to implement sustainable agriculture. Due to the multiplicity of institutions involved in supporting, promoting and implementing sustainable farming practices, it's important to analyse and

determine those involved in a particular area of interest, and categorise them according to their areas of competency, such as donors, agricultural extensionists, agronomists, researchers/crop breeders, brokers, humanitarian agencies and conservation NGOs. This analysis should assist in identifying competent partners to team up with in implementing sustainable farming practices, including assigning specific tasks that should be performed by the partners. This process should also help to identify specific capacity building needs at the service providers' level (e.g. research, agronomy, extension services). The role of conservation NGOs under these arrangements should be monitoring of compliance with agreed contracts, and ensuring that the link between sustainable agricultural practices and biodiversity conservation, including benefits to the farmers and local communities is well articulated and understood by the farmers.

### **5.2.6 Policy support**

For sustainable agriculture to succeed, governments should develop enabling policies, infrastructure and support capacity building of the smallholder farmers to adequately tap into the opportunities associated with sustainable farming practices. Recent development in many parts of Africa, and the inclusion of sustainable farming practices in the agriculture policy formulation and dialogues, give reason for optimism and provides lessons for future strategies to reverse the negative agriculture production trends experienced in the seventies and eighties.

SSA's agriculture has begun a recovery process, with exports starting to grow again following a long period of decline and stagnation. On the production side, there have been positive policy reforms and some technological breakthroughs, including adoption of sustainable agricultural practices in many SSA countries.

### **5.2.7 Create the conditions for sustainable agriculture to contribute to conservation success**

Promoters of sustainable agricultural practices should actively educate farmers about the link between these farming practices and biodiversity conservation, such as emphasising the need to prevent reliance on natural resources and encroachment into protected wildlife habitats. The benefits of conservation to farmers and the local communities should also be well articulated. For instance for the local communities at the frontiers - dividing land devoted to agriculture and protected areas (reserves & national parks), conservation NGOs should facilitate sales of food grown under sustainable farming practices to lodges in and around protected areas, which could give preferentially high prices, depending on quality of such supplies, and should broaden biodiversity conservation benefits, by providing employment, buying locally produced curios, cultural performances, etc. Tourists' lodges could also set up levies on bed occupancies, whose proceeds could be donated to farmers for advancing sustainable farming practices. Similarly protected area agencies could also charge levies on each tourist entering these areas, and the revenue earned through these levies could also contribute to funding sustainable agricultural practices. Such links could be appreciated by smallholder farmers who could reciprocate by supporting biodiversity conservation efforts, including restraining encroachment into protected areas.

### **5.2.8 Promote establishment of cooperatives**

Agricultural cooperatives play important roles in mobilising smallholder farmers to work together towards collective goals. They act as farmers' governance institutions responsible for multiple tasks such as: establishing and administering *Trust Accounts* into which part of profits made from sales of agricultural produce could be deposited for re-investment in sustainable farming practices; accessing grants, credit and agricultural markets; negotiating partnership arrangements with the private sector; and promoting collectiveness in adoption of technological innovations in sustainable farming and harnessing equitable sharing of profits from farming businesses. Conservation NGOs should broker community-private partnership in the production and marketing of these farming enterprises – and in so doing, enhance the investment capacity of the smallholder farmers, who in most cases lack the productive assets, such as access to credit, capacity, and expertise to engage in profitable marketing of their agriculture produce. These partnerships could be beneficial to the poor farmers, and would create incentives for these farmers to be allies in nature conservation.

### **5.2.9 Harmonise approaches to sustainable farming practices, and data-collection instruments for monitoring and evaluation**

As there are multiple promoters of sustainable agriculture in SSA, both at local and large landscape scales, application of these farming systems and data capture for monitoring and evaluating performance of these farming activities should be standardised. Similarly indicators to guide assessment of sustainable agricultural performance and impacts on rural livelihoods and biodiversity conservation should be harmonised to allow for effective monitoring and evaluation of these farming practices. Monitoring should be adopted as a systematic and continuous process of assessing progress and changes caused by implementing these farming practices – using predetermined and standardised indicators, while evaluation should aim at identifying the broader outcomes of sustainable farming activities, and determining whether their objectives have been met. M&E should be adaptive and process-based (Fig. 2), allowing for learning through locally generated processes and field experiences, guided by: (i) standardised instruments for gathering data; (ii) standardised indicators for assessing the impact of sustainable farming practices; (iii) annual targets/benchmarks for each indicator; (iv) required frequency of reporting on the performance of sustainable farming practices; (v) clear indication of the agencies/individuals responsible for monitoring and reporting for each indicator; (v); and (vi) levels/scale at which monitoring should be required (e.g., household, agro-ecosystem, etc.).

### **5.2.10 Learning framework**

Dissemination of information on sustainable agricultural practices' performance, and their actual and potential impacts on food security and biodiversity conservation would improve public awareness about their values, and would be a necessary precursor to adoption of appropriate sustainable farming systems. NGOs promoting these farming practices should incorporate information dissemination and training as a medium for providing "proofs of concept" examples of sustainable agricultural practices that improve agricultural intensification, productivity and contribute to human well-being and biodiversity conservation outcomes. A web-based platform could be established to: (i) provide space where scientists, researchers, and agriculture practitioners could share their knowledge and

experiences on sustainable agriculture and engage in processes of mutual learning; (ii) store information, tools and methodologies for assessing the performance and impacts of sustainable agriculture; and (iii) store material from workshops, academic papers, policy briefs and information sheets – to be accessed by agricultural practitioners, researchers, etc.

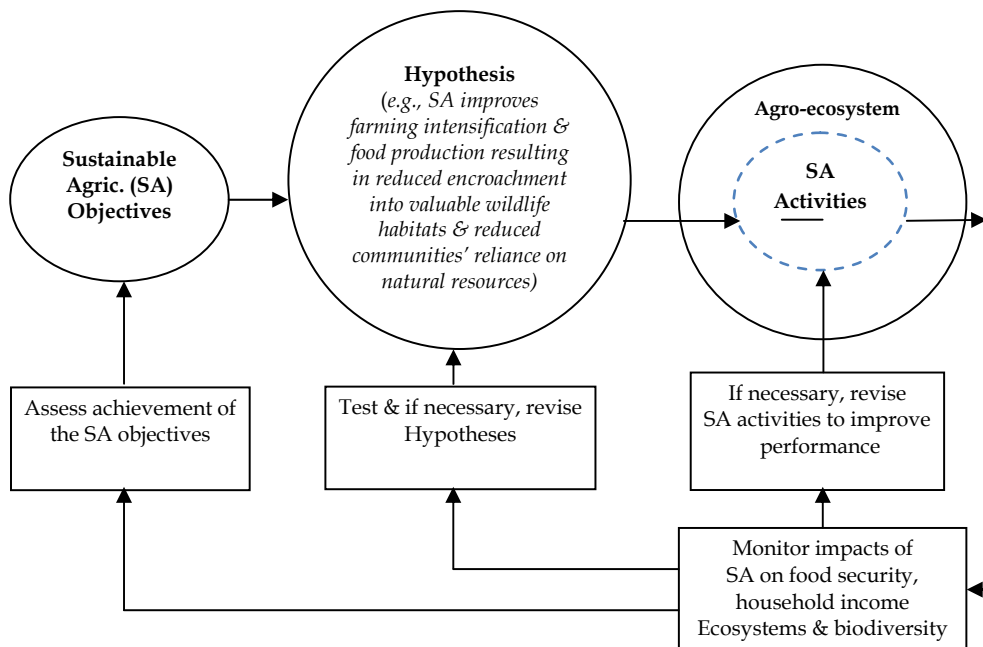


Fig. 2. An adaptive approach to monitoring and evaluating sustainable agricultural practices

## 6. Rural development

Rural development is an ever-elusive aspiration in the SSA, characterised by a continuous and dynamic evolution of development models and approaches over the past 50 years. These models have included: community development, small farm development, integrated rural development, market liberalisation, participatory development, human development, sustainable livelihoods, poverty reduction strategies, food security programmes, sustainable agriculture and rural development (SARD) and more recently, the Millennium Development Goals (MDGs) (for more detailed typology and analysis of rural development efforts, see Ellis & Biggs (2001). Neither of these has successfully achieved the sustainable rural development agenda, as poverty in all its manifestations (including denial of opportunities and choices most basic to human development to lead a healthy and creative life and enjoy a decent standard of living, freedom, dignity, self-esteem and the respect of others) is pervasive in SSA.

Although the proportion of the population in SSA living below the World Bank's new international poverty line of \$1.25 a day decreased from 55.7 per cent in 1990 to 50.3 per cent in 2005 (UN 2008), this marginal progress is far from the pace needed to reach the overarching Millennium Development Goal (MDG) of halving the rate of poverty by 2015 (UNEP 2003). Because of population growth, the number of people in the region living in

extreme poverty actually grew by 100 million over the same period. One person in two lives in extreme poverty in SSA. The prevalence of poverty in the region is due to the economic under-performance of most SSA – a situation which can be attributed to a number of interrelated factors. Notable among these are: the recurrence of natural episodic events (drought and floods), which lead to famine, malnourishment and under-performance of the human capital, especially in rural areas; armed conflicts in some countries (e.g., Democratic Republic of Congo, Somalia and Sudan), which besides killing innocent people, contribute to the destruction and loss of the valuable economic assets (forests, and wildlife); and external factors, such as the competition that results from the liberalization of international trade due to globalization and increases in agricultural subsidies in developed countries (Anon, 2005) which basically paralyse African agricultural economies.

With all these challenges, it would be naïve to expect sustainable agricultural practices on their own to drive rural development in SSA. Without doubt, these farming technologies have great potential to improve agriculture production and contribute to improving food security – an important ingredient of rural development, but for sustainable rural development, its time governments in SSA shift their rural development policies from rhetorical overtures to concrete actions, focused at transforming the rural areas by embracing a wide scope of processes and programmes, including:

- Development of institutions and their capacities in key areas, i.e. education and training, health, research and extension, marketing, savings and credit, environment, transport, etc.
- Development of rural infrastructure for roads, electricity, telecommunications, housing, water, sanitation, etc. Currently development in these sectors is restricted to cities and urban areas.
- Development of productive sectors: agriculture, non-agricultural industry, mining, tourism, natural resources, environmental management, etc.

Rural SSA is very rich in natural resources, such as minerals, petroleum, timber, wildlife, fish, water, etc., which are being extracted by the multi-national, private and state-owned extractive companies, but revenues from these natural resources extraction do not benefit rural development. The revenues being paid by the extractive industries (royalties, taxes, fees, etc.) to governments are not done in transparent manner and there is no accountability for such revenues to the local communities, who despite living in the midst of natural resources richness, are left in abject poverty. It is essential therefore that:

- Governments in SSA should enact legislation and procedures that enable transparency and accountability for the revenue earned from natural resources extraction, and set benchmarks for investments of these revenues in rural development. The enacted legislation should also enforce independent social and environmental certification of extractive industries to ensure that both renewable and non-renewable resources are exploited in a manner that ensures social and environmental safeguards, as well as contribute to social responsible rural development.
- Rural communities through their local governance institutions should participate in decision-making on resource revenue distribution and investments in rural development. This would require capacity building of the grassroots' governance institutions that are able to demand and advocate for broad-based economic and social development of their constituencies; and



- The civil society should hold the governments in SSA accountable for the management and expenditure of revenues received from extractive industries.

## 7. Conclusion

Although the performance of agriculture has experienced multiple turbulences over the past 50 years in SSA, the current efforts by national governments, supported by national and high level (African Union & NEPAD) agriculture policy reforms, gives reason for optimism and provides lessons for future strategies to reverse the negative production trends of the seventies and eighties. Africa's agriculture has begun a recovery process, with exports starting to gain positive momentum after a long period of decline and stagnation. Sustainable agricultural practices' potential to positively contribute to land use intensification, boosting crop yields and hence; meeting the ever-increasing food demands and meeting biodiversity conservation goals, depend on multiple conditions - requiring dedicated efforts to implement and achieve the expected results. Sustainable agricultural practices alone, will not sufficiently contribute to rural development. SSA should adopt an integrated approach to rural development that incorporates various economic sectors; including promotion of sustainable agricultural practices, and unlocking the potential to tap from revenues earned through royalties, taxes, etc. from extractive industries for investments in rural development. Doing so would unveil the most needed funds for developing various currently neglected socioeconomic sectors, such as education, infrastructure, health, agriculture, etc.

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# Renewable Energy for Rural Development – A Namibian Experience

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## 1. Introduction

Developing countries have 80% of the world's population but consume only 30% of global commercial energy. As energy consumption rises with increases in population and living standards, awareness is growing about the environmental costs of energy and the need to expand access to energy in new ways (Rena, 2008). As Wilson stresses that if each person currently alive would attain the US level of consumption, it would require four more Earths (Wilson, 2002:150). Increased recognition of the contribution renewable energy makes to rural development, lower health costs (linked to air pollution), energy independence, and climate change mitigation is shifting renewable energy from the fringe to the mainstream of sustainable development.

The realisation is growing that poor nations will suffer most from the effects of climate change. This vulnerability stems partly from their location in areas such as drought-prone sub-Saharan Africa or flood-prone Bangladesh. Their capacity to cope with climate change is also low because of limited financial resources, skills and technologies and high levels of poverty. And they rely heavily on climate-sensitive sectors such as agriculture and fishing. For example, Namibia is very dependent on natural resources: some estimate that up to 30 per cent of its GDP is reliant on the environment. Ironically, it is also these poor nations that have contributed least to climate change. Data covering 1950 to 2000 from the Climate Analysis Indicators Tool, developed by the World Resources Institute, indicates that African countries contributed 4.6 per cent of cumulative global carbon emissions during that period. Today their share of emissions is just 3.5 per cent of the total (IIED, 2007).

There is a growing concern on the issue of renewable energy all over the world that has been building interest among those in government, multilateral organizations, industry, and nongovernmental organizations (NGOs) pursuing energy, environment, and development agendas at local, national, and global levels. At the same time, commercial markets for renewable energy are expanding, shifting investment patterns away from traditional government and international donor sources to greater reliance on private firms and banks (Martinot, et al., 2002).

For the past 10 years, it has been frequently estimated that around 2 billion people have no access to modern energy services and about 1.5 billion people live without access to

electricity (World Bank, 1996: 1; IMF and World Bank, 2006: vi). Access to modern energy services and electricity is low in many developing countries, particularly in sub-Saharan Africa and parts of Asia (see table 1 for details). If the MDGs are to be achieved in these parts of the world, then significant efforts are needed to bring rural areas out of energy poverty. This can be done in two ways: increasing access to energy for domestic use – essentially increasing access to technologies which use modern fuels or make use of traditional fuels in cleaner, safer and more environmentally sound ways – and increasing access to electricity (UNCTAD, 2010).

Country	Population		Access to electricity (% of population)		
	Total (millions)	% living in rural areas	Total	Urban	Rural
Benin	9	59.2	22	51	5.5
Cameroon	18.5	44	46	77	16.5
Ethiopia	79.1	83.3	12	86	2
Kenya	38.5	78.7	13	51.5	3.5
Malawi	13.9	81.7	7.5	34	2.5
Mali	12.2	68.4	13	41	2.5
Senegal	12.4	57.9	46.5	82	19
Uganda	30.9	87.2	47.5	8.5	2.5
Zambia	11.9	64.7	20	50	3.5

Source: World Bank, 2006 (as quoted by UNCTAD, 2010: 4)

Table 1. Levels of electricity access in selected sub-Saharan African countries

Changing investment patterns make it more important to think about markets for renewable energy, rather than simply about the technologies themselves and their economic characteristics. Changing investment patterns also elicit increased decision-making and participation from a wider variety of stakeholders— not just traditional donor agencies and governments, but also manufacturers, rural entrepreneurs, individual households, local technicians, NGOs, community groups, utility companies, and commercial banks.

Renewable energy commonly refers to both traditional biomass (i.e., fuel wood, animal wastes, and crop residues burned in stoves) and modern technologies based on solar, wind, biomass, geothermal, and small hydropower. While traditional biomass provides about 7%–11% of global primary energy supply, the modern forms of renewable energy provide about 2% (Martinot, et al., 2002). For developing countries, the traditional biomass share averages 30%–45%, although some developing countries approach 90%. Besides traditional biomass, small hydropowers in China and transport ethanol in Brazil are among the largest single contributors to renewable energy supplies in developing countries (Rena, 2008). In fact, modern biomass represents 20% of Brazil's primary energy supply, aided by significant increases in the past 20 years in the use of ethanol fuels for vehicles and sugarcane waste for power generation (Byrne and Wallace, 1998).

The largest developing country and world's second largest economy – China – gets about 2% of its primary energy supply from renewable energy, mostly from small hydropower generation. Globally, contributions from wind power and solar photovoltaics (PV) are still small, but applications of these technologies are growing fast – at annual rates of 10%–30% in recent years.

#### *Definition*

Renewable Energy Technologies (RETs) are energy-providing technologies that utilize energy sources in ways that do not deplete the Earth's natural resources and are as environmentally benign as possible. These sources are sustainable in that they can be managed to ensure they can be used indefinitely without degrading the environment (Renewable Energy Association, 2009).

By exploiting these energy sources, RETs have great potential to meet the energy needs of rural societies in a sustainable way, albeit most likely in tandem with conventional systems. The decentralized nature of some RETs allows them to be matched with the specific needs of different rural areas.

In line with this, the UN Climate Change Conference (COP15) held in Copenhagen, Denmark, from December 7-18, 2009 and with the debate around patents and climate change-related technologies, it became easy to forget that there are many low-cost and clean renewable energy technologies available in the public domain. The UN meeting highlighted how these technologies can revolutionize the way of life for rural communities.

It is surprising to note that over 90% of rural Africa and 1.6 billion people worldwide are without electricity. Kerosene, firewood, and dried dung are relied upon by rural communities for lighting and cooking fuel. These traditional energy sources pose many health hazards, especially for women (and children as well). Air quality is a major concern with kerosene and open fires, releasing carcinogens, airborne particles, and greenhouse gasses. Women are disproportionately exposed to open fires for cooking. Midwives working at night have to rely on a dim, flickering light (Barnes and Floor, 1996; Barnett, 1990). In addition, women are also the ones who scavenge for firewood or transport kerosene, often in inhospitable terrain. Thus, besides being a health risk, this is also a tremendous loss of productivity for the village; as women in these villages are forced to spend more and more time in search of diminishing fuel sources.

In the UN Conference for Trade and Development (UNCTAD), several promising solutions were described for providing electricity and cooking gas for rural communities. These solutions – solar, biomass-to-electricity, biomass digesters, geothermal, micro-hydro and micro-wind power – were each shown to be particularly affordable and technologically promising in a variety of settings.

One of the most important messages to come out of the UN meeting was that the technologies deployed must be reliable. To ensure a reliable alternative energy supply and to help empower rural women, it's important to ensure solar power takes hold in these villages. A major problem with previous efforts in using solar power in rural settings was the inability to maintain and repair the necessary equipment. Training young men as solar engineers proved futile, as they would quickly leave to more lucrative urban markets.

With the provision of clean, off-grid electricity from solar panels, the air is cleaner, the village is more productive and women are becoming empowered. What's more, it makes clear economic sense. The cost of a solar system large enough for several lanterns is roughly the cost of one year's supply of kerosene. But, solar energy can only solve some of a rural communities energy needs. Other experiences showed that there are other alternatives which can meet the need for sustainable development in rural communities (ESMAP, 2007).<sup>1</sup>

An attempt is made in this chapter to provide an overview of some of the issues surrounding the use of renewable energy technologies (RETs) to increase access to modern energy services in rural areas in Namibia. RETs include, inter alia, the provision of electricity generated from renewable sources such as wind, solar, water, tide/wave and geothermal, and the provision of other modern energy services that are powered by renewable sources for activities such as household heating, space conditioning and water pumping. These kinds of technologies have long been subject to international debate and action as a means of expanding access to electricity by means of offgrid or grid extension programmes. Similarly, the development of RETs such as improved cooking stoves to increase efficiency and reduce health impacts of traditional fuel use has had a long history and has shown some success (ESMAP, 2007). However, growing concern over climate change and the increasing acceptance of a need for low-carbon development trajectories have provided renewed emphasis on improving access to modern energy services using RETs (UNCTAD, 2010).

## **2. Conceptual framework**

Three Renewable Energy Technologies (RETs) have been selected for this study; wind, hydropower and biomass. These are particularly relevant to rural areas and have both a track record and scope to develop further. There are considerable differences between these types of renewable energy technology in terms of age of technology, infrastructure requirement and scale, which are important to consider alongside their contribution to rural development of Namibia.

### **2.1 Wind power**

Wind power is derived from the harnessing of moving air to rotate turbine blades whose motion can be converted to electricity. Wind turbines can be deployed singly or in clusters (wind farms), as with other resources, such as mineral reserves, wind can only be exploited where it occurs. In geographical and commercial terms, this points towards areas having high wind speeds. Most wind power RET development has therefore occurred in exposed western areas of the UK.

### **2.2 Hydropower**

Hydro power has been used in industry for centuries. Like wind power, it is often located in areas of high environmental value and is subject to strict conditions at planning stage. The

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<sup>1</sup> For details see - Renewable Energy Technologies for Rural Development (02/25/2010) available at <http://ipsd.typepad.com/ipsd/2010/02/renewable-energy-technologies-for-rural-development-1.html> accessed on 3 September 2011.

British Hydropower Association, which represents the sector, is critical of the obstacles to development presented by regulation through the Environment Agency.

Hydropower in the UK is mainly represented by large-scale storage or dam-based sites, built in the first part of the last century. While these continue to be most significant in terms of energy generation, environmental and planning constraints mean that most growth in hydropower is in small-scale (less than 5Mwe) schemes. These include schemes based on existing dams and lochs and run-of-river projects.

### 2.3 Biomass

The term biomass covers all cellulose-based feed stocks including agricultural and forestry crops and residues, animal litter wastes and by-products. Burning wood is the oldest form of energy production. It is only very recently that other fuels have supplanted wood as the world's principal fuel. Indeed, in many regions wood-burning technology has remained the sole source of energy generation with little or no technological improvements.

After decades of renewable energy programs and investments in rural areas of developing countries, relatively little is known about the ability of renewables to deliver services that will raise incomes and provide other social benefits. Certainly there are social benefits from lighting, TV, and radio powered by solar home systems, mini-grids, and biogas, and even some economic benefits from reduced kerosene and candle use. Biogas for cooking and improved biomass stoves may also reduce expenditures for fuel wood, either in time or money, as well as create jobs. A clear result of the Nepal biogas program is that women spend less time and labor for fuel wood collection and cooking. In China, however, the direct financial benefits of biogas to households, beyond the social benefits of lighting, are not as clear. On balance, the literature does not offer a strong case that large rural development benefits have occurred from renewable energy (WZhong, et al., 2006).

Most insight on the economic benefits of rural electricity comes from literature on rural electrification through extension of central power grids. Studies clearly show the consumptive benefits and improvements in quality of life through electrification (World Bank, 1996; WZhong, et al., 2006). For example, a study in Namibia indicates that electrification has improved household welfare, but almost exclusively as a consequence of electric lighting. Access to high-quality light is the major change reported, particularly the ability to study in the evenings. But where rural electrification took place without other supporting economic infrastructure and skills, as happened in many development projects, productive economic development did not follow, acknowledged both the World Bank and the German aid agency GTZ (Stuart-Hill, 2003; Republic of Namibia, 2004).

The few examples mentioned earlier of rural small industry, agriculture, and other productive uses powered by renewable energy offer some promise of economic and development benefits. However, as just noted, economic benefits depend not just on the availability of energy but also on other conditions favoring small business in rural areas, such as access to markets, finance, communications, education, and health care. That is, economic benefits from rural renewable energy are more likely in areas where economic development is already taking place. Further, those who most benefit from the availability of energy are those who can afford the electrical equipment and other infrastructure needed to convert energy into useful services and productive activity (Brew-Hammond, 2007; World Bank, 2009b).

There is little question that solar home and solar community systems provide benefits that increase household welfare and quality of life, which include improved lighting for children's education, adult study, evening cottage industry, as well as television and radio. Anecdotal evidence suggests that demand for television has been a major driver of some markets (with soccer often mentioned). Distance education via television is also cited for subjects like farming, health care, and language. But little research has measured or quantified these benefits. In fact, concluded that rural households do not buy solar home systems for reduced energy costs, but rather for improved services like longer TV viewing and better lighting quality. Other anecdotal evidence supports this view of increased services rather than decreased costs: Some households continue to use kerosene for lighting so that the electricity from solar home systems can be conserved for television viewing (World Bank, 1996).

Research is emerging slowly. In Inner Mongolia, a socioeconomic assessment of small household-scale wind turbines found that households bought appliances such as refrigerators, washing machines, rice cookers, irons, and electric heaters to improve living conditions and save time, particularly for women. The study found that television and radio provide language instruction and information on commodity prices, weather, and new farming methods and practices. Electricity also increased income-generating activities, adding up to \$30-\$150/month to incomes (WZhong, et al.,2006; Brew-Hammond, 2007;). In Bangladesh, Grameen Shakti reports that community solar-powered cell phones, operated primarily by local women villagers in their homes, produce up to \$200/month in revenue for the operators. Villagers appear willing to pay per minute connection charges for calls because of the financial benefits from learning about commodity prices, exchange rates, market trends, and from verifying cash deliveries made by relatives (Barnett, 1990; World Bank, 1996; World Bank, 2009a).

On balance, it is not clear how welfare and quality of life benefits will drive demand for renewable energy systems beyond the wealthiest rural households. "Acquisition of Solar PV(photovoltaic) Home Systems (SHS) is often a lower priority for rural households than other basic needs and commodities; only after these other needs have been met do solar home systems become an option," which limits demand for consumer applications (Martinot, et al., 2002). We hypothesize that applications of renewable energy that provide income generation and social benefits, such as clean drinking water, cottage industry, distance education, and improved agricultural productivity, will appeal to increasing segments of rural populations (Martinot, et al.,2002; UNCTAD,2010).

Lessons suggested by experience are that: (a) Social benefits and quality of life, rather than income and economic benefits, have driven markets for renewable energy in rural areas; (b) experience with productive uses of renewable energy is still in its infancy and deserves much greater attention from donors, development agencies, and governments; (c) economic benefits from renewables are more likely in rural areas that are already undergoing development and can incorporate the additional energy dimension into existing development activities for water, health, education, agriculture, and entrepreneurship; and (d) published studies of income generation and economic benefits from renewable energy are still limited and call for further research (Kaundinya, et al.,2009).

In the rural energy and development literature (*see table-2*), much has been made of affordability of rural household systems such as solar home systems, biogas digesters, and



<b>ECONOMIC</b>	<b>ENVIRONMENTAL</b>	<b>COMMUNITY</b>
Short term <i>increase in employment opportunities locally during plant construction but often high reliance on overseas and non-local specialist engineers</i>	<i>Negligible or no direct impact</i> on the local environment. Indirect benefits include use of potential pollutant waste materials and maintaining farmers on the land	<i>Population increase during site / plant construction leads to a temporary increase in local cash flow</i>
Longer term <i>increased demand opportunities for local service sector development</i> to meet plant/site servicing needs	<i>Actual or perceived negative environmental impact of RETs often dissipates</i> when plant and site up and running	<i>Increased self respect for individuals through employment and association with green technology</i>
Would reduce local household bills <i>if energy generated could be procured locally</i>	<i>Reduced need for nuclear and conventional energy generation – this benefit is felt at a wider national level, rather than locally</i>	<i>Social and community support and development fund</i> is often provided for use by the local population
<i>Increased skilled and managerial job opportunities</i> when plant is up and running – benefit not necessarily located in the same locality or region though	<i>Negative impact during construction phase and potentially beyond (hydro in sensitive catchments)</i>	<i>Uneven (positive) impact on rural communities generally</i> , in terms of geographical location
<i>Increased opportunities</i> for diversification of the local (largely service) economy where ownership is local	<i>Stimulates wider public interest in sustainable and community based solutions to energy generation and waste disposal</i>	Can <i>help increase informal educational opportunities locally</i>

Source: Woodthorne, et al., (2003) *op.cit.*, p.39.

Table 2. Relationships between Renewable Energy and Rural Development.

improved biomass stoves. For example, many argue that households can afford to substitute solar home systems for candles and kerosene lighting if the monthly costs for each are comparable (World Bank, 1996; Martinot, et al., 2002; WZhong, et al., 2006). Based on affordability analyses, some donor programs for solar home systems began by offering large 100-watt sizes. Donors soon found these sizes too expensive for rural households and decreased sizes to 50 watts and even to 20 watts. This small-size approach to affordability also has occurred in the private markets in Kenya, Morocco, and China, where households often buy very small systems (i.e., 10–15 watts). In these cash markets, smaller systems may represent up to 80% of the market (World Bank, 2009a; Kaundinya, et al., 2009). Even so, most buyers are among the wealthiest households in rural areas. Some households upgrade later to larger systems when they can afford them.

A few countries such as India and China are developing policies for mandated shares of renewable energy in power generation. India has proposed that 10% of new capacity additions through 2012 come from renewable energy, which would mean an additional 10,000 MW. China's latest five-year plan calls for a fivefold increase in wind power to 1500 MW by 2005. The plan also proposes to require 5% of new power generation from renewables, which could mean an added 20,000MW by 2010 (Kaundinya, et al., 2009). However, such policies must overcome political and institutional hurdles, fit into utility-sector restructuring, and resolve who will pay for any extra costs of renewables in the shorter term until costs decline. In the longer term, renewables may integrate with "distributed generation" markets that include microturbines and fuel cells, while new technologies like biomass gasification and solar thermal power may become commercially viable (Barnett, 1990; World Bank, 1996; Mariyappan and Anderson,2002; WZhong, et al., 2006; World Bank, 2009a).

## **2.4 Grid-based power generation**

Total world electric power capacity stood at 3,400,000 MW in 2000, with about 1,500,000MW (45%) of this in developing countries. Electricity consumption in developing countries continues to grow rapidly with economic growth, which raises concerns about how these countries will expand power generation in coming decades. According to some estimates, developing countries will need to more than double their current generation capacity by 2020 (Khennas and Barnett, 2000). Traditional options, such as coal and large hydro, have environmental and social repercussions that have increasingly taken on serious political and economic undertones.

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### **2.4.1 Village-scale mini-grids**

Village-scale mini-grids can serve tens or hundreds of households in settings where sufficient geographical density allows economical interconnections to a central power generator. Traditionally, mini-grids in remote areas and on islands have been powered by diesel generators or small hydro. Generation from solar PV, wind, or biomass, often in hybrid combinations, can replace or supplement diesel power in these grids (Singh, 1997; Khennas and Barnett, 2000; Lew, 2001).

Most village-scale mini-grids have developed in Asia on the basis of small hydro, particularly in China where more than 60,000 mini-grids exist, as well as Nepal, India, Vietnam, and Sri Lanka, each with 100–1000 mini-grids. In China, most mini-grids have

resulted from government programs. More recently, rural entrepreneurs have built and run small hydro stations by borrowing from agricultural banks; revenue from just three years of electricity sales is apparently sufficient to repay such loans (Davis, 1995; Wang, 2000; Wu and Yu, 2000; Borbely and Kreider, 2001). Standardization of the industry has also facilitated interconnection of multiple stations into county-level grids. In Nepal, most mini-grids have been installed and managed by rural entrepreneurs. This Nepali entrepreneurial success story of the 1980s and 1990s has been attributed to several factors, including availability of credit from a public-sector agricultural development bank, simplified licensing procedures to reduce transaction costs, unrestricted power tariffs, private financing from commercial banks, and capital cost subsidies from the government. Also, technical assistance by bilateral donors and NGOs led to technology development and manufacturing within Nepal's industrial base (Cromwell, 1990).

Very few hybrid mini-grids employing combinations of solar PV, wind, and diesel exist, perhaps on the order of 150 systems in developing countries. Such systems are still not yet economically competitive with conventional diesel power and must be financed at least partly with government or donor funds. China's roughly 80 PV/wind/diesel mini-grids (about half of which are PV-only systems), sized 10–200kW, are installed mostly on islands along the coast and in the northern and western remote regions. In India, nine PV mini-grids (most 25 kW) and two biomass mini-grids serve 35 villages in West Bengal (Davis, 1995; Li, 2001: 89–91).

Although electricity provides improvements in the quality of life through lighting, entertainment, and increased conveniences, it is the productive uses of this electricity that increase incomes and provide development benefits to rural areas. As incomes increase, rural populations are better able to afford greater levels of energy service, which can allow even greater use of renewable energy. The major emerging productive uses of renewable energy are for agriculture, small industry, commercial services, and social services like drinking water, education, and health care (Singh, 1997; Van, et al, 2000;).

## **2.5 Household-scale wind power**

Household-scale wind power (sized 100– 5000 watts) has been piloted in a few countries, with most installations worldwide taking place in Inner Mongolia in China. Public programs were successful in disseminating more than 140,000 small wind turbines for household energy in this region. These programs were driven by local technology promotion agencies, development of local technology manufacturing, subsidies for purchase of locally manufactured wind turbines, and a government revolving credit fund offering repayment tied to the harvest season or future sales of cattle or wool. Performance of these systems has been good, except during the summer when winds drop and system output dwindles. Many households, spurred by government programs and demonstrations, are upgrading their systems with PV to complement the wind resource and provide all-season power (Lin, 2000; Khennas and Barnett, 2000; Lew, 2001).

## **3. Namibian experience**

### **3.1 Country profile**

The name of the country is derived from the Namib Desert, considered to be the oldest desert in the world. Before its independence in 1990, the area was known as South-West

Africa, reflecting the colonial occupation by the Germans and the South Africans. Republic of Namibia is a country with an area of 825,418 km<sup>2</sup> (318,696 sq mi). Namibia is the world's thirty-fourth largest country (after Venezuela). Namibia's western border is the Atlantic Ocean. It shares land borders with Angola and Zambia to the north, Botswana to the east and South Africa to the south and east. It gained independence from South Africa on 21 March 1990, its capital and largest city is Windhoek. Namibia is divided into 13 regions and subdivided into 107 constituencies and a stable democracy (Wikipedia, 2011).

Agriculture, herding, tourism and the mining industry – including mining for gem diamonds, uranium, gold, silver, and base metals form the backbone of Namibia's economy. The economy is tied closely to South Africa's due to their shared history. The largest economic sectors are mining (10.4% of the gross domestic product in 2009), agriculture (5.0%), manufacturing (13.5%), and tourism. Namibia's nominal GDP (2010 estimate) - total \$11.865 billion and the per capita \$5,651. However, according to 2003 estimates Gini-coefficient rate 70.7 (highest in the world and the Human Development Index of Namibia is registered to be 0.606 (105th out of 174 countries) in 2010 (Ministry of Mines and Energy, 2006; Rena, 2010a; Wikipedia, 2011).

Namibia has a population of 2.4 million people out of which little more than 50 % (51.2%) people are unemployed and the nation has suffered heavily from the effects of HIV/AIDS, with more than 15% of the adult population infected with HIV in 2007. After Mongolia it is the second least densely populated country in the world. Namibia has a high unemployment rate. "Strict unemployment" (people actively seeking a full time job) stood at 20.2% in 2000, 21.9% in 2004 and spiraled to 29.4 per cent in 2008. Indeed the unemployment rate rose from 36.7% in 2004 to 51.2% in 2008. This estimate considers people in the informal economy as employed (Rena, 2010a; Wikipedia, 2011).

According to the recent World Bank statistics, Namibia (based on per capita income) has moved from Lower Middle Income (LMC) country to the list of Upper Middle Income countries (UMC) by June 2011. Paradoxically, half of the population lives below the international poverty line of U.S. \$1.25 a day. With this background, Namibia therefore receives foreign aid. There are a number of legislative measures in place to alleviate poverty and unemployment. In 2004 a labour act was passed to protect people from job discrimination stemming from pregnancy and HIV/AIDS status. In early 2010 the Government announced that "henceforth 100 per cent of all unskilled and semi-skilled labour must be sourced, without exception, from within Namibia" (Rena, 2010b; Wikipedia, 2011).

### **3.2 Sustainable development in Namibia**

Sustainable development marks a commitment by the Namibian people to meet their own needs without compromising the ability of future generations to meet their own needs. Sustainable development depends on our knowledge of ecosystems, how well we understand and account for the human, social, cultural and economic forces in them, and how we use this knowledge and understanding to guide human behaviour.

The Directorate of Environmental Affairs (DEA) of Namibia's Ministry of Environment and Tourism, with support from the Government of Finland, has undertaken a national programme entitled "Information and Communication Service for Sustainable Development

in Namibia". The programme was initiated in 1998 through its first phase. The first phase of the programme was mandated "To promote environmentally sustainable development practices in Namibia by providing pertinent and appropriate environmental information to policy, planning and decision-making processes and to all relevant stakeholders through the State of Environmental Reporting system".

Namibia is the most arid country south of the Sahara. This means that solar energy is one of the most abundant resources available. Grid electricity is becoming more expensive and power blackouts in the Southern African region are now a common occurrence and bound to continue in the future. It is therefore necessary to reduce energy consumption and to find additional renewable energy sources (Republic of Namibia, 2008). There are numerous ways of utilising this energy, from active interventions to passive benefits. Energy efficient buildings are more comfortable to work and to live in and have lower running and maintenance costs (Wienecke and Mawisa, 2008).

Namibia has seen a steady increase in power consumption over the last ten years. Currently, electricity supply is based on 240MW from hydro, 120MW from coal and 24MW from diesel power and this must be understood against our electricity demand which is roughly 500MW. Given the vastness of the country and low population density, it is extremely difficult and costly to extend the grid to un-electrified areas, hence the need to strongly consider renewable sources energy (Tjivikua, 2010).

For the purposes of this chapter, it is useful to separate RETs into two categories: those used to provide *energy for domestic use* (predominantly cooking and heating) and those used to supply *electricity*. RETs used to produce energy for domestic use tend to do so by exploiting modern fuels or by utilizing traditional fuels in new and improved ways in Namibia. RETs that generate electricity can do so either as part of a stand-alone (or off-grid) system or as a grid-based system, by way of connection to a mini-grid or the national grid. Table 3 lists renewable energy sources, as defined by the United Kingdom Renewable Energy Association (2009), and corresponding RETs that provide modern energy services and electricity.

Energy source	RETs	
	Energy for domestic use	Electricity
<i>Elemental renewables</i>		
Solar	Solar pump, solar cooker	Solar PV
Water (including wave/tidal)		Micro- and pico-hydroelectric generating plant
Wind	Wind-powered pump	Wind turbine generator
Geothermal		Geothermal generating plant
<i>Biological renewables</i>		
Energy crops		Biomass generating plant
Standard crops (and by-products)		Biomass generating plant
Forestry and forestry by-products	Improved cookstoves	Biomass generating plant
Animal by-products	Biogas digester, improved cookstoves	Biogas digester

Source: Renewable Energy Association 2009 (as quoted by UNCTAD, 2010: 5).

Table 3. Renewable energy sources and corresponding RETs

Renewable energy is shifting from the fringe to the mainstream of sustainable development. Markets for rural household lighting with solar home systems, biogas, and small hydro power have expanded through rural entrepreneurship, government programs, and donor assistance, serving millions of households. Applications in agriculture, small industry, and social services are emerging. Public programs resulted in 220 million improved biomass cook stoves. Three percent of power generation capacity is largely small hydro and biomass power, with rapid growth of wind power. Experience suggests the need for technical know-how transfer, new replicable business models, credit for rural households and entrepreneurs, regulatory frameworks and financing for private power developers, market facilitation organizations, donor assistance aimed at expanding sustainable markets, smarter subsidies, and greater attention to social benefits and income generation.

### **3.3 Potential for solar energy in Namibia**

Namibia is a country with high values of solar radiation. About 300 sunny days per annum are experienced. It is therefore ideal to utilise solar radiation, which can be done by selecting solar hot water geysers, PV panels, and passive solar design.

Namibia enjoys sunny days throughout the year. Sunshine determines the amount of radiation that reaches the earth's surface. The map below illustrates the number of hours of sunshine per day. Sunshine hours are lowest along the coast – up to 5 hours - due to fog and cloud cover. The number of hours increases as one proceeds eastwards inland with a zone stretching from the central Namib Desert south-eastwards enjoying between 10 and 11 hours of sunshine per day. The central and northern parts of the country enjoy less sunshine hours (between 8 and 10 hours) due to cloud-cover during the summer months. The aridity is the result of many cloudless days; therefore Namibia has high solar radiation levels (Ministry of Mines and Energy, 2006).

The easiest way to achieve the objective of energy efficiency in Namibia is when a new building is planned. If existing structures are to be refurbished, the costs of such an exercise are usually higher than planning correctly from the start. However, there are opportunities to improve such buildings. This requires careful planning and an awareness of possible solutions (Wienecke and Mawisa, 2008).

#### **3.3.1 Solar energy - Cooking**

Cooking always requires energy. According to the 2001 census, energy sources for cooking were dominated by wood in 64% of all Namibian households. About 25% used electricity, ten percent used paraffin or gas, and less than 0.2 percent undertook solar cooking (Wienecke and Mawisa, 2008:15).

There are two types of solar cookers that are developed in Namibia by the local NGOs: the box cooker and the parabolic mirror. In the first case, food can be baked or cooked without any fear of burning. The second concentrates the sun's light at one point, which results in very high temperatures (see figure-1). However one must be careful enough (not to cook for too long as food can easily burn). Looking into the centre of the mirror must be avoided as the concentrated light can injure the eyes.



Fig. 1. Solar cookers (parabolic and box cooker) Source: Wienecke and Mawisa, (2008). p.15.

### 3.3.2 Water heating

Various types of hot water geysers are available in Namibia for domestic and industrial use, whether on flat or sloping roofs. The majority at present are flat plate systems that collect the sun's radiant heat. They consist of an insulated tank and solar thermal collectors. Fluid is circulated through in the tubes of the collector. This exchanges the heat from the absorber and transports it to the water tank (Wienecke and Mawisa, 2008:15).

Another system has been developed in Namibia that consisting of a series of modular transparent tubes, or rows of parallel transparent glass tubes. Inside the tubes are absorber tubes, where a fluid or gas is heated. This heat is then transferred to the water tank. These evacuated tube systems are lighter than the flat plate systems (see figure-2). However, the tubes are much more fragile than the flat plate. All systems should be installed by qualified companies.

Electricity generation from the sun Photo Voltaic (PV) panels generate electricity from the sun by converting direct sunlight into energy. These systems do not have moving parts and as a result require minimal maintenance. The electricity is generated with no emissions and no noise (see Figure-3). Multiple cells make up a PV panel. They consist of two or more thin layers of semi-conducting material, such as silicon. When the cell is receiving sunlight, an electrical charge is generated. There are four types of these cells namely: 1. mono crystalline, 2. polycrystalline, 3. thin film, and 4. Amorphous (Wieneck and Mawisa, 2008:16).





Fig. 2. Indirect Solar Water Heater Systems with heat collector. Source: Wienecke and Mawisa ,(2008).p.15.



Fig. 3. Direct Heat Exchange via Vacuum Pipes. Source: Wienecke and Mawisa, (2008).p.15.

### 3.4 Construction methods

Construction methods and building materials can influence long-term energy usage and the interior climate of a building. The durability, life cycle costs and energy consumption needed for maintenance, possible transportation of components or materials, the recycling potential at the end of a life cycle, and the environmental impact, determine the energy used. The cheapest materials, from an energy point of view, are those which are locally sourced and available, as they do not require long distances to transport. In other words these have low embodied energy and therefore their impact on the environment is minimal (Wienecke and Mawisa, 2008:10). One way to reduce several of the problems is to use what



is locally available. This requires an investigation into local resources. The latter refers to building materials and human resources, such as builders, artisans or artists.

Natural building materials often only use the energy from the sun, for example thatch requires sunlight to grow, or clay blocks use the sun's warmth for curing. Stone does not require any energy, except if transport is required or cement mortar is used during the construction. Sometimes different types of materials can be combined, for example in the case of soil cement blocks, where soil and cement are mixed (Wienecke and Mawisa, 2008:11-12).

Walls can be built with non-conventional building materials for example sand bags, rammed earth, gabions filled with building rubble or stone, or natural stone. It is necessary that the bottom of the trench is compact and level. The sides have to be plumb to provide for a solid foundation (Wienecke and Mawisa, 2008:11-12).

Once the foundations have been completed, the construction of foundation walls and walls can proceed, similar to conventional building methods. The difference is the materials, for example adobe (sun dried clay blocks) and clay mortar.

Suitable material consists of about 65% sand, 20% clay, and 15% silt. The suitability of material can be tested as follows:

- Take some moistened soil and compress it in the hand.
- drop the lump on the floor from a height of about one meter.

If the lump breaks up into a few pieces, then the material can be used for construction. If the lump breaks up and scatters into many small pieces, more clay needs to be added. Good quality clay does not require any additions. However, if the material needs reinforcement straw or grass can be used. Reinforced clay balls formed by hand are then used to build the walls by twisting them to form a solid mass (Wienecke and Mawisa, 2008:11-12).

Soil-cement blocks can also be produced using the so-called hydraform machine to produce the blocks. Around 75% of Namibian soils can be utilised. Cement or lime can be added to ensure the required strength of the blocks. At the HRDC, blocks with cement content of 4-8% were manufactured; thereby savings on cement usage were achieved. These blocks do not require mortar in between, except for the first layer to obtain a level surface. This constitutes another saving. However, they have to be cured for a week to ensure that these stabilised blocks are of good quality before they are used in construction (Wienecke and Mawisa, 2008:13).

### **3.5 Industrial materials**

Industrial materials usually require heavy investment in energy. The route from mining to processing to the finished product is energy intensive. Various machines and equipment are used in the mines, the ore is then transported for further processing, after which it is again shipped to factories, and then to warehouses and to retailers. Transport costs add to the price consumers have to pay. Examples include steel imported from South Africa, burned clay brick manufactured in Kombat and Mariental, or ready mixed concrete in Windhoek. Industrial products contribute significantly to the problem of pollution and global warming (Wienecke and Mawisa, 2008:10).

Another possibility is wind energy, which can be converted into electricity. The higher the mast on which a turbine is mounted, the higher the effectiveness of the system, as more energy is generated due to the higher wind speeds at a higher altitude. This energy is stored in batteries to ensure that electricity is available whenever needed.

### 3.5.1 Saving energy

The cheapest and easiest way of saving energy is not to use it or using reducing consumption. Passive solar design is one option. Another includes skylights or clerestory windows to maximise the use of daylight and distribute the light in a room. One possibility of saving energy, is replacing energy intensive appliances and light bulbs. Fluorescent bulbs save up to 85% of energy consumed by an equivalent incandescent bulb for the same amount of light. Although they are slightly more expensive than the “regular” bulbs, the money saved on electricity consumption is more than the extra costs paid over the life time of a compact fluorescent bulb (Wienecke and Mawisa,2008:16).

Electrical appliances and equipment should be compared to determine the amount of energy they consume. Below is a list of the most commonly used appliances in the home with their electricity consumption loads, average hours used per day and the approximate electricity consumption costs per month at current Windhoek prepaid meter electricity prices. The last column is a projection of monthly costs at a constant electricity price increment at 10% per annum over 5 years (Wienecke and Mawisa, 2008:17).

Appliance	Electricity Demand (w)	Hours used per day	Monthly Cost (N\$)	10% price increase over 5 years(N\$)
Geyser	2 500	5	285.00	427.50
Heater	1 600	4	145.92	218.88
Two plate cooker	2 000	2	91.20	136.80
Oven	2 500	1	57.00	85.80
Fridge	300	3	20.52	30.78
Kettle	2 200	0.5	25.08	37.62
Incadescent bulb (x3)	60	6	24.62	36.94
Iron	1 000	0.5	11.40	17.10
T. V. (colour)	80	4	7.30	10.94
Radio	6	4	0.55	0.82
Fluorecent bulb (x3)	15	6	6.16	9.23
sewing machine	100	3	6.84	10.26

Source: Wienecke and Mawisa,(2008).*Op.cit.*, p. 17

Table 4. Use of appliances in the home with their electricity consumption loads

Over the five year period, the running cost of the appliances would on average increase by about 33%. Electrical appliances and equipment should be compared to determine the amount of energy they consume. Below is a list of the most commonly used appliances in the home with their electricity consumption loads, average hours used per day and the approximate electricity consumption costs per month at current Windhoek prepaid meter electricity prices. The last column is a projection of monthly costs at a constant electricity price increment at 10% per annum over 5 years (Wienecke and Mawisa, 2008:17).

However, the costing of appliances used in the home does not consist only of purchase and operation costs. An appliance cost has to be considered for its operational life - what is termed life cycle costing. Life Cycle Costing is a process to determine the sum of all the costs associated with an asset or part thereof, including acquisition, installation, operation, maintenance, refurbishment and disposal costs. Table 5 shows the estimated lifecycle costs of common appliances used in the home. The costs include the cost of electricity connection, appliance costs, appliance replacement costs, and energy costs at current prices. The lifecycle cost is calculated for a period of five years (Wienecke and Mawisa, 2008:17).

Appliance	Electricity Demand (w)	Hours used per day	Monthly Cost (N\$)	Estimated Lifecycle cost over 5 years(N\$)
Geyser	2 500	5	285.00	22 608.73
Heater	1 600	4	145.92	12 274.20
Two plate cooker	2 000	2	91.20	8 941.95
Fridge	300	3	20.52	7 330.20
Kettle	2 200	0.5	25.08	5 019.75
Iron	1 000	0.5	11.40	4263.90
T. V. (colour)	80	4	7.30	6 617.00
Fluorecent bulb	15	6	6.16	3 711.16

Source: Wienecke and Mawisa,(2008).p. 17.

Table 5. Lifecycle costs of common appliances used in the home

#### 4. The role of HRDC in Namibia

The establishment of the Habitat Research and Development Centre (HRDC) was initially based on the fact that about 80% of building and construction materials were imported. It is a well-known fact that there are many resources in Namibia, which are not utilised. In 2002 the then Ministry of Regional and Local Government and Housing (MRLGH) supported the proposal to build a Centre, which will investigate and test alternative technologies, building materials and approaches. The latter included design and architecture with a focus on various types of energy inputs. This resulted in expanding the options to be considered, from available resources, e.g. clay and lime, to additional natural resources such as prosopis and local stone, to what is called waste. The latter included old tyres, building rubble, and metal drums (Wienecke, 2010:17-18).

The operations of the HRDC had to consider a wide range of activities. The HRDC is an institution in which the public and private sector can participate, as well as NGOs active in housing and associated fields. This requires a trans-disciplinary and trans-institutional knowledge generation approach to achieve the numerous objectives in the field of housing and its related issues (Wienecke, 2010:17-18).

Most of the HRDC design is in accordance with concepts such as alternative technology and Green Architecture, by utilising locally available materials, recycling materials, environmental benefits are derived, and taking environmental aspects into consideration in the design and during the construction process.

The HRDC is a government funded project and experienced bureaucratic delays. The reason is simple: the team involved constantly looked for resources, which could be used. For

example, it is interesting to note that when the Windhoek Municipality demolished a flat building, HRDC contacted the municipality and made an enquiry about the fate of the materials, e.g. building rubble, window and doorframes. The latter two were to be kept in store for a community project, whereas the rubble was to be dumped at a landfill site, as it was regarded as useless waste. Cooperating with the municipal department and the contractor the rubble was transported to the HRDC site, where it was reused in gabions and cement bricks were reused in walls. Similarly when a service station was built close to the site the natural stone (mica) left from the excavations for the petrol tanks were brought to the HRDC site – all free of charge (Wienecke, 2010).

When the construction of the HRDC started, the municipality issued a directive that all old tyres had to be transported to the main landfill site, where a fee of R7.50 per tyre was charged. This resulted in many tyres being disposed in the field around Windhoek. When the HRDC offered to take the tyres free of charge, hundreds were delivered to the site. They were incorporated in the construction of retaining walls, and buildings such as walls for storerooms and the double garage. Farmers in the southern parts of Namibia provided sheep wool, Grade 3, which was regarded as useless due to its poor quality, but it was utilised in the construction as an insulating material between the roof sheets and the ceiling.

The question could be asked: what is the value of alternatives? Alternatives provide choices, they can support efforts of employment creation, they can utilise locally available materials. Most governments are interested in creating employment opportunities. Government has, for example, provided funding to train young school leavers in various skills. A group was trained as masons in 2010 at the HRDC. A private contractor provided them with the chance to gain practical experiences at one of his building sites what they have learned as interns. This cooperation of public and private institutions shows that there is an untapped potential of advancing local opportunities.

## 5. Conclusion

In conclusion, this chapter mainly discussed the RETs that provide energy for domestic use (predominantly cooking and heating) and those used to supply electricity. RETs used to produce energy for domestic use tend to do so by exploiting modern fuels or by utilizing traditional fuels in new and improved ways in Namibia. The chapter further discussed the RETs used in the rural development of countries like India, China, Nepal, Mozambique, and Kenya and so on. Namibia can fairly draw some lessons from the experiences of these countries.

Namibia has huge potential in the development of RETs for rural economic development. It is therefore the community based conservation has been regarded as one-way of protecting the environment and subsequently provide employment in rural Namibia. The efforts are exerted in this direction and the emphasis has been made on making money from the conservation, not to keep the environment in its pristine state. However, in general, the knowledge about nature and the intricate relationships between the many parts is still limited in Namibia, although people claim to have vast knowledge. Little knowledge can be dangerous. Earth is a highly complex ecosystem, which is hardly understood by humans. To continue with unsustainable practices is endangering the basis

of life on earth. However, in many developing countries including Africa, the non-sustainable model of the North is promoted as the solution to the many problems. High population growth rates on a continent where a substantial percentage of the land consists of deserts and arid regions, the question of conserving and preserving natural resources has become critical.

With the provision of clean, off-grid electricity from solar panels, the air is cleaner, the village is more productive and women are becoming empowered. The cost of a solar system large enough for several lanterns is roughly the cost of one year's supply of kerosene. But, solar energy can only serve some of the Namibian rural communities energy needs.

Climate change is clearly a key influence on economic growth in Namibia. Therefore Namibia should no longer ignore the contribution of the environment to, and the importance of environmental sustainability for, national wealth in the face of the climatic shifts. It is imperative that Namibia needs to recognize and assess the likely impact of climate change on their desired development pathways of RETs, and to ensure all policies and activities are 'climate proof. While climate change clearly must be mainstreamed into policies and planning and this has to be done from the gross root level.

Sustainable development is important because all the choices we pursue and all the actions that we make today in Namibia will affect everything in the future. Government of Namibia needs to make sound decisions on renewable energy technologies at present in order to achieve the sustainable development and avoid limiting the resource availability for future generations.

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# The Multi-Functionality of Agriculture and Territorial Governance – A Learning Process in an Island Environment (Réunion)

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## 1. Introduction

Nowadays, territorial development is considered to be a complex process of a socio-technical and organisational nature. Therefore, it is appropriate to involve a significant number of stakeholders in decision-making and action development. Governance of this kind constitutes a new mode of coordination between stakeholders with different interests and different logical devices. It requires innovative apparatus and learning tools. However, the process of governance alone also provides a new source of learning. In this paper, we would like to contribute to the debates on territorial governance, by analysing a concrete example of agricultural development.

The relationships between a learning process and governance are complex and tensions occur frequently. Social sciences have developed research on implementing methods to coordinate stakeholders and regulatory systems. However, there has been little focus on territorial governance as a co-production process (between public and private stakeholders) for actions, objectives and rules within a territory. For some years now, 'governance' has, however, symbolised a new approach to managing relationships between the state authorities (which have been elected) and the population. The first impression we drew from our observations of the agricultural and rural world was that these new processes, which attempt to reconcile rules with local needs and politics with popular thinking, are the result of hybridisation and 'trial and error' (Chia *et al.* 2008). Nonetheless, they are very informative for researchers interested in rural development and an organisational approach. In this chapter, our aim is to contribute to the discussion in order to define and outline 'governance' at the same time as highlighting the analysis of the relationships that exist between the learning process and governance. The

term “governance” was first applied to companies to illustrate the relationships between shareholders and employees. It was then used to characterise the new relationships that the state developed with the private sector via decentralised services. The aim is to set up the policies implemented at a national level or to develop new policies at a local level.

The problems related to governance and, in particular, to its territorial dimension have been identified recently by Simoulin (2007). He defined governance as “*all of the cooperation situations which can no longer be organised based on hierarchy and the situations in which the state has no way of obtaining information in a satisfactory manner*” (Simoulin, 2007, p.17). Governance, therefore, represents a possible solution for developing a new society-based project, in which participation can be included in the democratic representation on the basis of an updated social contract. Governance is similar to organisational innovation, which is considered as a process. It is the product of alliances, hybridisation and the adaptation of many technical objects, as well as that of stakeholders and situations.

Our analysis mainly focuses on the tools and institutional arrangements that stakeholders use and/or produce in new situations in order to ensure territorial management with particular emphasis on the learning processes. Management tools express information (in different formats: logbooks, criteria, etc.) enabling stakeholders to justify their decisions. An instrument has a wider application and refers to a combination of criteria, tables, etc. in addition to cognitive models. Management tools are instruments that can be used in the rationalising process. The objective consists of “*helping an actor or a group of actors to analyse the context in which their actions take place and to anticipate possible developments*” (Moisdon, 1997, p.25). ‘Institutional arrangement’ is an even more general expression and stands for a combination of tools, instruments, representations, rules and people, etc.

In the French agricultural and rural sector, the 1999 Agricultural Orientation Law (AOL) was a manifestation of the collective recognition of the multi-functionality of agricultural activities (Appendix 1). The AOL set out propositions as well as obligations for both farmers and other rural development stakeholders in relation to issues that were previously not

The AOL of 1999 introduced two major changes with regard to previous laws:

1. Remuneration of the functions that the market did not take into consideration.  
The AOL encourages farmers to develop a global project that integrates the functions of agriculture (economic, social and environmental) and contributes to sustainable territorial development. The “economic function” used in the AOL means that food production is one of the functional components of multi-functionality. The SAC is the main tool used (Appendix 2).
2. Mainstreaming of non-farming stakeholders.  
The AOL extends the membership of the agricultural departmental commission (CDOA, Commission Départementale d’Orientation Agricole), which determines the priorities of production management and farm development policy. Previously, the CDOA was composed of exclusively agricultural stakeholders. However, it now includes non-agricultural territorial stakeholders from civil society: consumer and environmental protection groups, craftsmen, fishermen and hunters. It has to give its opinion on the draft model SACs, the “standard contract”, that are likely to be proposed for farm holdings.

Appendix 1. The July 1999 French Agricultural Orientation Law (AOL)

considered important, for example: landscape and natural resource management, territoriality of activities, establishment of a coordination committee with other land users. The state authorities set up a management apparatus to promote participation, which can facilitate the governance of rural development and local areas: the agricultural departmental commission (CDOA, Commission Départementale d'Orientation Agricole, Appendix 1). The creation of the CDOA and its subsequent extension to non-agricultural stakeholder categories actually marks a change in the method of state intervention in the agricultural sector. We go from a situation where the state, via the state organisations linked to the Ministry of Agriculture, Research, Economics, etc. defined and applied the actions that it considered desirable to a method of governance in which local stakeholders are involved in defining and implementing actions. Jean & Bisson (2008) describe this as "new partnership governance". The implementation of the AOL via a new contract, the Sustainable Agricultural Contract (SAC, Appendix 2), has encouraged and accelerated active encounters

The SAC was first called a Territorial Farm Contract (TFC). It was designed to support farmers who developed a comprehensive project using new production methods to satisfy non-commercial functions (*i.e.* not remunerated by the market) but required by society: natural resource management, adapted fertilisation, quality foodstuffs, traditional production, etc. "*it helps to improve the conditions of production, incomes and living standards of farmers*" (AOL, art. 1).

1. The SAC is a 5-year contract drawn up between the state and the farmer  
The farmer draws up the SAC with an SAC project holder, either a rural institution or organisation. The project holder has to present the SAC proposal to the agricultural department committee (CDOA, Appendix 1). When approved, it has to be accepted by the state administration. The signatory farmer is legally bound by the contract for 5 years. An overall project is drawn up as a function of the factors at stake. The farmer receives financial assistance in return for complying with the SAC's conditions.
2. The SAC improves interaction between:
  - sector-based agriculture and local development: management of specific territorial characteristics;
  - environmental, social and economic functions of agriculture: overall farm project. The SAC concerns the overall coherence of the farm and fits into the local development strategy. It should be drawn up in accordance with local guidelines (Appendix 1), the "standard contract". The latter "*is composed of a coherent set of standard measures and actions (Agro-Environmental Measures – AES), designed within the context of a project, to meet the stakes identified in the study prior to the establishment of the territorial farm contract*" (AOL, art. 1).
3. Thus, the 5-year SAC includes two sections:
  - the Environmental and Territorial Measures (ETA), including, for instance, actions on biodiversity management, cultural heritage and landscape maintenance, water management, integrated fertiliser and pesticide use. An SAC includes several ETAs, with a maximum payment per hectare and per year;
  - the Economic and Employment Commitments: for instance, investment, diversification, improved working conditions, adding value to production or rural tourism.

Appendix 2. The Sustainable Agricultural Contract (SAC); economic measures and environmental and land-related measures.

between various stakeholders: farmers, state extension officers and professional technicians, researchers and even agricultural employees, economic organisations (cooperatives, banks), consumer representatives or environmentalists. The CDOA coordinates the actions involved in "establishing" the SAC, including measures of evaluation and control, as well as actual content. The aim is to provide a focal point for territorial governance and for managing controversies in relation to implicit technical knowledge.

The implementation of sustainable agricultural contracts (SAC) in Réunion is particularly interesting because the new tools do not apply the former rules. Instead, they propose a new reference system and new approaches for agricultural and rural stakeholders. Agriculture's multiple functions reflect its territorial integration (Piroux et al., 2006) and presuppose the development of new relationships between local stakeholders. We propose an examination of the management mechanisms and the tools that stakeholders use and/or develop in new situations like this so that they can strengthen the management apparatus for their territories or define what they will become. The first part of this chapter clarifies the learning process. We then go on to describe our methodology and the main results we obtained. The relationships that exist between the learning process and governance are then analysed. In conclusion, we underline the importance of continuing the analysis of the function of this type of apparatus, not only to enlighten public decision makers but also to further knowledge on the apparatus for territorial governance and its management.

## 2. Management apparatus and organisational learning

Early research and also more recent research on organisations have highlighted the role played by tools, instruments and management apparatus in terms of their function and the coordination of action between stakeholders. Several authors have also underlined the importance of these tools, instruments and management apparatus for public or private organisations (Hatchuel et al, 2005; Lascoumes & Le Galès, 2005). The instruments used by this type of management can be: (i) material, such as a computer, for example; (ii) conceptual, such as the discount rate; (iii) aids for complex decision making, such as a marketing model for studying the potential market for a new product. These instruments can be analysed as a response to the complexity of any management apparatus.

The word '*dispositif*' (Foucault, 1994) has no single direct English equivalent. It can refer to a socio-technical system (Lianos, 2003; Dulcire & Chia, 2004) or to apparatus, *i.e.* a device or a mechanism oriented to produce something. Foucault defined it from a long enumeration that he grouped into a network, "*a thoroughly heterogeneous ensemble consisting of discourses, institutions, architectural forms, regulatory decisions, laws, administrative measures, scientific statements, philosophical, moral and philanthropic propositions—in short, the said as much as the unsaid. Such are the elements of the apparatus. The apparatus itself is the system of relations that can be established between these elements.*" (Foucault, 1994, p. 195). Agamben (2009) adopts this characterisation as a "decisive technical term" and complements it by adding "*the capacity to capture, orient, determine, intercept, model, control, or secure the gestures, behaviors, opinions, or discourses of living beings*" (Agamben, 2009, p.14). Thus the concept of apparatus allows us to understand a system as a configuration of shifting social and collective arrangements rather than a simple configuration of unmoving technical layouts. The strategic function of the apparatus corresponds to the governance that Foucault called the "governmentability".

In the field of agriculture and the environment, Mormont (1996) analysed the plan of action Agenda 21's<sup>1</sup> by looking at the apparatus that the stakeholders had set up to manage actions. He defines the apparatus as institutional agreements that link representations, standards, practices and stakeholders. This effectively implies taking into account the stakeholder learning processes and the corresponding adjustments made to the apparatus itself as a result of this learning. The apparatus is not a fixed object. It can be constructed, deconstructed and (re)defined continually.

Research on the learning process within an organisation has developed continuously since Argyris (1993) expounded his representation of the organisational learning process. He modified the pending theory of action within the organisation. Therefore, reference will be made to his work. His main objective was to construct an action-based theory (or research-action) in organisations with the aim of transforming them and supporting the change. The main hypothesis presumes that in order for this transformation to occur, members of the organisation have to modify their behaviour. Therefore, they have to learn and thus grasp new knowledge, techniques and mechanisms.

The learning process can be used for facilitating or preventing change: for example, the well-known defensive routines manifested by members of the organisation when they have not helped define the objectives or when changes generate doubts and modifications in their reference system. For example, when proposed changes do not comply with the representation that actors have of their objectives and contribution (place and role in) to changes, they can hinder the processes by simple reactions, such as failing to hand files in on time, failing to sign them, etc. Argyris & Schön (1978) have shown that there are two types of learning processes within organisations. The first is a simple loop process that occurs when members develop an operational learning process enabling them to modify their strategic plan of action. Whereas, the double loop learning process can be used for modifying strategies as well as underlying 'values' (objectives, paradigm). They modify the current theory of action in terms of the organisation.

Le Bas (1993) has identified two dimensions in the learning process: an individual dimension and a collective dimension. He considers that "learning is a process employed for acquiring knowledge". It can generally be defined as a process of accumulation and memorisation. It concerns human beings in their social activities above all and, particularly, in their economic activity. Although the learning process is obviously supported by an individual agent, it is also determined by the organisation within the institutional arrangements developed by the economic and social reports prepared by individuals. Thus, the expression "learning companies" seems inappropriate. Each member of an organisation constructs his own representation or image of the process. We actually believe that learning is essentially an individual process. Only individuals learn and not the organisation itself. They learn within an organisation, by addressing organisational issues. Moreover, one of the founding principles of the systemic approach allows us to state that the sum of learning is not organisational learning.

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<sup>1</sup> Agenda 21 is a set of concrete recommendations drawn up by the United Nations for the 21st century and signed by 179 nations. These recommendations are derived from the concept of sustainable development and based on three main pillars: economic action, social development and careful natural resource management.

An organisational learning process is, therefore, defined as a process that enables the organisation's stakeholders to acquire new knowledge, which is necessary for their contribution to productive, relational and organisational activities. This concerns new knowledge and know-how. In spite of the fact that in common language, knowledge and know-how are used indistinctly, major differences do exist and require clarification. Knowledge can be used for an individual, whereas know-how concerns a group, *i.e.* its construction and legitimacy are defined by a group of actors: "...knowledge is therefore developed through experience" (Avenier & Schmitt, 2007, p.122). The state of knowledge at a certain point forms one body with the individual. Know-how is defined as a series of statements, which express representations of the knowledge-state, which is internal to the subjects.

When Theys (2003) tried to define the notion of governance, he questioned the governability within the meaning of what is governable. "*If the notion of governance concerns rather the tools and processes of collective action*", that of "*governability focuses on specific situations*" (Theys, 2003). Governability supposes that, when confronted with specific and complex situations, effective and acceptable solutions have to be found. Some situations are intrinsically or politically manageable, others are not - or only with difficulty and effort. The meaning of governance may be too similar to that of organisational innovation (Cohendet et al., 2003), considered as a process. It results from alliances, hybridisation, "botching together" (Duymedjian & Rüling, 2010), in relation to technical objects, stakeholders and situations.

Therefore, we define territorial governance as the process of coproducing actions and rules within a territory between public and private stakeholders, with diverse and sometimes contradictory objectives, which help them to initiate processes that would define or outline a territory. In turn, these processes require learning processes. The process of territorial governance is actually the result of the continual interaction between the forces that generate conflict and those that encourage cooperation, the forces generated by tensions and negotiations in various forms (controversies, arguments, discussions, working groups, etc.).

Using these patterns and our local knowledge, we organised the work around three research proposals that were developed using surveys and observations.

- Organisations must use "learning processes" in order to modify their practices and favour technical and organisational innovations.
- The agents' learning capacity determines the stakeholders' and organisations' capacity to "change". Hatchuel (1994, p.112) states that the "*collective learning process is not only a coordination regime between actors but it is also a training process for actors*". As a result, we have to learn to create mutual trust collectively: a joint project.
- The learning process constitutes a major component for governance. Learning is a necessary process for the stakeholders at a local level. It enables them to develop and/or use new methods for coordination and decision-making within organisations by reducing transaction costs and opportunistic individual behaviour. We have defined it as governance.

### **3. A participative and comprehensive approach for studying the learning process**

During the research project on the implementation of the French AOL (Agricultural Orientation Law) in Réunion (Appendix 3), we first conducted semi-structured interviews

with farmers, civil servants from the Ministry of Agriculture and employees from professional organisations. We analyse: the local stakeholders' representations of the former agricultural activity and its management and the new activities promoted by the law; the design process and preparation of technical and economic references; the changes in the social, technical and organisational practices adopted by the contract farmers; in addition to the changes in the practices of the extension and administrative services; and the impact that the process has on representations and new development. The aim was to identify their perceptions (explicit or implicit) of the current agricultural situation on the island and their visions of agriculture in the future, including how they managed the new social contract and how to make the most of it. The surveys were conducted according to the guide based on changes in practices and learning processes. We also used data from former studies on the implementation of SAC in 2002 and 2003, as well as data from the analysis on the development of agricultural practices in 2003 (Piroux et al., 2006). Thus, we were able to identify that the learning process is a key issue for optimising the organisation of the system and relationships between stakeholders.

Réunion is an island that covers an area of 2 512 km<sup>2</sup>. It is entirely made up of basalt from lava flows that extend to 4 000 metres below sea level. It is a French Overseas Department located in the Mascarene Archipelago in the Indian Ocean. Two principal territorial units are commonly distinguished: the lowlands and the highlands. Most sugarcane is grown in the lowlands, which are between 0 and 400 m above sea level. The highlands constitute the areas above 400 m. In 2006, the population was 782 000 inhabitants with an annual growth of 1.6%.

Although most of the land is used for agriculture, including forest exploitation, agriculture is not the island's main economic activity. In 2006, the tertiary sector represented more than 82% of the added value; the secondary sector represented 13% and agriculture only 5%. Sugarcane is cultivated in the lowlands and is particularly affected by urbanisation. Consequently, sugarcane production is decreasing rapidly (20% drop in 10 years). However, the area under permanent grass (STH) and fruit trees has slightly increased. This does not compensate for the losses of sugarcane land. At the moment, sugarcane covers 53% of cultivable land. The STH and perennial fruit crop production cover 19% and 5% of cultivable land, respectively.

### Appendix 3. Some characteristics of Réunion

In order to develop the study on the SAC learning processes and their impacts on the coordination between stakeholders, a work meeting was organised in 2005 to discuss the topic with development partners from Réunion. We used a Research-Action approach (Chia et al. 2008) and proceeded in three steps. The first step involved capitalising on the work conducted on SAC development and implementation and on the development of working hypotheses. The second step consisted of carrying out specific surveys with agricultural advisors and with people in charge of services in the Chamber of Agriculture and the Ministry of Agriculture's decentralised departments (Appendix 4). The purpose was to study what had changed and how. Those surveyed, particularly the technicians and farmers, were selected on the basis of their involvement in applying tools. The last step involved a 2-day work seminar with several participants (advisors and people in charge of professional organisations and state departments).

**Twenty people from support organisations involved in implementing the SAC were interviewed. They included:**

- Directors of the Chamber of Agriculture (3) for the west, south and east zones;
- Several extension technicians;
- Chamber's CDOA representatives;
- Environmental service;
- Charter service of development;
- Cane sugar production channel manager;
- CERFA, Centre d'Economie Rurale et de Formation Agricole (centre for rural economics and agricultural training);
- Coopvanille, cooperative of vanilla producers;
- Réunion Island Ecology, environmental protection group;
- SAFER, Société d'Aménagement Foncier et d'Établissement Rural, institution whose mission is to control land law and, more recently, the rural environment;
- CNASEA, Centre National pour l'Aménagement des Structures des Exploitations Agricoles, services that manage the SAC dossiers;
- APR, association for promoting the rural environment;
- CGPER, general confederation for small farmers from Réunion.

#### Appendix 4.

Thus, we focused on observations made after the analysis of the learning process. We built an assessment grid based on the identification of the state of knowledge (individual or collective), whose type is technical or organisational. Stakeholders apply managerial knowledge to deal with questions, phenomena, relational and organisational choices, as well as strategy planning issues (see Table 1).

		NATURE	
		Individual	Collective
TYPE	Technical	Technical system Technical itinerary	Technical reference, production standards, choice of varieties, etc.
	Organisational	Production system Commercial system Family farming system Relational system, etc.	Communication system at the local and regional levels Assessment and control tools Advising, etc.

Table 1. Learning sources according to the origin of the process

In the second step of the internal workshop, we chose to restore results for three reasons: to improve our understanding of the learning process being implemented; to define the types and nature of the learning process collectively; and to define actions that could be proposed for future improvements. Working groups and discussions were organised in plenary sessions. One of the major difficulties encountered when carrying out individual surveys on practices and representations was that we only had access to the justification model used by stakeholders and not to the action model (Argyris, 1993). Meanwhile, after examining the



changes and the way in which they occurred, it was possible to identify and characterise the learning processes. The work carried out during the restitution session with participants (work groups) also enabled us to identify the collective dimension involved in the learning process.

In order to analyse the learning processes developed during the SAC implementation phase in Réunion, we designed a grid for analysing changes in practice. These changes depend on the stakeholders' representation of their activity and the contexts of the action (Fig. 1).

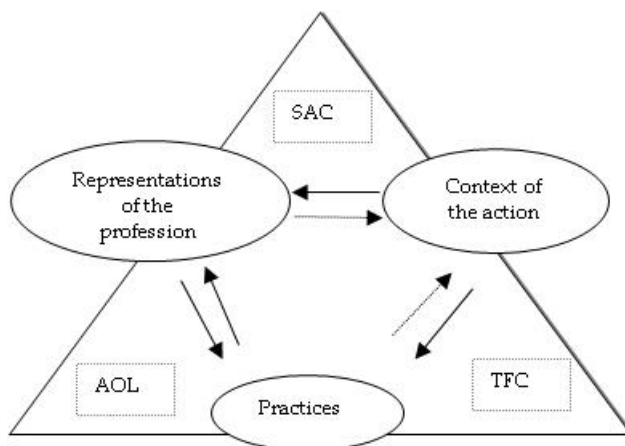


Fig. 1. A grid for analysing the changes in farmers' and advisors' practices (source: Chia et al., 2008)

This space can be characterised by a context of action, a product of the past, of social and political relationships and production. In some ways, it encompasses the work of stakeholders and the stakeholders' representations of their condition, the local agricultural context, as well as of the SAC context. In fact, the closer the actions proposed by this type of contract are to the farmers' representation of what should be done, the more likely they are to be adopted and accepted. Therefore, it is the work involved in "translating" and/or contextualising the TFCs (land management contracts) and then the SACs (sustainable agricultural contracts), *i.e.* the practices that will engender new learning.

#### 4. The new SAC practices: Learning processes at stake

Our investigations identified the different learning processes resulting from the development and subsequent implementation of the SACs. They can be classified into three types (Table 2):

- Technical learning: environmental learning, mulching, etc.
- Organisational learning: new local or territorial organisations (commissions), new rules, renewed work within the CDOA.
- Social or relational learning: creation of new forms of coordination between farm advisors and farmers; emergence of new dynamics in the professional organisations; improvement in coordination between the state's services and the profession.

These learning processes are individual (farmers, advisors), as well as collective (organisations, groups, etc.). They can be produced using various aids and apparatus, such as training days, commissions, working groups, committees, the CDAO itself, for example. These learning processes and apparatus foreshadow a new system of local governance.

	Nature			
	Individual		Collective	
Type	Farmer	Technicians	Farmer	Technicians
Technical	Controlled herbicide use and fertilisation, etc.	GAFS <sup>2</sup> , accounting, cartography	Environment, purchase	GAFS, plot record
Relational	Work with other farmers and family members	Workshop techniques, communication techniques	Meetings, joint AES work, definition, advising	Group workshop
Organisational	Plots, commercial work	Work planning, network management	Collective planning for specific task (CUMA)	Task division (SUAGER, ENV)

Table 2. Learning processes according to type and nature

The results presented in Table 2 show that implementing the SAC has encouraged different types of learning of various kinds. Therefore, the farmers developed new references and new management practices. These could be linked to the organisational dimension of the individual learning process, e.g. a technical action can lead to improved plot management. As far as the technicians are concerned, the learning process arose from the techniques used in group workshops and from the analysis of the function of the whole farm. The latter is a prerequisite for setting up the SAC because coherence is important, not only for a local project but, particularly, for farmers' individual projects.

The advisors had to conduct preliminary research to determine the zones likely to sign the SACs. Therefore, they used their knowledge and technical and social know-how (type of farmers). The work was conducted within the institutions, in this case within the SAFER, which acted as advisor for cane growers. Thus the SAFER advisors had to exchange and share information, etc. Training provides both a place and a context for crossed and multiple learning (Hatchuel, 1994). They benefited from learning and, in turn, proposed training courses on the AOL to farmers, including farmers that had signed up or completed the SAC. They had to persuade farmers individually to take part in this type of apparatus. The number of training courses and the number of farmers who participated are an indicator of the work that the advisor accomplished.

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<sup>2</sup> The Global Approach of Farming Systems (GAFS) considers the function of a farm as a system with objectives and end targets. It is based on the farm's complexity in terms of all of its technical, economic, social and family dimensions.

### 5. How have stakeholders' practices changed?

Stakeholders adapt in many ways. Change occurs progressively, *i.e.* not all references are modified (Callon et al., 2009). Collective work involves the joint development of a project and a common language. Only by adapting ideas and actions can apparently opposed parties be reconciled in order to implement a project that interests everybody. The adaptation process also produces organisational and technical learning processes. Development practices, *i.e.* the way that stakeholders conduct their activity, represent the way stakeholders combine, hybridise and build tools, instruments, relationships, know-how and knowledge in order to carry out an action. We analyse the chronology and nature of the learning process using the example of the sugarcane SAC.

The SACs have had a significant impact on technical practices (Piroux et al., 2006). They have implemented positive developments for adopting certain techniques (Fig. 2). For example, 82% of the users who prefer late weed control have abandoned this practice and now weed during the grass pre-emergence phase or during the early post-emergence phase. Of the users interviewed during the survey, 77% of those who chose to apply the 'controlled weeding approach' on all their plots had not used this practice before. Two-thirds of the users, who did not split their fertiliser applications during the cutting phase, did so when it was not mandatory because of the SAC. Despite the difficulty involved in the mulching operation, the SAC was used to develop the practice. Residues were systematically kept on-farm and, therefore, were not problematic during the replanting phase.

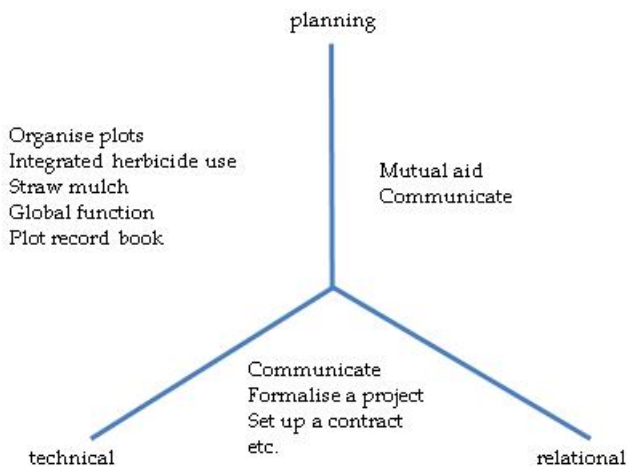


Fig. 2. What the farmers learned

The SAC also helped modify the organisation of work, especially during the cutting campaign. In addition it helped rationalise global soil management and define plots (which optimised the planning for replanting). Farmers unable to adopt the practices that they were supposed to adopt raised organisational issues relating to finance and labour force. However, the SAC was sometimes able to finance existing practices. Finally, the SAC tool seems to have accelerated the adoption of techniques that had been little used until then despite the fact that they had already been simplified by technicians.

The improvement was due to various elements: financial incentives; better training of the target public; effective assistance provided by technicians from the Chamber of Agriculture. For example, the assistance provided shed light on the general operation of a farm and thus revealed the factors that were slowing down the adoption of new techniques. Further study of the effective application of measures *in situ* over a longer period is required. In many cases, the grant provided by the SAC represented a major financial contribution and meant that the technical practices could be carried out at the appropriate time.

The technicians' action practices were also subject to change. Some of them have been identified as follows:

- Tools and methods: carrying out an agro-environmental assessment of the farm based on a more appropriate technical whole farm approach. This improves understanding of the factors affecting the adoption of techniques, advice, group work (workshops) and the use of computer tools.
- Labour organisation: according to the surveys carried out with some technicians, the SAC has given meaning to their work. Technicians worked with farmers to determine how to monitor indicators more clearly in order to help them achieve the objectives of their projects' action.
- Renewed references: they were made possible by keeping records, especially on areas of land.

Nevertheless, the changes raised a number of issues, especially issues of identity that we will discuss. The SAC was implemented using a new management apparatus, *i.e.* new relationships between different groups of stakeholders. The analysis of their intensity helped to clarify the mechanisms developed and to identify any dysfunctions. We thus identified five stakeholder groups: technicians, signatory farmers, professional organisations, support institutions and 'others' (representatives of civil society, development organisations, medical doctors, labour inspection, etc.). We would like to underline (Chia et al., 2006) the following, in particular:

- The improvement of mutual assistance between the technicians from the Chamber of Agriculture.
- The renewal of relationships between technicians and farmers: the different phases of the construction of the SAC project conducted jointly with greater confidence.
- The development of different relationships between farmers, especially the implementation of mutual support groups.
- The development of the relationships between many stakeholders and support institutions.
- The presence of new stakeholders for project preparation when requested by technicians: medical doctors, labour inspection, etc.
- The limited development of relationships with civil society organisations, which the AOL introduced as members in the CDOA: in Réunion, there are only two environmental protection organisations.
- The poor relationships between some members of the Chamber of Agriculture and the DAF, whose quality criteria for their case files were not well understood.
- The weak impact on institutional structures, which hinders internal reorganisation, with the exception of CNASEA.

Two working groups expressed the main issues that generated stakeholder interest (which is debatable) (Table 3).

	Group 1 = technicians	Group 2 = 'institutional' group
Aim of SAC?	<ul style="list-style-type: none"> <li>- Environmentally friendly agriculture</li> <li>- Income/project</li> <li>- Reconciling agriculture and the environment</li> <li>- Reconciling agriculture and society</li> <li>- Farm viability and sustainability</li> </ul>	<ul style="list-style-type: none"> <li>- Non-commercial practices</li> <li>- Global Approach of Farming Systems (GAFS)</li> <li>- Controlled agriculture</li> <li>- Sustainable agriculture</li> <li>- New organisation for agricultural development</li> <li>- Image of agriculture in society</li> </ul>
What was learned?	<ul style="list-style-type: none"> <li>- Project/strategy</li> <li>- Training</li> <li>- Communication</li> <li>- Environment and production</li> <li>- Communication/training</li> <li>- Human and financial means</li> <li>- New awareness for farmers</li> <li>- Reassessment of the CDOA's role</li> <li>- Improved environmental knowledge</li> </ul>	<ul style="list-style-type: none"> <li>- Synchronising assistance</li> <li>- Objective of territory forum for discussion, evaluation and orientation</li> <li>- Educational training</li> <li>- Improving knowledge for AES</li> <li>- Indicators of success</li> </ul>

Table 3. Summary of the working groups' activities during the workshop

- The development of the nature, methods and conditions of work: technicians' points of view and, sometimes, those of different 'institutional' groups. Technicians expressed their dissatisfaction with regard to the quality of their new working conditions. They sometimes expressed themselves in a rather defensive and even negative way. They even compared themselves to 'office rats'. The institutions preferred to put emphasis on the technicians' acquisition of new methods even though the latter acknowledge the value of a global operational approach, *i.e.* the Global Approach of Farming Systems (GAFS).
- Relational changes are developed although the institutions contest that relationships between the technicians are more intense.
- The lack of assessment criteria and indicators. Technicians highlight the lack of tools or an inadequate understanding of the tools for conducting their work: assessing a situation, assessing the impact of developing the SAC on farms and their environment, adapting an AES (agro-environmental measure) to a specific situation.
- Finally, technicians from the Chamber of Agriculture consider that the quality of their daily work is hindered by the lack of human resources, as well as the fact that the departments were re-organised to improve the management of the 'new situation'.

Some technicians (including those from the Chamber of Agriculture) consider that the process of implementing the SAC has been too hasty. As a result, they were under

considerable pressure in terms of the number of SACs they had to manage. However, it seems that some farmers failed to conform to the contract they signed. Considerable differences exist between the observed practices and the 'optimal model'. This is positive and could systematically encourage new learning processes (Chia, Dulcire and Piraux, 2006). In any case, some people consider the tool to be very complex and have asked for it to be simplified or strengthened with additional human resources.

From the SAC perspective, a majority of the participants consider that the technicians from the Chamber of Agriculture should encourage more environment-friendly agricultural production, as well as encourage the development of non-commercial goods. However, they do emphasise the fact that this should not affect the farmer's income. Finally, a last group maintains that the SAC should primarily help guarantee the farmer's income. This opinion does not negate the importance of environmental management but rather the reluctance (and even incomprehension) of some people to stop supporting cane monocultures (both technically and financially). The institutional group stressed the tool's role in terms of renewing individual and collective approaches. Awareness like this is beginning to develop. However, concrete environmental outcomes of development operations should be defined both at the level of the farm and the farmer's project.

The objectives set out by the SAC seem quite clearly differentiated. Coherent strategies need to be developed in order to meet them. The necessary learning processes have not really been shared at all. In other words they have not yet made it possible to create a common language or joint projects. The specified learning required to meet these demands involves communication: dialogue, outreach, training for technicians and farmers so that coherent projects and strategies can be developed, as well as the construction of management apparatus. The latter refers to the creation of spaces for debate and confrontation (like the CDOA) that can particularly be used for synchronising working methods or criteria for evaluating dossiers. Thus, there has not yet been a real discussion about the meaning that should be given to the profession of farmer and advisor. The CDOA is actually recognised, above all, as a body for technical discussion. For example, some people think that "less multi-functional" production (livestock, fruit and horticulture) should benefit from the SACs because that is where major environmental improvements can be made. Consequently, the capacity for collective discussion should be strengthened on a county scale.

## **6. Sustainable agriculture and territorial governance: Back to learning**

As Flichy (2007) has demonstrated, if agriculture is to be dynamic, it cannot just be based on a simple replica of the past: agriculture should be innovative in the socio-technical and organisational sense. SACs are tools, which have rapidly been adopted by agricultural development stakeholders and are the subject of intense debate. On the basis of observations that have been made, we make several recommendations to strengthen individual and collective learning, as a prerequisite to the continued implementation of the SACs. Lastly, the question of governance remains. Here, governance is understood to be the process to define and implement development action that associates all the stakeholders concerned (or at least all those who felt concerned). The question encourages further examination of the apparatus and tools that the stakeholders adopt, modify, set up in order to coordinate and develop a joint project and rules.

### **6.1 Redefining the farming and advisory professions: In terms of both techniques and representations**

All the stakeholders consider that the establishment of SACs has generated a new dynamic in rural areas. SACs were the catalyst for a change in agricultural practices, as well as technicians' practices. The latter have modified their approach to intervention (global approach, agro-environmental appraisal, monitoring, etc.). The changes in these practices forecast a change in the different professions. Thus, we can see that some farmers are becoming more "professional". This is illustrated by: improvements in the quality of plot management (keeping a plot record book); rationalising and better planning of technical interventions; an understanding of the farms' global function, which raises environmental awareness. The profession of advisor for the Chamber of Agriculture has also developed considerably from that of providing technical advice, oriented to sugarcane, to that of providing "whole" farm advice, which greatly modifies the organisation and objective of work.

Therefore, if we want to modify farmers' practices, development practices have to change, *i.e.* the way that professions are actually exercised: how stakeholders combine tools, instruments, methodologies and relationships in order to carry out different development actions. However, the technicians feel a unanimous sense of dissatisfaction as a result of the major changes in their profession, which has seen a notorious increase in paper work. This is the source of unrest that needs to be addressed. Other questions prevail on the real evolution of farmers' practices. Consequently, major work should be conducted to (re)define the farming and advisory professions. In order to achieve this, the adequate apparatus (places, types of stakeholder) need to be identified.

### **6.2 Supporting new professions: With a new approach to the organisation of agricultural development, communication and better training**

The stakeholders consider that one of the main weaknesses in the SAC contractual process is linked to inadequate communication and training to support the evolution observed in the professions. It is important for farmers to understand that the SAC is an innovative tool: help is given as a function of the "production methods" used and not the quantities produced. It is, therefore, important that the message given to farmers focuses on the environmental aspect of the SAC and the importance of respecting the commitments set out in the contract and not just on the help for finances and cash flow.

In practical terms, the different areas of training referred to include: environmental issues, the analysis of farmers' practices and their evolution, the GAFS type project approach (Global Approach of Farming Systems), which is very appropriate. In addition, it is essential to address the inter-relationships between these topics, as well as some rules of communication, which provide the basis for work on improving practices. Lastly, special effort is required to ensure that the elected councillors, particularly those who are involved in the different commissions, are aware of the professions' and SACs' new requirements.

### **6.3 Building strategic choices and a suitable system of evaluation**

Group discussions and group work have shown that evaluation needs to be considered. We think that in the management system created by the SACs, it would be sensible to develop a

global evaluation system rather than use individual criteria. Evaluation is actually part of all management or governance processes. It should be considered as an instrument for planning and orientation and not as a tool for censorship. Consequently, evaluation should first establish strategic objectives that are clearly identified and ranked in hierarchical order to provide a framework for implementing SACs. The results from the working groups show that the objectives set by the SAC clearly differentiate between economic and environmental approaches and call for the development of coherent strategies. Depending on the financial package available, defining these objectives should make it possible to: 1) prioritise interventions according to specific target groups or fragile zones affected by the specific issues at stake (environmental or other), which will mean that SACs can be concentrated; 2) define the methods for supporting farmers outside the SAC, taking into account the time allocated to the SAC farmers.

The evaluation should cover different areas:

- The quality of the dossiers that determine the criteria for acceptance or rejection of the SACs proposed in the preliminary commission;
- The technicians' work, which is not what it used to be. This raises the issue of the need to identify work parameters clearly. The technicians are actually concerned because they do not know the evaluation criteria for their new functions and are worried about being penalised;
- The management of signatory farmers.

Another important point that should be underlined is the need to involve institutions in the process to determine a collective definition for criteria, rules, evaluation times, etc. If this does not happen, each institution develops their own system of evaluation and each individual will give priority to the criteria that they think they will be judged on. Thus, for example, an advisor will seek to meet the criteria for the number of dossiers if he thinks that he will be (or actually is) judged on numbers. He will give priority to "quality" if he is explicitly judged on that criterion. The danger is the emergence of evaluation systems that are not compatible. These concerns are linked to the suitability of the current evaluation system, which is the product of previous situations, and a pertinent system that takes account of the new functions attributed to agriculture and new professions.

#### **6.4 Developing methods of coordination, as management apparatus**

The objectives should be chosen after discussion on a local scale. However, apparatus (such as the CDOA) that has been strengthened by the AOL does not provide a forum for debate on joint strategy development. The CDOA is actually recognised as a body for discussing technical issues and not as a real commission for agricultural orientation. Nonetheless, it is important to remember that not everything can be discussed everywhere. Therefore, stakeholders need to organise themselves, set up modes of cooperation and coordination, rules that allow them to be represented within the different institutions where questions relating to SACs are discussed.

#### **6.5 Strengthening organisational learning**

The organisations have not encouraged the learning processes considered necessary in the light of current changes. The learning processes identified have not really been shared at all.



In other words they have not yet made it possible to create a common language or joint projects. Thus, there has not yet been a real discussion about the meaning that should be given to the profession of farmer and advisor. Consequently, in order to deal with changes and new requirements (dialogue, communication, etc.), the professional organisations have reproduced the same structures and have continued to organise their activities on a sectorial basis. The search for coherence with regard to the dossiers has led to the development of new relationships between the Chamber of Agriculture's different services. These links need to be strengthened.

## **7. Conclusion: Learning and governance?**

Few studies have reported on the implementation and development of a contract as a stakeholder learning process. Indeed, the establishment of the CDOA and its subsequent extension to non-agricultural categories of stakeholders symbolises a change in the mode of state intervention in agriculture. Formerly, the state identified the rural actions that it considered appropriate, through state agencies linked to the Ministries of Agriculture, Research, etc. Since then, the state has promoted a new mode of governance in which the state liaises with local stakeholders to identify and implement actions. The French Agricultural Law has increased the complexity of rural and agricultural development issues by implementing a new type of action tool, namely the SAC. This allocates funds not on a quantitative basis but according to the 'production procedure' used. This represents a significant change, which some in politics call a "participative democracy" (Callon *et al.*, 2009). It constitutes a new form of rationality. As a result, all stakeholders in the rural and agricultural sector – in particular farm advisors and farmers – have to redefine their activities, tools, practices, *i.e.* their reference framework (what should be done, when, how and with what, etc.). We have observed that public policy tools have not only redefined the scope of stakeholders' action, particularly the nature of their relationships, but also developed different types of new learning processes (technical, economic and organisational processes) in addition to new processes of coordination. This degree of complexity means that we can no longer consider solutions from a purely technical point of view.

The new public policy tool has facilitated the progress of a new type of governance, by coordinating stakeholders with different interests and different logical devices. As a result, stakeholders' practical and organisational practices have developed. However, the process has not modified their values (common project) or the development model. Nonetheless, most of the learning processes have evolved as a single loop because the values and reference frameworks of the underlying development have not been taken into account. Similarly, multi-functional agriculture has not been integrated into this development approach.

Although stakeholders were involved in implementing and monitoring these tools, they were not really involved at the design stage for the local project. The purpose of this phase is to examine the role of agriculture in society and where the farming activity fits among other activities in the area. Training is necessary for the purposes of development support. However, a territorial project should be developed in parallel because it will be used for implementing public policies and relevant development actions. Therefore, the impact of territorial governance is limited. In fact, we have underlined the need to use a federative-type project for defining governance. Therefore, locations should be selected in which

stakeholders can define or redefine territorial values, as well as their objectives so that a dual loop learning process can be developed. The question of governance leads us to a critical examination of land management and rural development, the relationships between agricultural and non-agricultural stakeholders and the relationships between the government and farmers. In order to construct a joint project, territorial governance, as an innovative process, requires the effective participation of stakeholders at every stage so that defensive reactions can be avoided. We underline the fact that this type of participation for defining local actions and developing rules and institutional arrangements is difficult to implement and cannot be imposed.

Therefore, opportunities for collective thinking must be developed on a territorial scale so that actions have meaning, rules can be drawn up, new knowledge and know-how developed, etc. In other words, a flexible governance system should be set up within which resourcefulness and hybridisation are considered to be mechanisms of adaptation. Governance represents an adaptive approach in which the learning process is the key component to successful implementation. We believe that a research-action approach could help territorial stakeholders to grasp this dimension and, as a result, create adequate institutional organisations and sites for learning. However, we acknowledge that there is also the need for an analysis of the transition between individual and collective learning. All the indicators suggest that it is the intermediate situations - committees, focus groups, etc. - that facilitate the transition to a common language.

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# New Insights into the Assessment of Protected Areas – Integrating Rural development

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## 1. Introduction

It is widely acknowledged that the main purpose of designating protected areas (PAs) is the resulting environmental protection obtained. Over the last few years, however, socio-economic aims have been incorporated into the wide range of objectives pursued by PAs. While this incorporation has been occurring the prevailing vision of PAs has also been evolving, from a protectionist one to a wider territory-based one. So an integrated approach involving both PAs and the socio-economic development of their environs has been a growing feature of rural policy (see IUCN, 1998; OECD, 1999), to such an extent that PAs have become valuable tools for the promotion of rural development (Buller, 2000).

The new vision of PAs which has emerged from this reinforces local community participation to the extent that it is necessary for both conservation purposes and rural development (Dower, 1992; Wells et al., 1992). In addition, this combined vision is closely linked to a new perspective on rural governance, the most emphasised features of which are working in partnership, community engagement and active citizenship (Woods, 2005). In fact, the theoretical approach to the evaluation of public policies has shifted from a technocratic one to participative one.

In economics, however, the standard approach to assessing policies associated with PAs has continued to be based mainly on Cost-Benefit Analysis (CBA). This assessment method reduces a complex reality into an efficiency problem based on a monetary criterion. This in turn leads to the 'commoditisation' of ecosystem services and disregards existing or emergent economic, social and institutional issues related to local communities. So this mainstream economic approach does not result in a complete assessment of PAs even though it has been employed in a huge number of real-world cases.

This chapter argues that the PAs assessment framework should emphasise two important properties which are often disregarded, namely integration and participation. The implementation of such a dual approach permits the inclusion of rural development issues within current debates about PAs.

The main theme of the chapter is developed as follows. Section 2 describes the prevailing economic PAs valuation framework which measures benefits and costs. In Section 3 this method is critically analysed in relation to three issues: environmental sustainability, the

economic performance of local communities, and governance and participation. The arguments for integrating rural development into the assessment of PAs are set out in Section 4 while Section 5 proposes an innovative assessment framework based on an integrated and participative approach – the so-called Social Multi-criteria Evaluation (SMCE) approach. Section 6 describes a real-world case study using SMCE in a Natura 2000 (N2000) site in the Basque Country (Spain) and the chapter closes with a few concluding remarks.

## 2. The economic valuation of PAs

### 2.1 Benefits and costs of PAs

It is widely recognised that PAs have positive environmental effects. In addition to the environmental gains derived from conservation, other benefits are associated with PAs, including those associated with the rural development objectives listed below. Conservation policies, however, also involve costs, which are relatively high though public budgets reflect only a fraction of them. Both the benefits and costs of PAs have been exhaustively discussed by a number of authors (see e.g., Dixon and Sherman, 1990; Kushwah and Kumar, 2001). Although benefits are classified in various ways, corresponding to differences in the criteria and objectives related to each type of PA, those mainly associated with PAs can be identified as follows:

- a. *Environmental benefits.* These are the principal benefits expected to result when an area is protected. They include, for instance, watershed protection, soil conservation and the conservation of biodiversity.
- b. *Recreation, tourism and rural development.* Public use is generally one of the main objectives of PAs. Tourism is also related to rural development since it provides revenues for local people. Protection programmes have an important socio-economic relevance in many rural areas and have accordingly been included in rural development plans.
- c. *Education and research.* PAs can be used for both research and educational activities because they usually contain good environmental practices.
- d. *Consumption benefits.* Traditionally these have been derived from agriculture, cattle rearing and forestry (and the corresponding production of food, forage, timber). PAs, however, may impose different degrees of restrictions on such activities in order to prevent environmental damage.
- e. *Non-consumption benefits.* These include aesthetic, cultural and historical benefits and, unlike consumption benefits, they are not derived from direct use. But the most essential of non-consumption benefits is 'existence value' (Turner et al., 1994), a quality which includes natural resources. Value can be derived from the mere existence of a site independently of any direct present or future use.
- f. *Future values.* The protection of certain areas can produce a number of benefits (consumption or non-consumption) derived from their potential use in the future. This concept has also been denominated 'option value' (Garrod and Willis, 1999) insofar as people may hold the option of using the PA in the future.

Within a formal economic appraisal all these benefits can be measured as use values or non-use values to arrive at an aggregate measure of value, Total Economic Value (Turner et al., 1994).

On the other hand, a number of costs are also incurred as a consequence of designating and managing a PA. The level of these costs depends to a great extent both on the conservation measures taken and on the economic activities developed within the PA (Barreiro et al., 2004). Following Dixon and Sherman (1990) three main types of cost can be identified:

- a. *Direct costs*. These costs take the form of direct outlays, being directly related to establishment and management of PAs. They are usually incurred by Governments and comprise a variety of categories of costs, including owning the site, site facilities, staff costs, protection programmes and so on.
- b. *Indirect costs*. These refer to the adverse impacts of the establishment of PAs, including damage to property or injury to people by wildlife. Quite significant damages can arise from activity and use restrictions within PAs (forestry, for instance) and these usually require economic compensation for local people in order to offset potential losses.
- c. *Opportunity costs*. These costs represent the potential benefits that society or individuals lose due to the protection of a site rather than the utilisation of its resources in other ways.

After identifying both benefits and costs comes the problem of their economic valuation. Converting both benefits and costs of a PA into monetary terms meets a number of methodological constraints. This is basically because there is no market in which environmental assets are valued, and so they cannot be assigned a definite price. In fact, many environmental goods fulfil the two conditions of public goods: non-rivalry in consumption and non-excludability either by producers or consumers. So environmental goods, such as air quality, visual amenity benefits, and flood protection are public goods and, as such, may produce welfare benefits but have no market value. They therefore produce non-market benefits and that complicates their economic valuation.

In environmental economics several methods have been devised to deal with this issue. Despite their limitations, Contingent Valuation (CV) and Travel Cost have been the two methods most employed in empirical work to get around the valuation problem. Hedonic Pricing has also been used but to a lesser extent. These methods have been used to estimate the recreational value of PAs (Garrod and Willis, 1999; Hanley and Barbier, 2009). CV has also been widely employed in research aimed at revealing a wider range of benefits, such as non-consumption benefits (non-use value), and therefore allocating a specific value to particular PAs.

The CV has been the method mainly used to value welfare gains derived from habitat protection. The concept of Choice Experiment (CE) has recently surpassed CV in importance since it is methodologically more advanced (Hanley et al., 2007). Both of these calculation methods are labelled as Stated Preference (SP) methods since, to estimate them, a sample of respondents is asked to place values on environmental assets in a hypothetical market. In this procedure respondents are asked what is their willingness to pay (WTP) for a positive environmental quality change (or willingness to accept (WTA) a negative one). In this context protecting a site could be regarded as a positive environmental quality change.

Those methods are firmly rooted in the theoretical foundations of CBA and welfare economics. However, problems associated with SP methods have been highlighted by several authors (Hanley and Spash, 1993; Hanley and Barbier, 2009). These problems are generally ones of bias which may lead to differences between the prices derived from applying the cited methods

and the 'true' values of PAs. Systematic overestimation or underestimation may have various causes, including strategic bias, questionnaire design bias, cognitive biases, and hypothetical and context biases. Related but different problems have also been identified regarding the valuation of biodiversity benefits (Hanley et al., 1995).

Nevertheless, different compilations of real-world case studies (see e.g. Nunes et al., 2003) have shown how a particular monetary value may be assigned to PAs. One can note the wide range of values that the WTP may assume, depending on the site as well as on the relevant difference existing in each site between the minimum and the maximum WTP estimate.

## 2.2 CBA: A monetary assessment framework

CBA has traditionally been the principal assessment framework used in economics to assess PAs. The idea behind CBA is the comparison between the gains (benefits) and losses (costs) that a particular project or policy, such as the designation of a PA, may produce for society. Where possible, the effects of a project are measured as the individuals affected would measure them. Thus, individuals' preferences are measured as social preferences. Both benefits and costs, however, are relative as they are concerned with people's wellbeing.

CBA has its foundation in welfare economics. The principle underlying the theoretical foundation of CBA is that if 'winners' from a particular project or policy can hypothetically compensate 'losers' and still have some gains left over society as a whole is better off (and *vice versa*). This is known as the Kaldor-Hicks *compensation principle*, which is consistent with Pareto improvement since 'losers' (once compensated) are indifferent between the existing and the modified state while the modified state is preferred to the existing state for 'winners' (as long as they can over-compensate).

Benefits and costs that may occur over time are calculated in the form of Net Present Value (NPV). Both positive and negative effects generated over time by a particular project must be taken into account at the present time, when a decision is taken. The CBA decision-rule for accepting the proposed change, then, is a positive NPV as defined in Equation 1:

$$NPV = \frac{\sum_{t=1}^T (B_t - C_t)}{(1+r)^t} > 0 \quad (1)$$

where  $B_t$  and  $C_t$  are, respectively, benefits and costs in year  $t$ ,  $T$  is time-horizon, and  $r$  is discount rate.

If the NPV is negative the project will not be undertaken; it must be positive for the project to be accepted. When only a single real-world case is assessed, decision-makers should simply accept or reject the project depending on its NPV (that is, they should follow a cardinal criterion). But when several alternatives are assessed (all of them with a positive NPV) the choice should be made on an ordinal basis, projects being ranked according to their NPV. In either case, the CBA decision-rule only works under conditions of *strong commensurability* (Munda, 1996), that is, all gains and losses underlying a given action can be transformed into the single composite monetary measure of NPV.



Discounting the future is a matter of great debate among economists (see e.g. Hanley and Barbier, 2009). Usually a lower weight is given to a benefit or a cost in the future than in the present, giving rise to the practice of discounting. Discounting is how economists take account of changing preferences for costs and benefits over time, and hence the discount rate ( $r$ ) is a means of revealing time preference. Referring to Equation 1, the future must be discounted in order to obtain a present value, and that rate depends on society time preference (how much the present is favoured over the future). The longer is a project's time-horizon (the higher is  $T$ ) and the greater is society's preference for the future (the higher is  $r$ ) the lower will be the NPV.

CBA has been used as an assessment framework in many different environmental policy areas. It has been employed for assessing environmental global effects such as ozone damage and global warming as well as issues of local concern like water quality improvements, the reduction of lead in gasoline, the control of nitrate pollution and the evaluation of forest practices codes. In the USA it has been employed for evaluating policies mainly since late 1970s<sup>1</sup>, being extensively applied after President Reagan's Executive Order 12291 in 1981 for evaluating new regulations. In Europe a more recent legal framework, the 1995 Environment Act in the UK, envisages the widespread employment of CBA in policy-making. In the European Union (EU) context, the Water Framework Directive (2000/60/EC) also addresses the use of CBA to evaluate public projects.

In the PAs policy arena, valuing habitat protection has become a common way of valuing the benefits derived from protection and contrasting them with the costs of conservation. Research in England regarding the implementation of protection programmes in specific sites reveals that benefits generally exceed costs (Garrod et al., 1994; Willis et al., 1996). The programme for implementing the N2000 network in Scotland was also found to pass a CBA, although it failed when non-use values were excluded (Jacobs, 2004). Nevertheless, in most cases benefits are under-valued compared with costs. While estimating opportunity costs may depend on having data on a wide range of factors, the discovery of both direct and indirect costs of a particular site requires less information and resources. Moreover, in most cases total benefits of a particular PA are higher than quantifiable benefits (Dixon and Sherman, 1990).

### 3. Critical issues of economic valuation

As noted above, CBA has been widely used in environmental policy evaluation. The main advantages of using it, particularly within the PAs policy assessment context, can be synthesized as follows:

- a. CBA is a well-defined method with firm roots in economic theory, and its results can be expected to reflect the logic of economic rationality. This is a characteristic which is highly valued in the mainstream environmental policy-making context.
- b. Environmental values are explicitly incorporated into decision-making. So benefit-cost trade-offs are made explicit, which is a useful feature in the context of limited resources.

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<sup>1</sup> Hanley and Spash (1993) analyze in detail the development of CBA in the USA.

- c. Monetary valuation may be a powerful aid to estimating the appropriate compensation (1) for environmental damage such as oil spills or flooding, (2) for loss of welfare due to restriction of uses and activities in PAs, and (3) for establishing 'payments for environmental services' schemes.

By contrast, CBA possesses certain methodological restrictions – some of them described above – leading to certain disadvantages:

- a. There is a long standing problem of comparing inter-personal utility and aggregating individual preferences into a social welfare function.
- b. CBA is subject to uncertainty due to such problems as the projection of future prices, the unforeseen impact of events on ecosystems and human responses to unexpected shocks.
- c. There is no definitive answer to the methodological problems of selecting a social discount rate or of predicting the preferences of future generations.
- d. The value of the environment defies economic measurement and as a result the CV value reveals a number of biases. The valuation of non-markets goods is also raised as a problem for various reasons, including reliability, validity and transferability (Hanley and Spash, 1993). As a consequence, estimates of biodiversity conservation benefits and costs are said to be too imprecise and incomplete to be useful. Hence, the use of CBA as a comprehensive assessment tool is problematic in most real-world cases (Nunes et al., 2003).
- e. The basic inherent problem of CBA is the fact that project evaluation employs an unambiguous uni-dimensional monetary criterion (van Delft and Nijkamp, 1977; Janseen and Munda, 1999). The fact of converting all attributes concerning PAs (environmental, territorial, biological, socio-economic, etc.) into one single monetary dimension is unacceptably reductionist.

The above limitations do not mean that CBA is inferior to other methods of solving the evaluation problem. But the way in which the CBA framework approaches PA assessment is open to criticisms. Apart from the inherent methodological constraints that any assessment framework may possess, in our view there are three main areas in which CBA is weak when it confronts the task of integrating rural development into the assessment of PAs. These are environmental sustainability, economic performance of local communities, and governance and participation.

### 3.1 Environmental sustainability

Two important questions with regard to the environment are the extent to which natural capital and reproducible capital (that is, human and human-made capital) are substitutes and what effects this substitution (if it exists) has on social wellbeing. The degree of substitutability between natural capital and reproducible capital is related to the paradigmatic concepts of *weak* and *strong sustainability*. Weak sustainability implies that there is a high degree of substitution between natural and reproducible capital; for instance, roads and infrastructures may compensate for the depletion of environmental quality in producing social wellbeing. Strong sustainability by contrast implies that the loss natural wealth (say, of certain biological species) cannot be replaced by increasing utility derived from using man-made infrastructural investments. This contrast poses such questions as: To what extent should natural capital be substituted by reproducible capital? Does reproducible capital generate enough wellbeing for society to be better off even though

natural capital is depleted? Supporters of the strong sustainability paradigm argue that there is a critical threshold in natural capital beyond which we cannot go<sup>2</sup>.

But the degree of compensation in substitutions between natural and reproducible capital is a key factor in the CBA framework. The question of the sustainability approach calls into question the extent to which the compensation principle can be formalised. CBA can neatly be embedded in the context of weak sustainability since it means there is total substitutability between natural and reproducible capital. Therefore, a trade-off between them, using the compensation principle, makes sense. By contrast, the same reasoning suggests that CBA has to be abandoned in the strong sustainability paradigm because it recognizes no compensating trade-offs between natural and reproducible capital and so the compensation principle is not operational.

In addition to this argument, there are others of a more purely ecological nature which discourage the more extensive use of CBA:

- a. The use of the previously mentioned uni-dimensional criterion is not compatible with strong sustainability. Furthermore, CBA, as we have just seen, supports the weak sustainability position. But when a specific site is designated as a PA it means that the habitat and species living there will be protected 'for ever'. Natural sites are not usually protected only for 10 or 15 years; their establishment implies a long-term vision. Such an approach is associated with strong sustainability as long as no replacement of natural capital is permitted. It is reasonable to conclude that an assessment framework which inherently rejects such substitutability is of no use.
- b. Discounting is another issue related to environmental sustainability. If a particular project causes long-term damage (for example, nuclear dumping, landfill sites, genetic diversity loss, and so on), then discounting will make the present value of such damage low. Specifically, the higher the discount rate the less important the impact of future environmental damage will be. Simply lowering the discount rate can solve arithmetical problems but should not be a solution to environmental ones.
- c. Discounting makes it harder to justify projects that only provide future benefits, such as long-term landscape or environmental benefits provided by PAs. It also encourages current generations from consuming non-renewable resources more quickly to the detriment of future generations.
- d. CBA selects projects on the basis of cardinality rather than ordinality. It takes account of the magnitude of net benefits rather than their importance and that can lead to irreversible environmental damage.

These aspects of CBA may result in harming the way of life of many existing rural communities. As environmental and natural resources, from which many rural people earn their livelihood, are threatened, rural communities could become unsustainable.

### **3.2 The economic performance of local communities**

The role played by local communities with regard to PAs can be seen from different standpoints. An in-depth analysis should be undertaken in order to observe all effects

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<sup>2</sup> This issue is approached more in depth by several authors (Turner et al., 1994; van Kooten and Bulte, 2000).

generated between local communities and PA. In the interests of conciseness we will focus on the economic issues regarding local communities although there are many others.

The effects generated by the benefits and costs of PA described above are highly dependent on the geographical scale used in the analysis. In a large scale analysis the benefits involved are those of the whole society, but using a small scale analysis means only assessing the local community. García (2009) describes in detail how the scale of the analysis affects local communities.

It is generally acknowledged that, while the environmental benefits of PAs are 'captured' by the society as a whole, the costs are mainly borne by local communities. While this statement is generally true, it needs some qualifications. On the one hand local communities may gain some benefits; these include the revenues derived from tourism and public expenditure on the PAs which benefits local people in the form of more employment and better roads, and targeted aids for farming and rural development projects. On the other hand local communities also incur cost increases of two kinds: the loss of income and the need to renounce alternative uses of the land. When those two costs are concentrated on a few locations and affect a small number of people their effect can be huge. But, broadly speaking, the greater part of direct and indirect costs falls on the public sector, in other words, on the society as a whole. A well-defined and structured compensation scheme, therefore, will entail significant costs in terms of public expenditure for the public sector.

Nevertheless, the use of CBA casts doubt on the idea that benefits generated by the designation of PAs accrue largely to local communities. In fact, CBA generally neglects the question of equity, which means that its use does not make for fair outcomes (Munda, 1996). The hypothetical compensation that welfare economics predicts does not take into account different income levels and so the benefits and costs which arise do not affect people of all levels of income equivalently. Besides, according to the Kaldor-Hicks compensation principle, the wellbeing gained by society as a whole must be enough to offset 'losers' for a project to be justified. This seems to imply that when these 'losers' are local communities they should be compensated. But whether this actually happens is far from certain. A well-structured and powerful compensation scheme (whereby local people are compensated in relation to opportunity costs) might offset a considerable proportion of the costs incurred by the 'losers'; but as far as we know this is not what usually happens either because public expenditure resources are lacking or because there is insufficient coordination between different public sector actors.

Other empirical studies do attempt to assess the possible socio-economic impact of PAs in their surrounding area even though they have been less frequently used than CBA. For instance, they generally take into account revenues derived from tourism and merchandising, the creation of local employment, and targeted assistance for farming and rural development projects. Several analyses have used this method to value the socio-economic impacts of PAs in terms of their effect on wealth and employment, both from the local perspective (Mills, 2002) and on a regional scale (Duffi-Deno, 1997; Getzner and Jungmeier, 2002). However, there are at least two drawbacks in this approach: first, this assessment framework is mainly focused on the economic performance of local communities but disregards the environmental implications of PAs; and second, it has not included participation of local communities, a subject which has become an important aspect of current public policy evaluation frameworks.

### 3.3 Governance and participation

The third main factor which discourages more extensive use of CBA as a tool to assess PAs is its model for decision-making. It disregards stakeholders involved in the PA and focuses the decision about whether to proceed with a proposed PA on a judge, briefed by a project analyst. Furthermore, it disregards any participatory involvement, which should be one of the principal indicators of sound governance of a project. The EU White Paper on Governance identifies participation as one of five principles of good governance, the other four being openness, accountability, effectiveness, and coherence (European Commission, 2001). Participation is regarded as an important component of current innovative forms of environmental governance on the grounds that it promotes the legitimacy of governance solutions and so increases their effectiveness while also reducing the cost of policy making (Rauschmayer et al., 2009).

PAs are often good real-world cases of environmental governance in which a number of different stakeholders, scales and institutions interact with each other. The EU-wide N2000 network is a good example of such an interactive system in the context of multi-scale governance. The multi-national EU institutions, the member states and regions, and the local level authorities, all have something to contribute to governance. However, the Habitats Directive (92/43/EEC) embodies an exclusive and top-down approach to governance in this multi-layered community. In accordance with the provisions of the Directive, only ecological criteria and scientific information have been used to designate the areas which compose the N2000 network. Socio-economic criteria have been excluded despite the fact that the definition and establishment of those areas will have significant consequences for local communities. The Directive does not envisage any public participation mechanism in their implementation and development – a decision which is clearly negative for local communities. In fact, the lack of participation has created numerous conflicts in different European countries, including France, Finland and the United Kingdom, leading to drawn-out legal processes and delays in setting up the network (Paavola et al., 2009).

Since conflicts inevitably arise within PAs between biodiversity and natural heritage care they require effective governance (Paavola, 2004). Local communities play a key role in conflict situations and they may show resistance to PA designations. For instance, the forestry sector in Germany showed opposition to the implementation of the proposed N2000 network due both to the lack of economic resources and to insufficient participation (Krott et al., 2000). Thus, increasing the level of participation by local communities is a way of reducing or resolving conflicts (Bergseng and Vatn, 2009). Furthermore, open participation processes where participants can learn from each other can strengthen shared points of view and interests and thereby help to build both increased understanding of the different values of participants and greater confidence in the process itself.

Therefore, good governance is needed to meet effectively the objectives and functions attributed to PAs. This conclusion applies not only to purely environmental objectives but also to others, such as rural development. Evidence from the Triglav National Park (Slovenia) shows the importance that such a participative approach may have on rural development (Rodela and Udovč, 2008). That experience confirms that recognising local communities as key players and prioritizing participation in PA decision-making are important requirements.

#### 4. Incorporating rural development into the assessment of PAs

Two main reasons are given in support of integrating rural development into the assessment of PAs: (a) to place the PAs in a more inclusive perspective; and (b) to meet the need for participation by local communities in order to provide sound governance to the PAs. Those two key ideas lead to an understanding of PAs as systems which coexist and are interrelated in both their ecological and their human aspects. This systemic view is based on both the 'integrated approach' (which stresses multi-dimensionality, trans-disciplinarity and multi-scale analysis) and the 'governance and participation' approach (which advocates multiple perspectives, social learning and institutional analysis). Most of the PAs – particularly those with human populations – consist of so-called ecological and social subsystems, showing the connections and interrelationships among their elements and making up the so-called social-ecological system (Berkes et al., 2003).

The inclusion of multiple dimensions (ecological, economic, social, institutional, etc.) in the evaluation framework allows a much broader assessment of PAs, taking into account multiple issues related to rural development. In addition, *multi-dimensionality*, or the closely connected idea of *trans-disciplinarity* (considering information and data from the standpoint of different scientific disciplines) is a better way to capture the multiple dimensions of PAs. What is required, in Neurad's words, is an 'orchestration of sciences' (Neurad, 1973) to combat the approaches which reduce the analysis to a single-discipline becoming reductionist.

As noted already, the geographical scale used in the analysis is a key issue. Yet, under the integrated view, interactions and interdependencies appear on different scales and this suggests the need for a *multi-scale analysis* as well as a multi-disciplinary one. To give an example, the management of certain facilities in PAs may have relevant socio-economic implications on the local scale (but not necessarily on the regional one) while the conservation of a certain species in a concrete site may influence biodiversity at the regional scale.

Taking into account 'governance and participation' is also necessary for a complete assessment of PAs. First, this is because participatory processes have been widely used as an instrument for including *multiple perspectives* of different stakeholders in regard to PAs (Reed, 2008; Schultz et al., 2011). One of the main reasons for doing this is that it adds to the accuracy and quality of the information used to reach conclusions (Stoll-Kleemann and Welp, 2008). And such multiple perspectives allows the use of different types of knowledge (e.g. traditional, indigenous, scientific) during the participatory process.

Second, *social learning* has become a relevant attribute of participatory processes and environmental evaluation as a whole (Webler et al. 1995; Garmendia and Stagl, 2010). In rural communities it is also important because it is both an instrument during the participatory process itself and a result in the overall assessment.

Thirdly, from an operational point of view there are many additional factors which influence the degree of participation in PA decision-making (Rodela and Udovč, 2008; Bergseng and Vatn, 2009). Those include, among others: the experience of the authorities in leading participatory processes and attracting social actors, and the degree of participatory culture among the citizens. Because of this multiplicity of relevant factors, it is advisable to take account of the institutional peculiarities of each individual place and situation in order

to maximize the potential for participation. Hence, taking into account differences in social organization and institutions is of great importance for the assessment of PAs. The *institutional analysis* should examine such issues as the existing legal framework, the private property regime, the functions and objectives of social organizations and power relations. All this must be appropriately integrated into the assessment.

## 5. An innovative assessment framework for PAs

It seems clear that the methods belonging to multi-criteria analysis (MCA) evaluation framework can generally be adapted to real-world cases involving PAs. The main methods within MCA have traditionally been rooted in operational research and have been described in depth elsewhere (see Figueira et al., 2005). MCA, however, can be considered innovative in regard to PAs since, so far, there not many real-world examples.

MCA is a useful evaluation framework when there are different alternative projects which can be assessed using multiple criteria, each alternative being evaluated in relation to a particular set of criteria. Another major virtue of MCA is that it can deal with evaluation problems in which various conflicting interests are involved (Nijkamp et al., 1990). For these and other reasons multi-criteria evaluation techniques have been used increasingly in public planning over the last few years:

- a. there has been increasing emphasis on decision-making as a process within institutions using recognised procedures as opposed to conventional 'one-shot' decision-making;
- b. an increasing desire can be noticed in public decision-making to set out all feasible alternatives from which a solution can be chosen, instead of having a single solution dictated technically by an analyst; and
- c. there is growing possibility to include in the analysis some of the effects which are intangible and so incommensurable in conventional CBA.

MCA's attractions in comparison with CBA have been attributed to two general factors (van Pelt et al., 1990). First, MCA is much more flexible: it allows the explicit inclusion of sustainability and is also adaptable to different conditions, allowing, for instance, the evaluation of the interests of different generations by means of different criteria and the inclusion of qualitative information about income distribution issues. Second, MCA avoids most of the methodological constraints, such as measurements and valuation problems, which CBA often encounters in practical applications. Furthermore, MCA has a wider vision than CBA when assessing the effects on environmental amenities such as those provided by PAs. MCA can be seen as a generalized and a more flexible version of CBA because it allows for the inclusion of monetary aspects (Nunes et al., 2003).

For example, several articles discuss real-world cases involving a combination of MCA with CBA (Ciani et al., 1993; Munda, 1995; Strijker et al., 2000). Strijker et al. (2000) develop a simple MCA in which the net result of the CBA is incorporated as one of the two criteria employed for the overall assessment of an ecological network. Their final results are discussed under both MCA and CBA evaluation methods. Ciani et al. (1993) assessed different management alternatives for a particular Nature Park. They incorporated inputs used for CBA into MCA as criteria, concluding that the final results are quite different depending on whether CBA or MCA is employed. Munda (1995) uses a different technique in which economic criteria, such as employment are considered within a multi-criteria

framework; but economic valuation which leads to CBA is not used. As a result, there is no optimal solution but a compromise solution is proposed.

### 5.1 A participatory and integrated framework for assessing PAs

It is believed that the instrument which most neatly fulfils the requirements for an integrated and participatory assessment of PAs is the SMCE framework (Munda, 2004, 2008). The SMCE's properties are well-fitted to the wide range of PAs' attributes and functions, and it not only takes into account the environmental dimension but also other objectives related to rural development.

SMCE was designed as a multi- or inter-disciplinary approach to situations in which there are multiple objectives as well as multi-dimensional issues. It has been adopted to help solve the problems of decision-making in a complex situation. The SMCE perspective acknowledges that social conflicts usually arise between different stakeholders associated with each alternative. In fact, the SMCE provides systematic information on the nature of these conflicts in such a way that trade-offs are made explicit to a policy-maker.

The main feature of SMCE is the fact that it takes into account the social dimension of the problem at hand. It has introduced to decision-making the concept of *social incommensurability* which denotes the existence of a multiplicity of legitimate values in society (Munda, 2004) and this is reflected in the fact that conflicts in a decision-making context are normal. Thus, public participation is stressed as a necessary but not sufficient component of the evaluation process. Moreover, SMCE allows the employment of different types of knowledge, including that derived from experts, from policy-makers and from stakeholders. The involvement of social actors enriches the evaluation and decision-making process as democracy and the quality of processes are increased.

The SMCE method also promotes transparency. All evaluation processes (and hence their results) may be influenced by ethical judgements introduced either by the analyst or by any of the actors taking part. Compared to CBA, MCA has been criticised due to the opportunities it gives the analysts to include their own value judgements and hence subjectivity when selecting and weighting criteria (van Pelt et al., 1990; Ciani et al., 1993). So transparency about the assumptions used is essential if such problems are to be avoided.

The SMCE process comprises several steps. Figure 1 shows step by step the ideal problem structuring in SMCE, though it is subject to changes according to differences in the circumstances of the real-world cases appraised. In fact, SMCE has been employed in different fields to evaluate projects and policies relating to sustainability, including water supply and management (De Marchi et al., 2000), urban sustainability policies (Munda, 2006), renewable energy production and location (Gamboa and Munda, 2007), the risk of coastal erosion (Roca et al., 2008) and integrated coastal management (Garmendia et al., 2010). There are also practical applications with regard to PAs policy; Oikonomou et al. (2011) emphasized the ecosystem functions in planning and decision-making of a particular PA by means of SMCE.

Both empirically and theoretically SMCE is a valuable decision-support tool which can be used to address sustainability questions. In particular, with regard to PAs the following reasons are given to support SMCE being applied according to the principles underpinning



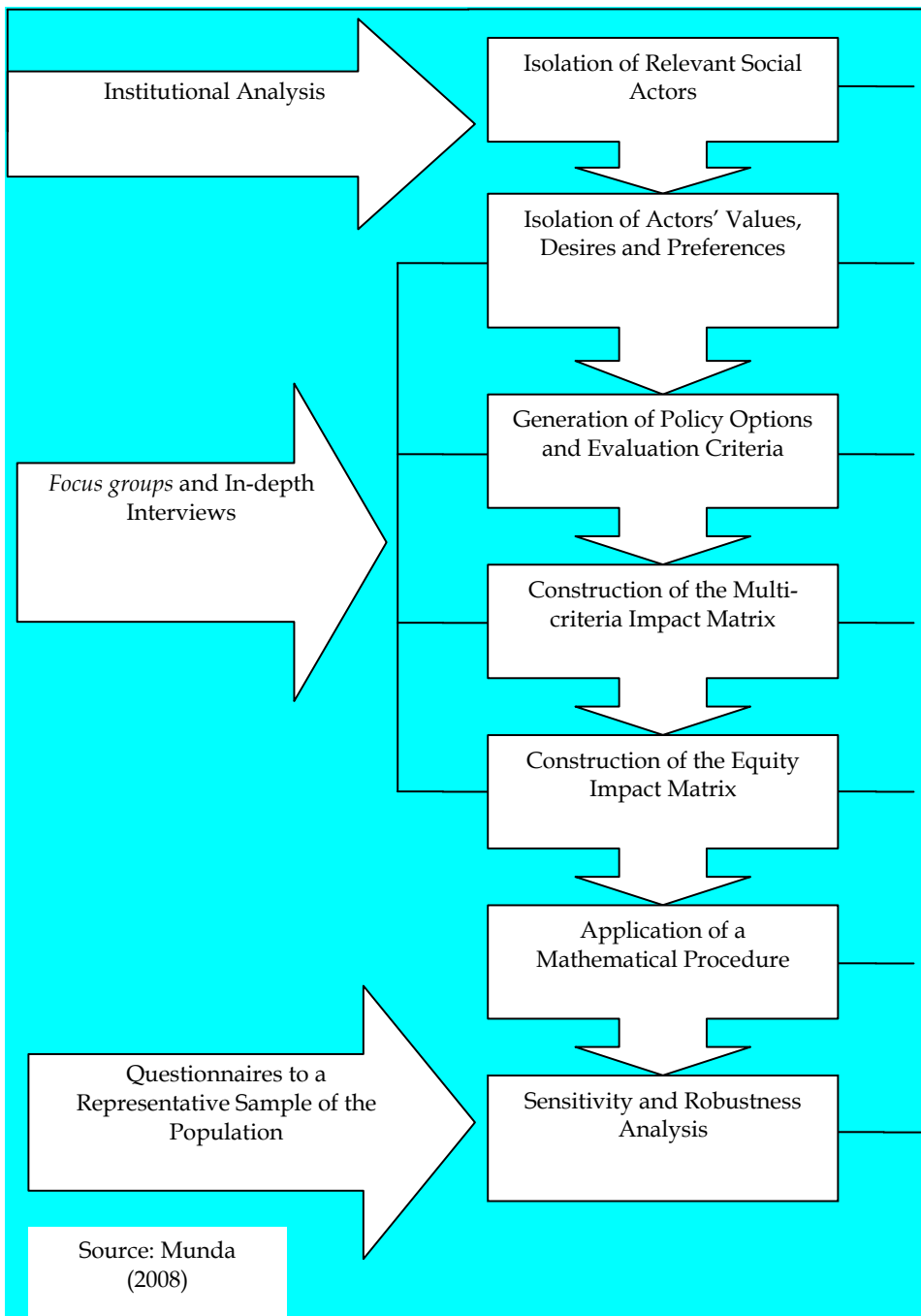


Fig. 1. The ideal problem structuring in SMCE

sustainability. First, PAs imply multi-dimensionality (due to the multiplicity of issues that are generally associated with them); hence a method which employs a multi-criteria evaluation framework such as SMCE should be well-fitted in such a context. The number of dimensions associated with PAs are indeed well-covered by this evaluation framework. And second, SMCE does not, like CBA, employ a single evaluation criterion but several, according to the goals which are set. As a result, the compensation principle is not applied and the method may be much closer to the strong sustainability approach. Both weak and strong sustainability approaches can be addressed in the SMCE framework, depending on the degree of compensability.

It is important to emphasise, however, that SMCE implies *incommensurability of values*, in other words, the absence of a common unit of measurement across plural values (Martínez-Alier et al., 1998). One should note that incommensurability does not imply incomparability, but *weak comparability*. This concept is valid since, on the one hand, comparison is feasible without resorting to a single type of value, and on the other hand, different kinds of measurement are needed to evaluate alternative options. In real-world cases in which different interests confront each other (for example, intensive agriculture *versus* environment conservation) the optimal solution predicted by CBA, for example, does not exist. By contrast, the final result of a decision-making process is a ‘compromise solution’ among the social actors involved (Munda, 2004, 2008). This statement has been illustrated in many real-world cases by means of SMCE (De Marchi et al., 2000; Gamboa and Munda, 2007; Roca et al., 2008; Garmendia et al., 2010).

## **6. A real-world case study from the Basque Country**

### **6.1 Overview of PAs policy in the Basque Country**

PAs policy in the Basque Country (BC) since the 1990s has placed great reliance on the promotion of Nature Parks. Under the 16/1994 Nature Conservation Act, the number of Nature Parks has increased from two to nine and they now comprise around 10 percent of the territory. The designation of Nature Parks in the BC has had three main objectives: environmental conservation, public enjoyment and rural development. One should note that the second and third of these objectives, taken together, are aimed at strengthening the positive socio-economic effects in areas adjacent to the PAs.

The promotion of Nature Parks has been closely related to rural development policy since 1992, when the first Rural Development Plan was launched in the BC (Etxano, 2009a). Both PAs and rural policy more generally have had shared objectives and functions during the past two decades. In addition, attempts have been made to build a sound relationship between the institutional framework of particular Nature Parks and rural development in their environs (Etxano, 2009b).

The real challenge facing the BC in the realm of nature conservation, however, is the implementation of the N2000 network, the main EU-wide ecological network. 52 Community Sites of Interest (CSI) and 6 Special Protection Areas (SPA) for birds have been designated, and they account for approximately 20 percent of the surface of the BC. As noted above, selected sites have been designated either as CSIs or SPAs exclusively according to scientific and technical criteria on the habitats and species of Community interest. CSIs have been declared according to Annex I (habitat types) and Annex II (habitats

of species) of the Habitat Directive (92/43/EEC) and SPAs have been designated according to specifications under the Birds Directive (2009/147/EC)<sup>3</sup>. During the last stage of the site selection process, member states have to designate CSIs as Special Areas of Conservation (SAC) within a period of 6 years from their being declared CSIs by the Commission. This period includes the time needed to establish a management plan for the site. Thereby, both SACs and SPAs will shape the N2000 network.

Given this background, there is believed to be some *momentum* in the BC towards finding an innovative design for the assessment framework for PAs, in particular for the N2000 sites. At present much work remains to be done on designing and implementing the management plans for designated sites, so there is an opportunity to incorporate in these plans an integrated and participative assessment framework as a valuable tool in the promotion of rural development.

## 6.2 A real-world case: The Garate–Santa Barbara N2000 site

The SMCE framework has been put forward as a major support tool for decision-making on the N2000 sites of the BC. A particular SCI, named Garate–Santa Barbara (G–SB), has been selected as real-world case study in order to observe the proposed assessment framework<sup>4</sup>. G–SB is located in the province of Gipuzkoa, between the towns of Zarautz and Getaria (see Fig. 2). The site covers about 142 ha, all of which are under a private property land tenure regime.



Fig. 2. Location of the G–SB N2000 site in the province of Gipuzkoa (Basque Country).

This area is a highly valuable environmental area in the BC because of its endemic biodiversity, including a particularly rare forest in the area based on cork oaks (*Quercus suber*), which are much more abundant in the Mediterranean bio-geographic region. G–SB belongs to the Atlantic bio-geographic region, but the 75 percent of such trees in the BC are found in G–SB and it is the only area in which small forests could regenerate themselves based on this tree species. The site became part of the European list of CSIs in 2004 (code:

<sup>3</sup> This is the codified version of Directive 79/409/EEC as amended.

<sup>4</sup> A detailed description of the real-world case study and its results can be found in Etxano et al. (2009)

ES2120007). The reason for its inclusion in this list is the presence of five types of environmentally valuable habitats as described in Annex I of the Habitat Directive: *Quercus suber* forest; *Quercus ilex* and *Quercus rotundifolia* forest; European dry heaths; endemic or-Mediterranean heaths with gorse; and lowland hay meadows (*Alopecurus pratensis*, *Sanguisorba officinalis*).

In addition to its environmental value G-SB has other important values closely linked to rural development in the area. On the one hand, the landscape and recreation values are significant tourist resources for the region. On the other hand, there are economic activities in the area based on forestry, cattle and agriculture. Some of the site's surface is covered by productive forest plantations (of *pinus radiata*, for example) aimed at obtaining economic profit. A few farm-settlements practising cattle breeding can also be found inside the SCI. But the most important economic activity linked to agriculture is the vineyards that produce a highly valued sharp wine known as *txakoli*. This latter sector has grown significantly in the area in recent years. While in 1998 90 ha of vineyards existed in the area, by 2010 this had grown to 400 ha, directly employing 77 people. This increase in wine production has occurred at the expense of a decline in cattle production, a substitution which has led to a marked land use change from grasslands to vineyards. Thus, a conflict arises within the site: conservation of the cork oak forests antagonises the wine producers who are interested in continuing to expand their vineyards<sup>5</sup>.

### 6.3 Institutional analysis and participatory process

By taking into account the guidelines defined in Fig. 1, the SMCE process can be adapted to the characteristics of real-world cases. So the evaluation process undertaken in G-SB has its own six phases: (1) Institutional analysis; (2) Selection of assessment criteria; (3) Creation of alternatives; (4) Construction of the Multi-criteria Impact Matrix; (5) Application of the mathematical procedure; and (6) Conflict analysis and sensitivity analysis.

The institutional analysis permits a better understanding of the historical roots of the site. It also encompasses the identification of social actors and the definition of the problem at hand according to different perspectives. So the participatory process undertaken is closely linked to the institutional analysis.

The main milestones of the participatory process are described in Table 1. This process involved providing presentations and interviews with various social actors about the issues at stake. Public workshops and individual surveys were also undertaken in a continuous process allowing for dynamic assessment and continuous validation. Moreover, the participatory process included an ample representation of social actors (Table 2).

On the one hand, a major step in the process involved the identification of relevant criteria to assess the site and this was essentially based on the results derived from workshops I and II. Once all social actors' opinions within the participatory forums were analysed eight main evaluation criteria were identified (see Table 3): Landscape quality, Biodiversity, Maintenance of agricultural activity, Income generation, Cost, Recreational and cultural value, Acceptability, and Social wellbeing.

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<sup>5</sup> See Díez et al. (2010) for a detailed review of conflicts in PAs of the BC.

Tasks	Description of actions
In-depth interviews with social actors	Get to know about social actors' discourse. In particular, know about their interests and position on conservation and rural development issues.
Public presentation of the project	Present the project and its participatory milestones to as many social actors concerned as possible. Discuss with social actors possible conflicts identified.
Workshop I: 'Criteria' Workshop	Identify relevant issues for social actors and criteria for assessing the site.
Workshop II: 'Alternatives' Workshop	Contrast results obtained in Workshop I. Identify different scenarios and related alternatives allowed by the current legal framework.
Workshop III: 'Results' Workshop	Present results obtained. Contrast results with social actors' point of view.

Table 1. Milestones of the participative process.

Social actors
<ul style="list-style-type: none"> <li>- Department of Environment and Land Planning. Basque Government.</li> <li>- Provincial Council of Gipuzkoa</li> <li>- Town Council of Zarautz</li> <li>- Town Council of Getaria</li> <li>- Owners: <ul style="list-style-type: none"> <li>• Vineyards landholders</li> <li>• Cattle ranchers</li> <li>• Productive forest landowners</li> <li>• Non-productive landowners</li> </ul> </li> <li>- Business Association: Supervising Council of guarantee of origin and quality of Txakoli in Getaria</li> <li>- Farmers' Unions</li> <li>- Ecological/Conservationist Associations</li> <li>- Cultural and Leisure Associations</li> </ul>

Table 2. Social actors involved in the participative process.

On the other hand, the creation of alternatives was based on potential future scenarios in regard to the management objectives of the site, its environmental features and the current legal framework. The scenarios were then mapped using Geographic Information System (GIS) tools in order to model the potential environmental impacts of each potential land use plan. In addition to this technical work the different scenarios proposed were discussed with social actors and external experts.

The land use scenarios were then used to identify potential management alternatives associated with the existence or not of payment schemes to landowners. The aim of these schemes is to compensate landowners for changing the present land use to one which will maintain a higher level of biodiversity on the site. According to the current legal framework two types of compensation schemes were outlined:

1. Current compensation schemes ('indirect costs'): established only for forestry, in particular schemes which take into account limitations arising from the slow growth of forest species in N2000 sites;
2. Additional compensation schemes, which at the time did not exist but which were proposed on the basis of existing information:
  - a. Compensation of lost profit ('indirect costs'): compensation given for agricultural activities damaged due to conservation objectives pursued within the SCI; and
  - b. Payments for environmental services: additional payments given for activities and land uses which increase social welfare.

#### 6.4 Integrated assessment

The next step consisted in assessing the suggested alternatives according to the set of criteria defined, which is illustrated in the Multi-criteria Impact Matrix (Table 3). Under an integrative view, each criterion was valued depending on the information available and relying on previously undertaken bio-geographic and economic assessments. Thus, indicators associated with each of the criteria were constructed. Finally, a ranking of alternatives is derived from the resolution of the algorithm allowing the aggregation of all information contained within the impact matrix.

CRITERIA		ALTERNATIVES							
		<i>Status quo</i>	<i>Business as usual</i>	<i>Ecological values Strength Moderate</i>		<i>Ecological values Strength High</i>		<i>Ecological values Strength Maximum</i>	
		<i>Baseline</i>	<i>Scenario 1</i>	<i>Scenario 2</i>		<i>Scenario 3</i>		<i>Scenario 4</i>	
		A01	A11	A21	A22	A31	A32	A41	A42
				Current compen.	Addit. compen.	Current compen.	Addit. compen.	Current compen.	Addit. compen.
Landscape quality	index	10,527	10,590	11,092	11,092	11,928	11,928	15,073	15,073
Biodiversity	index	199	200	218	218	247	247	345	345
Maintenance of agricultural activity	ordinal	5	6	4	2	3	1	5	4
Income generation	Euros	115,838	134,616	118,222	144,000	121,936	148,875	98,547	155,111
Cost	Euros	0	0	3,583	29,361	9,389	36,328	11,106	67,671
Recreation and cultural value	Euros	0	0	3.2 M	3.2 M	3.2 M	3.2 M	0	0
Acceptability	ordinal	5	6	3	2	4	1	5	3
Social well-being	Euros	0	0	47.2 M	47.2 M	102.3 M	102.3 M	228.2 M	228.2 M

Table 3. Example of Multi-criteria Impact Matrix integrating rural development issues.

Biodiversity and Landscape quality were valued by means of indexes elaborated using detailed bio-geographic information. Recreation and cultural value was assessed by a CE valuation undertaken to estimate cultural (non-use) and recreational values. Social well-being was also reduced to a monetary indicator by using the same method. Income generation and Cost were also valued in Euros. However, the former was estimated as

income derived from agriculture, cattle and forestry, including compensation schemes associated with each alternative. The amount of compensation was considered as the Cost since it involved public expenditure in form of compensation schemes. Maintenance of agricultural activity and Acceptability were assessed separately using a parallel multi-criteria assessment. Results derived from each of them were included as ordinal indicators in the Multi-criteria Impact Matrix.

In general, all the evaluation criteria are at least loosely related with rural development as it was interpreted in previous sections of this chapter. Some of them, however, are linked to it more closely. Maintenance of agricultural activity is probably the criterion which best reflects the core idea of rural development. The valuation was based on three indicators that were identified as the most relevant in the participative process: (1) support for agricultural activity, proxied by the total amount of aid received by the agricultural sector in the site (in Euros); (2) the improvement of access roads and infrastructure for farmers and local citizens in the site, in qualitative terms; and (3) the viability of local land management, measured according to the land cover (in hectares) associated with land use for 'commercialised agricultural products'. The larger is the land cover under this form of land use, the greater is the viability of local land management.

Income generation is also an important criterion from the rural development perspective. Average gross margins generated by agricultural activities were used to value it, including those derived from forestry and the production of *txakoli* wine. The amount of compensation was also included as it is part of the total income received by farmers and landowners. In addition, as already noted, Recreation and cultural value are linked to rural development by taking into consideration the revenues derived from tourism. However, in this case a welfare estimate of them has been attempted by means of a CE method; the socio-economic effects of tourism in the G-SB surrounding area, therefore, have not been assessed.

Finally, Acceptability reflects the idea of the preference level of each alternative, making explicit trade-offs between different interests, that is, the winners and losers, for each alternative. This analysis takes place in the context of the present discussion of rural governance and it provides useful information in the search for compromise solutions. So according to the level of acceptance/rejection of each alternative (measured by the number of actors in favour of or against each alternative) an ordinal ranking of alternatives was obtained and fed into the Multi-criteria Impact Matrix.

A main outcome of the SMCE process is the ranking of alternatives reached according to the set of criteria selected. The mathematical algorithm generated within the Multi-criteria Impact Matrix was solved by means of the NAIADÉ (Novel Approach to Imprecise Decision Environment) outranking method (Munda, 1995; JRC-EC, 1996). It can include a mixture of types of information (cardinal, ordinal, and fuzzy) which makes it suitable for multi-dimensional issues and uncertain circumstances. In addition, NAIADÉ allows the degree of compensation between criteria to be adjusted (from completely compensatory to non-compensatory) and hence makes a strong sustainability approach feasible.

Regardless of the final ranking of alternatives obtained, the most important outcome is the existence of integrated evaluation criteria which include measures related to rural development. This real-world case study shows how such integrated evaluation processes can be considered realistic possibilities for the assessment of PAs.

## 7. Concluding remarks

It has been argued in this chapter that a participatory and integrated assessment framework can produce a full assessment of PAs, including issues relating to rural development. In fact, at least in 'developed countries' such properties are clearly embodied in the currently prevailing visions of both PAs and rural development and governance.

Nevertheless, up to now the majority of real-world case assessments of PAs have relied on an economic valuation approach. The economic criterion is far from useless, but it should not be the only criterion because it possesses an excessive number of drawbacks. In our view the economic dimension should be considered alongside other variables in a multi-criteria framework which reflects complexity and multi-dimensionality of the assessment of PAs.

A useful participatory and integrated framework can be provided by SMCE as has been shown in the description of a real-world case study. The great potential and usefulness of SMCE in different contexts has been demonstrated in a number of other real-world cases. The real-world case study in this chapter has focused additionally on the way in which rural development issues can be integrated into the assessment of an EU N2000 site.

In the whole N2000 network there is an urgent need to establish such assessment frameworks. Generally speaking, the legal framework on which N2000 is based does not envisage participatory governance for such areas. This may lead both to conflicts within local communities and to the non-fulfilment of objectives associated with PAs, especially the rural development objectives. On balance there is some hope that in the near future the spreading use of integrated and participatory decision-support tools may improve these negative situations.

## 8. Acknowledgments

I am grateful for funding provided by IHOBE (the Basque Environmental Agency) through the research project coded as OTRI 2008.0101 (UPV/EHU) which allowed the real-world case study to be undertaken. I would also like to thank Bob Sutcliffe for his beneficial comments on preliminary versions of this chapter and for his support with language issues.

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# Land Use Conflict Between Farmers and Herdsmen – Implications for Agricultural and Rural Development in Nigeria

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## 1. Introduction

Land is probably the most important resource needed by Man for his day-to-day existence. All human livelihoods and activities are directly or indirectly dependent on land at varying thresholds. But land connotes different meanings to the various user groups. For instance, builders, manufacturers, fishermen, miners, hunters and farmers have different specifications in their requirement for land for their production/services. Out of all user groups, agricultural production perhaps exhibits the highest form of sophistication in its use of land. Not only must agricultural land be capable of supplying crop-specific nutrients and water; soil temperature, structure, texture and p-h levels are inevitable requisites in the choice of land for agricultural production activities. Yet, land is a limited, somewhat scarce, resource with both artificial and natural access and usage barriers.

These factors of specifications, multifarious uses of land and its limitedness have necessitated that various shades of competition for its utilization must ensue. Thus, competition for land between and within various user groups has been the bane of mankind since time immemorial. Non-agricultural user groups compete with agricultural user-groups on one hand, while there are various levels of intra-user group competition on the other. Indeed competition for land use is becoming keener and fiercer, largely due to increasing human and animal populations (Gefu and Kolawole, 2002). It has been illustrated that increasing population growth rate has continued to exert great pressure on available land resources with varying environmental and socioeconomic implications (Dietz, Ruben and Verhagen, 2001; Tarhule and Lamb, 2003; Fiki and Lee, 2004).

Farmer-herdsmen conflict has remained the most preponderant resource-use conflict in Nigeria (Ajuwon, 2004; Fasona and Omojola, 2005). The necessity to provide food of crop and animal origin, as well as raw materials for industry and export in order to meet ever-growing demands, has led to both “intensification and extensification” of land use (Nyong and Fiki, 2005). The competition between these two agricultural land user-groups, however, has often times turned into serious overt and covert manifestation of hostilities and social friction in many parts of Nigeria. The conflicts have demonstrated high potential to exacerbate the insecurity and food crisis particularly in rural communities where most of the conflicts are localized, with reverberating consequences nationwide.

## 2. Arable cropping in Nigeria

According to Lambrou and Laub (2006), 75 percent of today's food comes from 12 arable crops and five animal species, with just three arable crops (rice, maize and wheat) accounting for about 60 percent of the calories and proteins obtained from plants. Worldwide, arable crops enjoy remarkable dominance, playing significant roles in the socioeconomic lives of both rural and urban peoples. Arable crops include a wide range of annual crops of primary importance such as maize, rice, sorghum, millet, cassava, cowpea, wheat, soybeans, melon, groundnut yam, vegetables and so on.

In Nigeria, production of arable crops is essentially the prominent feature of agricultural activities. Indeed, almost all farmers in Nigeria cultivate one or more arable crops for food and income. According to Fayinka (2004), Nigerian agricultural production is dominated by rural-based small scale arable crop producers, who account for about 80% of total food requirement. In a study on production of some major arable crops in Nigeria, Okuneye *et al*, (2001) revealed that the average farm size in arable crop production was 4.58 ha. Central Bank of Nigeria, CBN, (2005) reported that 36.25 and 82.41 million hectares of arable crops were cultivated in 2004 and 2005 respectively. The CBN report further stated that production of arable crops increased from 88.3million tones in 2001 to 111.8 million tones in 2005. By far the most widely grown arable crop in Nigeria is maize, accounting for 6.6 and 7.5 million hectares in 2004 and 2005 respectively. Maize is grown almost in every part of the country. Most arable crop farmers rely on rainfall to produce, with farming activities normally beginning as soon as the onset of rains. Apart from being veritable sources of income for farmers; arable crops are processed into other useful items at industrial and household levels.

## 3. The cattle herding system in Nigeria

Cattle herding is dominated almost entirely by the Fulani tribe in Nigeria. Iro (1994) gave a vivid documentation of the herding system of the Fulani in Nigeria, and most of what is presented hereunder was derived from his account. According to him, herding is a daunting task, and contrary to widespread belief, it is not the delight of the Fulani- they herd not as a matter of choice but as a necessity. Iro (1994) found that about 75% of the sampled nomadic pastoralists maintained that cattle herding is not only toilsome, but also becoming increasingly strenuous.

The optimum Fulani cattle herd size lies between 80 and 100. With a preponderance of female over male at ratio 4:1, the Fulani maintains a balanced functional species composition that is made up of 'beefers, milkers, breeders, carriers, and stock beautifiers'. Iro (1994) also stated that the slow-maturing Sokoto Red cow and the lyre-horned White Fulani cattle are the mainstay of the pastoral Fulani holdings. White and Wickens (1976, cited by Iro, 1994) disclosed that the White Fulani, though less hardy, has higher milk and beef yield compared with the Sokoto Red.

Cattle belonging to individual family members are usually herded together, with male family members assuming automatic rights to all cattle, making it difficult to determine cattle ownership by female family members. Fulani men possessing less than twenty cows are seen as poor, while women having six cows are considered as rich (Iro, 1994). Women, however, own most of the small ruminants and all of the poultry (Swinton, 1987 in Iro,

1994). Though most Fulani men herd cattle well past the middle age, herding is dominated by the youths, while decisions about grazing are mainly made by the elderly family members. The Fulani herdsman makes excellent use of sign language, the cane and verbal command to drive the animals, with faster animals occupying the front rows. During migration, a typical herd consisting of several family units move in a column of up to five meters wide and two kilometers long. And by the time it passes any given point, 'everything that stands at that point is destroyed' (Fricke, 1979; and Vengroff, 1980 as cited in Iro, 1994).

Describing the annual herding cycle of the Fulani, Iro (1994) stated that the herding season begins with southward movement of the herd and along rivers and stream valleys from October to December – marking the end of rainy season and beginning of dry season. January to February is the harmattan season that is characterized by longer grazing hours, herd splitting, and more frequent visits to stable water sources. These thus increase southward movement of the herds. The months of March and April are usually the toughest for the herdsman and his cattle, as it is the hottest period in the grazing calendar. In deed, he now herds his cattle only in the evenings and nights (Riesman, 1977, as cited in Iro, 1994). May and June signify the end of dry season and vegetation begins to appear. This also marks the beginning of northward movement of cattle herds. From this period up till September, which is the peak of rainy season, though characterized by cattle-breeding, more milk production and shorter grazing hours, cattle herding coincides significantly with arable crop production. Farmer-herdsmen conflict therefore becomes prevalent during this period.

#### **4. Causes of farmer-herdsmen conflict**

The causes of farmer-herdsmen conflicts are often not far-fetched. However, there appears to be no consensus among both groups as to the causes of their mutual conflict. According to de Haan (2002), 'destruction of crops by cattle and other property (irrigation equipment and infrastructure) by the pastoralists themselves are the main direct causes for conflicts cited by the farmers, whereas burning of rangelands and fadama and blockage of stock routes and water points by crop encroachment are important direct reasons cited by the pastoralists'. Ingawa, Ega, and Erhabor (1999) reported that the key underlying causes of farmer-herdsmen conflict in Nigeria are:

- Changing resource access rights, whereby traditional access rights to communal grazing and water resources are being obstructed by the individual tenureship of arable farmers. This is particularly severe on the traditional trek routes, which become favorite cropping sites because of their better soil fertility resulting from the concentration of animal manure from the trekking herds in these areas. Within the fadama areas, this is exacerbated by the fragmented nature of the crop plots, which makes prevention of animals straying in the crop plots difficult;
- Inadequacy of grazing resources, as increasing crop cultivation (and increasing commercialization of the crop-residues) and poor management of the existing grazing reserves have resulted in a significant reduction in available livestock feed resources, in particular in the Northern States. Moreover the high value crops introduced by NFDPP (tomatoes and onions) produce almost no crop-residues for livestock feeding. Finally, the regulation that twenty percent of the fadama would need to be set aside for grazing (National Agricultural Policy, 1988) has not been adhered to; and

- Decline in internal discipline and social cohesion, as the adherence to the traditional rules regarding grazing periods, and the authority of the traditional rulers is breaking down. This is exacerbated by increased rent seeking of the formal and traditional authorities in managing resource access.

De Haan (2002) also noted that antagonistic perceptions and beliefs among farmers and herdsman could compound conflict situation, especially due to failing institutions and fierce competition for resources. Another cause of farmer-herdsman conflicts is increasing rate of cattle theft which, according to de Haan (2002), is often accompanied by violence. Other perceived causes of farmer-herdsman conflicts include inequitable access to land, diminishing land resources, antagonistic values among user groups, policy contradictions, and non-recognition of rights of indigenous people Adisa (2011a).

Whatever the causes of farmer-herdsman conflicts are, it is evident that the conflicts have been of great negative effects. These range from economic effects (such as loss of income/resources/yield) to physical (such as home/farm destruction, bodily injury or death of family member) and socio-psychological effects such as emotional exhaustion, job dissatisfaction (Adisa, 2011a). The causes and effects of farmer-herdsman conflict have attracted considerable theoretical and empirical analyses, but conflict actors and victims' coping mechanisms have not received sufficient attention in the literature (Adisa, 2011b). The main thrust of this chapter is to analyze conflict actors' coping strategies and the implications for rural development in Nigeria. Specifically, this study investigated the:

1. Personal and occupational characteristics of conflict actors
2. Effects of conflict on rural household welfare
3. Types of coping strategies used by conflict actors
4. Factors influencing the use the coping strategies, and

## 5. Theoretical considerations

There seems to be insufficient empirical studies focusing on how farmers and herdsman perceive and cope with mutual conflict. Zarafshani, Zamani and Gorgievski (2005) actually dwelt on coping strategies of farmers, but their work was focused on post-draught famine stresses. Lazarus' Cognitive Appraisal Model of coping, (Lazarus and Folkman, 1984) provides the theoretical foundation for analysis of coping in this study. Other coping models such as self-regulation model (Leventhal, Nerenz and Steele, 1984), psycho-maintenance model (Temoshok, Van Dyke and Zegans, 1983) are found in the literature, they paid little or no attention to coping as a mediator of stressful events, according to Zarafshani, Zamani, and Gorgievski (2005).

According to Lazarus' Model, coping from stresses consists of three processes which are:

- i. Primary appraisal - the process of perceiving a situation as a loss, a threat or an opportunity.
- ii. Secondary appraisal - the process of conceiving a potential response.
- iii. Tertiary appraisal - the process of coping resource appraisal.

Thus, within this framework, the way farmers and herdsman perceive their mutual conflict is an appraisal. The way they cope, following Lazarus and Folkman (1984), is thus categorized as (a) emotion-oriented, (b) problem-oriented or (c) social support oriented. The foregoing,



although, is theoretical analysis which is expected to translate, in practical terms, into a means of solving the problems posed by farmer-herdsmen conflict. The real theoretical discussion that is necessary for critical reflection must be represented in a concrete manner as to “almost confuse itself with the practical” (Silva, Almeida, Silveira and Melo, 2005).

## 6. Methodology

The study was conducted in Kwara State, Nigeria. Lying in the middle belt of Nigeria, the state has a land area of 32,500 km sq made of Guinea Savannah vegetation to the south and Derived Savannah to the north. Agriculturally, Kwara State is significant for food production in Nigeria because of its rich soil that supports the cultivation of many crops. The state has a cultivable land area of 2,447, 250ha (Kwara State Planning Commission, 2004). Similarly, it has abundant livestock that comprises of cattle, goats and sheep.

Four-stage cluster random sampling procedure was used to select respondents for the research. Kwara State is one of the states in Nigeria that have recorded high incidence of farmer-herdsmen conflict. Out of the 16 local government areas (LGAs) in the state, 10 are most associated with farmer-herdsmen conflict. Out of these 10, six were randomly selected—namely: Asa, Edu, Ifelodun, Ilorin East, Kaiama, and Moro LGAs. In each LGA, five farming communities were randomly selected making a total of 30 villages. Ten arable crop farmers were randomly selected from each village, thus giving a total of 300 farmers. In each LGA, 10 cattle herdsmen were also randomly selected for data collection. This was done by randomly selecting two herdsmen from five transit camps in each LGA. This gives a total of 60 herdsmen. In all, 360 respondents were selected for the quantitative data collection

Relevant data were collected with the aid structured questionnaire. The Test-retest method was used to determine the reliability of the instrument. This was carried out among 20 respondents that would not be included in the research sample. The value of coefficient of correlation “r” was found to be 0.89, which implied that the instrument was reliable.

Coping strategies of respondents were measured with 20 items on a 4 point Likert-type scale. These include 10 active problem oriented strategies, seven avoidant (or emotion oriented) strategies and three support seeking strategies (Folkman and Lazarus, 1980; Cooper, Deve and O’Driscoll, 2000). Respondents were asked to indicate how often they used each type of coping strategy to deal with aftermath of conflict and were scored.

Probit analysis was used to determine the influence of respondents’ socio economic characteristics on their coping strategies. The three coping strategies that were identified are classified as Problem-oriented coping strategies (POCS), Emotion-oriented coping strategies (EOCS), and Social support-seeking coping strategies (SSCS)

The Probit model assumes that

$$\Pr (Y = 1/X = x) = \Phi (x' \beta)$$

Where

$\Phi$  = is the cumulative distribution of the standard normal distribution,

$\beta$  are parameters typically estimated by maximum likelihood.

Y = Binary outcome variable

X = A vector of regressors

The use any of the coping strategies was manifested through a variable  $Q_i$  such that:

$$Q_i = 1, \text{ if } UPOCS \setminus UEOCS \setminus USSCS > t_i,$$

$$Q_i = 0, \text{ if } UPOCS \setminus UEOCS \setminus USSCS < t_i,$$

Where  $t_i$  = average  $UPOCS \setminus UEOCS \setminus USSCS$  which were calculated separately for the two groups.

UPOCS = Use of problem oriented strategies

UEOCS = Use of emotion oriented strategies

USSCS = Use of social support seeking strategies.

The use of each of the three categories of the coping strategies was computed for each respondent, since reconnaissance survey indicated that a combination of strategies is employed by both farmers and herdsmen to cope with conflict in agricultural land use. A three point Likert-type scale was used to measure the use of the strategies. There were ten, six and four items under POCS, EOCS, and SSCS respectively, whereby the respective scores of each respondent were expressed in percentage. The average POCS, EOCS, and SSCS for the farmers as well as those of the herdsmen were determined by using their respective sample sizes as the denominators.

## 7. Results and discussion

### 7.1 Personal and occupational characteristics

Table 1 presents the summary of the personal characteristics of respondents (farmers and herdsmen). The highest percentage of farmers were those within the age range of 36-50 years (42.3%), while those below 20 years were the lowest, accounting for just 5.5%. The average age of the farmers was 44 years. Among the herdsmen, the mean age was 29 years while the modal age range was 21-35 years, accounting for 37.5%. All this indicates, perhaps, that cattle herding attracts more youths than farming. That cattle herding is a male dominated enterprise was evident from the findings as could be observed from Table 1. Consistent with the results of research by Gurung (2006), all respondent herdsmen were male. This is contrary to the findings in respect of the farmers, where about 30% was female. This may be due to the possibility that farming is easier to practice among women, while for socio-cultural factors, most Fulani women might not take cattle herding as occupation. Table 1 further reveals that the farmers were slightly ahead of the herdsmen in terms of formal education. Indeed, most of the herdsmen had no formal education and none had a tertiary education qualification.

It is interesting to note from Table 1 that the average farmer and herdsman in the sample lived above the poverty line, as they earned the equivalents of \$842.74 and \$1694.94 respectively per annum (\$1=N120). Farmers in the lowest range of annual enterprise income who, incidentally are the majority, may however need to augment their income earnings as they were all leaving below poverty line of \$1 per day by earning below N43, 800 per annum which is the equivalent of \$1 per day. This confirms the prevalence of poverty among rural farmers in Nigeria, as noted by Chukwuone and Agwu (2005).

Respondents' family sizes ranged from one (unmarried) to 20 people. The modal range and mean family sizes for farmers were found to be 6-10 and nine people respectively, while

Variable	Farmers (n=293)		Herdsmen (n=56)		
	Frequency	%	Frequency	%	
Age (years)	6-20	16	5.5	18	22.2
	21-35	67	22.8	21	37.5
	36-50	124	42.3	12	21.4
	51-65	86	29.4	5	8.9
Gender	Male	206	70.3	56	100.0
	Female	87	29.7	-	-
Educational level	No formal education	82	28.0	36	64.3
	Quranic/Nomadic	16	5.5	12	21.4
	Adult education	32	10.8	-	-
	Primary	77	26.3	6	10.7
	Secondary	65	22.2	2	3.6
Annual income (N'000)	Tertiary	21	2.1	-	-
	1-40	106	36.2	1	1.8
	41-80	64	21.8	1	1.8
	81-120	49	16.7	12	21.4
	121-160	22	7.5	8	14.3
	161-200	18	6.2	8	14.3
Religion	201-240	34	11.6	26	46.4
	Christianity	104	35.8	-	-
	Islam	167	57.0	56	100.0
	Others	21	7.2	-	-
Family size	1-5	59	20.2	10	17.9
	6-10	128	43.7	11	19.6
	11-15	83	28.3	26	46.4
	16-20	23	7.8	9	16.1

Note: Mean age of farmers =44 years and for herdsmen = 29.0; Mean income of farmers =N101, 129 and for herdsmen = N203, 393; while their mean family sizes were 9 (for farmers) and 14 (for herdsmen.) N120=1US\$.

Table1. Personal characteristics of farmers and herdsmen in Kwara State, Nigeria, 2008. (N=349)

these figures for herdsmen were 11-15 and 14 people respectively. The implication is that the relatively large family sizes for the two groups may mean more people to cater for and, perhaps also more hands to work on the farm and help with cattle herding.

As discernible from Table 2, the two groups exhibited differing occupational characteristics. While most farmers were small-scale operators, most herdsmen operated on a relatively higher scale. This perhaps explains the gap in their income level as shown earlier on in Table 1. Furthermore, most of the farmers had alternative income-generating activities perhaps to augment their farm income. Interestingly too, about 20% of the herdsmen were agropastoralists – combining cattle-herding with arable crop production. This group of respondents is particularly unique as they qualify to be classified both as farmers and herdsmen, but are also predominantly ethnic Fulani just like the full nomads. On the other hand, farmers, who are essentially non-Fulani, did not engage in cattle herding as alternative occupation. Table 2 further shows that respondents from both groups were mostly driven by income-generating motive. Contrary to common belief, most farmers (82%) in the sample claimed that they farm for the money, not just for food. The desire by the two groups to enhance their income is capable of 'driving' their conflict for land use.

Variable	Farmers (n=293)		Herdsmen (n=56)		
	Frequency	%	Frequency	%	
Farm size (Ha.)	< 1	92	31.3	NA	NA
	1-3	50	17.1	NA	NA
	4-6	56	19.1	NA	NA
	7-9	38	13.0	NA	NA
	10-12	21	7.2	NA	NA
	12-15	16	5.5	NA	NA
	16-18	8	2.7	NA	NA
	No response	12	4.1	NA	NA
Herd size:	1-20	NA	NA	6	10.7
	21-40	NA	NA	16	28.6
	41-60	NA	NA	26	46.4
	61-80	NA	NA	5	8.9
		NA	NA	3	5.4
Alternative occupation:	None	99	33.8	42	75.0
	One	108	36.9	14	25.0
	Two	69	23.5	-	-
	Three	17	5.8	-	-
Production system:	Rain-fed	179	61.1	-	-
	Irrigation	62	21.2	-	-
	Both	52	17.7	-	-
	Pastoralist	NA	NA	45	80.3
	Agro-pastoralist	NA	NA	11	19.7
Production motive:	Food	53	18.1	-	-
	Income	240	81.9	56	100.0
Farming/herding experience (years):	1-5	28	9.6	10	17.9
	6-10	61	20.8	26	46.4
	11-15	83	28.2	14	25.0
	16-20	91	31.1	4	7.1
	21-25	30	10.3	2	3.6

Note: Mean farm size =2.8 Hectares; mean herd size = 41cattle; mean farming experience =13.7years; and mean herding experience = 9.1 years.

Table 2. Occupational characteristics of farmers and herdsman in Kwara State, Nigeria, 2008 (N=349)

## 7.2 Effects of conflict on household and rural development

Most respondents suffered various effects as a result of their mutual conflict. The effects on both sides ranged from physical, economic, to socio-psychological. Table 3 presents the results of the investigation of the socioeconomic effects of conflict among respondents. Conflict outcome experienced was actually determined as the loss, or gain of any of the listed resources. Objectionable as conflicts are, the findings show that both farmers and herdsman reported a few non-material gains. For instance, while 35% of farmers and 29% of herdsman said they gained in knowledge, 30.0% and 17.9% respectively agreed that they gained social support as a result of mutual conflict. The only other item that constituted a 'gain' for both parties was quality of relationship, although the figures were very low: 4.1% for farmers and 5.1% for herdsman. These low figures indicate that mutual conflict affects the quality of social relationships. Moreover, 24.6% farmers and 12.5% herdsman indicated a loss in quality of relationship as a result of conflict. Other non-material resources that were lost included job status (55.6% of farmers and 30.3% of herdsman); self esteem (52.9% of farmers and 16.9% of herdsman); and personal\family health (13.9% of farmers and 16.1% of herdsman).

Resources	Loss of		Gain of	
	Farmers (%)	Herdsmen (%)	Farmers (%)	Herdsmen (%)
Yield	85.0	8.9	-	-
Household resources	23.5	3.6	-	-
Social support	4.4	3.6	30.0	17.9
Stored products	22.5	7.1	-	-
Job status	55.6	30.3	-	-
Self esteem	52.9	19.6	-	-
Income	90.8	14.3	-	-
Family\ personal health	13.9	16.1	-	-
Knowledge	-	-	35.3	28.6
Quality of relationship	24.6	12.5	4.1	5.4

Table 3. Percentage Distribution of respondents according their conflict outcome experiences

Loss of material resources were, however, more widespread among farmers. Income loss had the highest relative frequency (91%) among farmers, followed by loss of yield (85%), household resources (23.5%) and stored products (23%). On the part of herdsmen, losses – whether material or not – were minimal. . Indeed, 14.3%, 8.9%, 7.1%, and 3.8% of herdsmen claimed to have suffered losses in respect of their, income, yield, stored products and household resources respectively. However, concerning non-material resources, 30%, 20%, and 13% of herdsmen suffered losses in respect of job status, self esteem, and quality of relationship respectively. These figures in respect of herdsmen were generally far less than those for farmers, meaning that farmers experienced more losses than the herdsmen

The results of the investigation of the socio-psychological effects of conflict on the quality of family lives of both farmers and herdsmen are summarized in Table 4. Findings confirm the positions of researchers such as Ortega, Johnson, Beeson and Craft (1994), Coelcho (2000), and Bosch (2003) that work related stress could have negative socio-psychological effects on family lives among farmers. Indeed, Ajayi and Allagenyi (2001), Johnson and Johnson (2002) and Daniels (2006) stated in their separate studies that family instability and intense frustration are negative consequences of job related conflicts.

Effects	Rating Mean Scores		
	Farmers	Herdsmen	t-value (p <.05)
Marital dissatisfaction	3.60	2.19	2.13 **
Declining quality of children's education	3.55	1.05	2.10 **
Physical exhaustion	3.75	2.15	2.18 **
Sleepless nights	3.85	3.58	1.51
Reduced interest in family matters	1.40	1.25	1.05
Anger\anxiety\emotional exhaustion	3.75	3.64	0.91
Reduction in food quality\quantity	3.95	1.50	2.45 **
Complaints at home	3.05	1.85	2.01 **
Farm\job abandonment	1.35	1.15	0.93
Staying more away from home	1.38	1.05	0.12

\*\*Significant at p<0.05, two-tailed paired t-test

Table 4. Results of t-test of variables of socio-psychological effects of conflict between farmers and herdsmen in Kwara State, Nigeria

Table 4 reveals that both farmers and herdsmen suffered several negative socio-psychological consequences relating to their respective family lives. It could be due to the fact that whatever happens at work could affect what happens at home. According to Potter (1995), it is hardly possible to find a frustrated person at work that is energized at home. These effects were, however, found to be more pronounced among the farmers than herdsmen, probably due to the fact that farmers suffered more losses than herdsmen. Table 11 shows further that herdsmen and farmer differed significantly in their rating mean scores of the socio-psychological effects of mutual conflict on the quality of their respective family lives in five aspects: marital dissatisfaction ( $t = 2.79, p < 0.05$ ), quality of children's education ( $t = 2.1, p < 0.05$ ), physical exhaustion ( $t = 2.18, p < 0.05$ ), reduction in quality and quantity of food intake ( $t = 2.45, p < 0.05$ ), and complaints at home ( $t = 2.01, p < 0.05$ ). The higher rating mean score of marital disaffection observed among farmers might, *inter alia*, not be unconnected with the higher rate of divorce, about 11%, as seen in Table 1. Also disturbing is the finding that farmer-herdsmen conflicts affected the proper education of children of respondents, as many farmers claimed to experience difficulties in paying school fees and purchasing textbooks and other school materials. This evidently does not augur well for the sustainable development of the affected children, and is capable of creating further social problems in the future if not timely checked. The fact that reduction in quality and quantity of family food intake was found to be a consequence of farmer-herdsmen conflict, particularly among farmers, might be an indication of food insecurity in rural communities. Although farmers had greater mean scores than herdsmen in all items, there were no significant differences in the effects of conflict on family life in the remaining five aspects as shown in Table 4. These aspects are: sleepless nights, reduced interest in family affairs, anger, job abandonment, and staying more away from home.

### 7.3 Conflict actors' coping strategies

Coping strategies of respondents were classified into three namely: problem oriented (POCS), emotion oriented (EOCS) and social support seeking coping strategies (SSCS). The use of each strategy among farmers and herdsmen were investigated. Table 5 shows the descriptive statistics of the use of problem oriented strategies among the respondents. Farmers generally used a combination of strategies, as no single strategy is enough to bring the needed succor caused by conflict. Ten strategies were identified, out of which 'use of job experience' (77.8% for farmers and 55.4% for herdsmen) was most often used by the respondents. Herdsmen in the sample generally used less of problem-oriented strategies than the farmers. This perhaps is an indication that farmers considered the conflict situation from the 'problem' perspective more than the herdsmen. The herdsmen probably faced less problems or direct consequences of the conflict than the farmers.

Other POCS used by the farmers are: taking up alternative occupation (69.6%), working harder (61.8%), buying food for home consumption (50.5%), and adopting and taking loans from friends and families (45.0%). The importance of job experience came to the fore, as respondents claimed to rely on their previous experiences to cope with the conflict situation. It could imply that respondents with long experience may be able to cope better than their colleagues with lesser experience. The fact that half of the farmers claimed to buy foodstuff for home consumption may indicate the severity of the effect of destruction of their farms. The least used POCS was sale of entire farm/herd (14.7% for farmers and 3.6% for herdsmen). This, together with the finding that 62.2% of the farmers 37.5% of herdsmen

Strategies	Used often Deal (%)	Used somewhat (%)	Not used (%)	Not applicable	Total (%)
Worked Harder	<b>61.8</b> <i>37.5</i>	<b>16.7</b> <i>42.9</i>	<b>19.1</b> <i>19.6</i>	<b>2.4</b> <i>0.0</i>	<b>100.0</b> <i>100.0</i>
Used My Experience	<b>77.8</b> <i>55.4</i>	<b>20.1</b> <i>35.7</i>	<b>2.1</b> <i>7.1</i>	<b>0.0</b> <i>3.6</i>	<b>100.0</b> <i>100.0</i>
Borrowed money	<b>45.0</b> <i>3.6</i>	<b>33.8</b> <i>9.5</i>	<b>21.2</b> <i>86.9</i>	<b>0.0</b> <i>0.0</i>	<b>100.0</b> <i>100.0</i>
Prepared for the worst	<b>8.8</b> <i>33.9</i>	<b>29.4</b> <i>32.1</i>	<b>61.8</b> <i>28.6</i>	<b>0.0</b> <i>5.4</i>	<b>100.0</b> <i>100.0</i>
Sold farm/herd	<b>14.7</b> <i>3.6</i>	<b>19.8</b> <i>5.4</i>	<b>65.5</b> <i>91.0</i>	<b>0.0</b> <i>0.0</i>	<b>100.0</b> <i>100.0</i>
Bought food/new herd	<b>50.5</b> <i>14.3</i>	<b>35.8</b> <i>16.1</i>	<b>13.7</b> <i>69.6</i>	<b>0.0</b> <i>0.0</i>	<b>100.0</b> <i>100.0</i>
Sowed less/reduce stock	<b>24.2</b> <i>6.2</i>	<b>13.1</b> <i>17.9</i>	<b>62.7</b> <i>72.3</i>	<b>0.0</b> <i>3.6</i>	<b>100.0</b> <i>100.0</i>
Took another job	<b>69.6</b> <i>3.6</i>	<b>14.7</b> <i>9.0</i>	<b>14.7</b> <i>85.6</i>	<b>1.0</b> <i>1.8</i>	<b>100.0</b> <i>100.0</i>
Tighten farm/herd security	<b>22.8</b> <i>33.9</i>	<b>13.7</b> <i>55.4</i>	<b>63.1</b> <i>3.6</i>	<b>1.4</b> <i>7.1</i>	<b>100.0</b> <i>100.0</i>
Used charms	<b>8.9</b> <i>25.0</i>	<b>24.2</b> <i>39.3</i>	<b>65.9</b> <i>17.8</i>	<b>1.0</b> <i>17.9</i>	<b>100.0</b> <i>100.0</i>

Figures in bold characters are for farmers, while those in italics are for herdsmen

Table 5. Use of Problem-oriented coping strategies among farmers (n=293) and herdsmen (n=56n=56) in Kwara State, Nigeria, 2008.

substantially used working harder as a strategy, might indicate the comparative resilience of the respondents in the face of unfavourable situations.

It is worrisome, however, that as much as 24.2% of the farmers adopted 'sowing less', while only about 6% of the herdsmen 'reduced' their herd size in order to cope with the effects of their mutual conflict. This obviously translates, especially on the part of farmers, into lesser farm output and consequent reduction in food availability, and may indirectly account for rising food prices. Table 3 further shows that the herdsmen were perhaps more security conscious than the farmers. More than the farmers, herdsmen 'prepared for the worst', 'tightened security', and 'used charms' as coping strategies. This scenario tends to indicate that herdsmen were probably more bellicose than the farmers.

Table 6 summarizes the use of EOCS among the two groups. Accepting the conflict situation/consequences as act of fate was found to be the most commonly used emotion-oriented coping strategy as 57.7% of farmers and 39% of the herdsmen used it a great deal. The ability to accept the situation with equanimity among groups is not only a psychological coping strategy, but is also capable of reducing the escalation of violent conflict between the two groups. Both also used prayer for peace, indicating their level of religious attachment. Use of drugs or alcohol was the least used EOCS among the farmers. The rate of drug/alcohol use was however higher among the herdsmen. It is instructive to observe that drug/alcohol use as a coping strategy not only portends undesirable health consequences, it could actually worsen the conflict situation by affecting the behavioural orientations of persons concerned.

Strategies	Used often Deal (%)	Used somewhat (%)	Not used (%)	Not applicable	Total (%)
Accepted it as fate	<b>57.7</b> <i>39.3</i>	<b>22.5</b> <i>35.6</i>	<b>14.0</b> <i>17.9</i>	<b>5.8</b> <i>7.2</i>	<b>100.0</b> <i>100.0</i>
Prayed for peace	<b>28.3</b> <i>51.8</i>	<b>64.8</b> <i>32.0</i>	<b>5.5</b> <i>10.8</i>	<b>1.4</b> <i>5.4</i>	<b>100.0</b> <i>100.0</i>
Pretended it wasn't bad	<b>14.6</b> <i>19.6</i>	<b>17.4</b> <i>21.4</i>	<b>66.6</b> <i>53.6</i>	<b>1.4</b> <i>5.4</i>	<b>100.0</b> <i>100.0</i>
Take it out on others	<b>8.9</b> <i>9.0</i>	<b>22.2</b> <i>17.9</i>	<b>68.9</b> <i>71.4</i>	<b>0.0</b> <i>1.7</i>	<b>100.0</b> <i>100.0</i>
Used drugs\alcohol	<b>7.2</b> <i>17.9</i>	<b>5.5</b> <i>21.4</i>	<b>85.3</b> <i>48.4</i>	<b>2.0</b> <i>3.6</i>	<b>100.0</b> <i>100.0</i>
Appease other party	<b>13.6</b> <i>25.0</i>	<b>21.8</b> <i>44.6</i>	<b>61.8</b> <i>26.8</i>	<b>2.8</b> <i>3.6</i>	<b>100.0</b> <i>100.0</i>

Figures in bold characters are for farmers, while those in italics are for herdsmen

Table 6. Use of Emotion-oriented conflict coping strategies among farmers (n=293) and herdsmen (n=56) in Kwara State, Nigeria, 2008

It was also found that pretence was not a common coping tool among the respondents, as only about 14.6% of farmers and 19.6% of herdsmen used it often. This indicates that both groups generally recognize the need to be realistic in the management of their mutual conflict. Taking it out on others means transfer of aggression and it was found not to be commonly used by the two groups. Indeed, about 9% of each category of respondents claimed to use. This not only corroborates the finding that most respondents accepted the conflict as fate, but also indicates a somewhat low level of mutual belligerency among them. Rate of use of 'appeasement' was higher among herdsmen than farmers. This might indicate that farmers were more at the receiving end and needed to be appeased by the herdsmen. It also, perhaps, shows that the herdsmen might be willing to compensate the obviously aggrieved farmers.

Table 7 illustrates the use of SSCS. It was found that the most commonly used was seeking help from friends and relations (73.1% of farmers and 59% of herdsmen) to ameliorate the effects of conflict. It was followed by seeking help from traditional institutions. A vast majority of the respondents in each group did not use litigation as a coping strategy, despite the fact that there are regulations regarding the use of agricultural land in the study area. This may be due to the respondents' lack of awareness of their legal rights or their decision to accept the situation as their 'fate'. Seeking help from local governments was least adopted as a coping strategy by farmers, perhaps because there was no enabling environment for that to occur.

#### 7.4 Factors influencing the use of coping strategies conflict actors

Probit analysis was used to ascertain the socioeconomic variables that influenced the use of the coping strategies of farmers and herdsmen. The results are presented in Tables 9-11. Table 8 summarizes the findings in respect of average values of the scores concerning the three coping strategies by respondents in each group. It was found that, among farmers, the average score in the use of problem-oriented strategies was 72.5%, while that for herdsmen was 43.2%. It implies that farmers, on the average, used more of problem-oriented coping strategies than herdsmen did. This might be due to the fact that farmers encountered more conflict-related problems than herdsmen.



Strategies	Used often (%)	Used somewhat (%)	Not used (%)	Not applicable	Total (%)
Help from relations	<b>59.0</b> <i>26.8</i>	<b>14.0</b> <i>32.0</i>	<b>25.2</b> <i>35.8</i>	<b>1.8</b> <i>5.4</i>	<b>100.0</b> <i>100.0</i>
Help from local leaders	<b>14.7</b> <i>7.2</i>	<b>15.0</b> <i>7.2</i>	<b>67.9</b> <i>85.6</i>	<b>2.4</b> <i>0.0</i>	<b>100.0</b> <i>100.0</i>
Sought litigation	<b>10.9</b> <i>3.6</i>	<b>7.2</b> <i>3.6</i>	<b>79.5</b> <i>89.2</i>	<b>2.4</b> <i>3.6</i>	<b>100.0</b> <i>100.0</i>
Help from local government	<b>4.4</b> <i>7.2</i>	<b>16.7</b> <i>14.3</i>	<b>75.5</b> <i>78.5</i>	<b>3.4</b> <i>0.0</i>	<b>100.0</b> <i>100.0</i>

Figures in bold characters are for farmers, while those in italics are for herdsmen

Table 7. Use of social support as conflict coping strategies among farmers (n=293) and herdsmen (n=56) in Kwara State, Nigeria, 2008

Item	Farmers	Herdsmen
Average use of problem-oriented strategies score (%)	72.5	43.2
Average use of emotion-oriented strategies score (%)	44.2	69.4
Average use of social support-seeking strategies scores (%)	68.8	21.6

Table 8. Mean scores of the use of coping strategies among farmers and herdsmen in Kwara State, Nigeria, 2008

On the other hand, the average use score in respect of emotion-oriented coping strategies was higher for herdsmen than farmers. Table 8 further shows that while farmers' average social support-seeking strategies score was 68.8%, that of herdsmen was 41.6%. This implies that the farmers had greater tendency to seek external help in order to cope with the effects of conflict than the average herdsmen in the study sample.

The Probit analyses of socioeconomic variables influencing the use of each of the 3 categories of coping strategies (the dependent variable) among farmers and herdsmen are presented in Tables 9-11. The ML- (maximum likelihood) binary probit method was used, with convergence achieved after 5 iterations. At degree of freedom 10 – which is the number of independent variables, the critical LR statistic ( $\chi^2$ ) is 18.0370 at 0.05 probability level. This means that the calculated LR statistic must be higher than 18.0370 for Probit coefficients for any of the coping strategy categories to be collectively statistically significant at 0.05 probability level.

The results indicate that, with average use of POCS among farmers found to be 72.5% (Table 6), the likelihood ratio, LR statistic of 23.26 was significant at  $p = 0.014 < 0.05$ . This implies that, at least one variable was significantly different from zero and that collectively, the coefficients are statistically significant. The collective  $R^2$  of 0.4362 was relatively low. This does not indicate that the model is bad or unreliable because, according to Granger and Newbold (1976), Achen (1982) and Gujarati (2004), a high  $R^2$  value is not necessarily evidence in favour of a model and a low one is not evidence against it. Judge, *et al* (1982) equally noted that it is not uncommon to get high  $R^2$  but find that some of the regression coefficients are either statistically insignificant or have signs that are contrary to reasonable *a priori* expectations. Also, Goldberger (1991) stated that what is important is to obtain estimates of the true population regression coefficients and draw statistical inferences about them. Table 9 shows that age ( $p = 0.008$ ), income ( $p = 0.028$ ), Family size ( $p=0.025$ ) and

farming experience (0.06) were individually significant and thus influenced the use of POCS by farmers. This means that the use of POCS among farmers increased with age, farm income, family size and farming experience.

On the other hand, the average POCS use score among the herdsmen was 43.2% (Table 6). Investigation of the use of POCS among herdsmen produced the data contained in Table 9. The variables were also found to be collectively significant (LR statistic= 20.822;  $p = 0.013 < 0.05$ ). However, the significance of educational level, annual income and production system in influencing the use of problem oriented strategies could be noted from their respective p-values. Desire to maximize income could lead to more resort to problem oriented strategies among herdsmen. Educational level however showed inverse coefficient which implies, perhaps, that increasing level of education might encourage less use of POCS among herdsmen. The significance of production system might indicate that, as herdsmen change their production pattern, the use of problem-centered coping strategies increased.

Variables	Coefficient	Standard Error	P	R <sup>2</sup>	Remarks
Age	<b>0.56</b>	<b>0.25</b>	<b>0.008</b>	<b>0.693</b>	**
	<i>0.27</i>	<i>0.33</i>	<i>0.22</i>	<i>0.782</i>	
Gender	<b>0.09</b>	<b>0.01</b>	<b>0.63</b>	<b>0.865</b>	
	<i>0.04</i>	<i>0.001</i>	<i>0.48</i>	<i>0.763</i>	
Educational level	<b>0.008</b>	<b>0.015</b>	<b>0.67</b>	<b>0.874</b>	
	<i>- 0.021</i>	<i>0.005</i>	<i>0.008</i>	<i>0.510</i>	**
Annual income	<b>2.3x10<sup>-6</sup></b>	<b>5.36x10<sup>-7</sup></b>	<b>0.028</b>	<b>0.712</b>	**
	<i>0.189</i>	<i>0.032</i>	<i>0.021</i>	<i>0.664</i>	**
Household size	<b>0.32</b>	<b>0.026</b>	<b>0.025</b>	<b>0.808</b>	
	<i>-0.012</i>	<i>0.01</i>	<i>0.44</i>	<i>0.803</i>	
Farm/herd size	<b>6.65x10<sup>-6</sup></b>	<b>2.5x10<sup>-6</sup></b>	<b>0.025</b>	<b>0.902</b>	**
	<i>0.006</i>	<i>0.022</i>	<i>0.19</i>	<i>0.811</i>	
Production system	<b>0.008</b>	<b>0.002</b>	<b>0.118</b>	<b>0.909</b>	
	<i>0.046</i>	<i>0.025</i>	<i>0.04</i>	<i>0.712</i>	**
Production motive	<b>0.032</b>	<b>0.233</b>	<b>0.69</b>	<b>0.911</b>	
	<i>3.39x10<sup>-6</sup></i>	<i>5.2x10<sup>-6</sup></i>	<i>0.63</i>	<i>0.826</i>	
Farming/ herding experience	<b>-0.049</b>	<b>0.01</b>	<b>0.016</b>	<b>0.831</b>	**
	<i>0.041</i>	<i>0.01</i>	<i>0.711</i>	<i>0.844</i>	
Land tenure	<b>-0.008</b>	<b>0.022</b>	<b>0.496</b>	<b>0.933</b>	
	<i>-7.14x10<sup>-5</sup></i>	<i>2.11x10<sup>-5</sup></i>	<i>0.55</i>	<i>0.905</i>	
Constant	<b>-0.057</b>	<b>0.349</b>	<b>0.91</b>		
	<i>-0.063</i>	<i>0.444</i>	<i>0.832</i>		
LR statistic (10 df) = <b>18.2611</b> ; 20.822			McFadden R <sup>2</sup> (collective) = <b>0.4362</b> ; 0.4159		
Probability (LR stat) = <b>0.014</b> ; 0.013					

Figures in bold characters are for farmers, while the italics are the herdsmen

\*\* Significant at  $p=0.05$

Table 9. Socioeconomic factors influencing the use 'problem-oriented' coping strategies among farmers and herdsmen in Kwara State, Nigeria, 2008

The average EOCS use score (tiEOCS) among farmers was found to be 44.2% as shown in Table 8. Table 8 illustrates the results of the probit analysis of the use of emotion oriented strategies. An LR statistic (i.e. chi-square value) of 19.32 and  $p = 0.0021 < 0.05$  showed that at least one variable was significantly different from zero and the variables were collectively

significant in influencing the use of EOCS among the farmers in the study sample. Age, farm size and farming experience were found to be individually significant in influencing the use of EOCS among farmers. As farm size increased, the use of EOCS also increased.

The significance of farm size in influencing the use of EOCS among the farmers might be due to the fact that increasing farm size requires more commitment from the farmer and he thus becomes more attached to the farm materially, physically and emotionally. He therefore uses every affordable strategy to combat actual and potential farm-related threats. Age and farming experience, however, recorded negative coefficients which connotes inverse relationship with the use of EOCS among farmers. Farming experience and age, which are interrelated, increased with decreasing use of EOCS among the farmers, suggesting that they relied on more realistic coping strategies, other than emotional ones, with increasing age and farming experience.

Variables	Coefficient	Standard Error	P	R <sup>2</sup>	Remarks
Age	<b>-0.46</b>	<b>0.21</b>	<b>0.031</b>	<b>0.524</b>	<b>**</b>
	<i>-0.45</i>	<i>0.01</i>	<i>0.103</i>	<i>0.913</i>	<b>**</b>
Gender	<b>0.09</b>	<b>0.25</b>	<b>0.45</b>	<b>0.812</b>	
	<i>0.04</i>	<i>0.21</i>	<i>0.19</i>	<i>0.922</i>	
Educational level	<b>0.044</b>	<b>0.01</b>	<b>0.26</b>	<b>0.786</b>	
	<i>0.032</i>	<i>0.001<sup>5</sup></i>	<i>0.32</i>	<i>0.904</i>	
Annual income	<b>6.2x10<sup>-7</sup></b>	<b>2.38x10<sup>-6</sup></b>	<b>0.39</b>	<b>0.824</b>	
	<i>2.20x10<sup>-6</sup></i>	<i>6.21x10<sup>-6</sup></i>	<i>0.17</i>	<i>0.844</i>	
Household size	<b>0.20</b>	<b>0.02</b>	<b>0.226</b>	<b>0.792</b>	
	<i>0.006</i>	<i>0.02</i>	<i>0.23</i>	<i>0.861</i>	
Farm/herd size	<b>2.60x10<sup>-6</sup></b>	<b>9.52x10<sup>-5</sup></b>	<b>0.045</b>	<b>0.618</b>	<b>**</b>
	<i>0.053</i>	<i>0.028</i>	<i>0.74</i>	<i>0.624</i>	
Production system	<b>0.005</b>	<b>0.326</b>	<b>0.52</b>	<b>0.861</b>	
	<i>9.1x10<sup>-5</sup></i>	<i>2.4x10<sup>-6</sup></i>	<i>0.66</i>	<i>0.938</i>	
Production motive	<b>0.05</b>	<b>0.031</b>	<b>0.81</b>	<b>0.901</b>	
	<i>0.045</i>	<i>0.003</i>	<i>0.31</i>	<i>0.925</i>	
Farming/herding	<b>-0.043</b>	<b>0.01</b>	<b>0.042</b>	<b>0.773</b>	<b>**</b>
Experience	<b>-0.037</b>	<b>0.015</b>	<b>0.027</b>	<b>0.832</b>	<b>**</b>
Land tenure	<b>0.001</b>	<b>0.026</b>	<b>0.83</b>	<b>0.914</b>	
	<i>0.005</i>	<i>0.25</i>	<i>0.48</i>	<i>0.910</i>	
Constant	<b>-0.059</b>	<b>0.488</b>	<b>0.847</b>		
	<i>-0.55</i>	<i>0.323</i>	<i>0.799</i>		
LR statistic (10 df) = <b>15.324</b> ; 16.624		McFadden R <sup>2</sup> (collective) = <b>0.3126</b> ; 0.6412			
Probability (LR stat) = <b>0.0021</b> ; 0.033					

Figures in bold characters are for farmers, while the italics are the herdsmen

\*\* Significant at p=0.05

Table 10. Socioeconomic factors influencing the use 'emotion-oriented' coping strategies among farmers and herdsmen in Kwara State, Nigeria, 2008

Among herdsmen, socioeconomic characteristics were also found to significantly influence the use of emotion-oriented coping strategies, as indicated by the result of the probit analysis presented in Table 10. With p-value of 0.033<0.05 and LR statistic of 22.624, the variables under consideration were collectively significant. Specifically, years of herding experience among the respondents increased the probability of using emotion oriented coping strategies. Also, with increasing age, the tendency to use EOCS was found to increase.

The use of SSCS among farmers was found to be influenced also by educational level, farm size and farming experience (Table 11). The average SSCS USE score among farmers was 68.8%. The LR statistic (19.1332) and probability value (0.0028<0.05) both indicate the collective significance of the variables in influencing the use of SSCS among farmers. With increasing level of education, farmers perhaps become more aware of social support possibilities, and therefore, adopt SSCS. Increasing farming experience and farm size among farmers might also increase their social support seeking abilities. It is also clear from Table 9 that with an LR statistic of 3.327 and a p-value of 0.0641>0.05, these variables are not collectively significant in influencing the use of social support-seeking strategies among the herdsmen. The reason for this might be that herdsmen generally did not use social support-seeking strategies to cope with conflict.

Variables	Coefficient	Standard Error	P	R <sup>2</sup>	Remarks
Age	<b>0.33</b> <i>0.25</i>	<b>0.01</b> <i>0.015</i>	<b>0.363</b> <i>0.82</i>	<b>0.810</b>	
Gender	<b>0.21</b> <i>0.019</i>	<b>0.21</b> <i>0.01</i>	<b>0.004</b> <i>0.36</i>	<b>0.844</b>	
Educational level	<b>2.17x10<sup>-6</sup></b> <i>0.021</i>	<b>9.66x10<sup>-5</sup></b> <i>0.025</i>	<b>0.032</b> <i>0.22</i>	<b>0.665</b>	**
Annual income	<b>-6.5x10<sup>-6</sup></b> <i>0.006</i>	<b>2.25x10<sup>-5</sup></b> <i>0.01</i>	<b>0.46</b> <i>0.16</i>	<b>0.883</b>	
Household size	<b>0.45</b> <i>0.023</i>	<b>0.025</b> <i>0.25</i>	<b>0.62</b> <i>0.62</i>	<b>0.904</b>	
Farm/herd size	<b>-0.005</b> <i>0.044</i>	<b>0.234</b> <i>0.03</i>	<b>0.026</b> <i>0.77</i>	<b>0.721</b>	**
Production system	<b>0.033</b> <i>2.7x10<sup>-7</sup></i>	<b>0.028</b> <i>9.3x10<sup>-7</sup></i>	<b>0.87</b> <i>0.43</i>	<b>0.923</b>	
Production motive	<b>0.019</b> <i>-0.015</i>	<b>0.015</b> <i>0.22</i>	<b>0.72</b> <i>0.28</i>	<b>0.872</b>	
Farming/herding experience	<b>0.327</b> <i>0.003</i>	<b>0.02</b> <i>0.015</i>	<b>0.009</b> <i>0.81</i>	<b>0.863</b>	**
Land tenure	<b>-0.031</b> <i>0.001</i>	<b>0.01</b> <i>0.023</i>	<b>0.021</b> <i>0.53</i>	<b>0.913</b>	
Constant	<b>-0.048</b> <i>-0.69</i>	<b>0.513</b> <i>0.318</i>	<b>0.921</b> <i>0.906</i>		
LR statistic (10 df) = <b>19.1332</b>		McFadden R <sup>2</sup> (collective) = <b>0.4522</b>			
Probability (LR stat) = <b>0.0028</b>					

Figures in bold characters are for farmers, while the italics are the herdsmen

\*\* Significant at p=0.05

Table 11. Socioeconomic factors influencing the use 'social support' coping strategies among farmers and herdsmen in Kwara State, Nigeria, 2008

## 8. Conclusion and policy implications

Conflict between arable crop farmers and cattle herdsmen over the use of agricultural land is still pervasive in Nigeria, and portends grave consequences for rural development. It has demonstrated great potential to affect various aspects of rural life. The conflicts had far reaching economic, production and socio-psychological effects on the households of most respondents. However, conflict actors and persons affected have used many strategies to cope

with the effects of conflict. While farmers generally tended to use problem-oriented strategies, herdsmen basically used emotion-oriented strategies. This might be an indication of a strong emotional attachment to the cattle among the Fulani tribe in Nigeria. Similarly, the relatively more pronounced use of problem-oriented strategies among the farmers is an indication that they actively sought solutions to the problems arising from the destructions they encountered. The sparse use of social support strategies among both groups suggests there were few avenues for victims of land-use conflict to seek social support. Several factors were responsible for the use of coping strategies among the two groups. Age, income, farm size and farming/herding experience significantly influenced the use of most of the coping strategies among the respondents. An increase in any of these variables increased respondents' propensity to use, especially, most of the problem-oriented and emotion-oriented coping strategies. The use of emotion-oriented strategies among herdsmen, however, decreased with increasing educational status. Thus, the tendency to be emotionally 'attached to the cattle' diminished with increasing years of education among herdsmen.

Farmer-herdsmen conflicts have persisted for far too long and the various strategies adopted by both groups have brought little or no progress in dousing the tide and impacts of the conflicts. It is important for both groups to adopt more realistic coping strategies. Coping strategies should be incorporated into the mainstream activities of farmer-herdsmen conflict management. Furthermore, the following recommendations are also proffered for

1. There is need for educational intervention in farmer-herdsmen conflict. This could be achieved by
  - a. creating better awareness of land use regulations among farmers and herdsmen.
  - b. availing extension personnel with conflict coping mechanisms through attendance of related seminar and conferences. By so doing, extension personnel would be able to teach farmers and herdsmen on conflict coping mechanisms,
  - c. educating both parties on the need for peaceful co-existence and mutual understanding,
  - d. the work of extension is not limited to teaching of new techniques, it is also instructive to know the obstacles that could stand in the way of the techniques to be adopted by farmers. It is therefore worthwhile for extension agencies to have units responsible for farmer-herdsmen relations,
2. Education among the two parties should be realistically encouraged. This would not only lead to better perception but also create better opportunity for awareness of realistic coping strategies,
3. There is need for viable NGOs on farmer-herdsmen conflict management, especially in the areas of awareness, education, prevention, and amelioration. Furthermore, non-governmental organizations should support livestock-centered livelihoods including cattle herding, not only in conflict mitigation but also in the support of grassroots innovations and in influencing favourable national policies.
4. A multi-stage conflict management framework is required to curb the danger posed by farmer-herdsmen conflict. The proposed framework should be statutory committees at community, local, state, and federal government levels. It should also include the relevant occupational unions.
5. Traditional and local leaders should be well involved in finding solutions to farmer-herdsmen conflict. The committees proposed above must have representatives of the local leadership.

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# Technological Model and Sustainable Rural Development for Rainy-Spell Corn Producers in Mexico

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## 1. Introduction

Mexican agriculture presents problems that affect the producers, the rural society and the alimentary security. The first one has to do with the poverty of the field inhabitants. Data from the Consejo Nacional de Evaluación de la Política de Desarrollo Social (CONEVAL), indicate that by 2008, 44.2% of the population (47.2 million Mexicans) was poor, having at least one social lack and an insufficient income to acquire alimentary and non- alimentary goods considered basic. Out of the total of the poor population, 63.2% inhabit the rural and 36.8% the urban surrounding (CONEVAL, 2010). Poverty tends to worsen because the prices of foods have increased; at the beginning of 2008 the real prices of foods were 64% higher than those of 2002 and the index of food prices marked a maximum of 214.7 points in December of 2010 (Diouf, 2011).

The second problem refers to the climatic change of anthropogenic origin, since the total quantity of greenhouse effect gases (GEG) we send to the atmosphere is almost twice higher than the capacity of natural absorption. The rest accumulates causing higher temperature and abnormality in rain standards and annual distribution. It is considered that agriculture, forests and other uses of land, were the second most important sources of emissions of GEG to the atmosphere with a total of 131.56 MtCO<sub>2e</sub>, accounting for 19% of the total emissions of the country (Diario Oficial de la Federación [DOF], Programa Especial de Cambio Climático, 2009). In the same way, agriculture is the activity most affected by climatic change and with it the different functions that it accomplishes: economic (production of foods and raw materials, productive linkages with other sectors), environmental (conservation of natural resources and biodiversity, ecological services,

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carbon capture), social (forms of social organization as the “mano vuelta”) and cultural (sense of bond to a social group).

The third problem relates to the low agricultural productivity of corn with mean national yields of 3,210 Kg ha<sup>-1</sup> which are far below of those gotten in The United States (9,450 Kg ha<sup>-1</sup>) and Canada (8,510 Kg ha<sup>-1</sup>) (Food and Agriculture Organization of the United Nations Statistical [FAOSTAT], 2010). To satisfy the internal demand 9.2 million tons of corn had to be imported spending almost 2,400 million pesos (Servicio de Información Agroalimentaria y Pesquera [SIAP], 2010).

The interactions of these three problems have become obstacles to attaining self-sufficiency in corn production and sustainable rural development. Corn is the main crop in Mexico, with an estimated harvest of 7.34 million hectares, 39.3% of the harvested total area (SIAP, 2010). This grain is Mexicans’ alimentary base with an annual consumption per capita between 120 and 130 Kg (Zahniser & Coyle, 2004). It is also an essential raw material of diverse productive chains: the industry of masa and tortilla, fritters, balanced foods, snacks and chemical industries that elaborate high fructose syrup, bioethanol, eatable oil, alcoholic drinks and lactic acid (Confederación Nacional de Productores Agrícolas de Maíz de México [CNPAMM] and Asociación Nacional de Empresas Comercializadoras de Productores del Campo [ANECPC], 2006). Likewise, corn is part of the memory of the Mesoamerican cultures, because it has contributed to the social organization; it has been creator of scientific and technological knowledge and it has given occasion for the biological diversity of this grain (Staller, 2010).

In the handling of corn, two contrasting trajectories or concrete models of solution of technological problems have interacted, concerning two paradigms or general approaches of investigation that define the outstanding technological problems and the necessary knowledge to solve them (Dosi, 1982).

The first trajectory, the modern one, is the hegemonic one and it is articulated to the “Productivist Paradigm” result of the “Green Revolution”. It prevails in the irrigated agriculture which occupies a fifth part of the total of harvested hectares. It is based on the use of high yield varieties which can achieve very superior crops to those of indigenous seeds, only if they are irrigated and fertilized. A greater fertility of ground and availability of humidity improve the ecology of weeds, plagues and diseases, thus making it necessary to introduce chemical products to combat weeds, insects and diseases (Borlaug & Dowsell, 2005). The entity prototype of this handling way is Sinaloa that contributes 51% of the total of the production of watering corn, with average yield of 10,180 Kg ha<sup>-1</sup> (SIAP, 2010).

The second trajectory or TM used in the handling of corn is the traditional or rural one that acquires an importance without precedents for the “Agro-ecologic Paradigm” (Altieri & Toledo, 2011). It prevails in general under rain-fed agriculture and, in particular, in federative entities with high indexes of poverty and specialization in corn production (Table 1).

These entities comprise 49.4% of the total of the harvested rain-fed area. Most are self-consumption producers living in extreme poverty, because their total revenue is insufficient to acquire basic foods and they have three or more social lacks (CONEVAL, 2010). They are also smallholders, because about 30% of their properties are less than one hectare size and a little more than 60% are between 1 and 2 hectares (Rascón et al., 2006). Likewise, they are low yield producers because they sow corn under extremely restrictive edafo-climatic and

States	Surface Harvested	%	Yield (t/ha)	Localization Coefficient <sup>1</sup>	Marginalization index
Chiapas	683,203	11.5	2.33	1.37	Very high
Guerrero	443,764	7.5	2.88	1.56	Very high
Hidalgo	190,596	3.2	1.32	1.21	High
Oaxaca	559,089	9.4	1.25	1.23	Very high
Puebla	506,113	8.5	1.64	1.70	High
Veracruz	551,295	9.3	2.37	1.12	High
Total	5,921,061	49.4	2.36	1.0	---

Source: Own elaboration with data from SIAP (2010) and from the Consejo Nacional de Población [CONAPO] (2006).

Table 1. Specialization in corn production and social marginalization in Federative entities of the Mexican Republic.

economic conditions. In order to be adapted to this adverse environment, they have re-created multiple agricultural systems that, in the last 60 years, have evolved because of a TM where modern and rural technologies interact. These millennial TM are at risk of disappearing because public policies excluded subsistence producers from the integral plans of agricultural development, implying that in order to survive, they have to diversify their activities. These plural activities, in turn, lead to intergenerational rupture of transmission of these cultivation methods, inappropriate handling of agrochemicals, greater damages to the environment and loss of sustainability of the agricultural activity.

In a context of low productivity, extreme rural poverty, climatic change, price rises of basic grains and application of erroneous policies to foment the productivity of rain-fed corn: are there technological options to promote productivity of corn producers in the framework of the sustainable rural development? In order to answer this question a study was carried out with a sample of 99 producers of Huaquechula Puebla, where a methodology was applied consisting of three stages: the impact of the technologies used in the handling of corn was evaluated; the high yield or efficient producers were identified, and the TM these producers used in the handling of corn was identified, which is intended to be transferred in order to foment the productivity and sustainability among the subsistence Mexican peasants that sow corn under rainy-spell conditions. Innovations have been the most powerful lever in the social evolution and it is achieved when new technologies are incorporated to the production, adding new (radical innovation) or improved (progressive innovation) products or services, and adopting new or improved production methods (Dismukes, 2005). Therefore, the innovation of corn can be attained if, in a setting of technology users sharing a

<sup>1</sup> Localization Coefficient (LC): Technique of the regional analysis that compares the relative importance of corn in the states, with the relative hierarchy the same cultivation has at National level. To estimate the LC, the Boisier's (1980) mathematical expression was used which states that: a) LC=1, indicates that the relative importance of corn in the entity is similar to that it has at national level; b) LC<1, means that in the state, the relative importance of the cultivation is smaller than that of the country, and c) LC>1, shows that the relative importance of corn in the state is greater than that of the country and therefore, it is inferred that that state is specialized in corn production.

group of concepts, knowledge, tools, abilities and a reservoir of concrete and abstract resources (Kurtev & Aksit, 2007), the used TM is transferred by the most efficient producers.

## 2. Materials and methods

### 2.1 Research area

Huaquechula is located in the west-central zone of the State of Puebla, Mexico. Its geographical coordinates are the parallels 18° 40' 06" and 18° 51' 48" north latitude and the meridians 98° 21' 18" and 98° 39' 36" western longitude. It has a border to the North with the municipalities of Atzitzihuacan and Atlixco, to the South with Tlapanalá, to the East with the municipality of Tepeojuma and to the West with Tepemaxalco.

### 2.2 Investigation techniques

The methodology used in the investigation embraced three phases:

#### 2.2.1 Evaluation ex-post of the TM used in the handling of corn

In this phase the following instruments were used:

**The survey.** It consisted of a questionnaire by means of which most of the data analyzed in the investigation were gathered and systematized. The questionnaire was applied to each producer of a representative sample with 125 questions of closed type, which was proven before its definitive application made in April of 2009. The gathered information embraced demographic, economic, agronomic indicators, as well as those of agrarian and livestock structure.

**Sample Size.** To determine the sample size the Equation 1 was used (Cochran, 1977):

$$n = \frac{N Z_{\alpha/2}^2 S_n^2}{N d^2 + Z_{\alpha/2}^2 S_n^2} \quad (1)$$

Where:

n = Sample size.

N = 538 producers.

d = Precision wanted for the estimate of corn yield: 50 Kg.

$Z_{\alpha/2} = 1.96$  = Value of the table of the standard normal distribution considering  $\alpha=0.05$  (Confidence level= 95%).

S = 241.25 Kg = yield standard deviation, estimated with preliminary data.

The resulting sample was of 99 farmers. The selection of the sampling units (producers) was carried out randomly one by one and without substitution.

**Modern Technology Appropriation Index (MTAI).** With the survey data the MTAI was quantified to know the degree with which the corn producers used correctly the technologies recommended by the Instituto Nacional de Investigaciones Forestales, Agrícolas y Pecuarias (INIFAP). To estimate the MTAI: a) the recommendations made by the INIFAP for each one of the activities of corn cultivation were contrasted, with those the producer applied; b) a nominal value was assigned to the technological package of 100 units

and it was pondered<sup>2</sup> based on the impact that each one of the components had on corn productivity: 10 for sowing date, 20 for variety, 15 for population density, 25 and 5 for fertilization dose and fertilizer application date, 6 and 4 for type and dose of herbicide, 6 and 4 for type and dose of insecticide and 5 for disease combat, and c) each one of the values pondered were divided by two: the first quotient corresponded to the use of the recommendation and the second to its appropriate handling. Therefore, the value of the MTAI varied between zero and 100 units. To calculate the MTAI the mathematical expression proposed by Damián et al. (2007) to calculate the Agricultural Technology Appropriation Index (ATAI), was adapted (Equation 2).

$$MTAI = \sum_{i=1}^k [(p_i)(APS_i / ATP_i)] \quad (2)$$

Where:

MTAI: Modern Technology Appropriation Index.

k = 10: Number of components of the technological package recommended by the INIFAP.

p<sub>i</sub>: Pondering granted to the i<sup>th</sup> component of recommendation.

$$\sum_{i=1}^k p_i = 100, \quad i = 1, 2, \dots, k.$$

APS<sub>i</sub>: Agricultural productive system for the i<sup>th</sup> component of recommendation; i = 1, 2, ...k.

ATP<sub>i</sub>: Agricultural technological package for the i<sup>th</sup> component of recommendation; i = 1, 2, ...k.

(APS<sub>i</sub>/ATP<sub>i</sub>): Proportion of used technology, regarding the recommended technology. According to the equation 2, the value of the MTAI varied from zero, when none of the recommendations of the technological package of the INIFAP was used, to 100 when all the recommendations of the technological package were used appropriately.

**Rural Technology Use Degree (RTUD).** The Rural Technology Use Degree (RTUD) was calculated, which measures in a scale from 0 to 100 the level in which the producers used technologies generated by the producers themselves. To measure the RTUD the use of the following supplies and agricultural practices was considered: Indigenous seed, association and rotation of crops, application of conservation techniques of ground and water, as well as that of manure used as organic fertilizer, granting to each one of them a value of 20 units. The RTUD was obtained by applying equation 3. The Rural Technology Use Degree (RTUD) was calculated, which measures in a scale from 0 to 100 the level in which the producers used technologies generated by the producers themselves. To measure the RTUD the following supplies and agricultural practices were used: indigenous seed, association and rotation of crops, application of conservation techniques of ground and water, as well as that of manure used as organic fertilizer, granting to each one of them a value of 20 units. The RTUD was obtained by applying equation 3.

<sup>2</sup> The pondering was carried out by Drs. Ricardo Mendoza and Abel Gil Muñoz and M.C. Ernesto Aceves, investigators of the Colegio de Postgraduados *Campus* Puebla. The three of them are specialists with more than three decades of experience in the handling of corn.

$$RTUD = \sum_{i=1}^k v_i \quad (3)$$

Where:

RTUD: Rural Technology Use Degree.

k = 5: Number of rural technologies considered for the study.

$V_i$ : Value assigned to the  $i$ th rural technology in function of its use or not for the producer. The value was zero if the producer did not use the technology or 20 if he did.

In accordance with the above-mentioned, a producer that did not use any rural technology obtained zero RTUD, if he used one of the five technologies the RTUD was 20, if he used two of the technologies the RTUD was 40, and so forth. When a producer used the five indicated technologies he obtained a RTUD of 100.

**Producer typology.** Producers were grouped into three categories according to the value of the MTAI and RTUD: a) low (0-33.33), b) medium (33.34-66.66) and c) high technology appropriation (more than 66.66).

### 2.2.2 Identification of high yield producers

To identify these producers: a) the lowest and highest yields gotten by the producers in each one of the studied municipalities were identified; b) the difference between these yields was calculated; c) this difference was divided by three; d) this quotient was added successively to the lowest yields to build three ranks of producers: low, medium and high yield (efficient producers).

### 2.2.3 Identification of the TM used by the efficient producers

In the last phase of the investigation the TM used by the efficient producers was identified.

## 3. Results and discussion

### 3.1 Evaluation ex-post of the technological model used in the handling of corn

Evaluation is an essential phase of agricultural planning that it is necessary to carry out assiduously, to feedback the decision making. It should provide trustworthy information for the design of programs and in that way to achieve greater levels of efficiency and operative effectiveness, optimize the social impact of the invested public resources and build viable solution proposals.

### 3.2 Modern technological model and corn handling

In the development of the "Productivist Paradigm" several entities have participated through the time. Being outstanding the Oficina de Estudios Especiales (OEE) created in 1943, the Instituto de Investigaciones Agrícolas (IIA) founded in 1947, the Instituto Nacional de Investigaciones Agrícolas (INIA) instituted in 1960 through the fusion of the OEE and the IIA, and of the Instituto Nacional de Investigaciones Forestales, Agrícolas y Pecuarias (INIFAP), that arises in 1985 through the fusion of the INIA and the national institutes of cattle and forest investigations. At the moment it is the agency authorized to assist the

demands of producers and agroindustrial chains in cattle and agricultural investigation (INIFAP, 2003).

To make its task, the INIFAP has used the approach “General Recommendations”. It consists of carrying out field experiments in places of interest regions to create “*production formulas*” which are the mean responses of the crops assisted in the experimental cycles. These results are systematized in technological packages and they are recommended for each one of the municipalities that integrate the 190 Districts of Rural Development of the country, with the purpose of promoting the adoption of this TM and the modernization of the Mexican field. The TM recommended for the corn producers of the municipality, is shown in Table 2.

Innovation	Huaquechula
Sowing date	Between March-May
Seed type	H-30, H-33, H-34, H-40, H-48, H-50 H-137, H-139, VS-22
Plant density (ha)	50 thousand plants
Fertilization formula (ha)	140-60-00 and 110-50-00
Fertilization date	It is applied during sowing and second labor
Herbicide type and dose (ha)	Gesaprím 50 (1 kg), 500 FW (1.5 L); Gesaprím 50 (1 kg) plus Hierbamina (1L).
Insecticide type and dose (ha)	Volatón 2.5% or Furadán 5% or Volatón 5% (25-12 kg); Folimat 1000 (0.5 L); Methylic Parathion (1 L) 50% or Malathion (1 L) dissolved in 200 L water by hectare.

Source: INIFAP. 2009.

Table 2. Innovations recommended by the INIFAP for corn handling in the municipality of Huaquechula Puebla, Mexico.

When calculating the MTAI, low (55%) and medium appropriation (45%) producers were found since, on the average, only 32.8 units of the innovations of the INIFAP were used. In addition, it was found that there is no significant relationship between the use of these technologies and yield ( $n=99$ ,  $r = 0.0155$ ,  $p=0.8789$ ) and that there is no significant statistic difference among the yield means of the low and medium appropriation corn producers ( $t=-0.6930$ ,  $p=0.4900$ ), even when the latter used 15.5 more units of the recommended modern innovations (Table 3).

Indicators	Low		Medium		Municipal Average	
	Number	%	Number	%	Number	%
Producers	54	55	45	45	99	100
Yield	2196		2251		2221	
MTAI	25.8		41.3		32.8	

Source: own elaboration with data obtained from the survey, 2009.

Table 3. Number of producers, yield (Kg ha<sup>-1</sup>) and MTAI, by type of producers of Huaquechula Puebla, Mexico.

It is probable that the reduced use of the TM recommended by INIFAP was due to the fact that the method “General Recommendations” is based on the following suppositions:

- i. In the defined regions (DDR and municipalities), corn producers have a reasonably similar handling, eluding the diversity of agroecosystems and producers existing in these geographical spaces.
- ii. Only the edaphic-climatic factors influence corn handling. It does not take into account that the producer’s access to the production means influences manifestly this handling.
- iii. Greater yields can only be obtained if modern inputs are used. However, the high costs modern inputs put them out of reach of the small producers’ budget, with yearly mean remunerations of 3,700 pesos (Escalante, 2006).
- iv. Producers are unable to generate technologies for corn handling. Owing to the shortcomings of most of these suppositions, this TM could not be adapted to the average conditions in which the municipality producers live and produce.

### 3.3 Rural technological model and corn handling

This TM, has been created by a wide social base on a local scale that includes millions of peasants. Their roots are empiric knowledge and innovations the communities have used in diverse disciplines of the knowledge and resource administration ((Topfer, 2000). This TM has been favored by scientific and civil organizations and it is the base of the “Paradigm Agro-ecologic” (Altieri & Toledo, 2011). When these innovations reign in corn handling, it is considered a traditional and inefficient agriculture; for this reason, there are no experimental fields to promote its improvement and, for the same reason, they are not organized in technological packages. It is a predominant the idea that the only knowledge is the scientific one; another kind of knowledge does not have the validity nor the rigor that western science demands to generate technologies (De Sousa, 2006). This notion has no scientific support. Empirical data in Table 4 show that in the TM used in corn handling, modern and rural technologies interact with an evident supremacy of the latter. When calculating the RTUD it was found that it is 45 units higher than the MTAI on the average and that a very weak relationship is presented ( $n=99$ ,  $r = 0.2554$ ,  $p=0.0107$ ) between RTUD and yields. A statistical difference was found between the yield means of the corn producers of medium and high RTUD ( $t=3.6361$ ,  $p=0.0.0004$ ) (Table 4).

Indicators	Medium		High		Municipal Average	
	No.	%	No.	%	No.	%
Producers	29	29	71	71	99	100
Yield *	2010 a		2308 b		2221	
RTUD	55.9		86.9		77.8	

Source: own elaboration with data obtained from the survey, 2009.

\* Different letters in the yield means indicate that there is significant statistical difference among them (Tukey Test,  $p < 0.05$ ).

Table 4. Number of producers, yield (Kg ha<sup>-1</sup>) and RTUD by type of producers of Huaquechula Puebla, Mexico.

The TM used by the municipality producers, confirms the importance of rural technologies (Table 5).



Innovation	Huaquechula
Soil Conservation (%)	Rustic dams (46), living terraces (4), stone terraces (3) ditches (9), Soil conservation techniques were not applied(37)
Sowing date(%)	Jun (68) and July (32)
Seed variety (%)	Indigenous (96) and hybrid (4)
Plant density (ha)	65,584
Crop Association (%)	Corn associated with: pumpkin (58), bean (6) and pumpkin and bean (4). Crops were not associated (32)
Crop Rotation (%)	Alternation with: peanut (25), pumpkin (2), bean (5) and sorghum (43). Crops were not alternated (25)
Average manure application (t/ha)	875 applied before sowing
Fertilization formula (%)	29 formulas applied: 138-00-00 (10), 69-00-00 (9), 30.75-00-00 (9), 115-00-00 (8), 51.25-00-00 (7), 41-00-00 (6), 92-00-00 (6) and 61.5-00-00 (5) and other formulas (30). Not applied (10)
Fertilization date (%)	During sowing (12), first labor (55), second labor (23)
Name and dose of herbicide /ha (%)	6 types of herbicides applied, prevailing: Esterón 1 lt/ha (36), faena 1 lt/ha (14), basagrán 1 lt/ha (11); and other herbicides (9). Not applied(30)
Name and dose of insecticide /ha (%)	8 types of insecticides applied, prevailing: Furadán 1 l/ha (26), Methylic Parathion 1 lt/ha (7), Othesrs (11). Not applied (56)

Source: own elaboration with obtained data from the survey, 2009.

Table 5. Innovations used in corn handling by the average producer of Huaquechula Puebla, Mexico.

A more detailed analysis of this TM and the one recommended by the INIFAP show certain coincidences only in the dates of fertilizer application. In the other tasks carried out, there are unquestionable discrepancies, but standing out were the following ones:

- i. The sowing dates recommended (March-May) were suitable for the plateau of Puebla, but not for the warm-dry areas as Huaquechula, with a rainy season that usually begins at the end of June or beginning of July.
- ii. The INIFAP recommended the sowing of hybrids and almost all the producers used indigenous seeds because: a) they are easy to get; b) the families prefer them for the elaboration of tortillas; c) they possess a millennial adaptation to the local agroecosystems affected by recurrent droughts; d) their production costs per hectare are notoriously inferior to that of the hybrids; e) they have a stable productivity through the time, and f) they are pillars of the cattle reproduction, on providing of greater quantity and quality of forage. The municipality peasants have, on the average, 1.9, 0.7, 0.7 and 0.3 heads of bovine, equine, mule and asinine livestock respectively. Some of these races are used as draft animals since 52% of the producers use them to furrow, 54% to give the first labor and 65% the second labor.
- iii. The density of plants per hectare used by the producers was greater than the recommended one. Probably this is due to that they fertilized their soils with a mixture

of manure and synthetic fertilizers, where the former promotes a bigger absorption of nutrients, improving the fertility of the soils.

It stands out that most of fertilizers used by the producers were nitrogenous, as long as the INIFAP also recommends those containing phosphates. This may be due to the fact that the soils in which the experiments were carried out to generate the best economic doses of fertilization possessed certain edaphic properties that do not coincide with that of the soils in which the peasants sow, to which, on the average, almost a ton of manure per hectare a year was applied.

- iv. 70% of the corn producers used herbicide as manpower substitute in corn handling. The exclusion of the subsistence producers out of the neoliberal model of accumulation has originated an intense emigration and manpower aging. Of the total of the population of the corn producers' family (499 people) 38.5% had emigrated and the producer average age was of 57.3 years.
- v. The least used agrochemical were the insecticides, due to the use of rural technologies such as the association and rotation of crops.
- vi. Roughly, there was a reduced use of agrochemicals because their high costs put them out of reach of the corn producers' budget, with an annual average expense per capita of 9,194 pesos.
- vii. There are three activities (soil conservation, association and rotation of crops) and two inputs (indigenous seed and manure) that INIFAP does not consider in its TM, even though the municipality corn producers have used them daily for years. In brief, it can be stated that it is a question of agro-ecosystems that, to prosper, like in any other, multiple tasks (soil preparation, sowing, tillage, fertilization, etc.) had to be, carried out successively at field level.

To this end, corn producers used modern (machinery, hybrids, agrochemicals) and traditional (draft animals, indigenous seeds, association and rotation of crops, soil conservation, manure) technologies, with an evident prevalence of the latter. This technological syncretism is one of the elements that defines and characterizes the rural handling of corn.

The persistence of this handling method could be due to the interaction of several factors:

- i. The innovations were derived from rural knowledge systems, where producers had adopted, adapted and transmitted to other generations by oral and experiential means, a TM that turned out to be the most appropriate for its agro-ecosystem and life conditions.
- ii. They possessed higher productive efficiency for the following reasons:
  - a. Conservation of soil and water prevented loss of nutrients and water that are indispensable to improve the productive capacities of soils.
  - b. The association of crops is the sowing of two or more crops in the same plot. this helps to articulate different elements of the agro-ecosystem (crops, soils, plants, animals); create synergies that increase the productivity of resources whose cost tends to zero (solar energy, air, nitrogen, carbon); group plants (corn-legumes) with diverse energy efficiency, growth habits and root systems, use in a more effective way the solar energy, nutrients and water. For instance, the corn-bean/Lima bean association powers the soil-plant-environment relationship, since legumes fix atmospheric nitrogen that is used by corn, and promotes the biodiversity of flora

- and fauna that, in turn, creates trophic chains and woofs that regulate plague growth and the low use of insecticides.
- c. Crop rotation reduces problems of weeds, plagues and diseases; it increases the levels of available nitrogen in soil, reduces the necessity of synthetic fertilizers and, along with soil-conservative farm practices, diminishes soil erosion (Ball et al., 2005).
  - d. The use of manure is a key indicator of soil quality since it provides nutrients, improves the structure and texture of soil, as well as physical, chemical and biological fertility of soil, increases airing, penetration and retention of water, stimulates the development of beneficial microorganisms for the plant and is essential for carbon capture (Fenton et al., 2011).
- iii. They have an economic and nutritional complementariness. The poly-crops protect the rural families from total economic damages caused by climatic factors (drought, frost and hailstorms) which can affect some of the cultivated species, but hardly all. Likewise, corn-bean/Lima bean are essential for rural diet, since the corn provides carbohydrates and other elements (such as niacin) and the bean/Lima bean contributes proteins, tryptophan and lysine (Long-Solis & Vargas (2005).
- iv. It encourages the cropping-cattle raising interaction that, for these corn producers, is a strategy of essential survival that has allowed them to diversify their sources of revenues and feeding, have organic fertilizer, have animal traction force and recycle the organic waste the rural family generates.
- v. They are more resilient; that is to say, the corn agro-ecosystems managed with the rural TM has a greater capacity to recuperate their productivity even though they are usually exposed to climatic interferences.
- vi. Finally, its persistence is due to the fact that it consists of sustainable agricultural systems inspired by biology (Vincent et al., 2006). That is to say, it is biomimetic because its handling is based on an ecological engineering that assembles, in the time-space different components of the agro-ecosystem: crops, soils, trees, animals and environment (Altieri, 1991). Likewise, these systems integrate geologic, physical, chemical and biological processes through flows and cycles of matter and energy that settle down between live organisms and their environmental contribution (Connor et al., 2011).

### 3.4 Technological model of the efficient producers

In order to study this TM, the efficient corn producers were firstly identified and, later, the technologies they used in corn handling were determined.

### 3.5 Identification of the efficient producers

When applying the methodology proposed to identify the efficient corn producers the following results were obtained: a) the lowest and highest yields were 1,400 and 3,100 Kg ha<sup>-1</sup> respectively; b) the difference was 1,700; c) the quotient value was 567, and d) the ranks calculated for low-, medium- and high-yield producers were of 1,400-1,967, 1,968-2,534 and >2,534 Kg ha<sup>-1</sup>, respectively. The features of these types of producers are shown in Table 6.

Indicators	Low		Medium		High		Municipal Average	
	No.	%	No.	%	No.	%	No.	%
Producers	24	24%	53	54%	22	22%	99	100%
Yield	1740 a		2206 b		2783 c		2221	
MTAI	32 a		32.9 a		33.6 a		32.8	
RTUD	68.3 a		80.8 b		80.9 b		77.8	

Source: Own elaboration with data from the survey, 2009.

\* Inside each file (Yield, MTAI and RTUD), different letters in the means indicate that there is significant statistical difference among them (Tukey Test,  $p < 0.05$ ).

Table 6. Characteristic of the corn producer types of Huaquechula Puebla Mexico, according to their yields ( $\text{Kg ha}^{-1}$ ), MTAI and RTUD.

In these data it is observed that:

- i. The medium productivity corn producers prevailed.
- ii. Almost one of every four corn producers was efficient.
- iii. In corn handling, modern and rural practices interact, with the latter prevailing since the RTUD among the high yield producers was greater (47.3 units on the average) than the MTAI.
- iv. It was found a significant difference among corn yields of the producers, being bigger among the efficient producers with regard to those of low and medium yield (Tukey test  $p < 0.05$ ).
- v. The increment of the MTAI was not reflected consistently in a significant increment of the unitary yields ( $n=77$ ,  $r = -0.0908$ ,  $p=0.4324$ ); while the higher the RTUD, the yields were consistently higher ( $n=77$ ,  $r = 0.4621$ ,  $p < 0.0001$ ).

### 3.6 Identification of the technological model of the efficient producers

The identification of the efficient corn producers is an essential step to know the TM they used in corn handling (Table 7).

When contrasting these innovations with those the municipality peasants used (Table 5), it stands out that:

1. Most of the producers have used a TM reasonably similar in corn handling, based on a syncretism of modern and rural technologies.
2. The efficient producers used, in higher degree, rural technologies in corn handling except in soil conservation, because most of them possess lands with smaller slope (Table 8).
3. When using less modern technologies, discounting the insecticide, the corn handling had lower costs per hectare.

Innovation	Huaquechula
Soil Conservation (%)	Rustic dams (36), stone terraces (9) and ditches (9), Soil conservation techniques were not applied (46)
Sowing date (%)	Jun (73) and July (27).
Seed variety (%)	Indigenous (100)
Plant density (ha)	66,242
Crop Association (%)	Corn associated with: pumpkin (64) and bean (4). Crops were not associated (32)
Crop Rotation (%)	Alternation with: peanut (32), and sorghum (54). Crops were not alternated (14)
Average manure application (t/ha)	989 applied before sowing
Fertilization formula (%)	14 formulas applied, prevailing: 69-00-00 (23), 41-00-00 (14), 30.75-00-00 (9), 51.25-00-00 (9); other formulas (45). Not applied (0)
Fertilization date (%)	During sowing (9), first labor (64), second labor (27)
Name and dose of herbicide /ha (%)	Faena 1 lt (32), and Esterón 1 lt (27), Not applied (41)
Name and dose of insecticide /ha (%)	4 types of insecticides applied, prevailing: Furadán 1 l/ha (32), Others (23). Not applied (45)

Source: Own elaboration with data from the survey, 2009.

Table 7. Technological Model used by the efficient producers in corn handling in Huaquechula Puebla, Mexico.

### 3.7 Socioeconomic and technological characteristics of corn producers

In Table 8 some socioeconomic and technical features of the municipality producers are shown according to their yields.

Indicators	Low		Medium		High		Municipal Average	
	No.	%*	No.	%*	No.	%*	No.	%*
Age	57.7		57.6		56.2		57.3	
Family size without migrants (Prom.)	2.8		3.2		3.2		3.1	
Migrants/family (Prom.)	1.7		1.9		2.2		1.1	
Remittances (\$/month per capita)	173		171		188		175	
Expense (\$/month <i>per capita</i> )	737		759		816		766	
Corn sowed area prom.(ha)	1.68		1.92		2.1		1.89	
Without slope (No.)	6	25	16	30	10	45	32	32
With little slope (No.)	13	54	35	66	11	50	59	60
With a lot of slope (No.)	5	21	2	4	1	5	8	8
Primary multi-active ** (No.)	14	58	43	81	17	77	74	75
Secondary multi-active *** (No.)	8	34	8	15	4	18	20	20
Peasants **** (No.)	2	8	2	4	1	5	5	5
Possession of tractor	1	4	10	19	4	18	15	15
Yoke of oxen Possession	13	54	17	32	10	45	40	40
With technical consultantship	1	4	6	11	2	9	9	9
Bulls, cows, mules & horses (Heads No.)	2.5		3.6		4.4		3.5	
Sheep & goats (Heads No.)	9.3		14.9		18		14.2	
(Fertilizer application (Kg/ha)	608		948		989		875	
Plants' density /ha	63,570		66,223		66,241		65,584	

\* The % is in relation to the total of producers according to their unitary yields.

\*\*It includes producers that cultivated corn and carried out other tasks of economic branches of the primary sector.

\*\*\* They executed other activities in the secondary and tertiary sectors, besides those dedicated to corn cultivation.

\*\*\*\* It includes the producers that sow only corn.

Table 8. Socioeconomic and technical characteristics by type of producers according to their yields per hectare of Huaquechula Puebla, Mexico.

In this table, the following could be observed:

- i. The three types of producers had living conditions that were essentially similar. The similarities were noticeable mainly between medium and high yields producers, having greater access to production means than those low yield producers.
- ii. The efficient producers had slightly greater quantity of manpower at their disposal, because the rural innovations are intensive in this factor of the production.

- iii. 21 efficient producers were multi-active, but 77% of them carried out other tasks in the primary sector and 18% in other sectors. The percentages for corn producers of medium and low yields are 81 and 15 and 58 and 34, shown in the same order. The multi-activity carried out in the same region in the secondary and/or tertiary branches, has transfigured agriculture in a strategy of secondary life, causing that the producer reduce his specialization in crop handling. The multi-activity carried out outside the community, because of the emigration, has caused a total technical rupture of the corn handling. The lingering interruption of corn sowing by members of the family is an obstacle for the transmission of the traditional knowledge (Nadal & Wise, 2004).
- iv. An element with greater deterioration among the low yield corn producers is the agriculture-cattle raising synergy, causing the quantity of applied manure to be smaller, thereby diminishing the fertility of the agricultural soils and their productive capacity to sustain greater densities of plants and unitary yields. The probable interaction: greater use of rural technologies and the smaller multi-activity of the efficient corn producers in economic branches disjointed of the agricultural and cattle activities, explains their greater productivity.

But the efficiency of the rural TM does not confine itself to the yields per hectare because it has been demonstrated (Etchevers et al., 2001) that these agricultural systems act as sinks of CO<sub>2</sub>, main GEG that is causing the global warming. This way, subsistence corn producers have contributed with environmental services that benefit the whole humanity.

On the other hand, the modern TM has caused deforestation, structural loss and salinization of soil, loss of nutrients and contamination with fertilizers and pesticides (Pengue, 2005). This TM has contributed 14% of the planet warming (Stern, 2007). The modern TM on undermining the natural conditions, in which the agricultural activity is carried out, endangers its persistence in the time because it is more vulnerable to the alterations of temperatures and precipitations originated by the climatic change. This vulnerability was evidenced at the beginning of 2011 with farmers of Sinaloa (Mexico) that were affected by a strong freeze, to the extent that 90% of the 715,000 hectares sowed during the cycle autumn-winter 2010-2011, registered high indexes of damages (The Economist, 2011).

### **3.8 The proposal of sustainable rural development (SRD)**

For the promoters of field modernization, the "technification" of agriculture would originate an increase in production that, in turn, would create greater agricultural surpluses and revenues, facilitating the producers to acquire a greater quantity of goods and contributing to the expansion of the aggregate demand. This way, it would be possible to attain high consumption and development, identified with the lifestyle instituted by the countries of Western Europe and, mainly, with the frantic consumerism encouraged by the United States of America. This schematic vision of development contrasts with the notion of the SRD, grounded in the conceptual contribution the World Commission on the Environment and the Development in its report "Our Common Future" (1987), where sustainable development is understood as that that satisfies the necessities of a generation without compromising the capacity of the future generations to satisfy their own necessities. In this framework, the SRD comprises a double process re-created cyclically and simultaneously. The first moment, includes the production of goods that are required for the satisfaction of necessities. The second moment embraces the satisfaction of human necessities (biological

and cultural), in concrete terms as the rural society perceives and solves them. To this end, man settles complex and dynamic relationships with nature that should safeguard the natural conditions that support this production. That is to say, to be sustainable through the time. The proposal of transfer of the TM of the efficient corn producers is located in the framework of the SRD for the following reasons:

- i. This TM provides corn and other goods obtained from the productive complex “cornfield”, which are the base of rural gastronomy where corn and most of the plants associated to it, are used and/or consumed by rural families or by their livestock. In the same way, the production-consumption of corn has been the base for the re-creation of the rural worldview, understood as the form in which a social group interprets the world, defines its daily behavior and its bond with a social group. Furthermore, the production of this grain has been the origin of rural organization forms that have lasted until our days, such as the “mano vuelta”.
- ii. With the transfer of the TM of the efficient corn producers it is possible to increase, in the case of Huaquechula, the yields of the low and medium yield producers by 37% and 21% respectively. We suppose that this increase can be more substantial if the rescue and revaluation of the rural TM becomes a priority of the Mexican State.
- iii. The deterioration of the agriculture-cattle raising synergy and the loss of manure, are an enormous opportunity to promote the use of the organic waste generated by the inhabitants as organic fertilizer. According to the Secretaría de Desarrollo Social [SEDESOL] (2010), in 2009 the inhabitants of the country generated 20 million tons of organic residues. As it is known, about 20% of the original weight of the organic garbage becomes compost after a process lasting about three to four months. Therefore, at least, 12 million tons of organic fertilizer can be produced in a year if they are distributed in a proportional way among the 6.5 million rain-fed hectares sowed with corn (SIAP, 2010). Diverse studies have demonstrated that the use of compost as fertilizer increases the availability of nutrients and soil productivity, without contaminating the environment (Ouédraogo & Zombré, 2001; Lima et al., 2004). Likewise, compost production can represent an important productive chain for the generation of thousands of jobs in the field and the city.
- iv. The handling of this TM requires greater consumption of human energy. Therefore, to foment its use it would be necessary to grant the subsistence producers substantial subsidy per cultivated hectare. It is a question of applying the Principle of Difference (or of equity), where the primary social goods (rights, freedoms, opportunities, revenue and wealth) are distributed in an unequal way to favour the individuals that are in worse situation (Rawls, 1975).
- v. The use of the rural TM has performed such environmental services as: the mitigation of GEG emissions and of the impacts of disasters associated with natural phenomena, biodiversity conservation and protection of hydric resources (De Schutter, 2010). The economic retribution to the peasants for these environmental services should be considered as an essential mechanism of the environmental national policy.

The transfer of the TM of the efficient corn producers is viable for the following reasons:

- i. The institutional framework “Sustainable Modernization of Traditional Agriculture” (MasAgro) exists with the purpose of rescuing and improving the handling,



productivity and sustainability of the basic grain producers (Diario Oficial de la Federación [DOF], 2010).

- ii. The producers know and have managed this TM, which coincides with their natural environment and the circumstances in which most of them produce and live.
- iii. The governments of the federative entities have radio and television stations, massive media that have been used already with success to transfer technologies, mainly the former. Radio is a medium that allows its transmissions are received quickly, thanks to its penetration in geographical regions of difficult access by means of waves with frequency and amplitude modulation at low cost. It also has the advantage of ubiquity since it allows the receiver to make other tasks, at the same time that he or she listens to the radio. Furthermore, these governments have the human resources and infrastructure to execute all the phases that the model of technological transfer comprises.

The proposal of transferring the TM used by the efficient producers is an idea that has a technological origin, but that it surpasses this question since it intends as a mean to achieve SRD: to enlarge the productivity of corn and the plants associated to it, to improve the revenues and the nutrition of the rural producers of basic grains, to diminish the poverty indexes, to make the producers become the protagonists of the diffusion of the rural TM, and to provide more environmental services to the society (De Schutter, 2010). It is also planned to create jobs, reinforce cultural identity, as well as solidarity and social organization among the corn producers. It is thought that the SRD can be reached more quickly, if it is passed through the PT of the efficient producers to the "Agro-ecologic Paradigm."

#### **4. Conclusions**

In the Mexican field, extreme poverty, climatic change and low productivity that have become obstacles to reach the SRD coexist. In order to reverse this process a methodology consisting of three steps is proposed: to evaluate the efficiency of the modern and rural innovations used in corn handling, to identify the efficient producers and the TM they use to promote its transfer to the other producers. The results of this investigation indicate that this process is feasible since this TM it is adapted, roughly, to the conditions in which the peasants produce and live. With the transfer of the innovations used by the high yield producers, it is probable to increase the yields per hectare of corn and the plants associated to this crop, to diminish extreme poverty, provide more environmental services to the society, create jobs, reinforce the cultural identity, the social solidarity and the political empowerment of the producers, without undermining agriculture sustainability. But mainly, the transfer of this TM can be the shortest and effective way to pass from the rural handling to the agro-ecologic handling of corn.

#### **5. Acknowledgments**

To FOMIX-CONACYT and the Government of the State of Puebla for the financing granted to make this investigation. This publication was made during the postdoctoral stay carried out in the Mastership in Sciences in Rural-regional Development of the Universidad Autónoma Chapingo.

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# Gender Issues in Agricultural Extension and Rural Development in Nigeria

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## 1. Introduction

Agricultural development has been a major concern to most developing countries within the last two decades. It represents a cluster of six related but separate concepts; agricultural expansion; increased production per acre of cropped land or per head of livestock; agricultural growth; a situation characterized with agricultural products per agricultural worker, rising income per person employed and agricultural transformation.

Agriculture is the mainstay of the Nigerian economy, employing about 70-80 percent of the population with the GDP contribution of N34, 950 . 00 million between 1980-1985 (World Bank, 2003). This increased from N40,500. 00 million in 1986 to 59,389. 00 million in 1996 (FOS,2000). The aggregate agricultural production declined till 1980 (oil boom era) This led to a sharp decline in per capital real GDP in agriculture. By 1985, the index per capital real GDP of agriculture was 35 percent. Arokoyo (2003)

In Nigeria, the rural areas are the food and fibre producing centers. They are also the seed bed of national population which serve to replenish the human resources of the urban centers. During the period of national emergencies and crises, the rural areas constitute a reservoir of national patriotism and manpower (Ekong, 1988). Hence household security relies heavily on rural food production. According to Ekong (1988), the rapid increase in global food prices over the past years has raised a lot of issues in the developing countries. Development will therefore not be achieved without rapid agricultural growth.

Rural development is the bedrock of agricultural development in developing countries (including Nigeria) where most farmers are involved in subsistence agricultural practice. A review of current response to food crisis across the world has shown that these measures are being used with varying degrees of successes and failures, depending on the nature of the crisis per country. Various strategies are being used to protect the poor from the increase in price shocks. It is therefore necessary to invest in agricultural sector for rural development to increase agricultural output. Women's role is also very crucial to the overall success of efforts directed towards rural development for increased agricultural productivity. They are more involved in agricultural activities than men especially in sub-Saharan Africa and provide most labour for a number of agricultural activities. They constitute about 90 percent of the workforce involved in direct arable crop production (Ogunlela and Aisha, 2009). The

role of women in agricultural and rural development can therefore not be over-emphasized when considering rural and national development of Nigeria.

Rural Development will therefore take place when attention is paid to various relevant institutions such as the cooperative societies, land tenure system, bank and credits, development of viable local government areas, educational institutions, medical institutions, and agricultural marketing outlets.

### **Nigerian women in agricultural activities**

Rural development is the mainstay of agriculture and agricultural development in developing countries (including Nigeria) therefore all efforts geared towards agricultural development will be fruitless without it. Women in Africa (including Nigeria) generally play an important role in small-scale traditional agricultural production (Afolabi, 2008). Rural women have taken over the production and processing of arable crops and are responsible for as much as 80% of the staple food items. Estimates of women's contribution to the production of food crops range from 30% in the Sudan to 80% in the Congo contributing substantially to national agricultural production and food security (OECD, 1992). Most farmers in Nigeria operate on the subsistence and smallholder level in an extensive agricultural system; therefore, in the country's food security lie in their hands. Women farmers are the principal labour force on small holder farms and perform the largest share in land preparation, weeding, transporting, processing and marketing of agricultural products. Women therefore contribute greatly to agricultural production in Nigeria as take the lead in most agricultural activities. They make up to 60-80 percent of the labour force. Therefore the significant role they play in meeting the challenges of agricultural production and development are quite dominant and prominent. (OECD, 1992). The importance and relevance of women in agricultural development can therefore not be overemphasized. This is because they are known to be more involved in agricultural activities than men in sub-Saharan African (SSA) countries including Nigeria.

## **2. Current extension delivery – Management and major actors in Nigeria**

The Agricultural Development Programme (ADPs) nationwide is the agency responsible for public extension service delivery at the grassroots. Recently there is a new democratic dispensation involving the local governments in extension delivery, in collaboration with the ADPs. The quality of staff and the resources of the Local Governments are such that they have been able to make minimal impact (Arokoyo, 2003).

### **2.1 Women in rural development programmes in Nigeria**

Over the years, Nigeria has been involved in several agricultural programmes which include Operation Feed the Nation, Green Revolution, River basin development authority, Back-to-land programme e. t. c. Most of these programmes have not had a lasting impact and therefore vanished without achieving most of their objectives. Women –in-agriculture unit was created from the existing ADPs in 1989 in order to extend extensionists' services to women farmers. Since the World Bank stopped funding the programme, different states have tried to implement the programme under varying policies and adopting varieties of strategies to sustain the programme. The Women –In –agriculture unit of the ADPs was created in recognition of women's contribution to agriculture. This was as a result of a

research sponsored by the United Nations Development Programme (UNDP) in 1987, which revealed that agricultural extension services had not targeted women as important clientele, in spite of the indispensable role played by women in agriculture. The research also revealed that most of the messages from the extension agents emphasized their domestic role with topics on child care and family nutrition. The widespread assumption that men and not women make key farm management decision is a misconception and the idea that women in the northern parts of the country were not involved in active agriculture was finally laid to rest (Nnoyelu, 1996)

The Women-In- Agriculture programme therefore aims at identifying the key constraints and provides solutions towards increasing women farmers' agricultural productivity source and develop through research. WIA also helps to form women groups and cooperatives. This programme compliments greatly the efforts of other women agencies such as the women commission, women in health of all state Ministry of Agriculture and of course, the family support programme (FSP)

### **2.1.1 Women-in-Agriculture (WIA) development programme in Nigeria**

Women in Agriculture (WIA) was operative as one of the components of the UNDP major project NIR/87/014, tagged 'Strengthening agricultural extension services in Nigeria' between November 1988 to March 1991 with the aim of assisting the Federal government of Nigeria in meeting its declared objective of self-sufficiency in food production and increased agricultural export by helping to increase the rate of adoption of appropriate innovations by the rural farming communities. The Federal government of Nigeria (FGN) therefore requested for FAO/UNDP assistance.

The Integrated Agricultural Development Programme (IADP) led to the establishment of Agricultural Development Project (ADP) which is now present in each of the thirty-six states, and the Federal Capital Territory of the country. Idachaba (1988) reported that the ADPs constitute the single largest agency charged with the responsibilities for agricultural extension services in Nigeria. The ADPs started nearly a decade before the WIA (Women-In-Agriculture) was introduced in different places. The recognition of the dominant role of Nigerian women in farm production, and the need to modify extension system to address it was initiated by the Federal government of Nigeria after a series of World Bank study missions to a number of loan-assisted projects in various parts of Nigeria. These studies confirmed high contribution of women (60% of farmers) while they received little or no information from the extension agents Mijindadi (1985). The recognized involvement of women in agriculture and especially food production made it possible for the government to establish a WIA unit in April 1989. The activities of the WIA as a component within the extension department had focused on rendering of agricultural extension services through female extension staff to female farmers as individuals and groups in areas of crops and livestock production, handling and marketing techniques, processing, storage, and utilization.

The ADPs started nearly a decade before the WIA (Women-In-Agriculture) was introduced in different parts of Nigeria. The agricultural programme for women farmers aimed at harnessing the total on-farm and off-farm agricultural capabilities of farm women in order to build better lives for themselves, families and communities.

### 2.1.2 Objectives of the WIA unit of the ADP, Nigeria

The main objective of the WIA unit of the ADP is to improve the living standard of rural women farmers. The specific objectives of the WIA unit of the ADP include:

- identification of the constraints faced by women farmers;
- sourcing and collaborating with research institutions to develop suitable technologies to meet identified constraints and needs;
- Ensuring timely extension support to women farmers in the area of agricultural production, processing, utilization (with greater emphasis on production)
- Improving extension services through increase in number of female extension agents;
- Introducing improved and appropriate technologies which are labour saving and can remove drudgery, and are yet affordable by the women farmers.
- Organizing women groups and encouraging groups to register as viable cooperative groups so as to have access to credit facilities;
- Introducing newly recommended farm technologies by conducting SPATS and establishing women groups.
- Updating and up-grading the skills of WIA agents in agricultural/food production, preservation, storage, processing, utilization and nutrition.
- Training women farmers to increase their agricultural food production income and to improve their nutritional status;
- Developing local recipes from farm produce;
- Providing assistance to women in post harvest technologies; and
- Initiating technologies that will reduce the drudgery associated with day-to-day activities of women. (Odebode,2008)

## 3. Rural development

### 3.1 Concept of rural development

Development is a continuous process involving allocating and generating resources (Idachaba, 2000). This is mainly done to satisfy social and economic needs. Development in the rural area is also very important and endowed with abundant human and natural resources. Rural development involves a process by which a set of technical, social, cultural and institutional measures are implemented with and for the inhabitants of rural areas with the aim of improving their socio-economic conditions, to achieve harmony and balance at the state, national and the regional levels (Ekong,2003). Since there is no universal definition of rural development, different scholars view it from different perspectives. Obinne (1997) defined rural development as a process of creating and widening opportunities for individuals to realize full potential through education and share in decisions and action which affect their lives. Idachaba (2000) defined rural development as a means of providing basic amenities, infrastructure, improved agricultural productivity, extension services and employment generation for the rural dwellers. Olayide (1980) defined rural development as a process whereby concerted efforts are made to facilitate significant increase in rural resources and productivity with the central objective of enhancing rural income and creating employment opportunities in rural communities for rural dwellers. Hence, it is an integrated approach to food production, provision of physical, social and institutional infrastructures with an ultimate



goal of bringing about good healthcare delivery system, affordable and quality education, improved and sustainable agriculture etc. Coombs and Ahmed (1974) defined rural development as the far-reaching transformation of the social and economic structures, institutions, relationships and processes in the rural area. They viewed goals as agricultural and economic growth as well as social and economic development with equitable distribution and creation of benefits. UNECA (1974) defined rural development as a process by which a set of technical, social, cultural and institutional measures are implemented to improve the socio-economic conditions of the rural dwellers. Ladele (1990) defined rural development as a cyclic process involving analysis of the current situation, policy, modeling and implementation of the measures to be used. He further opined that the programming of rural development is very essential for any agrarian economy. According to him, the greatest empowerment that could benefit rural folks is education and information. Extension education therefore will serve as an essential tool for the attainment of sustainable rural development.

In summary, it is imperative to view the development programme in Nigeria beyond the growth of a particular sector. Development must be viewed with a holistic perspective. This is because rural development in Nigeria has been going on under various means by various organizations, communities, states and local government areas for a long time.

Rural development in Nigeria was viewed as the same with agricultural development. It therefore goes beyond this and covers issues relating to social, institutional and physical infrastructure.

In Nigeria, the local government, state and federal governments contribute to rural development. These efforts are being complemented by the activities of non-governmental organizations, international funding agencies and community initiatives.

An integrated rural development recognizes rural-urban continuum and the implication that the rural area cannot be considered in isolation but in relation to the urban counterparts. Furthermore, different policies were put in place by the government on rural development in order to improve the living condition in the rural areas and discourage rural-urban migration.

Despite the number of rural development policies introduced at different times, by different successive government with a huge of material and financial resources, each policy usually dies with the initiating government. All efforts made by the government to put money into agricultural development have not yielded good result. Other efforts include provision of modern infrastructure, primary health care, food and shelter, employment opportunities, recreational facilities, primary and secondary education, loan and further incentives.

### **3.1.1 Characteristics of the rural areas**

Ekong (1988) identified the characteristics of the rural areas as follows:

Rural areas involve people with lower level of living, ineffective or institutional structures, poor social and physical infrastructures, low per capital income, poor technical efficiency of agriculture as a result of poor production methods, small cultivable land, endemically low productivity and High level of poverty.

Several development projects in Nigeria since 1960 include the farm settlement scheme established in 1960s, the National Accelerated Food Production Programmes (NAFPP) established in 1972, Agricultural Development Projects (ADPs) (1972), the Nigerian Agricultural & Cooperative Bank (NACB) (1973), the Rural Banking scheme (1973), Operation Feed the Nation (OFN) (1976), the River Basin Development Authority (1976), Agricultural Credit Guaranteed Scheme (ACGS) (1978), Directorate of food, Roads, and Rural Infrastructures (DFRRI) (1986), National Directorate of Employment (NDE) (1987), Directorate of social mobilization (MAMSER) 1987), National Agricultural Land Development Authority (NALDA) (1988), Better Life Programme for Rural Women (BLP) (1986) and Food security and Poverty Alleviation Programme (PAP) (1999). These different rural development projects were put in place to improve the livelihood of the rural people by different governments at different times.

### **3.1.2 Objectives of rural development projects in Nigeria**

The major objectives of rural development programmes are as stated below:

- Maximum mobilization of domestic human and material resources for self reliance
- Provision of social amenities and infrastructures to narrow the gap between the rural and the urban areas
- Integrating the goals of development efforts into a comprehensive system.
- Bridging the gap between the rural and urban areas by providing social amenities and infrastructures. Chambers (1983).

### **3.1.3 Problems of rural development programme in Nigeria**

Rural development programme in Nigeria is faced with constraints. These constraints serve as impediments to successful agricultural development programmes. Problems limiting rural development programmes include:

- Lack of rural infrastructural development
- Improper interpretation of local situation.
- Effect of conflicts and even threat of potential conflicts.
- Environmental Degradation
- High level of corruption and crime
- Lack of proper coordinated implementation of programmes.
- Lack of community empowerment
- Lack of Control over productive resources by the women.
- Lack of Social or Economic Power by women as against their male counterparts and poor health of women

These problems hinder rural development especially among women in the rural areas in Nigeria. It is therefore important to look at the development planning holistically because development planning often runs the risk of tackling one problem without consideration of other issues that are closely related and may affect the success or failure of interventions. It is important to see the holistic picture of opportunities and constraints, activities and values, personal characteristics of age, education, status e. t. c. to plan a strategy that will truly be beneficial for the society at large and the individuals at the grassroots. Attempts to increase

women's incomes or agricultural productivity will succeed if other constraints facing women, such as limited access to credit, labour shortages and lack of seed and other input are also addressed (Olawoye, 2010). Rural development efforts should aim at assisting all members of the community including women. This is because, in some communities, certain groups or individuals are marginalized. These individuals include the poor, women, especially widows, or persons from poor households, ethnic minorities, pastoralists, physically challenged and other sick people.

### 3.2 Rural women in food production

Over the past two decades, issues relating to the recognition of women's role in economic and social development and of equality between men and women have fostered increasing interest among policy makers and development practitioners. Despite a noticeable improvement in gender awareness worldwide, data on women's work and economic contribution have remained far from comprehensive (Odebode 2008). Their economic roles have been undervalued, underestimated and seldom acknowledged for proper articulation in development plans and policy information.

However, with the rapid socio-economic growth, now being experienced all over the world, women are found to be playing significant roles wherever they are found. Within the last two decades, the role of women in the development process has become a major focus of research analysis and policy decision. The situation analysis of sexual inequalities and socio-cultural dynamics has revealed gender disparities in income, health, education, literacy, share of income from labour, economic participation and political voice (Sarr, 1999). Women are thereby often relegated to the status of second-class citizens, depending on the rights of their husbands and other male relatives. They often have limited access to and control of productive resources such as land, technology or financial services (FAO, 2006). According to Olawoye (1988), rural women constitute the "economically active population" but they were largely not considered productive because they usually worked as unpaid family labour. A large majority of the farmers operate at the subsistence, smallholder level, with intensive agriculture being uncommon.

In Nigeria, as in many parts of Africa, it is estimated that women contribute about 70 percent of the labour in food processing and preservation (Olawoye, 1988). However, division of labour in food production in the rural areas of Africa is usually both task and crop specific. While men do the land clearing, grow perennial crops, provide meat and raise large animals, women do the hoeing, planting, thinning, weeding and care for small domestic animals.

Each organization has its own gender culture (i. e. relationship between male and female). Mainstreaming gender into agriculture is therefore a necessity to bring gender perspective to all aspects of agricultural policies, and activities by building gender capacity and accountability.

Gender mainstreaming is the process of assessing the implications for women and men of any planned action including legislation, policies or programmes in all areas and at all levels. It is a strategy for making women and men's concerns and experiences an integral dimension of the design, evaluation of policies and programmes in all political, economic, and societal spheres so that men and women benefit equally. Gender issue therefore

involves basic gender relationship which has become a major determinant for different situations.

Nigeria is a very big country with different socio-cultural, geopolitical and agro-ecological zones. Furthermore, there are more than 350 different ethnic groups with large proportions of Muslims, Christians and traditional believers (Olawoye, 2005). These diversities have resulted into various dimensions to gender relationships, cutting across different groups. Gender-based differences have therefore become important at household, community and national levels.

In Nigeria, the gender-related responsibilities at the household and community levels are clearly delineated. 'Gender' has become a common development concern in the last two decades (Olawoye et al, 2002). Gender is therefore not just the differentiation between male and female but involves socially constructed roles, responsibilities, constraints and opportunities for people (Olawoye et al, 2002). In addition, gender does not refer to women alone because the activities of women can only be understood fully in relation to the gender division of responsibilities in the household, community or nation.

In any society, gender roles are developed and transmitted through the process of socialization with the family members and other significant groups and individuals taking up the major role of agents of socialization at various developmental stages. In Nigeria, there is the tendency of encouraging gender stereotyping with boys and girls brought up to believe that aggressive behavior and certain occupations are suitable for males and that girls should be restricted to gentle behavior and less technical careers.

### **3.2.1 Gender issues in agriculture**

There has been a growing recognition of the importance of gender to some specific development sectors in recent times. It has also become a cross-cutting issue in agriculture, health and, infrastructural development. This is because, there has been significant gender related changes. In the past decades, women have been known to play an important role in agricultural activities in the rural areas. Despite their roles in agricultural activities, their contributions were not recognized and so, they were left out in development programs. This has led to decrease in agricultural productivity (Odebode, 2008).

Women do most of the work in the subsistence agricultural sector in most localities in Nigeria. Women are responsible for fetching water, gathering firewood, transporting harvested produce to the homestead and market and carrying crops to the mill for processing. In Nigeria, the introduction of Sharia laws prohibiting males and females traveling together has put additional strain on women in the affected states. Women therefore spend more time moving from place to place within the village vicinity.

Gender as a concept is used in social sciences to define the roles and activities of men and women. These roles are socially defined by the traditions and beliefs of a particular culture. Gender is therefore not synonymous with sexual differences which are based on only on biological characteristics . the gender constructions are culture specific and assign different identities and roles to men and women (Olawoye,2002)

Gender analysis is a tool for understanding and learning more about the activities of male and female in the society, the opportunities and problems they face in performing their

activities. Olawoye, et al (1994) defined Gender as a social construct that identifies the socially expected rights, responsibilities, privileges and obligations of males and females. According to her, each society or group decides which tasks, as well as which opportunities should be assigned to males and females, young and old. Olawoye et al (1994) further explained that Gender analysis involves the study of both male and female responsibilities and how these responsibilities and activities are interrelated.

Gender division of labour is best understood in learning about socio-cultural differences. Gender analysis therefore is not necessarily about developing programs for women, which is the common assumption of the people in the society. It is focused on the relations of both men and women to the social and economic structure of the society.

In many societies, men have certain roles and responsibilities while women have other roles and responsibilities and often, the biological differences between men and women are used to explain these different roles. In Ghana, for example, men have traditionally been involved in cloth weaving. In India, women are laborers in the construction company. So biological differences do not necessarily determine what men and women (Olawoye,2005) can or should do. The roles are often socially defined by the traditions and beliefs of a particular culture. In conclusion, there are many potential effects of gender imbalance to responsibilities usually heavier for women.

### **3.2.2 Importance of gender analysis in extension work**

Gender analysis is important in development programmes for many reasons. It helps to do a systematic assessment of males and females often different needs, preferences, activities, and preferences as well as different access and control over resources by males and females, sexual division of labour, and income-generating activities and participation of men and women in development opportunities. (Olawoye,1985) The importance of gender analysis is summarized below:

1. It provides information recognizing gender and its relationship with race, ethnicity, culture, class, age, disability and other statuses.
2. It helps in planning issues relating to livelihood. This will assist in achieving viable and sustainable livelihood strategies.
3. This can be used in raising awareness of gender issues. This helps to inform policy makers and provide gender training materials. All these will assist in monitoring different impact of policy, project and budget commitment on both male and female.
4. Gender analysis helps to identify the needs of male and female.
5. It helps to identify different problems facing the participation of both male and female.
6. Gender analysis helps to identify various ways in which male and female do or do not benefit from livelihood interventions.
7. It provides reasons for the current division of responsibilities and benefits and their effect on the distribution of rewards and incentives.
8. It helps to provide insights on how gender equality can be prioritized within efforts of sustainable development to ensure maximum efficiency in pursuing development goals.
9. Gender analysis helps to identify the roles and responsibilities of male and female (e. g. productive roles, reproductive roles); seasonal patterns (community participation,

community politics), Assets (e. g. human assets, natural assets, social assets, physical assets and financial assets) power and decision making, needs and priorities (e. g. women's and men's needs and priorities).

### **3.2.3 Reasons for gender analysis in agricultural extension work**

Agriculture is the main source of foreign exchange earnings in Nigeria. It supplies both food and cash crops that help her foreign exchange earnings.

Agricultural Extension is an out of school, voluntary, educational process aimed at improving the welfare of the rural populace (Odebode, 2005).

A common assumption is that gender analysis focuses only on the status of women in the society. It is focused on the relationship of both men and women to the social and economic structure of a society.

Some gender analysis theorists observed that, the focus for gender analysis is on men and women's productive roles and that activities that men and women carry out in the agricultural process come under this group; various researches have showed a better picture of gender roles in agriculture. Men and women may work on the same crop, on the same field but perform different tasks. For example, land preparation is usually the task of men while weeding is identified with women. Various members of households perform various tasks assigned to different members of the household. It is important to note that both women and men play significant roles in agricultural production. Moock (1986)

Despite the importance of the productive activities of the Nigerian farmers, little was known about the important roles played by women. In agricultural development, both men and women farmers do not carry their agricultural activities alone but what is significant in the daily needs of farming families e. g. farmers need to wash their fabrics, cook, pay their children's fees, attend churches/ mosques, and perform various social activities. Gender analysis takes into consideration, other roles that pertain to the lives of farmers in their communities. In farming communities, women and men alike have different commitments in their community roles. (Odebode and Akinsorotan, 2002) During the colonial period, efforts to improve agric productivity focused on increasing cash crop production by the male farmers. Women's role became more prominent after the independence.

### **3.2.4 Importance of gender analysis in agricultural extension work**

Gender analysis helps the extension agent to:

- find ways of providing information to men and women in the performance of shared tasks.
- provide information to both men and women as to what relates to their specific tasks
- provide technical information to farmers
- provision of information in understanding gender roles as it relates to crops and tasks
- provide alternative ways of communicating information to farmers
- facilitate the formation of women farmers groups.
- present new technologies in ways that are easily understood by both men and women farmers and can be implemented one step at a time, bearing in mind literacy and language issues faced by women in particular.

### 3.2.5 Gender terms

**Gender:** This is the culturally specific set of characteristics that identifies the social behaviour of women and men and the relationship between them. i. e. it is the socially constructed relationships between men and women. (Toolkit for Gender Mainstreaming in Higher Education in Africa,2006)

**Sex:** This refers to biological differences between men and women. An individual is a male or female regardless of race, class or age. However, the social meaning attached to that person's sex may be different.

**Gender Equity:** This is the process of being fair to women and men. Usually, equity leads to equality. Gender equity therefore denotes the equivalence in life outcome for women and men recognizing their different needs and interest (. University of Ibadan Draft Gender policy (2011)

**Gender Equality:** This refers to the allocation of resources opportunities, support and encouragement without any discrimination on the basis of biology, between men and women. i. e. it means that women and men have equal conditions for realizing their full human rights and potential to contribute to national, political, economic, social and cultural development and benefit from the results. Gender equality therefore means women having the same opportunities in life as men, including the ability to participate in the public sphere. For example, if men and women are given the same opportunities, equality will be greatly achieved i. e. equal valuing by society of the similarities and differences between women and men and the varying roles they play.

**Gender roles:** These are clusters of socially or culturally defined and learned expectations about how people will behave in specific situations.

**Gender mainstreaming:** This is an organization strategy to bring a gender perspective to all aspects of an institution's policy and activities through building gender capacity and accountability.

**Gender Needs:** Shared and prioritized needs identified by women that arise from their common experiences.

**Gender Planning:** This involves the technical and political processes and procedures necessary to implement gender -sensitive policy.

**Gender Relations:** This involve hierarchical relations of power between women and men that tend to discourage women.

**Gender Violence:** This involves an act or threat by men or male-dominated institutions, that inflicts physical, sexual, or psychological harm on a woman or girl because of their gender. This occurs in situations where women and men struggle for resources, influence and exercise power in everyday living. There is a systematic exclusive of women from exclusion authority, unfairness in allocation of resources.

**Gender Training:** A process of developing awareness and capacity on gender issues, to bring about personal or organizational change for gender equality.

**Gender Discrimination:** This is the systematic treatment of individuals on the basis of their gender, which denies them rights, opportunities or resources.

**Women Empowerment:** This is a bottom-up process of transforming gender power relations, through individuals or groups developing awareness of women's subordination and building their capacity to challenge it. It is about men and women taking control over their lives, setting their own agendas, gaining skills, building up self-confidence, solving problems and developing self reliance.

**Gender division of labour:** This is the organization of labour on the assumption that men perform specific roles and that women provide domestic labour such as house wives.

**Gender awareness:** This is a situation whereby all players in an organization and institution recognize the importance of gender and its effects on their objectives, plans and programs

**Gender sensitivity:** This is the translation of awareness into practices, which result in changes in the perceptions, plans and activities of institutions and organizations.

**Gender blindness:** This is the conscious development of objectives, plans and programs in an organization with no effort to recognize or incorporate gender issues that might influence the functioning of that organization, the production of plans, the implementation of programs and the outcomes of the programs. It reinforced or practiced by people who do not or refuse to consider gender as a factor in institutional settings. Odejide (2011)

**Gender Gap:** This is referred to as the difference in the scores between men and women on attitudes, interests, behaviors, knowledge and perspectives on particular issues such as policy preferences and voting preferences. Gender Gap may be attributable to women's difference or distance in perspective or independence from men in opinions, perceptions, economic interests and social and psychological autonomy. It varies according to class, race, age, marital status, religion and other factors. (Gender Equity policy (2011)

**Gender Audit:** This gender audit helps to understand what the situations of women are relative to those of men in a given organization. This may be on achievement of men and women, enrolment, and retention.

### **3.3 Gender issues in agriculture and rural development**

In Nigeria, the study of gender considerations in the conduct of research, programmes and government policy formulation have improved and gained prominence in all aspects of human endeavors in the last three decades. gender has been accepted as a cross-cutting issue in nearly every sector . The consideration of gender issues in Agriculture has therefore become imperative for a fuller understanding of social dynamics from the international to the household levels.

#### **3.3.1 Women and youth in agriculture**

Over the years, issues concerning women have taken on new dimensions and have also received varied treatments by the United Nations and other agencies.

With the rapid socio-economic growth, now being experienced, all over the world, women are found to be playing significant roles wherever they are found. Though it is an established fact that the majority of people in developing countries such as Nigeria live in rural areas and that



over 50 percent of the rural population are women. It is therefore important to examine the contributions of women to agricultural development if self-sustained rural development is to be achieved. Rural women have several roles such as farm management, home makers and agricultural labourer (Odebode,2007). Over the past decade, laborers, women's contribution to family income have been well documented (Adekanye, 1985) and official agencies are beginning to recognize women as producers of goods, not just consumers of services. There is a growing realization that development programmes have not only failed to benefit women, but also have hurt them (Adekanye, 1986). The U. N. Decade for women (1976-1985) which legitimized women's status has contributed immensely to the awareness of women's major contributions to their societies OECD (1990).

Different studies by researchers have revealed the true curriculum on rural women's lives and have made some impacts on development policies of governments and donor agencies. As a result, how best to integrate women into the development process has been consistently and systematically questioned by both researchers and practitioners.

Women's roles are vital to the sustenance of their families, communities and society at large. They work on the fields and farms to produce food crops for family consumption and or sale, rear animals, market farm produce in addition to bearing and rearing children and manage large households with little amenities such as basic necessity such as portable water and fuel Seiders (1996). Some work on their husband's farms carrying out varieties of operations while some women are traders of food crops, selling processed and unprocessed forms of agricultural products while few are commercial farm producers involved in cash crop production. In summary, rural women in Nigeria are extremely active in agricultural activities. i. e. food processing, food productive marketing and distribution of agricultural produce. They are also involved in child bearing, family health, nutrition, home management and other domestic chores (Odebode, 2008).

Therefore,

- agricultural extension services and other non-farm and non-agricultural extension work should be directed towards them to enhance their income and improve their standard of living.
- Agricultural extension programmes should target both men and women so as to improve their knowledge and skills and subsequently improve agricultural activities.
- Agricultural extension programmes should also be aware of women's roles and be able to involve women in extension activities.

### **3.3.2 Constraints to women's role in agriculture**

Agriculture represents a dominant sector of the economy of Nigeria. Agriculture also remained the main source of foreign exchange earnings until the discovery of petroleum. Nigerian women constitute more than half of the agricultural labour force. Though rural women in farms and household throughout Nigeria and Africa in general play significant roles in food production, processing and feeding families. According to Olawoye, (2002) there were specific breakthroughs in acknowledging the significant role played by rural women in agricultural production which resulted into a limited value as an input to gender sensitive policy formulation. This according to Olawoye led to numerous specific studies among different tribes.

The end of that decade therefore focused attention on the constraints faced by rural women in their productive activities.

Some of the constraints rural women face in Agriculture are stated below:

### **1. Lack of control over productive resources**

Rural women lack control over productive resources necessary for their livelihood activities. These include lack of control over Land, labour, capital, decision-making. All these are major limitations for the majority of the rural dwellers. There is the need to improve access of rural women to all these productive resources to enhance their productivity and expand the areas they use for production. Without adequate incentives, infrastructure, credit, etc. their productivity will remain low.

### **2. Lack of social or economic power**

Women are usually ascribed or given a lower status than men and they are not usually allowed a voice in development. Rural women need to be encouraged to take active roles in agricultural activities and women should be encouraged to form cooperatives, farm focus group discussions and traditional groups whereby they would be allowed to contribute and give their contributions to agricultural development.

### **3. Lack of education and training**

Education is very essential in the development process. It enhances participation and helps to build confidence in women. Inequality with men counterparts inhibits progress. Women's access to education and training influences their productivity (Adeyeye, 1991). Lack of education and training in basic skills contributes to the vicious cycle of under-development, low productivity and poor conditions of health and welfare of women (Odejide, 1988). Rural women usually rely on their service providers due to lack of education. These service providers include the transporters, marketers, input suppliers and loan providers.

### **4. Poor health of women**

Due to involvement in too many tasks by women, their health is usually affected. This results into low productivity.

### **5. Time**

Rural women do not have enough time for other economic activities due to their involvement in multiple tasks and this has limited expansion on their scale of activities. This also limits their ability to participate in other income generating activities. Odejide (1996). Jiggins (1989) identified the constraints of rural women in agriculture as fluctuation in the supply and demand with seasonal climatic changes, frequent product market venture, poor opportunities for diversification and multiple roles of women limiting their freedom to exploit commercial assets. More attention should be focused on designing programmes that will help to enhance the income and improve productivity of rural women.

## **4. Conclusion**

This paper has defined rural development as the process of improving the living standards of the masses of the low income population. wherever they may be residing and making

the process of their development self-sustaining. This is because rural economy still constitutes the cornerstone of the economy. Features of rural development highlighted include improving the living standards, required mobilization and allocation of scarce resources and drawing up priorities among competing needs. This is basically to attain a maximum balance between available productive services and welfare. Making the process of self-sustaining therefore will need involving, working with, and deciding with the rural inhabitants who are the beneficiaries of rural development.

Development planners should therefore believe in the ability of the rural people for leadership capability that could further be developed and harnessed . The beneficiaries (rural people) should also be willing to accept responsibilities or the control of the welfare of the people. (WCED,1978) Successive governments in Nigeria have been trying their best to work on the need for rural development. All these programmes have been put in place to improve the standard of living of the people. Rural development programmes must therefore be sustainable. This is because the greatest bane in Nigeria's development process is lack of sustainability from one government to another. The challenge of extension service in Nigeria is to assist in transforming the rural communities in a way as to ensure the well-being of the present and future generations regularly. Sustainable rural development does not involve a particular form of farming, nor the use of a particular piece of land. The sustainability of the capacity of the people, countries and the whole world to support the livelihood of the people is very important. Rural development in Nigeria will be sustainable when Nigerians have access to all basic and essential goods and services required to live a decent life. i. e. potable clean water, inside and outside their houses, well staffed and equipped hospitals and schools, markets, transportation facilities, electricity, communication, balanced nutrition, employment, recreational facilities, efficient sewage system, and all enduring democracy. Rural development will be sustainable when the needs and aspirations of the present are met without compromising the ability to meet those of the future. This involves the process in which the exploitation of resources, direction of investments, and the orientation of technological development and institutional change are all in harmony and enhance the current and future potentials to meet human needs and aspirations

Finally, gender inequalities should be given more attention as it is fundamental for enhancing women's position, roles, responsibilities and participation in rural development process. This will enable the participation of women to rural and agricultural development to assume a better perception . This will also enable the government to formulate gender-responsive policies. Such policies will be gender sensitive and will help in promoting food production and empower women to gain equal access to production and marketing. Such policies will also help to consider gender roles in rural development.

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# Social Marginality and Subsistence Agriculture – Way of Life in Rural Communities in Central Mexico

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## 1. Introduction

This discussion is focused on the conditions of social marginalization that prevail in numerous rural communities and on the effectiveness of the national strategy that should secure human improvement, food supply and the sustainable management of natural resources. Social marginalization characterizes a precarious structure of opportunities, which exposes the families to privations, risks and vulnerabilities that escape individual control (CONAPO, 2005) and show the distance between the components of social development and economic growth. The sociopolitical environment underscores the regulation to exploit lands, forests, common use water and the rights on the land (DOF, 1992), as well as the selectivity of productive and social support to assist the needs of marginalized zones and in extreme poverty (DOF, 2001). The scarce space destined to alimentary security and sovereignty establishes the rhetoric of administration, not of the State responsibility to guarantee the supply of food to the least favored population. The mixture of private right laws and laws that regulate the use of lands, water, and forests tends to transform the social relations and cultural bases of rural communities and places them in disadvantageous situations.

The study analyzes the way of life in sixteen rural communities in San Felipe del Progreso, State of Mexico, characterized by a significant proportion of indigenous population, self-consumption agricultural systems, high degree of social marginalization and the degradation of natural resources. The results reveal that the accumulated needs of education, labor, alimentation, healthcare services, as well as natural and economic limitations to produce maize, put the families in permanent risk and broaden the gap between the objectives of rural development policies and the growing social and environmental vulnerability of this social sector in risk

## 2. Research approach

The perspective of cultural ecology points out that the adaptation of a preindustrial society to the environment is a process that depends on technology, social structures and relationships with nearby societies. These relations may induce changes in the society under study (Steward, 1963: 43). In the adaption process and under pressures from the environment, social groups reorganize technology (tools and knowledge) to make the most

of natural resources and emit responses that may be favorable to achieve reproductive success, health and alimentation (Daltabuit Godas, *et al.*, 1988: 9). When domestic economies implement diverse strategies generated in an environment of scarcity and lack; migratory labor and its economic contribution to the preservation of land cultivation becomes distinguishable (Orozco, 2005). The variety of economic activities performed by the members of the familial group assembles the vital, socialized and systematic activities that define their way of life. The way of life and the environment are the territorial patrimony of each community; it includes the right to access natural resources, productive practices and distribution of benefits (Ortega, 1998:33). The exploitation of natural diversity for production incorporates the variation that comes from the interaction of the environment and the management of land; the management practices performed on the *ecosystems* depend on the ecologic characteristics of the land and the social and cultural dynamics in which producers are involved (Toledo *et al.*, 1987: 95).

The formulas of agrarian reorganization maintain agricultural, livestock and forest systems. Not only are these systems structured by rules and resources, they also incorporate the function of the places where social life occurs – plots, households, yards, pens, orchards, arable lands, etc. The dwellers hierarchize and limit their spaces and use them as places for leisure, production, social interaction and experimentation (Ávila, 1996:65).

### 3. Methods and materials

The methodological procedure consisted of analyzing statistical and cartographic information and regulatory laws, recognizing the terrain, interviews of the opinion leaders and applying structured interviews; the capture and analysis of data, the discussion of results and conclusions were carried out in successive stages (Fig.1).

Sixteen rural communities were selected according to the degree of social marginalization, presence of indigenous population, soil and vegetal degradation and the existence of self-consumption agricultural production systems (GEM, 1969), (Table 1).

The universe was composed of 4,282 producers and the sample was calculated through the following formula (Sierra, 1995: 195):

$$n = \frac{o^2 \times p \times q \times N}{E^2 \times (N - 1) + o^2 \times p \times q}$$

N = universe size

n = sample size

$o^2$  = confidence intervals

p, q = variances

$E^2$  = sample error

$$\begin{aligned} n &= \frac{2^2 \times 50 \times 50 \times 4282}{10^2 \times (4282 - 1) + 2^2 \times 50 \times 50} = \frac{4 \times 2500 \times 4282}{(100 \times 4281) + 4 \times 50 \times 50} \\ &= \frac{42820000}{428100 + 10000} = \frac{42820000}{438100} = 98 \end{aligned}$$



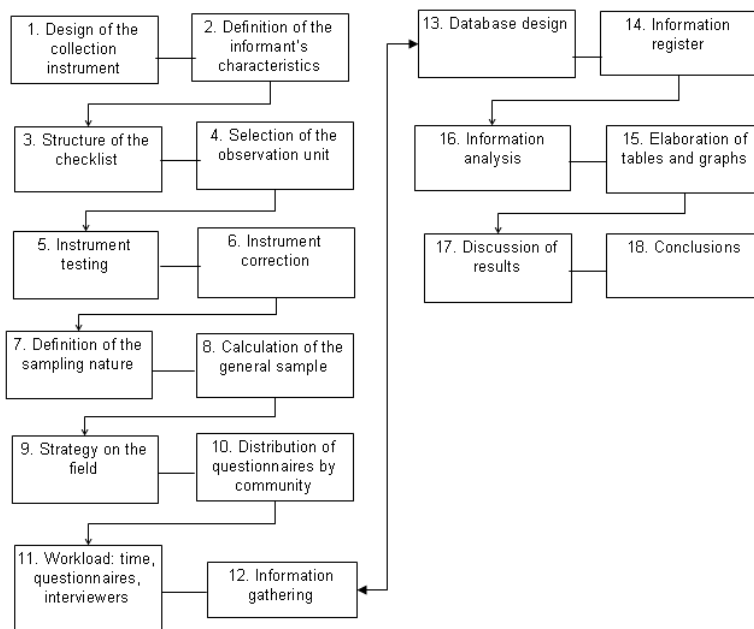


Fig. 1. Methodological procedure

Locality/community	Total population	Population of 5 years of age and older who speaks an indigenous language %	Marginalization index	Marginalization degree
San Antonio Mextepec	1386	34.7	0.47346	High
Santa Ana Niché Ejido	1440	17.36	- 0.17536	High
Santa Ana Niché Centro	1413	14.2	-0.492284196	High
Fresno Nichi	2191	17	-0.404930658	High
San Agustín Mextepec	4163	37.0	- 0.04792	High
San Jerónimo Bonchete	2074	34.7	0.35895	High
San Jerónimo Mavati	825	3.5	0.01458	High
Ejido Emilio Portes Gil	2955	33.0	- 0.85748	Mid
San Nicolás Mavati	1052	6.46	- 0.02701	High
San Antonio de las Huertas	3392	27.6	0.150402072	High
San Juan Cote	2081	20.6	0.489687546	High
Guadalupe Cote	1402	48	0.787029751	Very High
San Miguel de la Labor	4839	51	0.794843418	Very High
San Nicolás Guadalupe	5455	61	0.487461481	High
Calvario del Carmen	3925	22.1	1.210425504	Very high
Estutempan	561	17	0.601020733	High
<b>16</b>	<b>39154</b>	<b>34.0</b>		

Source: GEM, 1969, CONAPO, 2005

Table 1. Selected rural communities

The mistrust among the inhabitants and the distance between communities allowed applying eighty-eight check lists out of the ninety-eight that were estimated. The analysis schema incorporates variables which allowed designing the questionnaire that was applied in the study zone (Fig. 2).

The social conditions are integrated by the set of factors that characterize the accessibility to basic goods and services necessary to live, education, healthcare, alimentation and housing; the economic conditions integrate the factors that define the productive base and include the activities that are performed to satisfy the basic needs, employment, income and technology. The systems of land use comprise the set of activities, strategies and instruments whose objective is obtaining products and benefits. These systems conjugate the environmental or ecologic component (physical base), and the technologic and economic-social components. The first of them articulates the production forms developed by the community; the second component integrates the set of instruments and means of production and the practices of land management; and the third contains the ways of distribution and consumption of the products, social organization, population, land tenancy and rationality and agrarian ideology. Each component is related to the others and the hierarchy between them depends on the development degree accomplished by each society at a particular moment (Chonchol, 1996:23).

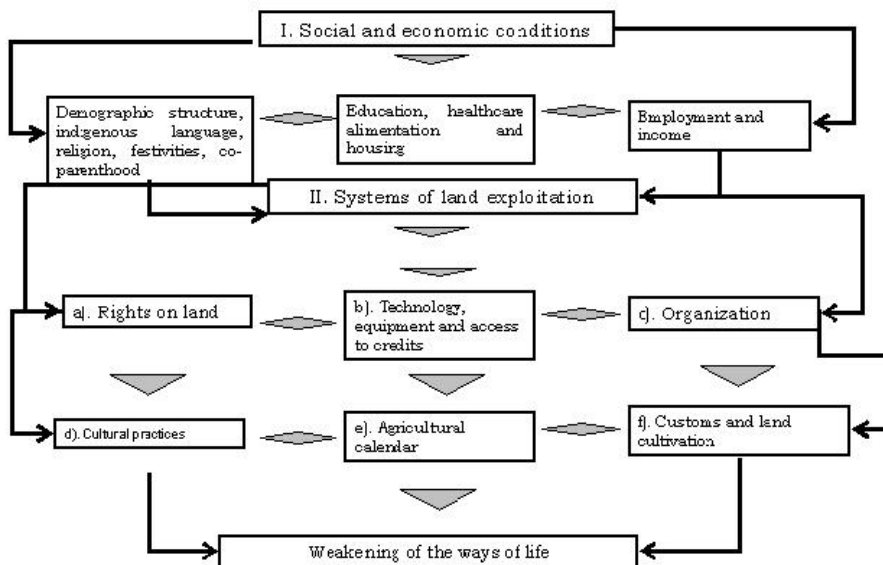


Fig. 2. Variables and indicators of the measuring

The survey was carried out in July 2010, the information was captured in a data processor and tables and graphics were produced. The state of the way of life of the rural communities was determined by a cause-effect matrix. In the valuing we took into account field observation, information from the survey and five magnitudes of effects: minimal (1), mild (3), moderate (5), high (7) and maximum (9) (Jaimes *et al*, 2006:720).

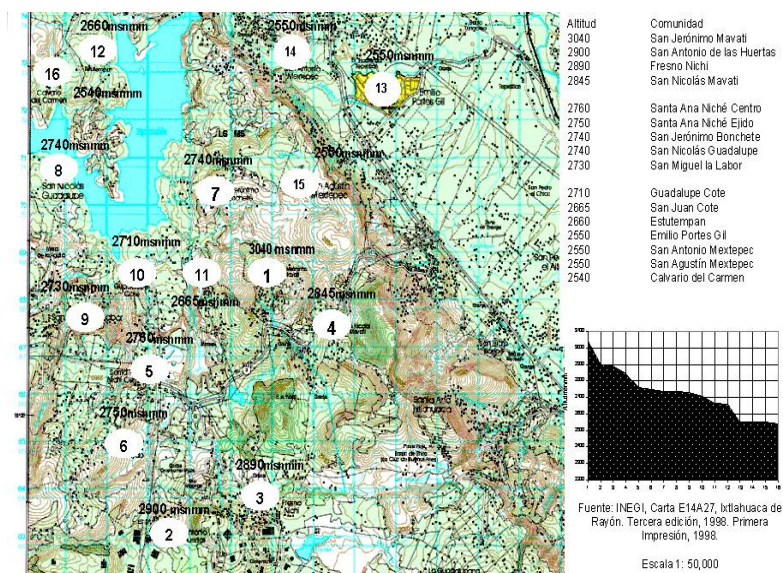
#### 4. Territorial context

The municipality of San Felipe del Progreso is an emblematic case of economic, social and environmental delays. In the 1980's, this municipality was located in the Fundamental Region of Peasant Economy (*Región Fundamental de Economía Campesina*, REFEC) and an area of primordial attention due to its degree of alimentary marginalization (Sánchez, 1980:45, COPLAMAR, 1982:11).

Nowadays San Felipe del Progreso is identified by being part of the Mazahua ethno-region. It has eighty-seven localities and 100201 inhabitants, with five of the localities (San Felipe del Progreso, Calvario del Carmen, San Miguel la Labor, San Nicolás Guadalupe and Ejido San Pedro el Alto) having more than 2500 inhabitants (INEGI, 2005). It has high social marginalization index (CONAPO, 2000; 2005) and 25% of its population speaks an indigenous language (INEGI, 2005).

An important sector of the population works the land for self-consumption; in numerous areas both agriculture and grazing have suffered from soil erosion. About 1.4% of the cultivable soil is eroded; forest areas are damaged from immoderate commercial logging, extensive exploitation of shrubby zones to obtain firewood and the practice of shifting cultivation and slash and burn. These factors have favored the broadening of cultivation zones and the expansion of grazing spaces (GEM, 2004).

The selected communities are located circa 30 km away from the municipal head; the productive base is composed of soils with varied depth which are irregularly distributed in sierras, hills and prairies; the ecologic conditions propitiate a temperate climate with a regime of summer rains and the annual mean precipitation is 800-900 mm (Fig. 3).



Source: INEGI, 1998, Map E14A27 Ixtlahuaca de Rayón. Scale 1: 50,000.

Fig. 3. Distribution of the rural communities and altitudinal profile

The expansion of agricultural surface onto forest soils is the cause of water erosion, washing of soils and loss of natural vegetation. The soils of volcanic origin are used for the seasonal cultivation of maize and grazing.

The hydrologic component is composed of seasonal creeks that feed Tepetitlán dam, used to control floods and irrigate small nearby farms.

## 5. Social conditions

The demographic component approximates social, economic and cultural features of the communities. In the survey there was a population register of 486 people, 50% women and 50% men, the population structure indicates a reduction of infantile and elderly population and the broad sector of population from 18 to 45 years of age which requires a job (Fig. 4).

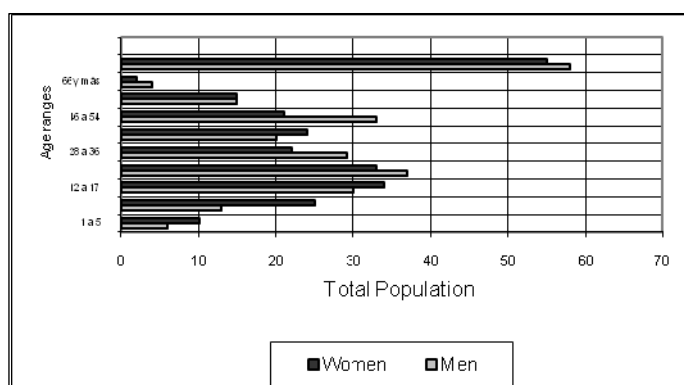


Fig. 4. Population structure

Seventy-six percent of the population could read and write; and only 51% (249 people) had some schooling. The schooling levels with high frequencies in the population were elementary and secondary schools (Table 2). The low qualification level of the labor force and lack of employment opportunities created few chances of accessing remunerated labor and healthcare services.

Schooling level	Population	%
Elementary	135	28
Secondary	78	16
High school	26	5
Technician	4	1
Graduate	6	1
	249	51

Table 2. Schooling level

Above half of the respondents used local medical consultation, while 11% has got medical service in Mexican Institute of Social Security (*Instituto Mexicano del Seguro Social, IMSS*) and the Institute of Security and Social Services of the Laborers of the State (*Instituto de Seguridad y Servicios Sociales de los Trabajadores del Estado, ISSSTE*). Attention to gastrointestinal diseases was common in children, respiratory in youths, and cardiovascular and diabetes in adults. Treatment was limited to infusions of medicinal herbs<sup>1</sup>: knowledge on the properties of the plants is limited. Concerning the frequency of food consumption, distinguishable were maize, tortilla and beans; while the low consumption food items were meat, fish and poultry (Fig. 5). Fish is eaten only in the community of Estutempan, and by and large, the diet is complemented in rainy season with some seasonal plants<sup>2</sup>.

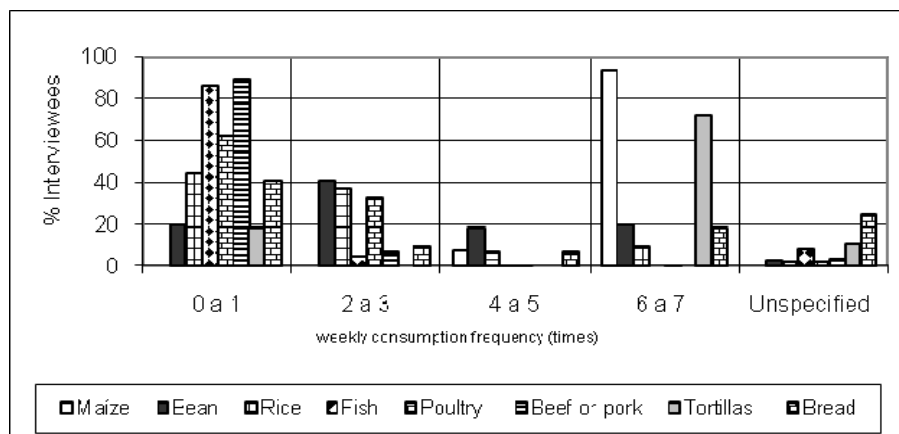


Fig. 5. Frequency of food consumption

The national survey on alimentation and nutrition in the rural environment for the State of Mexico (ENAL) indicates an increment in the per capita consumption of foods of animal in the period 1996-2005<sup>3</sup>. However high-risk malnutrition (7.7%) and stunted growth (22.3%) persist in the infantile population (Ávila Curiel *et al*, 2005:44). The diet scarce in proteins

<sup>1</sup>*Laccaria laccata* (cammomile), *Punica granatum* (pomegranate), *Eucalyptus globulus* Labill (blue gum), *Gnaphalium sphaecellatum* (mullein), *Ruta Chalapensis* L. (fringed rue), *Schinus molle* L. (Peruvian pepper), *Brickellia veonicaefolia* H.B.K. Gray (marjoram), *Ternstroemia Pringlei* Rose (tilia), *Chepodium ambrosioides* L. (epazote), *Aloe vera* L. (aloe), *Pinus patula* Schl. Et Cham. (patula pine), *Andropogon citratus* (lemongrass), *Peumus boldus* Molina (boldo), *Satureja macrostemum* (mountain tea), *Heterotheca inuloides* Cass (arnica), *Ambrosia artemissifolia* L. (artemisia), *Crataegus mexicana* Moc. et Sess (Mexican hawthorn), *bougainvillea spectabilis* (bougainvillea), *Litsea glaucescens* H.B.K. (laurel), *Allionia incarnata* Choisy (windmills), *Cedronella mexicana* Benth (toronjil), *Artemisia, laciniata* Willd. (wormwood), *Mentha arvensis* var. (peppermint) and *Spigelia Longiflora* Mart. et Gal. (donkey herb), (Martínez, 1994).

<sup>2</sup>*Brassica campestris* cruciferous (turnips), *Chenopodium Nuttalliae* Staff (huauzontle), *Chepodium mexicanum* (ashen quelite), *Amaranthus hybridus* L. (smooth amaranth), *Coriandrum sativum* L. (coriander) and wild mushrooms (Martínez, 1994).

<sup>3</sup>The consumption of beef or pork increased 21.4 to 25.1 grams, chicken meat went from 30 to 36.5 grams and fish consumption was 7.3 grams in both surveys. However, there is greater malnutrition in children who within his family speaks an indigenous language (13.4%), compared with those younger than five years in whose families to speak only Spanish (Ávila Curiel *et al*, 2005:44 y 45).

manifests in the malnutrition the children have and the exposure to the effects of stomach and respiratory diseases.

As for the households, 26% and 59% had 1 - 2 and 3 - 4 rooms respectively, while 78% had kitchen and 40% used gas stoves. Nonetheless the use of firewood in traditional hearths as an energy source still prevailed. The architecture of the households exhibited improvement of material conditions: brick walls, concrete roofs and cement floors (Table 3). Nevertheless, 16% of the households with dirt floor represent a highly vulnerable sector.

WALLS	%	ROOFS	%	FLOORS	%
Adobe	28	Tile	32	Dirt	16
Brick	69	Sheet	8	Cement	82
Sheet metal	3	Concrete	60	Mosaic	2
	100		100		100

Table 3. Household construction materials

There was higher malnutrition and propensity to gastrointestinal diseases in children under 5 years of age who lived in households with dirt floors and defecate on the floor. As for the household services, official data indicate that 63% of the inhabited households had piped water (INEGI, 2007) and the inhabitants pointed out that water supply is performed via springs, creeks and wells. They agreed on the fact that the water had good quality, but only 18% of the families received water every day, while most received it every other day or weekly.

A collective complaint is the insufficiency of the distribution network, excessive chlorination, scarcity and a faulty management by the committee in charge of distributing it. Introducing potable water in some communities has not been possible because of their dispersion and the ceaseless phenomenon of irregular settlements. Sewage system covers 20% of households; only in few cases does this network connect to the public network, and the discharge of residual waters in gorges is common.

### 5.1 Social organization

Organization is the base of social and economic life of the communities and it is expressed through the cultural elements of the place where social life and coexistence occur. 84% of the respondents identified with the community based on the following reasons: they were born in the place, they are happy with the peaceful, quiet, and familial coexistence.

Twenty-seven percent of the population speaks Mazahua language, despite more than 60% of the informers considers that it is important to speak the native tongue, they stated that youths and children are scantily or not at all interested in learning it. 65% of the families profess Catholicism and 20% are Evangelic. As part of the religious practices there is a celebration held for the patron saint by means of *mayordomias* –system of position and charges– and god-parenthood prevails; godparents help with the work in the plot and care for the children. 45% of the interviewees verified the participation in vigilance and religious activities, likewise the customs of praying, benediction of the first groove planted and mass

in the harvest are preserved; whilst the customs which tend to disappear are: the use of wooden plow, mass by the end of the season and the harvest godfather, in general there is an agreement on the fact that increasingly the groups gather less frequently and the celebrations have decreased in splendor due to widespread poverty.

In regards to authority, 90% of the informants recognized in the first place the delegate; in the second the ejido commissary and the priest. In the requests for the government the people distinguishes agrarian support training, advising, employment, financial programs, sewerage system, street lights, paved roads, honesty, fulfillment of and information on supportive programs. The interviewees identified “*Oportunidades*” Program of Human Development, which promotes inter-sector actions for the education, health and alimentation of the families which live in extreme poverty conditions. Data from the survey reveal that only 32% of the interviewees received support from this program and national data from 2011 *Oportunidades* fiscal balances verify that the prospective population amounts to more than 50.6 million Mexicans who experience some degree of poverty (DOF, 2010).

Less moderate figures account for the growth of population in extreme poverty, probably urban poverty is on the increase, while the pauperization of most of the rural population becomes acuter; so is outlined by *Oportunidades* Program in 2010, whose beneficiary universe was 5.8 million (GF-SEDESOL, 2010: 4) barely 12% or 15% of the population in poverty conditions.

## 6. Economic conditions

The employed population represented 42% (205 people) of the population, 37% is completely devoted to livestock activities and 60% combines them with another activity (Fig. 6). 25% of the informants indicated that some of the family members works in masonry and domestic service in Mexico City, San Felipe del Progreso and the City of Toluca, and at least they contribute with 3 to 6 USD a day or 13 to 26 USD a week. From time to time, some producers obtain money from selling sheep and a reduced group receives income from working in other activities. 80% of the income is destined to alimentation; 20% to sow maize, with a tight margin to save and access additional satisfiers.

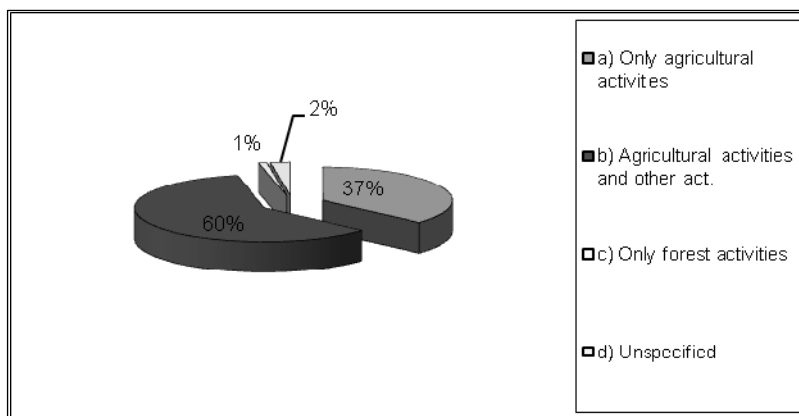


Fig. 6. Occupational distribution of the population

The report on indigenous people human development in Mexico produced an income index for this population sector of 0.59536 and a per capita income of 3.541 USD (Fernández *et al*, 2006); four years later the minimum wage for the area under study was \$54.47 MXN (SAT, 2010). In this context, 25% of those interviewed received income between 4 and 8 USD, and 75% did not receive revenue by being unemployed and having consumed the production of maize.

## 7. Production system

The bases of labor organization are land and family; above half of the families is composed of four or more members (Figure 7).

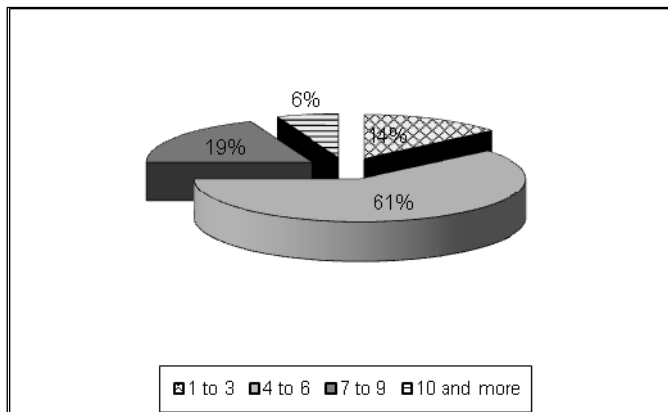


Fig. 7. Number of members per family

Labor division is fundamental for the functioning of the economic unit, the distribution of tasks distinguishes the function of the children and youths in works in the field and the scant importance given to school, and in the absence of the father, the mother takes up the responsibility of looking after the plot.

The production and reproduction of the domestic units: it works from the complementary activities of their members in tasks distributed according to their gender and age; only within this logic of complementary labor is the survival of peasant systems understood (Bonfil, 1996:68).

The set of rural communities has a surface in social property of 9,846 hectares, 89% of the surface is allotted and 11% of it is destined for communal use (INEGI, 1991). Lands of common use are fir forests and an assortment of oak, pine, strawberry tree and cedar. Due the advancement of agriculture and the fragmentation of forest coverage in small cultivation plots, in the landscape one can notice the patches of disperse forest, the loss of natural vegetation and the affectation of the habitant of wild animals.

The interviewees point out that reforestation (65%) and firebreaks are carried out; likewise they recognize firewood extraction and periodic burns as the cause for the persistence of plagues on trees and soil erosion.



Most of the informants recognized themselves as ejido owners, 41% from two to twenty years as owners; 32% from twenty-one to forty years; and 6% more than forty years as so. Only 15% mentioned that their plot was measured by the Program of Certification of Ejido Rights and Entitlement of Urban Plots (*Programa de Certificación de Derechos Ejidales y Titulación de Solares Urbanos, PROCEDA*). The federal character of this program made it a national priority, it was a basic instrument of the 1995-2000 Agrarian Sector Program; with a voluntary character, the purpose was to guarantee juridical certainty to ejido proprietors and foster productive association (Orozco, 2003: 143).

The implications of the program are not completely known, however the interviewees have a good impression of the measurements and certifications of the plots, not only for the security of their families, but also to allot the lands and cede them to their children so that they obtain the certification of plot rights

These benefits have not improved the conditions of life; agriculture is not enough to satisfy their needs, they do not ask for loans because of the high interest rates and sell fractions of land due to their bad economic situation. It is common that proprietors promote the subdivision of the arable lands with housing ends, once inhabited the plots turn into areas of precarious settlements that lack services and infrastructure, and facing the impossibility to work the individual plot, it is frequently hired, used in sharecropping or for a divided use. 86% of the interviewees possess a plot and 14% two or more in social property, 28% has private property plots. In both cases maize is sowed seasonally along the year on an average surface of one to two hectares. Producers invest two days of work on sowing and nine days on harvesting, 36% pays day laborers; 88% uses the crop for self-consumption; and 15% for consumption and sale; 43% considers that production is not sufficient, their daily consumption is 2.5 kilos a day. Even if the yield and production volume of maize are low, agriculture is a very important alternative for alimentation.

The cost of sowing a maize hectare varies from plot to plot; it depends on the plot size and the economic solvency of the producers, the expenses were calculated between 80 and 280 USD, including day laborers, agricultural supplies and pre and post sowing and harvesting works.

In sowing maize 81% of the informants uses crossbreed seeds and 77% applies agrochemicals, has fowls available as food and few working animals, livestock is fed on stub, grass and maize, and they grow broad bean, oat, gourd, bean and from time to time wheat for self-consumption. 77% and 43% of the respondents used hired yokes and tractor respectively. While 85% of the respondents did not have financial credit, only 15% received support from the Program of Support for the Countryside (*Programa de Apoyo al Campo, PROCAMPO*) worth 1000 MXP per hectare (81 USD).

The data express discouragement to apply for a loan and the scarce benefit from the support, and the producers, far from using the resource for production, use it for food and dressing, in this respect the economic support is negligible. The situation has an explanation in the operation of a new financial structure implemented in the country as from 1994, which established mortgage, thus plot certification became indispensable to back the loans and apply for PROCAMPO supports (Orozco, 2003:182).

Facing the absence of productive investment, there is a low technologic level that is expressed in sowing maize with no other care but the work prior to rainy season (April -

May), the observance of cultural practices before sowing distinguishes plowing and first and second harrowing. Plowing consists in preparing the land with grooves and break clods, they use a tractor in even zones and yoke in sloped zones; then white maize is planted, whose phenological cycle is 140 days long. In the case of a loss by rain delays the custom is to reseed black maize, whose growth cycle is 90 days long. Once sowing is performed, the second harrowing is carried out, it consists in covering the seed in wet soil, they place the seed under the groove to use the moisture and then turn the soil, activities after sowing are fertilization and weeding. In spite of the unfolding of work and resources invested according to the possibilities of producers, the result is no income from selling the harvest.

## 8. Discussion of results

The relationships between communities is expressed in a way of life based on self-consumption agricultural production, family size, division of labor, land tenancy and external income make a difference between survival and starvation (Table 4).

C/E	EF1	EF2	EF3	EF4	EF5	EF6	EF7	EF8	EF9	TOTAL	%
C1	9	9	9	9	9	9	9	7	7	77	17
C2	7	9	7	7	9	9	9	1	1	59	13
C3	9	9	9	9	9	7	9	1	1	63	14
C4	1	1	9	9	9	9	9	7	1	55	12
C5	7	3	3	9	9	7	1	1		40	9
C6	7	7	7	7	9	9	9	1	1	57	13
C7	1	1	1	1	7	9	9	7	7	43	10
C8	1	1	1	1	9	7	9	9	9	47	11
TOTAL	42	40	46	52	70	66	64	34	27	441	100
%	10	9	10	12	16	15	15	8	6	441	100

Causes

Effects

C1. Agriculture and extensive rearing  
 C2. Exploitation of shrubby zones for firewood  
 C3. Slash and burn and shifting cultivation  
 C4. Reduced cultivation surface  
 C5. High production costs and absence of technical and financial support  
 C6. Absence of productive organization  
 C7. Minimal instruction level  
 C8. Low income

EF1. Loss of forest coverage  
 EF2. Increase in water erosion  
 EF3. Reduction of soil fertility  
 EF4. Low land yields  
 EF5. Poor improvement of the production means  
 EF6. Limited capability of collective management  
 EF7. Scarce employment opportunities  
 EF8. Alimentation poor in proteins  
 EF9. Deficient housing services, irregularity and water scarcity

Table 4. Weakening factors of the rural way of life

In the ecologic and cultural dimensions, the social conditions and production systems of the studied communities are based on an action-reaction-feedback relation system stimulated by the internal and external social environments. In this perspective, the familial groups amplify their adaption capability through varied survival strategies that allow them to overcome the limitations and adversities in order to secure social reproduction.

Within this logic the families opt for decisions made in contingency and risk conditions, outstanding is labor migration, labor division by age and gender, increment of pressure from the dwellers through extensive agriculture, slash-and-burn and shifting agriculture and the exploitation of shrubby zones for firewood, which linked to the absence of a productive organization leads to a limited management to obtain technical and financial support that would allow improving the production means and cultural practices; all of this undermines not only the basic resources (soil, water and vegetation), but also the way of life of the producers.

The analysis of empirical data shows that the weakening of the rural way of life is expressed in the progressive deterioration of basic resources for production (soil, labor force and investment); this causes the natural socio-technical de-capitalization of the production system of maize which, associated to the increase of education, employment and social security needs as well as the demise of cultural features, places the familial groups in permanent crisis and projects a phenomenon of social and environmental deterioration that progressively increases the vulnerability of this population sector.

## 9. Conclusion

The abandonment of the policy of productive support and the extension of a social policy that tries to eradicate marginalization and poverty, as well as the subordination of agrarian and agricultural policies to the new environmental laws that regulate the access and exploitation of natural resources overlook the progressive deterioration of the cultivation systems, the fundamental base for the way of life of rural communities.

The deterioration of the rural way of life expresses the accumulative effects that appear in the alimentation poor in proteins, in deficient housing services, irregularity and scarcity in water supply, in the demise of cultural features and the associated customs, in the low or inexistent incomes, as well as in the affectation of indivisible natural resources (communal use lands), and to sum up in the increase of social marginalization and poverty. The situation experienced in these places underscores the gap between indigenous households and national development, and makes the dysfunction of the statements and results of rural development policies evident.

## 10. Acknowledgments

The Autonomous University of the State of Mexico and the National Council of Science and Technology, in the financing of the project 54706 "Methodology for the assessment of the socio-environmental practices in the use and management of natural resources in rural communities of the state of Mexico".

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# From Tsetse Control to Sustainable Rural Development – Progress and Opportunities for an Ethiopian Community

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## 1. Introduction

### 1.1 Background

Ethiopia is one of the poorest countries in the world in spite of long-standing efforts to improving the livelihood of the people and expanding their choices. The three essential but restricted choices for human development in Ethiopia and elsewhere are to lead a long and healthy life, to acquire knowledge, and to have access to the resources needed for a decent standard of living (OECD, 2011). To be sustainable, human development should satisfy the current needs without compromising the possibility of future generations to satisfy their needs (WCED, 1987). To encourage sustainable development, the United Nations member states and international organizations agreed to achieve the Millenium Development Goals (MDG) by the year 2015 (UN, 2005). For Ethiopia, Jobarteh et al. (2011) reported progress with respect to economic development and most MDGs with the exception of environmental sustainability. Namely, Jobarteh et al. (2011) put the country at extreme risk of food insecurity and vulnerable to climate change. Hence, it is unclear whether it can escape the vicious cycle of natural resource degradation and food insecurity driven by absolute poverty and population growth (Sisay Asefa & Tesfaye Zegeye, 2003), also referred to as poverty trap (Eenhoorn & Becx, 2009) or as ‘poverty – environmental degradation and food insecurity circle’ (Shibru Tedla & Kifle Lemma, 1998).

Poverty is the lack of, or the inability to achieve, a socially acceptable standard of living (Bellù & Liberati, 2005). Basically, the inability refers to a situation in that individuals lack command over economic resources. In Ethiopia, extreme poverty defined by the World Bank as living on less than USD 1.25 per day is common (Ayalneh Bogale et al. 2002; Anonymous, 2011a). Environmental degradation becomes a result and a cause of economic stagnation and decline, which is aggravated by absolute poverty and food

insecurity. Soil degradation is the severest environmental problem and Ethiopia loses about 400 tons/ha of topsoil every year (Shibru Tedla & Kifle Lemma, 1998; Sisay Asefa & Tesfaye Zegeye, 2003).

Food insecurity can be defined as the lack of capability to produce food and to provide access to all people at all times to enough food for an active and healthy life (World Bank, 1986). The average yield for food crops is low and has been growing only about 0.6 percent and lags behind the population growth of about 3 percent, resulting in an annual per capital decline of 2.4% in domestic food production (Sisay Asefa & Tesfaye Zegeye, 2003). Livestock are extremely important to economic development and contribute to the livelihoods of 60-70% of the population (Haldermann, 2005). Animal husbandry is a local, multi-purpose activity, in that livestock produce food directly and provide key inputs to crop agriculture including fertilizers. Livestock not only provide poor people with food, income, traction and fertilizer but also act as catalysts that transform subsistence farming into income-generating enterprises, allowing poor households to join the market economy (ILRI, 2011). However, livestock health and multi-purpose productivity are severely constrained by inadequate feed and diseases transmitted by arthropods such as ticks and tsetse (Torr et al., 2002).

New technologies are important elements in Ethiopia's human development efforts (Aseffa Abreha et al., 2003). If selected, a single technology, however, should not be used as a silver bullet, i.e. a simple remedy for a difficult or intractable problem. In fact, silver bullets have been qualified as the most dangerous innovation misperception and an unpromising approach to development (Carpenter, 2009). Rather, technologies should be integrated into a system or package. Waage (2010) and Sayer and Campbell (2004) emphasized the important role that science plays in technology development and implementation. Rather than dealing with technology development, however, this paper focuses on the selection of technologies by rural communities, the integration of the selected technology systems into sustainable development efforts, and the evaluation of the impact. This requires taking into account the complexities of the ecological-social (ecosocial) systems, where the technologies are introduced, and a framework for impact assessment.

## **1.2 Technology system selection and implementation**

A wide range of technologies should be considered. The restriction to low input technologies favoured by many specialists is inadequate because they suffer from poor adoption records (Tripp, 2006). The restriction to local and traditional technologies as the only legitimate, fair and appropriate technologies in a development context may be a constraint facing new developmental challenges including climate change and emerging diseases (Waage, 2010). Moreover, prejudices for technologies should be replaced with the understanding that being "appropriate" is not about where innovation comes from but about how useful it is (Waage, 2010). Chinsinga (2003) criticizes technology transfer from the outside and little attention given to what motivates farmers to improve their land and husbandry systems. According to him, exogeneous forces to developing countries produce an unsustainable reform, the will has to spring from within developing countries with external stakeholders playing simply a facilitatory role. Samuel Gebreselassie (2006) shifts the attention from technologies to carefully designed 'innovation systems' where the promotion of new technologies is linked to processes of farmer innovation, social and



cultural institutions governing uptake, and the economic and market conditions pertaining, particularly for poorer farmers in more marginal areas (Mitiku Haile et al, 2001; Ejigu & Waters Bayer, 2005). These concepts were the driving force behind the establishment of on-site technology testing, demonstration and training units named BioVillages (Baumgärtner et al., 2001).

The implementation of technologies provides new opportunities that often raise ethical reflections on the basis of moral theories (Huppenbauer & De Bernardi, 2003; Newton, 2003; Huppenbauer & Bleisch, 2011).

Human development needs to take into account the complexities and multi-dimensionality of the problem (Sisay Asefa & Tesfaye Zegeye, 2003). Briefly, a complex system is composed of many parts coupled in nonlinear fashion, has properties that cannot be fully explained by studying component parts, and the relationship between cause and effect is not as consistent as the regular, predictable simple systems we are familiar in dealing with (Gallagher & Appenzeller, 1999; Holling, 2001; Jørgensen, 2009). Leong (2010) emphasises that we cannot proceed confidently on the basis of past knowledge to predict the consequences of our actions, nor the evolution of events around us. Moreover, we need to be prepared for surprises and select strategies based on creative thinking, experimenting with new ideas, observing their effects and increasing the probability of outcomes favourable to us (Leong, 2010; Resilience Alliance, 2010).

According to the traditional view, sustainability is composed of ecological, economic and social components. To deal with complexity and uncertainties in the outcome of development activities that expose the user to risk, adaptive management (AM) is recommended (Holling, 1978; Jiggins & Röling, 2000). AM is a strategy that can readily be adapted during development to take into account of new knowledge during implementation (FAO, 2011). AM may allow to rely on an approach that is neither too reductionist to capture reality nor too comprehensive embracing “everything” instead of focusing on the stakeholders and processes that matter (Sayer & Campbell, 2004). AM may also allow a balance between expensive external expertise and neglected local knowledge and may allow efficient use of models for understanding, actions and negotiations (Sayer & Campbell, 2004). Finally, the widely used facilitation extension model can easily be integrated into an AM process (Röling, 1995; Gilioli & Baumgärtner, 2007).

### **1.3 Evaluation contexts**

To deal with complexity, Pawłowski (2008) proposes the integration of different spheres of human activity into a sustainable development program. Later-on, he defines a hierarchical system composed of level I with an ethical plane, level II with ecological, economic and social planes, and level III with a technology, a legal and a political plane (Pawłowski, 2011). According to him, the ethical plane is of fundamental importance because moral convictions determine human activities. Goodland (1995) proposed that ecological sustainability is the basis for social sustainability, and that it is achieved by keeping the scale of the human economic system within the biophysical limits of the ecosystem. Level III integrates technologies, legislation and politics as management instruments and part of governance that refers to the manner in which societies exercise power. Pawłowski (2011) emphasizes that the integration of levels and planes is needed but acknowledges that this is difficult to achieve.

Adaptive governance becomes a form of social coordination with self-organizing and enforcing capabilities and relies on networks that connect individuals, agencies and institutions at multiple organizational levels (Folke et al., 2005). In Ethiopia and other African countries traditional governance structures (TGS) have survived the challenges of the forces of time. ECA (2007) asks for political commitment and courage to take bold decisions on the role and involvement of traditional authorities in the service delivering and good governance process.

The idea of sustainable community development confronts the typical community development practitioner in several somewhat distinct, though over-lapping contexts (Schmidt, 1997). Waltner-Toews et al. (2003) look at ecosocial systems from different perspectives. To evaluate the consequences of technology implementation for human development, reference is often made to the contexts of agroecological sustainability (Gliessman, 2000, 2007), ecosystem service provision (Daily & Dasgupta, 2007) and ecosocial sustainability (Holling, 2001). Agroecological sustainability refers to the production by an ecosystem that maintains the resource base upon which it depends, relies on a minimum of artificial inputs from outside the farm system, manages pest and diseases through internal regulating mechanisms, and is able to recover from the disturbances caused by cultivation and harvest (Gliessman, 2007). Ecosystem services are not restricted to agroecological production but comprise ecological processes that sustain and fulfill human life. General distinctions exist between provisioning, cultural, and regulating ecosystem services (Koshel & Mcallister, 2008). Ecosocial sustainability refers to a complex system in that humans are no longer external managers but become part of the system (Waltner-Toews et al, 2003). Ecosocial sustainability has ecological, economic and social dimensions in that respective ecological, economic and social capitals and their costs can be defined (Goodland, 1995). In this context, sustainable development is the realization of potentialities for enhancing the capitals with respect to costs (Costanza & Daily, 1992; Gilioli & Baumgärtner, 2007). Sustainability is also defined as the capacity to create, test, and maintain the adaptive capability or resilience of the ecosocial system, and sustainable development can be achieved by fostering adaptive capabilities (Holling, 2001).

Indicators are used to monitor changes in agroecological sustainability, ecosystem service provision and ecosocial sustainability. For example, the European Union recommends ecosocial sustainability assessment on the basis of complex set of indicators exemplified in Germany's report (ESDN, 2010). Often, the available information is summarized for sustainability assessments and recommendations (Anonymous 2011b).

#### **1.4 Scope of the chapter**

The paper summarizes the implications of technology selection and implementation for sustainable development in the Southwestern Ethiopian village of Luke. At project beginning, the income resulting from the sale of agricultural products and provision of labor to non-farming activities was less than one US \$ per day, indicating that the villagers were living in extreme poverty (*cf.* UNSTATS, 2006). The productivity and well-being of the villagers were constrained by malaria to some extent, and increasingly, by food insecurity and limited opportunities for alternative income generation (Getachew Tikubet et al., 2006). Apparently, from ecological, economic and social standpoints, the Luke system operated at project beginning below the national average.

To overcome these constraints, the Luke villagers took the initiative, sought assistance from international and national institutions, and prioritized activities. This analysis focuses on the first decade of technology implementation (1995-2005) and evaluates the progress in animal health improvement as a result of tsetse and disease control technology implementation. The consequences of the implementation of this and other technology systems are analyzed within Pawłowski's (2008, 2011) hierarchical system of sustainable development and evaluated in the contexts of *i*) animal health and *ii*) sustainable agriculture, *iii*) ecosystem service provision and *iv*) ecosocial sustainability. The evaluation from these different perspectives aims at the identification of opportunities for rendering the development more sustainable.

## **2. Animal health improvement**

### **2.1 Animal health constraints**

Many factors are responsible for the poor health and productivity of Ethiopian cattle. Several *Trypanosoma* spp. protozoans vectored mainly by tsetse *Glossina* spp. are responsible for the Nagana disease seriously affecting the health of livestock (Torr et al. 2002). In Africa, efforts to improve cattle health through vector control have a long history (Omamo & d'Ieteren, 2003). In spite of decade old campaigns, both the disease and the tsetse vector are still very present on the continent. Omamo and d'Ieteren (2003) found literature information putting the number of cases of human trypanosomiasis in Africa at 300,000 and estimated the annual direct and indirect economic losses on the continent from animal trypanosomiasis to be at least US \$1.6 billion and as high as US\$ 5 billion. For Ethiopia, Getachew Tikubet et al. (2003) provide specific information.

Torr et al. (2002) described the components of integrated Trypanosomiasis control. In summary, the application of trypanocidal drugs can keep cattle productive and is often the only affordable control technique. A study carried out in Southern Ethiopia, however, shows the costs are much higher because of cattle mortality and loss in draught power. Drug resistance is another factor limiting the usefulness of chemotherapy. The tsetse vector has frequent contacts with hosts, rapid movements, and viviparous and low reproduction that should be considered in control strategy design. The tsetse control operations are only promising if undertaken over a sufficiently large area. The two basic strategies are either eradication through insecticides or the introduction of a small but sustained level of mortality through baits including odor baited traps, insecticide treated target baits or natural baits such as cattle treated with pesticides. The Organization of African Unity (now African Union, AU) began a tsetse eradication initiative based on SIT (sterile insect technique) (OAU, 2001; Reinhardt, 2006). Dransfield et al. (1990), Leak et al. 1995), Saini et al. (1999) and Getachew Tikubet et al. (2003) provide examples for the efficiency of trap and cattle targets use in Kenya and Ethiopia.

### **2.2 Methodology**

The Luke villagers sought help from Ethiopian national institutions and the Nairobi based International Centre of Insect Physiology and Ecology (ICIPE) to improve food security and livelihood. At the beginning of the activities, a project planning meeting took place under a big tree near Luke. Although the villagers lived in absolute poverty and suffered from

multiple stresses including food shortage and diseases, they made clear that a project should give priority to animal health improvement and opted for a technology system composed of antitrypanosomal drugs and odour baited traps for tsetse monitoring and control. To make the control system efficient, they accepted project execution in an adaptive management framework, welcomed the assistance of ICIPE facilitators, participated in monitoring activities and made manpower available for control operations. The facilitators collaborated with ICIPE project managers and scientists from ICIPE and the Italian University of Molise (Baumgärtner et al., 2003).

Adaptive tsetse and trypanosomiasis management consisted of biweekly collection of data from monitoring traps and subjecting them to geostatistical analyses (Sciarretta et al, 2005a, 2005b, 2010). The resulting maps on tsetse distributions were passed to facilitators who presented them to communities for planning control operations. Adaptive management enabled them to respond to changes in actual tsetse distributions and to make efficient use of traps. They had knowledge on ICIPE's urine baited trap technology for disease vector control and opted for a disease control system based on traps and antitrypanosome drug administration by the Ministry of Agriculture. Odour baited traps were also used for monitoring purposes in other villages, but the technology of vector control with urine baited traps was acceptable to Mamede villagers and Luke farmers only. In the villages of Asosa and Keto, however, farmers preferred herd management to avoid tsetse infested areas and insecticide impregnated cloths (targets) to control tsetse, respectively (Baumgärtner et al., 2008c).

### 2.3 Results

The integrated pest management system composed of the trapping technology for tsetse monitoring and tsetse control, and drug administration to infected animals, was readily accepted by the Luke community and successfully implemented in collaboration with national and international partners (Getachew Tikubet et al., 2006). Geostatistical models were a useful tool for studying tsetse spatio-temporal distributions and guiding tsetse control operations (Sciarretta et al., 2005a, 2005b, 2010). From the organizational standpoint, the applied facilitation extension model was effective.

Figure 1 shows the decline in tsetse catches through time towards negligible numbers in 2006. In the same period, the disease prevalence decreased from 29 to about 10% (Getachew Tikubet et al., 2006). Therefore, on the basis of disease prevalence reduction, the project can be qualified as successful. However, the information available is insufficient for a comprehensive cost-benefit analysis. Nevertheless, the financial support of about USD 20'000 per year for a 10 years period provided by donors favourably compares to the estimated increase in income of about USD 300'000 per year for the entire Luke community (Baumgärtner et al., 2010).

### 2.4 Discussion

The decrease in trap catches and in the proportion of diseased animals is attributed to the application of the integrated pest and disease management system. The reduction of disease prevalence was substantial but remained at a low level. Presumably, trap catches do not represent tsetse densities and hence, are poorly correlated with disease transmission.

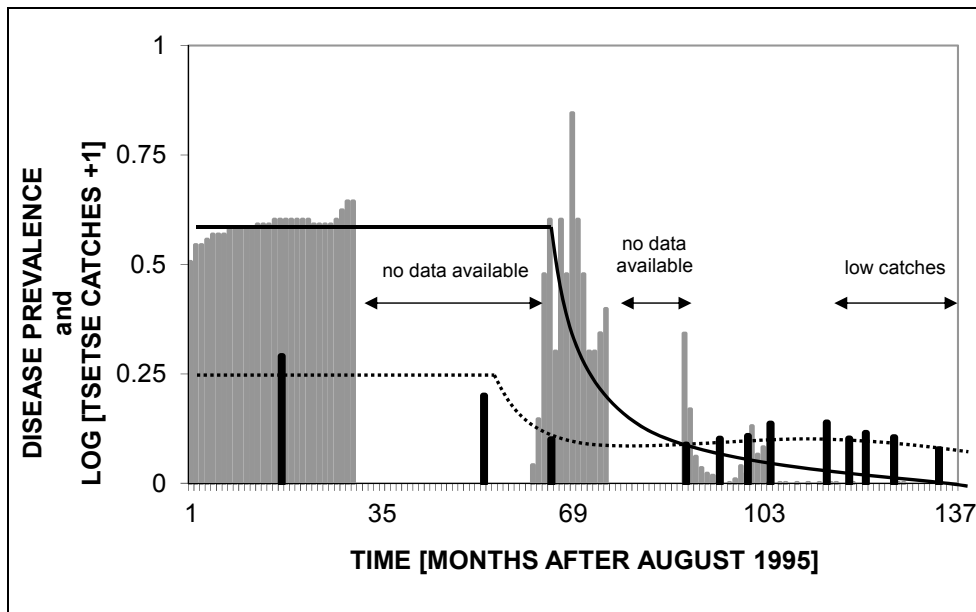


Fig. 1. The results of integrated tsetse and trypanosomiasis control at Luke, Southwestern Ethiopia, represented by the trends in biweekly tsetse trap catches (log (catches per day+1), dashed line, light coloured bars) in odour baited traps and disease prevalence (proportion of infected cattle, dotted line, dark coloured bars).

Moreover, traps have been designed for the control of tsetse that is the biological vector of trypanosomes. However, Spickler et al. (2010) state that trypanosomes are also transmitted by mechanical vectors including biting flies such as horse flies (*Tabanidae*). The traps used at Luke may not be suitable for monitoring these vectors and hence, underestimate the vector potential.

The success in disease reduction through an apparently cost-efficient technology system is related to many aspects. The initiatives taken by the villagers through their traditional structures, the selection of the technology system, the motivation of the villagers, and their interest in implementing a facilitation extension model and taking advantage of the decision-support provided by external scientists were the key issues for meeting project objectives and confirm the utility of the concepts. The facilitators were experienced technicians able to efficiently communicate with villagers, national institutions and external scientists who provided models for knowledge acquisition, decision support and negotiations among stakeholders. In addition, most stakeholders recognized the advantages of models in the facilitation process (Baumgärtner et al., 2003, Schiarretta et al., 2005a, 2005b, 2010). The objective of animal health improvement was clear to all stakeholders who collaborated efficiently in spite of a diversity of views and difficulties in finding agreements on technology system implementation and method of interpretation.

Omamo and d'Ieteren (2003) identified inappropriate objectives, inadequate links between research and policy making, and insufficient social science input as major

shortcomings of tsetse and trypanosomiasis campaigns. The objective aiming at animal health improvement defined in terms of disease prevalence was met. The strong links between scientists and facilitators on one hand and between facilitators and communal tsetse control committees on the other was a prerequisite for efficient project execution. The co-operation of facilitators and farmers with national institutions was not only indispensable for monitoring disease presence and for drug administration but also opened the door for the project to be considered in the Ethiopian national poverty alleviation agenda (Aseffa Abreha et al., 2003).

### **3. Animal health improvement and human development**

#### **3.1 Introduction**

Rogers and Randolph (1988) and Barrett (1989) noted the possible negative consequences of tsetse control operations, and the current Pan African Tsetse and Trypanosomiasis Eradication campaign calls for thorough land use planning in tsetse control programs (OAU 2001; Reinhardt, 2006). Hence, the tsetse and disease control operations were accompanied by a program aiming at integrating animal health improvement into sustainable human development.

#### **3.2 Methodology**

To prevent the system from developing into an undesirable state, farmers were expected to implement additional technologies. Technology package selection and implementation by Luke villagers and their colleagues from neighboring areas were facilitated by an on-site technology testing, demonstration and training facility named BioVillage. The technologies for vegetable production and other activities included dipping irrigation, double digging, raised beds and organic fertilization, energy production in biogas digesters, and honey bee keeping (Aseffa Abreha et al., 2003; Herren et al, 2007). Facilitators working for ICIPE and the Yeha project of the Addis Ababa based BioEconomy Foundation (BEA) were expected to interact with the respective scientists and collaborators of Italian, German and US universities and to assist interested villagers in implementing the technologies of interest.

To improve the knowledge on the dynamics of the ecosocial system, to guide actions and to facilitate negotiations among stakeholders, a bioeconomic model was developed (Baumgärtner et al., 2008b; Gutierrez et al., 2009). In general, bioeconomic models are developed for better understanding pathways of development and for assessing the impact of alternative policies on the natural resource base and human welfare. They integrate important biophysical information and ecological processes with economic decision behavior (Regev et al., 1998; ICRISAT, 2009).

The consequences of technology implementation are evaluated within the contexts of agroecological sustainability (*cf.* Gliessman, 2000, 2007), ecosystem service provision (*cf.* Hein et al., 2006) and ecosocial sustainability (*cf.* Goodland 1995). A voluminous literature proposes indicators for assessing the sustainability in these three context. For example, Gliessman (2000, 2007), Meyerson et al. (2005) and UNSTATS (2008) provide important information on indicator selection and aggregation for respective assessments. In this case, however, the available financial and logistic means neither allowed the consideration of the literature nor the use of a

comprehensive set of indicators. Instead, we made use of information readily available in national and regional statistics collected by Ethiopian Authorities and combined it with data published by Getachew Tikubet et al. (2006) and Baumgärtner et al. (2008b, 2010).

Agricultural sustainability is qualitatively assessed on the basis of sustainability concepts and parameters defined by Gliessman (2000, 2007). Hence, a conceptual model is used to tentatively assess inputs and qualify internal processes.

Ecosystem service provision is classified into production services, regulation services and cultural service, and assessed in biophysical terms (Hein et al., 2006). Undoubtedly, the information available is neither complete nor sufficiently reliable for undertaking a comprehensive evaluation of all services and go beyond a biophysical assessment towards a valuation of ecosystem services (Hein et al., 2006). In fact, the available data permit the quantification of milk, meat and tef (*Eragostis tef*) production at Luke, while the information on stocking rates and on the proportion of arable land to agricultural land allows a tentative qualification of some regulation services. Cultural services depend on the human interpretation of the ecosystem. Among the characteristics, there is nature and biodiversity, i.e. provision of habitat for wild plant and animal species, and provision of cultural, historical and religious heritage. In general, species biodiversity reaches a maximum at intermediate levels of management (Smith and Smith, 2000) and is quantified as follows. Hawando Tamirie's (2006) maximum stocking rate of 3.5 TLU ha<sup>-1</sup> may represent intensive pasture exploitation, so that half of it (1.75 TLU ha<sup>-1</sup>) may be a plausible rate for intermedium pasture management. The estimated stocking rate - dependent biodiversity values are 0.51 (1995), 0.04 (2005) and 0.14 (2006) for pastures, while constant values of 0.01 and 0.20 are tentatively assigned to unmanaged land and arable land to take into account deforestation and low level of management intensity for tef, respectively. The biodiversity values obtained under different management intensities are multiplied by the surface of unmanaged land, tef and pastures. The sum is entered as a biodiversity index into Figure 2. Heritage provision may reach 0.1, 0.8 and 0.1 of the desirable levels in forests, arable lands and pastures. The multiplication by the respective surfaces and the summing up of the products yields an heritage provision index entered also in Figure 2. Additional information used to quantify ecosystem services is reported in Table 1. Figure 2 is a spider diagram, i.e. a graphical model often used for the assessments of ecosystem service provision (Hassan et al., 2005).

Ecosocial sustainability assessment is inspired by the summary of France's strategy that reconciles the ecological, economic and social aspects of human activities, undertaken on ecological, economic and social pillars of sustainability (Anonymous, 2011b). As previously stated, the Luke system initially operated below the national average at a low level of development. To facilitate the representation of changes, we make use of the initial assessment and report the changes relative to the national average or other suitable reference values. Specifically, the parameter values for Luke are related to the neighboring area (draught power requirements), to the poverty threshold (income) or to mean values for Ethiopia (population density, proportion of arable land; milk, meat and tef production, cattle number per person). Importantly, many variables are *per capita* (Table 2) and, hence, influenced by population growth. The variables and the source of the information is given in Table 2, while the information from Luke has been obtained from Getachew Tikubet et al. (2006) and Baumgärtner et al. (2008a, 2010). To show the changes, the calculated values are represented in a spider diagram (Figure 3).

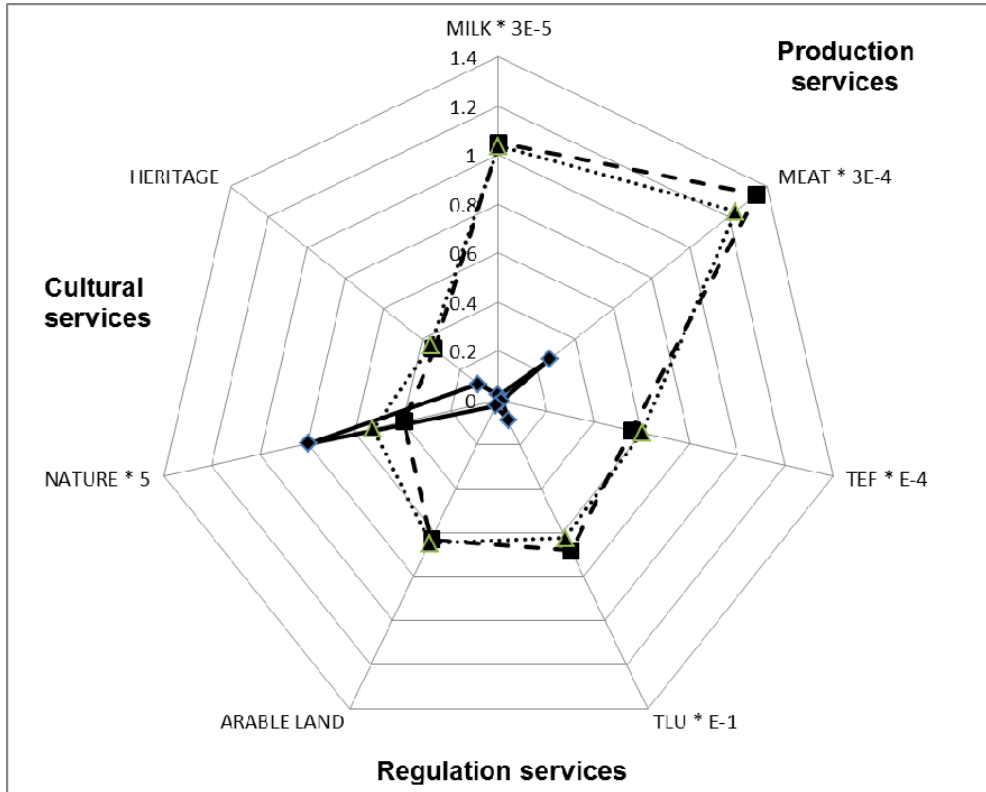


Fig. 2. Ecosystem service provision by the Luke ecosystem divided into production, regulation and cultural services with readily available data (MILK = milk production in l per year, MEAT = meat production in kg per year, TEF = tef production in kg per year, TLU = tropical livestock units, ARABLE LAND = proportion of arable land to agricultural land; NATURE = biodiversity index; HERITAGE = conjectured index of culture; diamonds and solid lines = data 1995; quadrats and dashed line = data 2005; triangles and dotted line = data 2006).

### 3.3 Results

Many farmers participated in training courses at the Biovillage technology testing, demonstration and training facility, but only few technologies including organic fertilizer production and to some extent, vegetable production, were adopted by the villagers. Interestingly, the villagers took the initiative to use the energy produced by the Biovillage biogas digester to pump water to the village. This can be interpreted as a positive response, although we expected the energy be used for cooking purposes to substitute dung cakes.



Ecosystem service category	Parameter	Information used for indicator computations		Source of information
Production	milk	herd structure lactation period	30% cows 279 days	Tesfaye Mengistidie Dore (2007), Belete Anteneh
	meat	average weight off-take year <sup>-1</sup>	268 kg 7.5%	Tariku (2006), Nell (2006)
	tef ( <i>Eragrostis tef</i> )	average yield	1.1 t ha <sup>-1</sup>	Heiniger (2009)
Regulation	erosion control, soil fertility and water holding capacity	Tropical livestock units (TLU), maximum	3.5 ha <sup>-1</sup>	Hawando Tamirie (2006)
	nutrient cycling	proportion of arable land to agricultural land		Getachew Tikubet al. (2006), Baumgärtner et al. (2008b, 2010)
Cultural service	biodiversity and nature	relation to intermediate management <sup>a</sup>	proportions for forests, arable land, and pastures (see text)	Estimates and conjectures by the authors
	heritage	perceptions by the community		

Table 1. Ecosystem services provided by the Luke ecosystem in Southwestern Ethiopia: information used for constructing the spider diagram (Figure 1) (max. = maximum, <sup>a</sup> = for the concept, see Montagna et al., 2011).

Dimension (plane)	Parameter	Reference quantity	Information source
Ecology	Tropical livestock units (TLU) ha <sup>-1</sup> , maximum	3.5	Hawando Tamirie (2006)
	Population density <sup>a</sup> ha <sup>-1</sup>	75	TradingEconomics (2011) [ <a href="http://www.wikipedia.org/">http://www.wikipedia.org/</a> ]
Economics	<i>Per capita</i> income (poverty line) per day	1.25 USD	Anonymous (2011a)
	Draught power (number of oxen per ha <sup>-1</sup> )	1.9	Gryssels et al. (1984)
	<i>Per capita</i> milk consumption <sup>a</sup> year <sup>-1</sup>	19 l	Belete Anteneh Tariku (2006)
	<i>Per capita</i> meat consumption <sup>a</sup> year <sup>-1</sup>	13.9 kg	
Sociology	Tef ( <i>Eragrostis tef</i> ), yield ha <sup>-1</sup>	1.1 t	Heiniger (2009)
	Area under cultivation <sup>a</sup>	2457000 ha	
	Livestock number <sup>a</sup>	143.33 mio	Netherlands - African Business Council [ <a href="http://www.nabc.nl/">http://www.nabc.nl/</a> ]
	School attendance	1.0	Target defined by stakeholders

Table 2. Reference parameters and the source of the data for the evaluation of ecological, economic and social sustainability in relation to reference parameters in the Luke community, Southwestern Ethiopia, reported by Getachew Tikubet et al. (2006) and Baumgärtner et al. (2008b, 2010) ( <sup>a</sup> = area and numbers reported for Ethiopia).

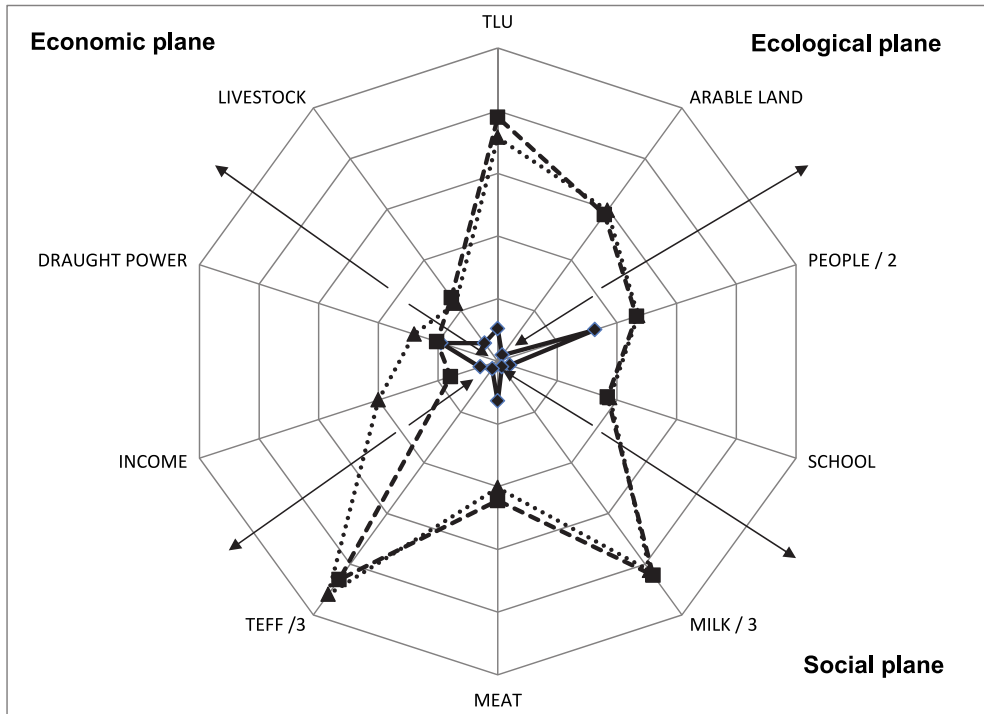


Fig. 3. The ecosocial sustainability of the Luke community, depicted on ecological, economic and social planes in that readily available variables are represented relative to reference values (TLU = tropical livestock units, ARABLE LAND = proportion of arable land to agricultural land, PEOPLE = population density, SCHOOL = proportion of Luke children attending the school, MILK / 3 = milk production, MEAT = meat production, TEF / 3 = tef production), INCOME = income relative to one US \$ per day, DRAUGHT POWER = need of oxen relative to number of 1.9 in a neighboring area, LIVESTOCK = number of cattle per person) (diamonds and solid lines = data 1995; quadrats and dashed line = data 2005; triangles and dotted line = data 2006; the scales for the axes are 0.5, the arrows point to the deviations from the reference values).

The bioeconomic model proved to be valuable tool for a comparative analysis of transformability of ecosocial systems and for obtaining insight into the dynamics of the ecosocial system after technology implementation (Baumgärtner et al., 2008b). A high degree of transformability was thought to facilitate adaptive governance. Nevertheless, the stakeholders made little use of the model in the facilitation process. Information exchange among stakeholders was less frequent than in the animal health project component and project execution suffered from diverging views on methodologies and objectives among stakeholders. Hence, in the 1995-2006 project period, the facility extension model applied to human development or enhancing sustainability was not effective. Figures 2 and 3 show that, irrespective of the context, substantial changes occurred from 1995 to 2005, but only small differences were recorded between 2005 and 2006.

From an agroecological standpoint (*cf.* Gliessman, 2000, 2007), livestock health has been improved through the input of an external tsetse trapping and therapeutic disease control technologies rather than through a hypothesized activation of internal regulating processes. Disease prevalence has decreased but the number of diseased animals has increased (Getachew Tikubet et al., 2006). Consequently, a farmer keeps more livestock but has to invest more into drugs that amount to one US \$ for treating one animal. The increasing amount of antitrypanosomal drugs further augment the external input into the system. Importantly, as a result of animal health improvement, draught power became available (Yigzaw Dessalegn & Yohannese Mehari, 2007). However, the 2.7 ha ploughed by one ox in 2005 is far above the 1.9 ha average reported by Gryssels et al. (1984) in a neighboring area. Hence, the oxen may suffer from work stress unless additional oxen are imported which would again increase the inputs. The substantial increase in arable land occurred at the costs of a reduced pasture area. This reduction and the concomitant increase in cattle resulted in overgrazing that may have exposed livestock at a nutritional stress even if crop residues are used as feed. Since dung is preferentially used as a source of energy for cooking and for fertilizing house gardens, only a small amount of nutrients may find the way as fertilizers to arable crops. Increased reliance on external inputs, stressed draught power and inefficient distribution of fertilizer indicate that technology implementation resulted in a decreasing agroecological sustainability.

From the standpoint of ecosystem service provision (*cf.* Hein et al., 2004), the Luke community benefitted from measurable increases in milk, meat and tef production but suffered from a decrease in regulation services (Figure 2). In fact, overstocking may negatively affect soil fertility, erosion and water holding capacity, while the ratio of arable land to agricultural land indicates constrained nutrient cycling. In fact, the ratio of 0.6 is much higher than ratio of 0.4 reported for Ethiopia in 2008 indicating that too much land is being ploughed. The reduction in cultural services through a decrease in biodiversity and nature is mainly due to either relatively low (arable land) or high levels of management (forests, pastures). However, cultural services appear to be somewhat improved through better heritage conservation achieved through the traditional integration of arable land into the farming systems. As opposed to production and regulation services with a measurable background, however, the proportions representing the level of cultural ecosystem service provision are merely useful conjectures for tentatively showing the change.

From the ecosocial standpoint (*cf.* Goodland, 1995; Holling, 2001), significant changes occurred in selected variables on ecological, economic and social planes with respect to reference values (Figure 3). For following the change, the innermost lines connecting the values obtained in 1995 should be compared with the outer lines connecting the 2005 and 2006 values. The deviations from 1 indicated by the arrows represent the differences from the reference values. On the ecological plane, the Tropical Livestock units (LTU), the proportion of arable and the population density were below the reference value in 1995 and far above in 2005 and 2006. This is seen as an indication that the carrying capacity of the Luke system has been exceeded and that the ecological basis cannot sustain the development on economical and social planes any more. On the economic plane, both the livestock asset and the draught power have substantially increased albeit without reaching the reference value, while the income has reached the poverty line (Anonymous, 2011a). Apparently, the resources available for livestock became insufficient for cattle and oxen numbers to reach the reference values. Nevertheless, given the interest in poverty alleviation

and the importance of livestock as an asset to hedge against disasters (Haldermann, 2005), the progress on the economic plane is remarkable. On the social plane, Figure 3 also shows significant progress. Namely, school attendance is close to the target of 100%, meat production has reached the reference value, while tef and milk production have far exceeded it. Presumably, the nutrition has greatly improved and the surplus has increased the income. In summary, there is a risk that the progress on economic and social planes is no longer sustained by the ecological basis. This is interpreted as unbalanced and hence, unsustainable development.

### 3.4 Discussion

During the decade under study, few attempts were made to correct the level of unsustainability of the agroecological system, to improve ecosystem service provision and to balance the development in ecological, economic and social dimensions. Specifically, technology adoption was limited, models were hardly used in the facilitation process and the ratio of project costs to benefits seems to be unfavourable. Several factors may contribute to these shortcomings.

Probably, there was simply no sufficient time for villagers to recognize the problems and to react to apparently deteriorating agroecological and ecological conditions. Moreover, the facilitation extension model was not effective primarily because there was limited interaction between stakeholders. Because of limited logistic and financial support as well as a lack of interest by many stakeholders, the on-site demonstration and training facility was poorly managed. Apparently, the diverging views of and the operating on different moral systems by stakeholders was a major obstacle to project execution (Baumgärtner et al., 2008a).

The models developed by Baumgärtner et al. (2008b), Gilioli and Baumgärtner (2007), Herren et al. (2008) and Gutierrez et al., (2010) were hardly considered by the stakeholder community. Among the reasons was the late availability of the models, unclear objectives, few financial resources, and diverging views on methodologies. Moreover, the stakeholder community was unaware of the need to engage the participants into a modelling process and to develop and use a variety of models for different purposes (Peterson et al. (1997). The lack of interest is surprising since the bioeconomic model proved useful for the assessment of system transformability and for predicting the trajectory of the ecosocial system towards a collapse unless the villagers engage in reproductive health programs and take into account the limitations of the natural resource base (Baumgärtner et al., 2008b; Gutierrez et al., 2009). Conceptual models on ecosystem service provision and sustainability models proved to be useful for comparing the Luke agropastoral system with an Alpine system which both depend on managing common-pool natural resources. To avoid overgrazing, the Luke community was advised, among others, to integrate stocking rules into governance (Baumgärtner et al., 2010).

The provision of ecosystem services depends largely on the intensity of pasture management. Importantly, the Luke pastures are common pool resources that generally face the problem of overuse. Namely, according to the “Tragedy of the Commons” (Hardin, 1968), a herdsman will try to keep as many cattle as possible on the commons because he receives all the proceeds from the sale of the additional animal (positive utility) but shares the effects of overgrazing with all other herdsmen (negative utility). However, the “Tragedy

of the Commons” is possible but not inevitable (Ostrom et al., 1999) and in Luke, could be avoided by improving adaptive governance (Baumgärtner et al., 2010).

Pawłowski’s (2011) hierarchically organized planes, the evaluations carried out in different contexts (Goodland, 1995) and the here proposed conceptual and graphical models provide important insight into the changes and can complement the bioeconomic model as evaluation tools in the facilitation process. There is room for further improving impact assessment: the current analysis is restricted to agricultural and unmanaged land and disregards home gardens which are an important contributor of food. False Banana (Enset, *Ensete ventricosum*) is a traditional staple crop in Luke and of particular interest in securing food supply under difficult conditions for agricultural production. Moreover, a difference should be made between unmanaged land and partially deforested areas.

#### 4. Opportunities for sustainability enhancement

According to many Ethiopian researchers, human development requires poverty reduction and the overcoming of both environmental degradation and food insecurity (Shibru Tedla & Kifle Lemma, 1998; Sisay Asefa and Tesfaye Zegeye, 2003). Presumably, the Luke villagers were aiming at similar objectives when they sought external help and initiated their efforts with improving animal health. For them, livestock is an asset used as hedges against risk and disaster (Haldermann, 2005). Most of the stakeholders, however, accepted the prioritization of animal health with reservation and emphasized instead the need to enhance sustainability in human development efforts. Apparently, unclear objectives were less of a hindrance in animal health improvement efforts than in selecting and implementing technology packages for sustainable development. In this case, project execution was plagued by disagreements on methodologies and conflicting views on objectives. The use of Pawłowski’s (2011) hierarchical system may be useful for structuring discussions and provide a comprehensive framework for negotiation and reconciling stakeholder disagreements. The evaluation of sustainable development from the perspective of agroecological sustainability (*cf.* Gliessman, 2007), ecosystem service provision (*cf.* Daily & Dasgupta, 2007) and ecosocial sustainability (*cf.* Goodland, 1995) may better respect diverging views among stakeholders and contribute to reaching goals in a more efficient manner. Coordinated efforts towards common objectives, without insisting on agreed definitions (Owen, 2003), would pave the road to better cooperation among stakeholders than done so far.

Ethicists differentiate between consequential (e.g. utilitarian), deontological (duty-based) and virtue based moral systems (Huppenbauer & Bernardi, 2003; Newton, 2003; Huppenbauer & Bleisch, 2011). The members of the stakeholder community appear to operate on the basis of diverging moral systems (Baumgärtner et al., 2008a). According to the ecological pragmatism of B. G. Norton (Georgia Institute of Technology, Atlanta, USA) several divergent moral theories, which do not even agree on the determination of environmental ethics issues, can nevertheless work together as part of a single moral enterprise even though their respective commitment is in practice based on very different theoretical considerations (Afeissa, 2008). However, the fundamental role of ethics in Pawłowski’s (2011) system of sustainable development and our experiences indicate that particular efforts are needed to setting up dialogues and to respecting pluralistic views for strengthening the cooperation in working towards common objectives.

The slow adoption of Adaptive Management (AM) and the reluctance in integrating a modelling process useful in knowledge acquisition, decision support and negotiation was a major hindrance for project execution. Towards the end of the project period, however, most stakeholders recognized the utility of AM and the important role of models in connecting research with management so that the research meets management needs and management helps answer relevant research questions (Sayer and Campbell (2004). A more intensive dialogue among stakeholders than done so far is considered indispensable for making efficient use of mathematical, conceptual and the here presented graphical models.

Apparently, technology testing, demonstration and training at the Biovillage site were difficult to build into the facilitation process and had only a limited impact. However, Sayer and Campbell (2004) recognize that uncertainties and complexities require continuous learning through trial and error, analyzing mistakes and successes should be equally rewarding. The facilitation process employed in this project emphasizes the learning process and, albeit not recognized by all stakeholders, did allow for trial and error. Moreover, the demonstration and training site does not necessarily restrict technologies to preconceived notions of stakeholders (Tripp, 2006) and allows improvements of already implemented technologies (Newton, 2003). In the evaluation of the project, the criteria of technology selection and implementation may be overemphasized. Sayer and Campbell (2004) argue that indicators of natural resource system performance should reflect adaptability and a capacity for learning, rather than, for example, increased yields or adoption of new technology. An evaluation of the succeeding phase (2007-2011) may allow a revision of the methodologies and a re-interpretation of the results.

During the project phase (1995-2006) the fundamental role of adaptive governance was increasingly recognized by some but not all stakeholders. Accordingly, societies can improve adaptive governance through the continuous improvement of structures and processes by which they share power to shape individual and collective actions (Lebel et al., 2006). In adaptive governance, efforts could be made to harmonise traditional and modern governing structures (Getinet Assefa Gadena, 2009). In particular, the stakeholders should agree on mechanisms to enhance traditional leaders' interaction with the various arms of the government (legislative, executive and judiciary) (ECA, 2007). In Ethiopia, the strengthening of the interactions between existing formal and informal local governance systems analyzed by Spielman et al. (2009) may be a particularly promising strategy in development efforts.

## 5. Conclusions

Diverging views on methodologies are not necessarily a hindrance to technology system implementation in sustainable development efforts. Nevertheless, to overcome the difficulties experienced in dealing with complex technologies and impact studies, stakeholders should seek basic agreements on cooperation and objectives without insisting on generally agreed definitions. If stakeholders operate on the basis of different moral systems, cooperation could be improved by intensive dialogues and respecting pluralistic views. The use of a hierarchical system with ethical, ecological, economic, technological, legal and policy planes is helpful for this purpose. The evaluation of sustainable development from different perspectives or in different contexts further contributes to overcoming difficulties.

In a facilitation process dealing with simple technology systems, adaptive management can easily integrate scientific contributions. In more complex systems, however, unprepared stakeholders are unable to efficiently apply mathematical, conceptual and graphical models to knowledge acquisition, decision support and negotiation. To make efficient use of these tools, an intensive dialogue between stakeholders is indispensable. Albeit of limited impact in the period under study, there are few alternatives to setting up on-site technology testing, demonstration and training facilities for selecting and implementing complex technology systems.

When evaluated in a narrow context, a simple technology system may readily produce positive results. When evaluated in broader contexts, however, the implementation may have consequences that threaten sustainable development if not complemented by the integration of additional technology systems, adequate natural resource management procedures and the revision of governance with respect to new rules and better integration of traditional governance structures.

The different evaluation contexts yield different but complementary results: in an agroecological context, the production may increase while the sustainability decreases; in the context of ecosystem service provision, technology implementation may result in higher production services, lower regulation services and more diverse cultural services; in the context of ecosocial sustainability, the measures undertaken to balance sustainable development on ecological, economic and social planes may prove to be insufficient for sustainable development. Hence, the evaluation within different contexts or from different perspectives is fruitful and recommended for sustainability assessments.

## 6. Acknowledgments

The Austrian Development Corporation (ADC), the Swiss Development Corporation (SDC) and BioVision Foundation, Zurich, Switzerland, provided financial support to the International Centre of Insect Physiology and Ecology (ICIPE). The assistance by Ethiopian Authorities and the collaboration of the Luke community is greatly appreciated.

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## **Section 3**

### **Policy and Practices**





# Strategic Environmental Assessment (SEA) of Rural Development Programs in the European Union – Towards a More Efficient Monitoring of the Environmental Effects of Agricultural Policies

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## 1. Introduction

It could be asked why a volume dealing with rural development finds it useful to dedicate a special chapter to the Rural Development Programmes (RDP) in the European Union and the Strategic Environmental Assessment (SEA) applied to these special programs.

In the introduction to the present chapter we would like to answer this question by explaining the challenge that the RDP and the SEA together could present to European countries regarding the environmental sustainability of development in rural areas.

It is a difficult challenge and we hope, albeit not completely convinced, that it could be largely overcome in the next few years. It will become clear in the following pages that many methodological, technical but above all political obstacles must be overcome in order to enable the RDP to display its considerable potential and the SEA to achieve environmentally positive effects on agricultural policies all over the European Union. Only after 2013 it will be possible to assess the true environmental results of the money spent by the Structural Funds on the rural areas in the 27 European countries. The effects obtained by these two programming periods (2000-06 and 2007-13), when the use of particular tools to improve environmental quality in rural areas was mandatory, will be important for the future of the whole planet: if the strong initiative displayed by the European Commission in this direction, through financing and through technical directives, is unsuccessful, it is probable that this policy will have no future in non-European countries, which could be seen as a heavy defeat for environmental protection and valorization as well.

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\* This chapter illustrates the results of a research project carried out jointly by the four authors under the scientific coordination of A. Spaziante. The text is also the result of a collaborative work; in particular, AS drafted sections 1 and 4; CR drafted sections 3.1, 3.2 and 3.4; MC drafted section 3.3; CM drafted sections 2.1 and 2.2

We can begin by stressing that the starting-point must be the general aim defined by the European Commission as “territorial cohesion,” i.e. a common responsibility that has to be shared by both Member States and the Union and reflected in European policies on the necessity to boost growth and create jobs according to the Lisbon Strategy, and to improve sustainability according to the Göteborg strategy.

For this reason the European agricultural policy has been amended over the last few years to improve the concepts of sustainability, multifunctionality and competitiveness, and the Structural Funds offer the financial tools to support the application of these concepts.

A second main focus is on the tools developed to pursue environmental sustainability, assessing every program and plan - RDP included - to verify that it complements the fundamental EU strategy for development sustainability.

The new policy recognizes that rural development has an important role in confronting new challenges such as climate change, water management, bioenergy and biodiversity. More funding has been diverted from production subsidies towards targeted measures which will improve biodiversity, contrast climate change, increase the use of alternative energies, improve water quality, etc. Through the new Common Agricultural Policy (CAP) the European Commission has encouraged Member States and their Regions to offer incentives to farmers to make environmental improvements.

In this perspective, if forest and agricultural soil loss is the most direct and measurable environmental effect, the agricultural land use changing can be seen as a strong reflection of the new Common Agricultural Policy effect.

The necessity for positive results in this direction pushed the European Commission to obtain and to enforce the use of special tools able to insure these effects such as SEA.

The chapter will stress that it is necessary to take advantage of the integration between these important tools introduced by the European Commission (RDP and SEA) in order to steer rural area development and to correct the effects on the environment of the Common Agricultural Policy so as to make better places that are valued and have identity. This is an enduring ambition of planning and the reason why the major challenge of spatial planning is to find solutions for a more sustainable millennium in the rural as well as in the urban areas.

Aiming to diffuse knowledge about the long-term work going on in the European countries to achieve sustainable development even in rural areas, the chapter will expose in detail the European CAP's new strategies and give an example of the SEA for the RDP of the Piedmont Region (Italy).

Before beginning the detailed exposition of the CAP strategies and the Piedmont Region SEA for the RDP, we think it helpful to recall some of the main elements in the process that led to the definition of the SEA of plans and programs: as this procedure is not explained in other chapters of the book, and it is an innovative tool endowed with many interesting methodological and technical aspects, it worths consideration here.

SEA was drawn up and officially introduced into European legislation through Directive 42/2001/EC, but the concepts and general framework predate the Directive: in 1992, on the

occasion of the Earth Summit in Rio de Janeiro, the journal *Impact Assessment and Project Appraisal* published a monographic issue on strategic assessment, proposing an initial organization of the studies in question.

In 1992, Thérivel and other authors were the first to define the SEA as “a formalised, systematic and complete process for assessing the environmental effects of a policy, of a plan or of a program and of its alternatives, which includes the drafting of a report on the results of the assessment and which takes these results into account in a public and responsible decisional process,” (Thérivel et al., 1992) highlighting that the assessment process must be appropriately structured and based on negotiation and social interaction practices.

Towards the end of the 1990s, with the enactment of Community Regulation No. 1260/1999, SEA was officially introduced into the Community’s legal framework, but its implementation was limited only to the programs and plans supported, during the five-year period 2000-06, by the European Structural Funds.

As mentioned earlier, the definitive procedure for the assessment of plans and programs, through the adoption of Directive 42/2001/EC, was officially introduced into the European legal framework in 2001.

The Directive extended the environmental assessment process to all plans and programs with significant effects on the environment, to be initiated immediately after the decision to undertake a new plan/program and before the plan/program adoption. We should stress at this point that the main innovative aspects of the SEA originate from two basic considerations: the observation that sustainable development objectives can be pursued more effectively by integrating the environmental aspects “upstream” and not “downstream” of the decision-making process and the awareness that the search for solutions compatible with the environment depends on the degree of involvement of the different partners concerned.

SEA's objectives and role in the European Union are openly stated in article 1 of the Directive: “The objective of this Directive is to provide for a high level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans and programmes with a view to promoting sustainable development, by ensuring that, in accordance with this Directive, an environmental assessment is carried out of certain plans and programmes which are likely to have significant effects on the environment.”

From July 2001 each Member State had four years time to incorporate the new Directive into the national laws related to either environmental protection or planning processes or (better) both of them, but we must note here that many countries (Italy among them) delayed the transposition of the Directive with negative consequences in terms of methodological progress as well.

Through the “toolbox” offered by the Strategic Environmental Assessment procedure, the paper goes on to suggest the integration of agro-environmental and landscape indicators to describe, measure and monitor the effects of the new programming cycle of rural development for sustainable regional growth.

## 2. The CAP and the new EU strategies for agriculture: The day after the Lisbon Strategy

Why is the Lisbon Strategy so important for the development of rural areas? The answer requires the provision of some figures. Rural areas cover 90% of the territory of the European Union and are home to approximately 50% of its total population. Agriculture and forestry are the main uses for land and play a key role in the management of natural resources in rural areas and in determining the rural landscape. Agriculture makes a valuable contribution to the socio-economic development of rural areas and enables the full realization of their growth potential.

The wider contribution of agriculture to the prosperity of the EU is considerable. The agri-food sector (including beverages) accounts for 14.2% of the total EU manufacturing output, with production worth €675 billion. It is the third largest employer in Europe and the second biggest exporter of foodstuffs globally, with agricultural exports worth over 62.000 Millions of € in 2005. (EC, 2011)

European citizens are deeply attached to the diversity of the European landscape, which has been created by the wide variety of agricultural structures and types of farming in the EU. Safeguarding this diversity means investing in the future, creating new employment possibilities and encouraging rural diversification. People must be offered opportunities to create wealth as well as long-term rewarding job prospects. That is why the Lisbon Strategy is as relevant to rural areas as it is to urban Europe.

On 2 February 2005, the European Commission re-launched the Lisbon Strategy. This strategy seeks to tackle the EU's urgent need for increased economic growth and job creation and greater competitiveness in the world markets. It is a major EU policy priority. The Lisbon Strategy aims to provide people with a better standard of living in an environmentally and socially sustainable way.

The guiding principles for the contribution of the CAP to the Lisbon Strategy were set by the European Council in Göteborg in 2001 and confirmed in the Lisbon Strategy Conclusions in Thessaloniki in June 2003. These principles are *strong economic performance* that goes hand in hand with the *sustainable use of natural resources*.

Without the CAP, many rural areas of Europe would face major economic, social and environmental problems. Rural development measures, in particular, can play a significant role in fostering and maintaining prosperity in rural areas. The CAP will continue to make a concrete contribution to increasing growth and jobs in the future.

The CAP has been undergoing a process of reform since the early 1990s. These reforms have focused mainly on increasing the competitiveness of agriculture by reducing support prices and compensating farmers through the introduction of direct aid payments. A decisive step came in the 2003/2004 CAP reform with the decoupling of direct aids from production and the realignment of the CAP with consumer concerns. This reform was a key step toward a more market-oriented and sustainable CAP.

The new CAP, post 2003/2004, constitutes a fundamental contribution to the Lisbon process. It places the emphasis on market orientation rather than market support. It removes many of the negative incentives of the old CAP. A more entrepreneurial approach will require a change in the culture and working habits of many organizations and will require support

and encouragement (both political and financial). This will remain a major challenge in the coming years. For these reasons, the instruments of rural development will grow in importance.

### **2.1 Sustainable rural development: The “green” side of the second pillar of the CAP**

Rural Development Programming 2007/2013 constitutes the second pillar of the CAP. Rural development can be considered to be the key tool for the restructuring of the agriculture sector, and for encouraging diversification and innovation in rural areas. The enlargement of the European Union has changed its agricultural map. Rural development policy can help to steer this process toward a more value-added, flexible economy, in line with the Lisbon Strategy.

In all Member States, rural development can help to promote competitiveness in the agricultural and food processing sectors. The Rural Development Regulation sets out the legal framework within which the RDP must operate. The Rural Development Policy 2007-2013 focuses on three areas in line with the "three axes" of measures laid down in the new Rural Development Regulations (Axis 1: Improving the competitiveness of the agriculture and forestry sectors; Axis 2: Improving the environment and countryside; Axis 3: Rural quality of life and diversification of the rural economy; and the Axis Leader, which operates across Axes 1, 2 and 3). Axis 2 in particular provides measures to protect and enhance natural resources, as well as to preserve high nature value farming and forestry systems and cultural landscapes in Europe's rural areas. To this end, the European Community's strategic guidelines for rural development suggest that resources devoted to Axis 2 contribute to three EU-level priority areas: (i) biodiversity and preservation of high nature value farming, forestry systems and traditional agricultural landscapes; (ii) water; (iii) climate change.

The provision of environmental goods, particularly through agri-environmental measures, can form a basis for growth and job creation through tourism and rural amenities. There is particular scope for innovative approaches that add value to the rural economy by remunerating farmers for environmental services and linking these to diversification into tourism, crafts and training. Similar linkages can be made in the non-food sector. The adoption of particular farming techniques can improve the economic and environmental performance of farms. Environmental projects, including the management of Natura 2000 sites<sup>1</sup>, can provide important spin-off effects by acting as demonstration/tourism/training projects.

### **2.2 Rural territories undergoing “greening growth” through Strategic Environmental Assessment**

As green growth may well become the growth paradigm for the 21<sup>st</sup> century, policy makers require policy tools in order to address this challenge.

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<sup>1</sup> *Natura 2000* is an ecological network of areas with high natural value in Europe. Its foundation are the Bird Directive (Council Directive 2009/147/EC on the conservation of wild birds) and the Habitats Directive (Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora)

SEA constitute one of these tools. SEA is an analytical and participatory approach for incorporating environmental, social and climate change considerations into plans and programs. Within the “programs” category, according to the Directive 42/2001/EC on SEA, RDP must be accompanied by an SEA process. SEA is used to safeguard the quality of information, participation, transparency and accountability of strategic planning. Originally designed as an extension of environmental impact assessment (EIA), the most commonly used assessment approach at project level across the world, SEA has developed in a more strategic direction, responding to the different needs which politicians and governments have at the strategic level.

The aim of SEA is to integrate a continuous process of fact-finding and a dialogue between civil society and the private sector into planning and policy-making, aiming to influence decision-making for the purposes of environmental and social sustainability.

The objective of the SEA process is to provide a high level of environmental protection and to contribute to the integration of environmental considerations into the preparation and adoption of RDP. According to Dalal-Clayton and Sadler (2005), SEAs of plans and programs “promote and further develop methodologies at policy, strategy and project levels for sustainable development decision-making.” SEA is an instrument or, more precisely, a process that assists and facilitates decision-making. It acts at the strategic level of decision-making and aims to promote an integrated approach, taking into account the economic, social and environmental dimensions of sustainable development. Its goal is to analyze a variety of alternative development scenarios and to predict their cumulative environmental and social effects, considering the legal and institutional backgrounds of countries. The process involves an analysis of the probable effects on the environment, recording these effects in a report, undertaking a public consultation exercise concerning the report, taking into account the comments and the report and informing the public about that decision afterwards.

SEA can enhance the greening of rural development by:

- providing data and an analysis of the capacity of natural resources and environmental services;
- highlighting institutional and governance gaps or constraints affecting environmental and social sustainability;
- promoting capacity-building and the institutional, legal and regulatory adjustments which are critical for the environmental and social sustainability of sector reforms;
- strengthening accountability in the management of environmental and social risks by increasing transparency and empowering weaker stakeholders belonging to the rural world.

According to Regulation 1698/2005/EC on support for rural development, the environmental assessment required by the SEA Directive shall be integrated directly into the broader ex-ante evaluations of RDP. The strategic aim of SEA is to focus on hypothetical limits, opportunities and alternatives and to reach a consensus on a preliminary definition of the criteria and the possible options for the sustainable development of the territory (Partidário & Clark, 2000; Fischer & Seaton, 2002).

The structure of SEA for rural development is based on the following macro-phases:

- "screening": an investigation of whether the plan or program falls under the SEA legislation;
- "scoping": defining the boundaries of investigation, assessment and the assumptions required;
- "documentation of the state of the environment": collection of baseline data on which to base judgments;
- "determination of the likely (non-marginal) environmental impacts" with the support of the common monitoring and evaluation framework (CMEF) for rural development and its set of indicators;
- informing and consulting the public;
- influencing "decision-taking" based on the assessment;
- monitoring the effects of plans and programs after their implementation.

If, on the one hand, we can say that the principles that underpin the concept of SEA have been acknowledged, the implementation of the SEA Directive in rural development represents a significant challenge for Member States. Through SEA, it should be possible to incorporate the principles of sustainability into the policy-making and programming process, to discuss alternatives while options are still open, to anticipate problems and to encourage politicians towards the integration of environmental and sustainability issues into their decision-making.

### **3. Case study. The SEA of the RDP of Piedmont region: Key emerging issues**

In the following sub-sections, we provide background information on the RDP of the Piedmont region and the associated SEA process; we then present and discuss key findings in relation to the following emerging issues: (i) environmental indicators and monitoring; (ii) the spatial distribution of agri-environmental measures; and (iii) the integration of agricultural policies and spatial planning at the regional level.

#### **3.1 Background information**

Piedmont is a region in North-West Italy, with an area of 25,402 km<sup>2</sup>, a population of 4,453,000 and a total agricultural area (TAA) of 10,683 km<sup>2</sup>. The RDP classifies the regional territory into four main areas (Figure 1):

- *Urban centres*, comprising major urbanized areas, where agriculture has a relatively marginal role and is under pressure from the demands of urbanization. These areas account for 17% of the total regional area, 62% of the total population and 20% of the TAA;
- *Intensive agricultural rural areas*, located in the fertile plain land of the Po Valley. Here, agriculture is characterized by intensive production processes and high chemical inputs. The main products include cereals, rice, horticulture, fruits and cattle. These areas account for 17.3% of the total regional area, 13% of the population and 31% of the TAA;
- *Intermediate rural areas*, mainly comprising hilly territories characterized by specialized agriculture (orchards and vineyards) integrated with other activities such as agri-tourism and catering. They account for 22.7% of the total regional area, 14% of the population and 23% of the TAA;

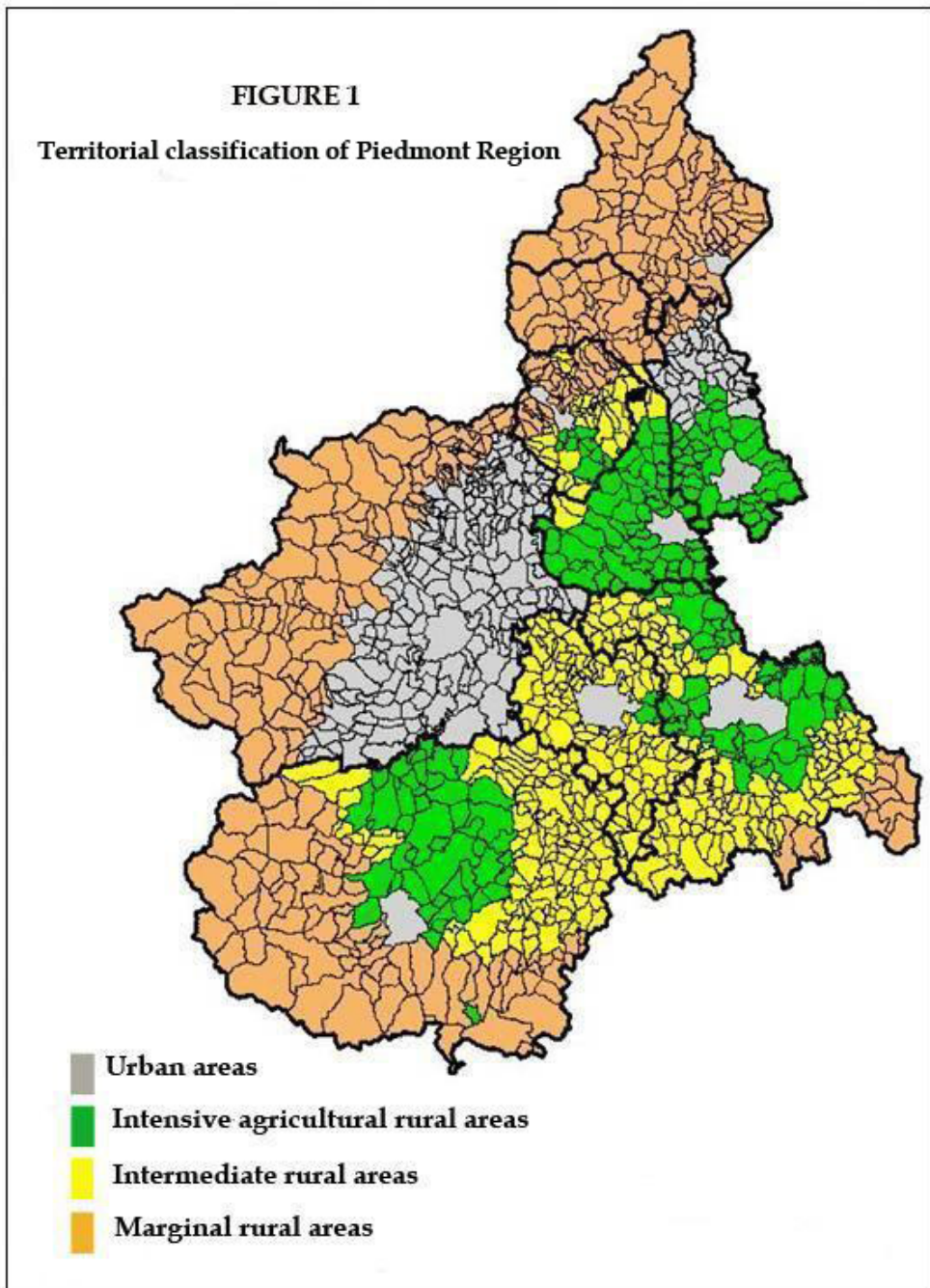


Fig. 1. Territorial classification of Piedmont Region



- *Marginal rural areas* are mainly mountain territories with comparatively lower levels of accessibility and socio-economic development. These areas account for 43% of the total regional area, 11% of the population and 26% of the TAA.

The RDP 2007-2013 underwent the formal SEA process pursuant to European regulations within the broader ex-ante evaluation; the environmental report (ER) was completed by April 2007. Despite not being required by EU regulations, the Regional Authority decided that the environmental assessment would be carried out also during the implementation phase of the RDP, and that an updated version of the ER was to be elaborated on as part of the broader mid-term evaluation report, to be concluded by December 2010. The mid-term SEA was therefore set the task of extending the objective of the mid term evaluation – to improve the quality of the RDP and its implementation by assessing the degree of utilization of resources, the effectiveness of the programming and its socio-economic impact – to cover environmental aspects as well. The ongoing SEA was conducted in the period from September 2009 to December 2010.

The SEA was therefore carried out following a political decision by the RDP management authority, and was not the result of EU obligations. This allowed the use of a more flexible approach: not all of the formal requirements for an ER were met, whilst other aspects received greater attention. The elaboration of strategic alternatives, for instance, was not considered, as there was no room for radical changes in the approved RDP. Conversely, on the basis of the specific needs of the Management Authority, some issues emerged as critical and were addressed within the SEA and the broader mid-term evaluation.

With regard to the assessment phase, a co-evaluation approach was used for the elaboration of the ER, with a mixed methodology comprising: (i) three focus groups (FGs) one for each axis of the RDP; and (ii) specific semi-structured interviews.

The FGs included all of the key persons in the regional authority who were involved in the program implementation, as well as the staff in charge of the elaboration of the mid-term ER and the SEA consultants. They were organized in order to foster inter-organizational communication and the exchange of information and knowledge, and to gather broad information on an array of relevant issues to be examined in more depth through semi-structured interviews with key civil servants in charge of the implementation of the main measures of the RDP.

The semi structured interviews were designed as follows: the SEA team prepared an “assessment matrix,” matching the specific actions envisaged by each measure of the RDP with a set of identified environmental components, namely: (i) air quality and climate change; (ii) energy; (iii) soil loss; (iv) water (quality and consumption); (v) ecosystems and biodiversity; and (vi) landscape and cultural heritage. The matrix was sent to civil servants some days before the scheduled interview. This method proved useful in that it provided an opportunity to combine the expertise of the SEA team with the expertise of the civil servants for the identification and assessment of possible environmental effects determined by the measures and actions of the RDP. During the semi-structured interviews, ideas for feasible innovations in the data collection system concerning applications for funding by potential beneficiaries emerged and were part of the final recommendations included in the ER.

### 3.2 Environmental indicators and monitoring

Monitoring is a key element of SEA processes, as established by Art. 10 of the SEA Directive. The European Commission provides a single framework for monitoring and evaluating all RDPs for the programming period 2007-2013, the so-called CMEF (see section 2.2), developed in accordance with the Member States and pursuant to Council Regulation n° 1698/2005. The CMEF establishes five types of indicator, namely:

- **Baseline indicators.** These are used in the definition of the program strategy. They fall into two categories:
  - *Objective-related baseline indicators*, which are linked directly to the wider objectives of the program and are used as the reference against which the impact of the program will be assessed;
  - *Context-related baseline indicators*. These provide information on relevant aspects of the general contextual trends that are likely to have an influence on the performance of the program.
- **Input indicators.** These refer to the budget or other resources allocated at each level of the assistance, and the progress of payments to beneficiaries;
- **Output indicators.** These measure activities which are realized directly within the program and which are measured in physical or monetary units (e.g., the number of farms receiving investment support);
- **Result indicators.** These measure the direct and immediate effects of the intervention. They provide information on changes in, for example, the behavior, capacity or performance of direct beneficiaries and are measured in physical or monetary terms (e.g., the number of jobs created);
- **Impact indicators.** These refer to the benefits of the program beyond the immediate effects on its direct beneficiaries, both at the level of the intervention and also more generally in the program area. The full list of impact indicators of the CMEF is presented in the following table.

	<b>Indicator</b>	<b>Measurement</b>
1	Economic growth	Net additional value added
2	Job creation	Net additional full time equivalent jobs created
3	Labour productivity	Change in gross value added per full time equivalent (GVA/FTE)
4	Reversing the decline in biodiversity	Change in the declining trend in biodiversity as measured by farmland bird species populations
5	Maintenance of high nature value farming and forestry areas	Change in high nature value areas
6	Improvement in water quality	Change in gross nutrient balance
7	Contribution to combating climate change	Increase in production of renewable energy

Table 1. List of impact indicators of RDP established by the CMEF.

As the table shows, the impact indicators as envisaged by the CMEF are limited in number and quite straightforward in their definition. The CMEF also foresees that Member States may provide additional indicators “[s]ince common indicators may not fully capture all effects of programme activity [...] Such additional indicators should be developed by Member States and programme partnerships in a flexible manner, but in accordance with the general principles governing the use of indicators in the CMEF” (EC, 2005: 8). These general principles state that for program monitoring to be feasible and cost-effective, the focus must be on a limited number of objectives and the related indicators (EC, 2006: 8). In fact, Art. 81 of Council Regulation n° 1698/2005 specifies that Member States may “specify a *limited* number of additional indicators” (EC, 2005: 6, emphasis added).

The rationale of the European Commission for developing the CMEF is clear: to have a single framework for the entire EU which facilitates quantitative comparison between Member States. The specificities of each RDP may be addressed by additional indicators; but, these must be limited in number and easily measurable in a standardized way.

However, when the environmental effects of several measures of RDPs are assessed in greater depth, a trade-off can be identified between the straightforwardness and comparability of indicators versus their robustness in ecological terms and their capability of covering the entire spectrum of the environmental effects of the RDP.

With regard to the first point, it has to be noted that while output and impact indicators of environmental measures expressed in quantitative terms such as “Total area under agri-environmental support” or “Number of farm holdings and holdings of other land managers receiving support” undoubtedly provide straightforward information, the “impact” associated with a certain intervention is a function of both the magnitude of the intervention itself (which is the parameter monitored with the indicators of the CMEF) and the characteristics of the recipient of the action. The same quantitative reduction in the input of nitrates into the terrain will have a different net impact if it occurs in a nitrate-vulnerable area where the groundwater is very close to the soil surface than in a less vulnerable area. In the same way, the effects of maintaining a certain land area as a habitat which is conducive to biodiversity on the ecological functionality of the area depends largely on the relationship between this area and its surroundings: the positive effects will be maximized if the area is close to, or part of, a corridor or a core area of the ecological network. Conversely, the effects will be smaller – the total area in question being equal – if it is a fragmented patch with no spatial relation to other natural sites. As it will be discussed more in detail in the next sub-section, when assessing the environmental effects of an agri-environmental measure, considering only the total area or the total number of actions may lead to miss important elements which will determine the overall environmental impact of a measure. A need to deepen the assessment arises: examples of how this was done in the present case study are illustrated and discussed in the next sub-section, focusing on the spatial analysis of selected measures of the RDP.

With regard to the second issue – the coverage of the different environmental aspects affected by the implementation of the RDP – the SEA process showed that some key environmental aspects affected by, or strongly related to, agriculture are only very partially covered by the basic set of environmental impact indicators devised by the CMEF. Two

issues in particular are neglected, namely *soil loss* and *landscape preservation*. These are recognized at the EU level as key themes shaping the relationship between rural development and sustainability.

Soil loss occurs when a portion of soil undergoes a transformation that nullifies its capacity to provide ecosystem services, in particular to absorb water, fix CO<sub>2</sub> and release O<sub>2</sub>; typically, this occurs when a natural or agricultural area is urbanized. Urban sprawl is the cumulative outcome of the scattered processes of urbanization that determine soil loss and it is, according to the European Environmental Agency (EEA), an “ignored challenge” within the EU (EEA, 2006). It is not a simple task to establish the net effect of the RDP on this phenomenon: on the one hand, some measures finance the building of new agricultural facilities which directly contribute to soil sealing; on the other hand, by supporting farming activity, the RDP provides means for rural areas to “resist” the pressures of urbanization from urban areas. During the SEA process, the need to monitor this particular aspect and the contribution of the RDP in contrasting or fostering it was put forward as a desirable improvement in the monitoring framework for the next programming period.

The rural landscape in Piedmont has been subject to relevant transformation over the recent decades, not only due to changes in the agricultural sector (such as the introduction of new cultivations), but also as a result of increasing urbanization. The SEA process stimulated some reflections on the dynamics and trends that interested the regional rural territory: in particular, peri-urban areas at the fringe of the urban territories underwent a heavy “de-ruralization” process that turned them into hybrid territories in which urban and rural features are mixed together and are not always easily recognizable. As a result, the zoning described at the outset of this section, and which descended from the European Regulations, was somewhat contrived.

One of the outputs of the mid-term SEA was the identification of all of the actions of the RDP that may have an effect on the landscape (an exercise that was not carried out during the ex-ante SEA). Landscape is conceived as “an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors” (COE, 2000). Landscape, which is associated with architectural and historical heritage, was one of the six evaluative dimensions that comprised the assessment framework (see the beginning of section 3), meaning that each measure and action was also assessed in relation to its potential capacity to alter, deteriorate, restore or valorise existing landscapes, which in turn are conceived as the entire set of physical, natural, perceptive, cultural and historical features of Piedmont.

It emerged that a large number of measures and actions can affect landscape (as previously defined), both positively and negatively, often as a result of indirect or unintended effects. However, notwithstanding several measures of the RDP are designed to pursue landscape preservation and enhancement, no specific reference is made to landscape in the CMEF. In fact, the consideration of the landscape component in the monitoring of the RDP has long been deemed too complex to address, and although some tentative indicators were considered in the previous programming period (2000-2006), the European Commission and Member States decided not to include it in the current CMEF.

Whilst quantitative approaches which are able to grasp the perceptive dimension of landscape are far from being widely accepted and consolidated, the increasing attention

which has been paid to landscape preservation policies over recent years has driven research on the identification of landscape indicators, particularly after the European Landscape Convention came into force (see, for example, Cassatella & Peano, 2011).

Building on the hypothesis that linking agri-environmental policies and landscape preservation policies mutually enhances both of them, we maintain that in light of the scientific advancements and the accumulation of experiences and evaluation in this field, the elaboration of additional landscape indicators appears to be desirable, useful and feasible and represents an interesting field of research. Further reflections on this point are put forward in the conclusions section.

### **3.3 Spatial analysis of environmental measures**

As described in Section 3.2, the CMEF is the set of indicators by which Member States monitor the performance of their RDPs and their environmental effects. As an evaluation tool on a European scale, the CMEF does not always capture some specific aspects of each country or region, and therefore it has been suggested that it may be beneficial to include additional indicators on a local scale in order to enhance the data provided by the baseline indicators.

One of the aspects for which it has been possible to verify the effectiveness of RDP in terms of environmental monitoring is the spatial distribution of applications which are granted financing. The only quantitative parameter (the area of the land on which the measure is applied) does not always provide the true effectiveness of a measure, especially from an environmental perspective: the hectare extension of a measure has different effects on the environment when activated in a priority area rather than in one which is considered to be less environmentally sensitive. In this regard, within the Environmental Report prepared for the mid-term evaluation of the Piedmont region RDP 2007/2013, an analysis of the geographical distribution of some key actions was carried out in order to verify the degree of consistency between the program objectives in terms of spatial priorities established by the managing authority (the Regional Department for Agriculture) before and during the preparation of application's call for bids, and the actual localization of financed actions. In fact, for several measures, the managing authority identified priority target areas, such as nitrate- and pesticides-vulnerable areas,<sup>2</sup> protected areas and Natura 2000 sites, and assigned higher scores to applications that fell within such areas. A crosscutting check was carried out on all the axes of the program in order to assess the spatial distribution and the related effects not only of agri-environmental measures, which by their nature are activated in order to support and improve the environmental quality of rural areas, but also to observe the distribution of certain pivotal measures of Axis 1 (improving the competitiveness of the agriculture and forestry sectors) which, if not carefully monitored, could have significant environmental effects on rural areas.

For the measures of Axis 2, the study of spatial distribution was therefore carried out in order to verify the actual effectiveness of various measures. In particular, the pivotal

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<sup>2</sup> Nitrate-vulnerable areas are identified by the Piedmont region as being established by the EU Directive 91/676/ECC and Directive 2009/128/CE.

measure 214, "Agri-environment payments," is articulated in various actions and sub-actions which differ in terms of their financial scope and the degree of response from beneficiaries, and features a spatial distribution for the 2010 campaign that shows interesting results.

For action 214.1, "application of integrated production techniques," which pursues a significant reduction in the amount of chemicals being put into the ground, the administration's will during the inquest drafting process was to target actions in sensitive areas, found mainly in agricultural areas of the plains. This will was confirmed by the inclusion of specific incentives in the call for applications of that action. However, for the 2010 campaign, all of the applications which were submitted received funding, thus rendering ineffective any selection mechanism. The "natural" spatial distribution that resulted from this was therefore driven more by economic factors relating to the individual needs of beneficiaries than by regional program guidelines. The spatial distribution of action 214.1 is presented in Figure 2 which shows a strong concentration of applications in areas which are not classified as priorities. A possible reason for this distribution lies in the obligation to rotate crops imposed by measure 214.1. Most of the farmers who applied to the actions were already practicing crop rotation, while in areas where monospecific farms (mostly maize producers) prevail, the payment associated with the action is not economically viable due to the reorganization of the farm's activities that crop rotation would require. These considerations show that the goal of reducing the intensity of chemical inputs in relation to monocultures in plain areas by integrating farming techniques has, at present, been only partially achieved. In conclusion, a more cost-effective (in strictly environmental terms) implementation of measure 214.1 should involve more spatially targeted applications, as it is currently mainly adopted in areas which, by their nature, have crop types with a lesser impact and therefore need fewer corrective actions.

The reduction of chemical inputs is also an objective of action 214.2: "application of organic farming techniques" (Figure 3). This action targets the same sensitive areas as measure 214.1. In the spatial analysis for the 2010 campaign, the results are far from the set targets, and almost all of the approved applications are located in areas which are not identified as priorities. This analysis in fact highlights that only 25% of the land which is affected by the action falls within priority areas. Similarly, the analysis of the distribution within the four main areas shows that, while the program aimed to concentrate on "intensive agriculture" areas, there is a higher incidence in marginal rural (mountain) areas, to which a low priority was assigned. In addition, in this case, the call for application of the action received greater response in those areas which, by their nature, present crop types requiring less chemical inputs, and less of a response where it would have had a higher positive environmental effect.

Action 214.4 (arable reversion to permanent grassland), can produce several beneficial environmental effects, from reduction of chemical inputs to preservation of soil quality and rural landscape. This measure raised great interest among beneficiaries in the 2009 and 2010 campaigns. The reason for such success is probably to be found in the combination of two purely economic factors: the award value, which was the highest allowed by the regulations for this class (€350/ha), and the poor performance in the market associated with sowable land that has led many farmers to switch production to permanent grassland.

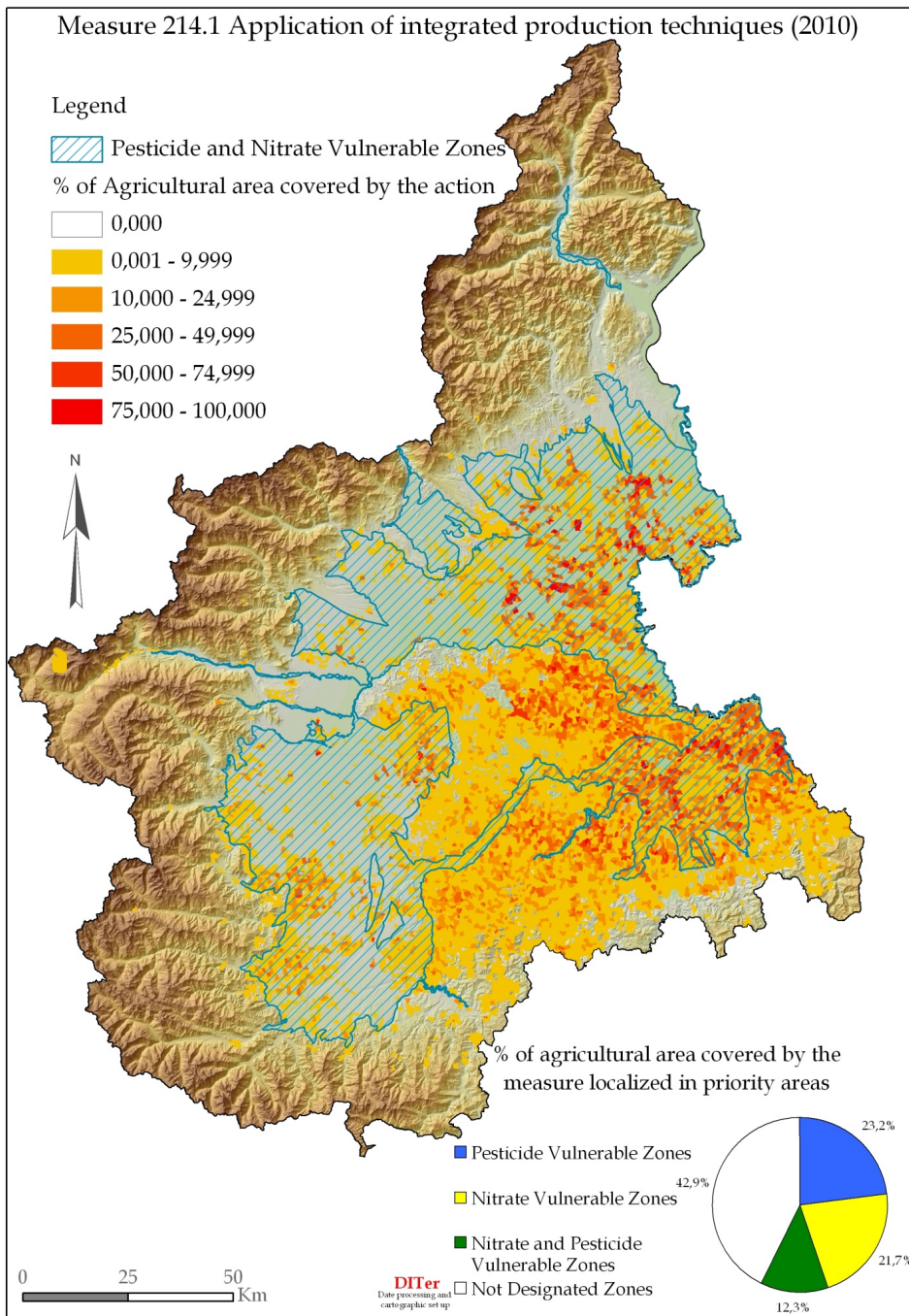


Fig. 2. Spatial distribution of Measure 214.1: *Application of integrated production techniques*



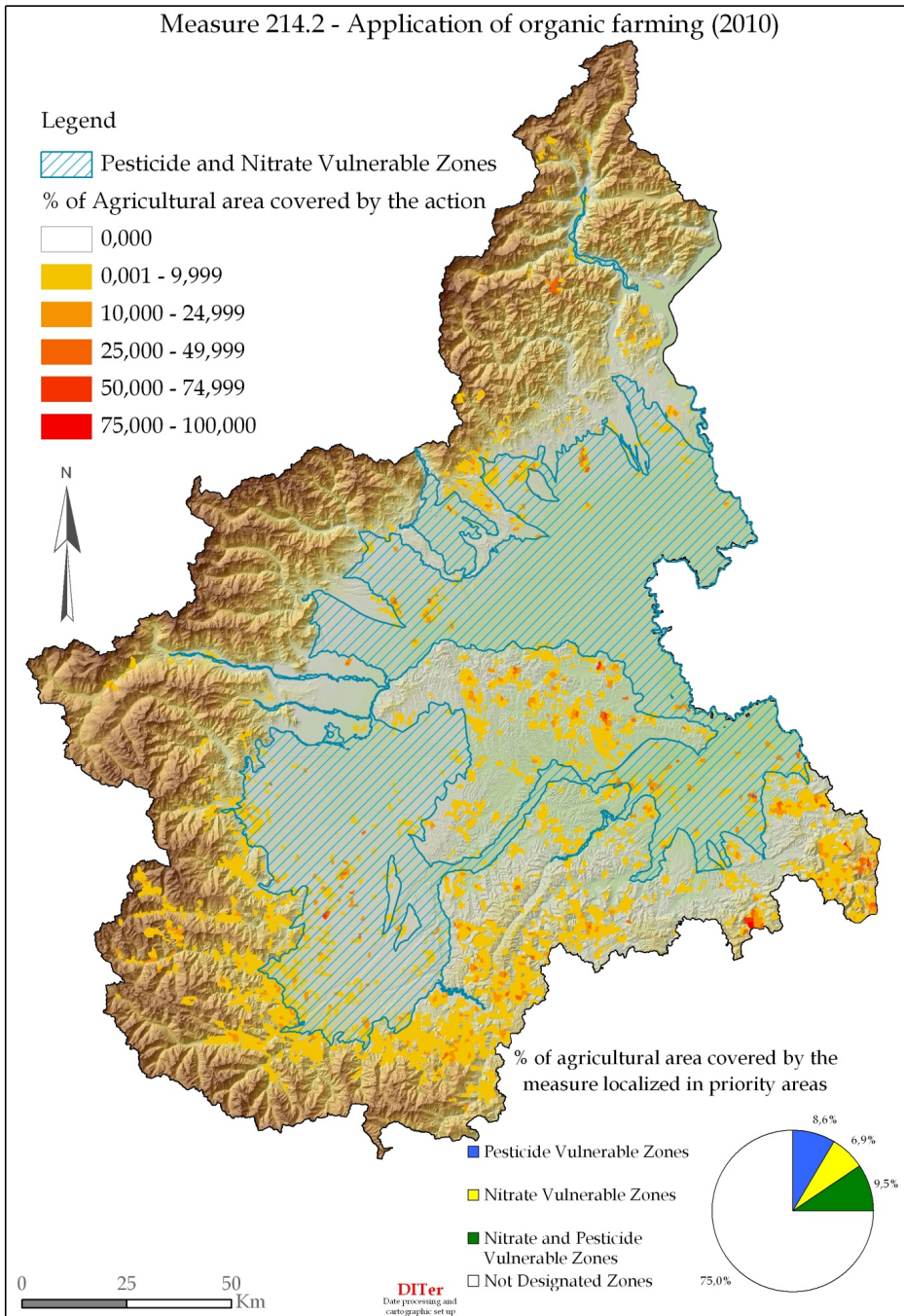


Fig. 3. Spatial distribution of Measure 214.2: *Application of organic farming*



Analyzing the results in terms of spatial distribution (Figure 4) shows that they are not entirely consistent with the program and implementation guidelines of the call for bids issued in 2010, because in this case, all of the technically eligible requests received by the managing authority were accepted, thanks to the guarantee of full-measure financing. The majority of these (about 45%) were concentrated in the "intermediate rural areas," within which the quality of the soil and rural landscapes is not at risk of deterioration, unlike the "intensive agricultural rural areas" or the "urban centres." Therefore, the registered result goes against the values recorded in the call for applications, in which urban areas and agricultural plains were assigned higher scores. In line with these results, including those relating to the localization of the applications accepted for funding, 8% of the total surface area was found within the protected areas of Piedmont (natural parks, natural reserves, etc.), whereas the regional TAA located within these areas is about 10% of the total.

These three examples summarize some of the problems that arose during the implementation of the current program, and in particular the difficulty experienced by the Piedmont region in providing satisfactory results to the EU as regards the geographical distribution of some of the most important agri-environmental measures, both from the point of view of environmental effects and also with regard to the economic significance provided by the program. The European Commission requires from Member States constant updates on the results achieved compared to the expected results, and the correct location is certainly a very significant parameter with which to determine whether the performance of a specific measure is in line with the expected results after the investment of considerable sums of money. If these results were disregarded, the signal would be interpreted by the Commission as a reason to question the usefulness of awarding such a measure in future programs.

It is very important that policy choices and their fulfillment, which is often subject to complex political mechanisms, result in stronger links in the future with the adopted payment system. Weighted mechanisms currently offer little incentive for those who must choose to reduce their economic gain in favor of virtuous farm management, based, for example, on the reduction of chemical inputs or the preservation of biodiversity, the soil or the rural landscape. This is probably because the reward mechanism and proportional compensation is not always favorable for the farmer who may, while agreeing with the measure's ethics, be forced to renounce it for economic reasons.

A second aspect that is important to note is the need to improve the effectiveness of communication with regard to the opportunities afforded by the RDP with regard to all possible beneficiaries operating in those areas which, due to their particular morphological characteristics, lend themselves to agri-environment interventions. From 2007 until today, the results of workshops and seminars prepared by the management authority in order to inform beneficiaries about the RDP program have revealed a widespread feeling of separation between those who work on the ground on a daily basis and decision makers. In particular, this problem was often linked to the role of farmers associations, which are historically the only reference to which farmers pay attention. Taking advantage of this special role, they tend to accommodate communication between their members which will highlight the content and benefits of certain measures for certain areas only; these measures are significantly related to the economic growth of farms. In order to improve the

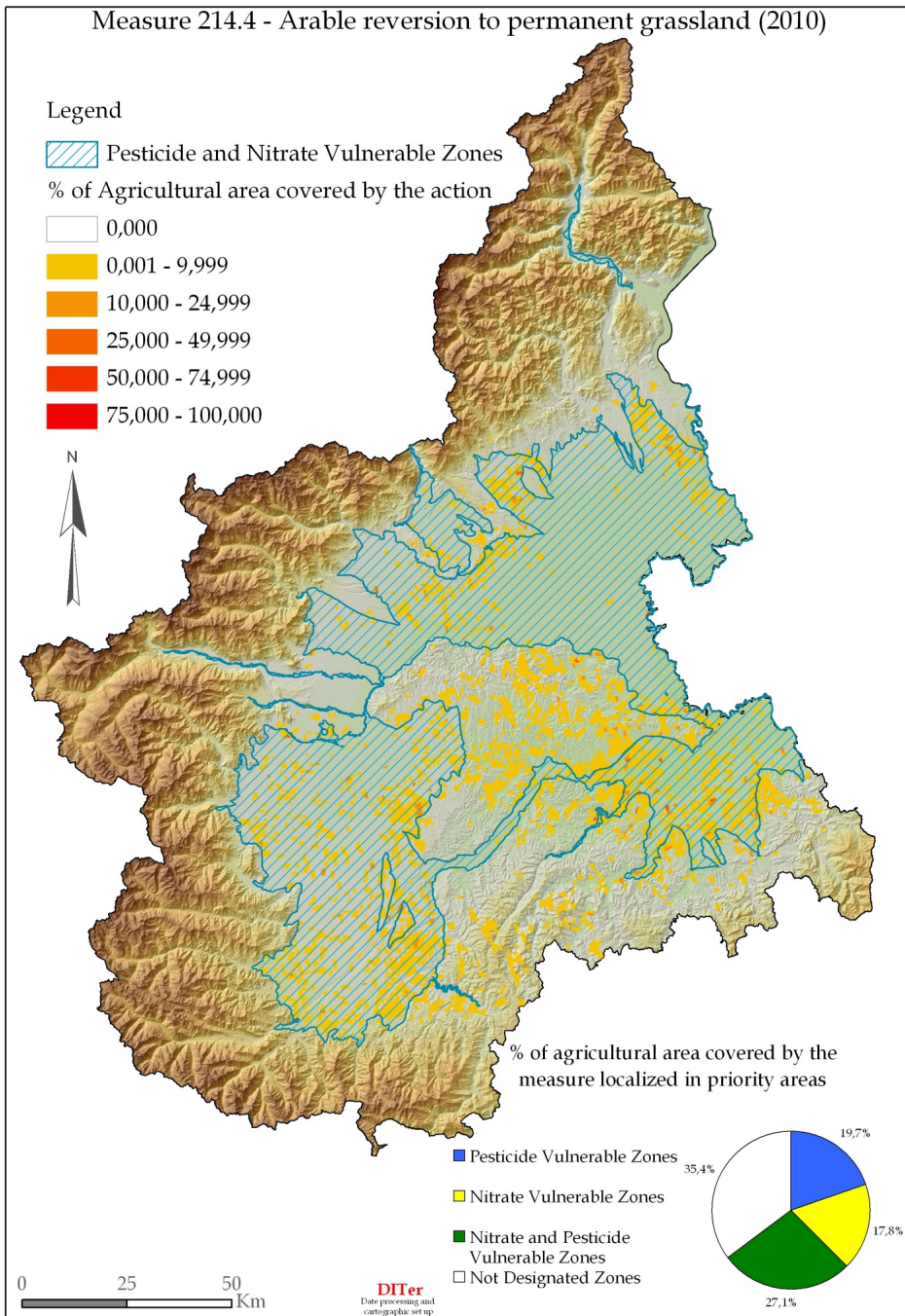


Fig. 4. Spatial distribution of Measure 214.4: *Arable reversion to permanent grassland*

effectiveness of the results of environmental measures, not only in quantitative terms, but also with regard to their spatial distribution, it is fundamental that the management authority enhance communication to relevant stakeholders to circulate the information about the possibilities offered by the RDP. This communication must illustrate the content of the actions and sub-actions that blend environmental ethics with rural development and the effectiveness of which would be much greater if applied in areas which are considered as priorities from the environmental point of view. This action would also allow the managing authority to collect information regarding the feelings, ideas and real issues that touch the daily lives of the beneficiaries by starting the slow process of mending the gap between politics and territory that has historically precluded the success of the program. The managing authority must raise the awareness of farmers in Piedmont that they are part of an RDP designed specifically for them and which is not something to be wary of or to rely on solely to modernize their agricultural machinery.

### **3.4 Agricultural policies and spatial planning: The need for environmental policy integration**

The SEA Directive establishes that the Environmental Report must contain an outline of the content and the main objectives of the plan or program and its relationship to any other relevant plans and programs (Annex I). Within SEA processes, this is commonly done through two types of analyses – *internal* and *external coherence analyses* – which are aimed at verifying the degree of consistency between different actions within the same plan / program and their coherence with other relevant plans/programs elaborated by the same authority or with objectives and actions which may somehow affect the implementation of the plan / program under assessment respectively.

In the case of Piedmont region's RDP, the aim of external coherence analysis was to ascertain the degree of compatibility, integration and harmonization between its objectives and actions and the environmental and socio-economic objectives established by other regional plans/programs and European programs.

In the Italian context, this aspect is particularly relevant, as regional authorities were assigned a great many responsibilities as regards the government of the territory following a devolution process which culminated in 2001 with a constitutional reform which made Italy a semi-federal state, in which regions have high discretionary power over a number of issues including spatial planning, environment, health, energy, management of protected areas, transportation and SEA implementation (Rega, 2007).

The RDP is therefore part of a variegated, complex and dynamic framework made up of many different laws, regulations and plans/programs. Furthermore, regions are in charge of elaborating and implementing the programs which are co-financed by the structural funds of the EU, such as the RDP itself and transnational cooperation programs (in the case of Piedmont, cooperation with France and Switzerland).

Over the last decade, the regional system of territorial governance has undergone a significant shift from a hierarchical, command and control-based model toward a more cooperative one, based on the principle of subsidiarity. The regional government initiated a process of harmonization and integration of its instrument of territorial governance (plans and programs) in order to overcome the traditional fragmentation and

sectorialization of the administrative action. To this end, the Region elaborated the so-called *Framework of Territorial Governance*, gathering together the three main regional plans concerning spatial planning: the Regional Strategic Document, the Regional Territorial Plan and the Regional Landscape Plan, which all contain directives and guidelines for spatial planning, urban development and landscape/environment preservation for other sectors of the regional government (e.g., waste water, energy or management) and lower-tier institutions (provinces and municipalities). It is therefore essential within the SEA of the RDP to examine the relationship between the RDP and the *Framework of Territorial Governance*.

The results of this exercise showed that, overall, the structure of the objectives and actions of the RDP features a robust level of internal consistency; furthermore, no major incoherencies between the RDP and the *Framework of Territorial Governance* were identified. However, the results also indicate that potential and desirable synergies between the RDP and other EU-funded programs (such as transnational cooperation programs) are currently not being fully exploited, even though they concern to a large extent, the same areas (marginal rural areas: see previous section), and the same potential stakeholders.

With regard to the other sectoral plans of the Piedmont region, no incoherencies were found, but a deeper strategic integration between the different instruments which were examined is lacking in some cases. The strategic design of the objectives and actions of the RDP is indeed based on a detailed analysis of the regional context, which covers not only strictly agricultural aspects, but broader environmental and socio-economic ones as well. However, its implementation follows a sectoral rationale, meaning that its integration with other regional instruments has not been fully developed. This is partly explained by a key difference between the RDP and other relevant regional plans: the former is a programmatic instrument which allocates economic resources among a plurality of stakeholders (mainly farmers), while the latter are regulatory instruments – they establish rules and constraints for the transformation and/or preservation of the territory, and are not associated with a budget. This has important implications for how these instruments are elaborated and on their subsequent implementation: the allocation of economic resources and the establishment of regulations (which in the Italian context is the main difference between “programs” and “plans”) sometimes follow different rationales.

In addition, in the Italian context, agricultural policies have traditionally been developed by considering agriculture mainly in terms of its economic aspects and only to a minor extent in relation to its function in the transformation or preservation of rural territories. Farmers’ associations are long-established lobbies which, understandably, are devoted mainly to voicing the economic concerns of their affiliates. Although at the EU level there is now widespread acknowledgement of the environmental function of agriculture (see Section 2), changes in the attitudes of stakeholders operating on the ground are inevitably slower.

However, the urban/spatial planning discipline has traditionally paid relatively little attention to rural areas as well, which are often considered to be areas which are “not yet urbanized” rather than productive ones, or as potential biodiversity sinks and providers of ecosystem services. Only recently urban planning has fully recognized the intrinsic value of such areas and their importance from an ecological perspective.

Shifting the point of view from the elaboration and implementation of plans and programs to their environmental effects, a strict interrelationship between agricultural policies and spatial planning clearly emerges. The identification of environmental effects shows that almost all the environmental factors listed in the SEA Directive are affected by one or more actions of the RDP, either directly or indirectly. Some shortcomings of the implementation of some actions were also identified due to a lack of integration with urban planning instruments, e.g., with regard to the measure concerning “village renewal and development,” which sometimes conflicts with the building regulations established by municipal plans.

In conclusion, the actual interplay between agricultural policies and spatial and landscape plans call for a greater strategic, programmatic and implementation-oriented integration between different decision-making centers in order to overcome the traditional separation which characterizes complex structures like regional authorities. The holistic approach of the SEA, as envisaged by the Directive, can play a positive role in this sense.

#### **4. Conclusions**

As a general conclusion, we should first of all observe that many European countries delayed the incorporation of the SEA Directive into their laws and the Italian government was particularly late in doing so; only in April 2008 it was implemented in a new law about environmental regulations. This delay generally had a negative effect on the quantity and quality of the SEA application to “ordinary” planning and programming, but it must be stressed that this did not affect the SEA of the RDP that each country and Region, (in Italy each of the existing 20 Regions) had to develop in order to put forward an RDP to the European Commission: as a matter of fact, these special programs supported by the Structural Funds were in any case subject to the SEA and the 27 countries and the 20 Italian Regions had to present to the European Commission all the RDP equipped with a SEA.

Nevertheless we should add that the concepts and technical contents of the SEA are not always correctly applied for the proper purpose. Often the procedure is only formally pursued in order to get the regulations inspected and the approval obtained, with no real involvement. This reprehensible attitude affects some SEA for RDP, too.

The example of the Piedmont region, in Italy, is, on the contrary, and in a general sense, a positive case study, as the need to put community provisions into practice was rightly taken in hand and the procedure was carried out to benefit the environmental side, too.

The ex ante SEA completed in 2009 and the ongoing SEA were (and are being) carried out in an attempt to meet the intentions and the spirit of European Community Directive 42/2001/EC, and have tried different ways, whether optional or compulsory.

Our research study was intended to support the technical staff of the Piedmont Region in the difficult application of a Directive that is completely new and untried.

We conclude by highlighting the lesson learnt on the relation between rural development and future research perspectives put forward, particularly with regard to the Piedmont Region case study.

As regards process and institutional aspects, the results of the mid-term SEA call for a more integrated approach in the programming of rural development funding schemes, taking into account the wide array of regional policies and related instruments that can affect, or are affected by, rural development programs. In this sense, it is argued that adequate application of SEA can play a central role.

We emphasize that, beyond its operational aspects, the case study which we had the opportunity to work on brought to light some critical aspects that will certainly be on the agenda in the short term.

First of all, there is the strategic significance which the process of evaluation/territorial governance can take on at the local level. The majority of conflicts and environmental problems cannot be contained within municipal let alone regional boundaries; significant results could be achieved only by a multi-level approach, not only for juridical and institutional reasons, but particularly because environmental resources are not acknowledged within administrative boundaries. This necessitates moving to an upper level some typical problems of the SEA procedure: the necessity to face the trans-boundary aspects and the vertical merging of the territorial and environmental objectives; to widen the participation process; to select the most representative indicators; to draft alternative scenarios; etc.

As far as methodological aspects are concerned, the importance has emerged of the participation processes, the monitoring, awareness and formation of policies to involve all the actors, including individual farmers, in virtuous actions so that rural space can become a “good” to be preserved for them and for future generations.

Nevertheless, we have to express our doubts about the effectiveness of these tools: a bad capacity of using them in an effective way may compromise the expectations about their role for a real change in rural planning.

Moreover, the case study strongly confirms the importance of implementing a monitoring activity which can take into account previously neglected environmental aspects such as soil sealing and landscape preservation. In this sense, a satellite remote sensing-based approach may be envisaged. For example, landscape changes over the years could be analyzed by resorting to available archives of satellite images. The goal is to identify major changes in land use patches, highlighting land degradation and soil sealing phenomena on the one hand, and realization of environmental enhancement measures (tree planting, habitat creation, hedgerow installation) on the other.

For this reason, we would conclude recommending a pilot study that could be carried out on a selected area with significant agri-environmental features, in order to identify a possible methodology for systematic adoption in the monitoring of future RDPs.

In conclusion, the integration of RDP and SEA can be considered as an effective tool for pursuing sustainable rural development only if carefully assessing and monitoring the effects of rural policies on environment and landscape to achieve balanced regional growth.

We suggest that SEA can take on a decisive role in the governance of the Rural Development Programme process, as well as in the process of connection between investigation and programming: the investigation pursues the objective of recognizing and

clarifying the interactions between the different phenomena and of making the elements of greatest environmental criticality, so that the potential positive environmental externalities of the program can emerge, and the assessment can emphasize the right actions in order to valorize the environmental potentialities offered by the Structural Funds for rural development.

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# Financial Resources in Rural Development – An Analysis of Relational Capital in Credit Cooperatives

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## 1. Introduction

Rural areas have chronic difficulties in accessing financial resources. Besides their structural weaknesses, these areas have to add the financial constraints that threaten rural development. In many parts of the world, numerous official reports show lack of rural access to formal financial services, the main reasons being excessively conservative bankers and lack of interest in rural credit (for example, loans to poor farmers). In addition, the harsh conditions of informal lenders (in particular, high interest rates) become a form of usury.

Accordingly, rural finance problems have been attributed to private commercial banks' lack of willingness and to the intention of exploiting informal lenders. Therefore, one of the solutions mitigating lack of credit in rural areas has been credit cooperatives. These financial resources are usually characterised as being closely linked to rural territories and specific productive sectors (agri-food, etc.).

On the other hand, financial markets have identified the existence of a growing invisible *balance sheet* in corporations (Sveiby, 1997). This invisible balance sheet is the result of differences between corporations' real value (market value) and the resulting value of applying generally accepted accounting criteria and principles (accounting value). This very difference has been one of the main reasons why methodologies to identify, measure and manage the intangible and intellectual assets of an organization have emerged, especially those that accounting cannot collect.

Management of an organization's intangible assets has been an outstanding competitive factor in the business literature over the last decade. Today, knowledge plays an essential role in social and economic development because its emergence, process and transfer have been shown to be sources of power and productivity (Castells, 1997).

Relational capital is defined as the knowledge value joining individuals and the organization which leads to more or less permanent relationships that remain with market players and society in general (IADE, 2003). This block of intangibles is justified by the fact that organizations cannot be considered isolated systems because much of their future competitive advantage will depend on organisations' ability to capture external knowledge

(Cohen and Levinthal, 1990). The definition of relational capital includes all the value generated by the organisations' relationships with reference groups, both internal (shareholders, etc.) and external (customers, suppliers, etc.) stakeholders (Bontis, 1996).

The link between credit cooperatives' financial resources and rural areas forms a unique relational capital. Proof of this lies in the social action that credit cooperatives develop in their operating area in relation to cultural, educational or social services. In an environment of structural changes within the banking sector, the development of rural areas seems to largely depend on the management of intangibles, such as social bonding, reputation or customer loyalty.

The origin of the economic crisis we are currently experiencing is a banking crisis that has undermined a large part of the economic world's trust. Credit cooperatives possess a network of particular relationships with their environment which provide them with specific strong points and weak points. Their capital structure, their closeness to customers and their social actions confer them specific competitive advantages. Thus, corporate reputation, social relationships with the government or with the media, and exercising social responsibility, grant them specific characteristics which merit study in order to better manage their competitive advantages (for example, use of their Education Fund).

This study therefore approaches the accounting of relational capital intangibles within a specific business reality: credit cooperatives. These financial corporations have been a key element for recent rural development in extensive regions (their role is evident in sectors such as the agri-food industry). However, whereas there are practical applications implemented in banks and savings banks, there have been very few empirical studies conducted into this legal banking system form.

This work uses a Delphi analysis to identify the peculiarities of the relational capital of credit cooperatives. The qualitative Delphi methodology is the most appropriate for this type of analysis where information about the analysed phenomenon is clearly lacking (Sanchez et al, 1999).

As a result, this study approaches the description of relational capital in credit cooperatives to provide relevant information for decision making for this type of corporations in a highly complex and increasingly competitive environment such as the banking industry. In addition, it discusses the implications on the financial resources available for rural development.

## **2. Cooperative banking in the financial crisis context**

Today's economic crisis has hit the financial system as a whole but, logically, different types of credit organisations have not been affected equally. Traditionally, analysing cooperative banking has identified unique competitive advantages such as their greater liquidity structure, this being the result of their traditional retail-type business model where gaining resources predominates as opposed to investment (Belmonte, 2007). Another of their outstanding features is their better margin from interests on total mean assets or the lower costs that their liabilities incur. Nevertheless, the scenario with low interest rates and intense competition has brought about a drop in all the margins from outcomes in banking sector and, more markedly, in credit cooperatives. Traditionally, however, their main weaknesses

have been their high running costs, their poor efficiency and their low economic and financial returns.

This financial crisis has outlined a scenario where these strong and weak points have converged with the remaining credit entities. Along these lines, and in relative terms, credit cooperatives have been the type of organisation whose efficiency has best improved in recent years, and whose economic and financial returns have least diminished during this period. Moreover, the sharp increase in doubtful debt rates in credit entities has been lower in credit cooperatives (if compared with their competitors).

Similarly, their competitive advantages have faded with the economic crisis because their greater relative liquidity, their lower margin from interests or their lower liabilities costs have gradually reached the levels of those of banks and savings bank.

By way of conclusion, today's scenario presents significant uncertainties for banking sector, some of which are structured in nature, which is the case of credit cooperatives, as several studies have indicated previously. Thus, this situation appears to require the development of certain critical policies (AFI, 2009; Palomo, 2001):

1. Change in the growth model and in the diversification of sources of income: the strong expansion of credit investment which took place in the years prior to the economic crisis is not compatible with the new economic scenario. Nowadays, financial institutions are restricting credit and the growth pattern needs to move towards improved returns (by setting prices). In a scenario with low interest rates, increasing the ordinary margin (via commissions) and/or the operating margin (by cutting costs) will need to be prioritised. In this sense, innovating in the business model will also involve operations for integration into the sector (IPS; Institutional Protection System; and cooperative groups) with a view to generating economies of scale. In other words, the birth of new competitors with greater solvency and efficiency needs to be ensured.
2. Managing liquidity: the current climate of mistrust has strangled financial markets. Consequently, it will be essential to diminish any liquidity tensions by particularly considering the gradual withdrawal of liquidity policies from the ECB's system and public aid. Accordingly, conditions that favour the emergence of a new "liabilities war" are ideal.
3. Managing risks and doubtful debts: the foreseeable increase in the doubtful debts rate will affect cooperatives' outcomes owing to greater endowments. Organisations will need to have a suitable risk management policy where provisions will play a key role.
4. Strengthening solvency: despite the traditional strength that Spanish bank companies have maintained, the new scenario will require having to pay special attention to solvency as the current sources of risk could affect it substantially.
5. Managing efficiency: the economic crisis also considers important challenges to improve efficiency, especially running costs. In this sense, expansion policies will have to be reconsidered as the organic growth model seems to have been exhausted. Furthermore, applying policies such as opening new business channels, streamlining the branches network or subcontracting activities with a view to cutting running costs seem recommendable.

Basically, the complex postcrisis banking market will force credit cooperatives to swiftly put right their weak points. The main objective will be to seek a diversified increase income and

to cut running costs while attempting to not interfere with the sector's own strong points (closeness, social character, etc.). Opportunities now lie more than ever in exploiting the dense network of relationships it maintains with (and gives meaning to) a credit cooperative: its relational capital.

### 3. Relational capital

The general consensus on intellectual capital models classifies components in accordance with their nature into human capital, relational capital and structural capital. Relational capital is defined as the value of the knowledge provided to people and to the organisation which derives from the (more or less permanent) relationships they maintain with market agents and with society in general (IADE, 2003). This block of intangibles is justified by the fact that organisations cannot be considered isolated systems, but that many of their future competitive advantages will depend on organisations' capacity to acquire external knowledge (Cohen & Levinthal, 1990). Consequently, the definition of relational capital includes the whole value generated by the relationships the organisation maintains with its reference groups, which include both its internal (shareholders) and external (customers, suppliers, etc.) stakeholders (Bontis, 1996).

One of the first references to identify and measure intangible assets was the Balanced Scorecard by Kaplan and Norton (1997), where relational capital is integrated into the customer's perspective. Its main limitation is that this first model centred the firm's relational capital on only the value the firm generated as a result of its relationships with its customers. This became known as "customer capital myopia" (Martín, López & Navas, 2004). Subsequent models, like those of Brooking (1996) or of Stewart (1997), partially correct this shortfall by including other relationships under the name of market assets which, other than customers, also take into account alliances, brand names or corporate image. Along the same lines, other models were postulated, such as Intangible Assets (with its external structure) (Sveiby, 2000) or Navigator (with its customer capital) (Edvinsson & Malone, 1997).

Accordingly, given the heterogeneous agents that form the firm's relational capital, some later models proposed dividing it into several blocks. The profound changes taking place in the economic model and the distinct nature of conflicting interests which appeared among the firm's stakeholders motivated a good number of works that defend the basic separation of relational capital into business capital and social capital. The result is to distinguish between intangibles that relate directly with the agents involved in the business process from the rest (which shape the firm's social responsibility). This characterisation of relational capital was defended in the works by Coleman (1990), Nahapiet and Goshal (1998), Cohen and Prusak (2001), McElroy (2001), Bueno (2002) and IADE (2003).

#### 3.1 Business capital

As mentioned earlier, business capital is formed by the value generated by those intangibles that relate directly with the agents corresponding to the business process. The business capital is made up of elements such as (existing and potential) relationships with customers (which provide the firm with value in terms of distribution channels, and the number,

loyalty and satisfaction of customers. This capital also includes relationships with suppliers, allies and competitors, as well as those relationships which the firm maintains with various investors and institutions.

### **3.2 Social capital**

The social capital concept not only relates relational intangibles with the current corporate social responsibility (CSR) perspective, but integrates the relational capital that is not directly connected with the agents linked to business processes.

Social capital has become very important in recent years in various social disciplines other than economy. Lesser and Cothrel (2001) state that social activities are fundamental in knowledge economy because they represent a series of critical resources that create essential competences. Doubtlessly at the business level, social capital helps explain the success of a significant number of companies, which is frequently founded in the relationships with their surroundings, their social actions, etc.

Social capital has proved a complex term and has been used heterogeneously from different disciplines, which makes reaching consensus difficult as far as its definition is concerned. Nonetheless, and despite the lack of agreement on its meaning, its measurement and its effects, the academic and professional community has widely accepted that social capital exists. Bank entities in particular (and savings banks more strikingly) have been well aware of the relevance of social capital on the firm's competitiveness.

Social capital can be defined as the sum of existing and potential resources deriving from the network of relationships from the social unit (Nahapiet & Ghoshal, 1998). Another more exact definition conceptualises it as the value represented by the relationships that the firm maintains with social agents which act in its domain in terms of the level of integration, compromise, cooperation, cohesion, connection and social responsibility that it establishes with society (IADE, 2003). In short, social capital implies establishing a network of relationships, providing a structure to help information circulate and representing a collective asset that cuts transaction costs (Rodríguez, 2004).

### **3.3 Credit cooperatives' relational capital**

Credit cooperatives have always stood out for their proximity to rural clientele by financing economic development in their areas of operation (Server & Melián, 1998). Traditionally, it has been hypothesised that this proximity is a competitive advantage for cooperatives and that this fact identifies a strong social capital capable of generating future economic income for them. Furthermore, recent studies highlight how cooperatives include an internal resource capable of generating a competitive advantage in their relational capital. Likewise, there has been evidence that the relational capacity of the managers and directors of cooperatives is a determining factor of these firms' competitiveness (Moyano, Puig & Bruque, 2008).

In line with the reflection made by Rodríguez (2006) on savings banks, credit cooperatives also establish links with society in their areas of operation, thus permitting an interconnection with a given community's initiatives. Therefore, credit cooperatives are

repositories of a network of social relationships endowed with a series of intangible assets that affect their activity. Consequently, credit cooperatives count on a series of characteristic intangibles among which relational capital is known.

In the particular case of savings banks, social capital has been recurrently employed to explain what some bank companies contribute to economic and social development in the areas they operate in. Credit cooperatives are unique organizations in our financial system and they own intangibles that have particular characteristics. So it is that corporate reputation, social relationships with the administration or the media, and exercising social responsibility confer them specific characteristics that are worthy of study to better manage both their competitive advantages and the use, for example, of the cooperative education fund.

#### 4. The Delphi analysis

The Delphi method was created by the North American consultancy firm, The Rand Corporation, at the end of the 1940s, although it actually developed in the 1960s and 1970s. Linstone and Turoff (1975) defined it as a method for structuring a group communication process which is efficient when it comes to allowing a group of individuals to deal with a complex problem as a whole. This technique is a systematic and iterative method used to collect the opinions of a group of experts, and it can be employed with two basic objectives in mind (Dalkey & Rourke, 1971):

- Predictive purposes: the method used as a prediction technique under uncertainty conditions for future scenarios (Fildes, Jallan & Wood, 1978).
- Obtaining an opinion on a specific theme for which no previous information is available. This application is particularly relevant when historical data are lacking (Gupta & Clarke, 1996).

On the other hand, the distinctive characteristics of this subjective group technique are:

- Participants maintain their anonymity during the process (to avoid groupthink).
- Participants' feedback is controlled, which permits noise to be freely transmitted (without irrelevant, redundant and mistaken information).
- There is a statistical group response (so that all the individual opinions are considered in the group's final result).

The Delphi Technique aims to obtain a reliable group opinion from a group of experts (Landeta, 1999). Analysing the experts' estimations basically consists in aggregation to obtain a central tendency distribution measurement (normally the median), which is taken as the statistical response. The interquartile range is also established as a dispersion measurement of the estimations.

The specific application of the Delphi analysis to the intangibles field was covered by Sanchez et al (1999). The intention was to generate some shared guidelines to measure and diffuse information about intangibles and to illustrate the peculiarities of adapting the method to this field. The graph below depicts the development of a Delphi analysis stages to specifically study intangibles:

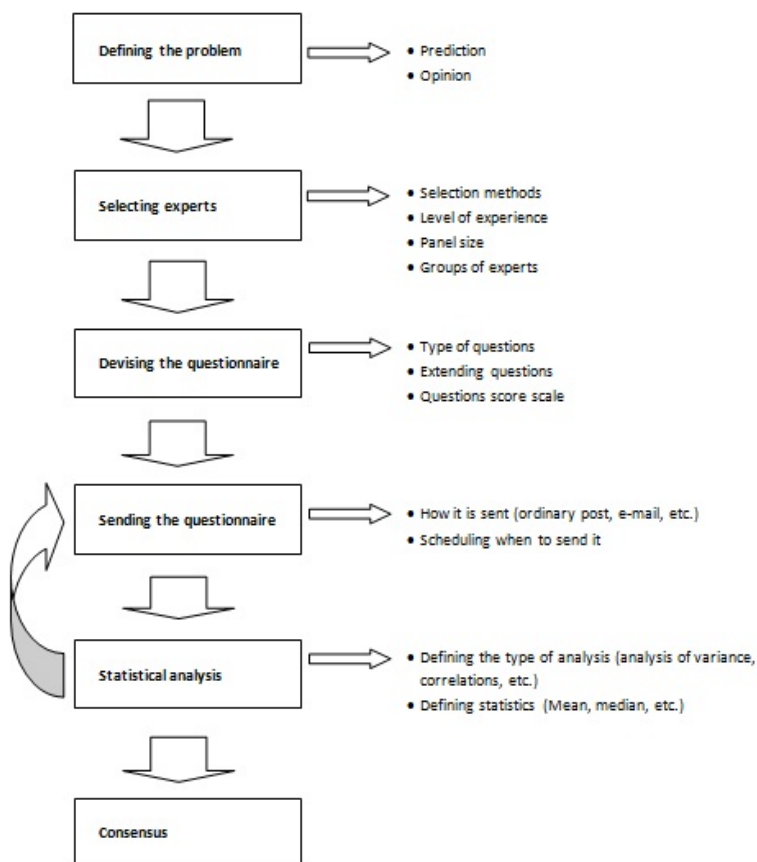


Fig. 1. Stages of a Delphi analysis to study intangibles. Source: Sanchez et al (1999)

## 5. Characterisation of credit cooperatives' relational capital by means of the Delphi analysis

Given the fact that there is virtually no background on studying relational capital in the cooperative banking domain, applying the Delphi methodology proves useful in an exploratory study. For such studies, the majority of experts in social research recommend using qualitative methodologies (Corbetta, 2003; Sanchez et al, 1999).

The object of this work is to determine whether the legal (and philosophical) nature of credit cooperatives influences the configuration of their relational capital. However, the intention of applying the Delphi method is mainly to search the identification of the peculiarities of credit cooperatives' relational capital in comparison with the remaining banking entities.

The qualitative method followed in this work has been the Delphi method. To perform this method, this work has counted on the opinions of 25 experts from academic, professional (basically the general directors of credit cooperatives) and institutional domains.

The method chosen to send the questionnaire to the participating experts was electronic mail. This tool is most useful in such studies as it facilitates the completion of questionnaires, and speeds up the process of sending and receiving information.

The first part of the questionnaire contained a section of questions to help analyse the situation and the future perspectives for the credit cooperatives sector (SWOT, the importance of the sector, the optimum dimension, etc.). Next, a second questionnaire section was completed to identify the strong and weak points of only credit cooperatives' relational capital, while also asking about the hierarchy of its various characteristic intangibles. The questionnaire contained a final section which asked the experts to compare these intangibles with those developed by the remaining credit associations (banks and savings banks) to assess their relative position.

### **5.1 Making up the group of experts**

The panel of experts basically included three expert profiles: general managers of credit cooperatives, academics who specialise in the areas of study involved, and technicians from business and public organisations who offer their services to the sector. Several consultants who offer their services to or do audits in the various credit cooperatives were also invited to participate. Invitations were sent to a total of 71 experts by prioritising the number of general directors of the credit cooperatives given their foreseeable lower response rate.

At all times a geographic balance was sought by inviting experts of the aforementioned profiles to participate from the following Spanish Autonomous Communities: Valencia, Madrid, Andalusia, Catalonia, the Basque Country, Navarre or Castille-la Mancha. Nevertheless, for reasons of accessibility and given the number of existing credit cooperatives, most of the participating experts were from the Land of Valencia.

All the panelists belonged to the "expert" category, and did not include facilitators or stakeholders as they were not considered relevant in this analysis. Hence, specialists predominate in this study.

Finally, 25 experts participated in the first round, of whom 22 also participated in the second round. This number is not only statistically significant, but also minimises errors in the qualitative study since a higher participation rate would barely diminish errors, as Landeta demonstrated in 1999.

### **5.2 Analysis of the results**

Firstly, an analysis of the results was done to determine the number of valid responses for each question. The 25 study participants answered all or most of the questionnaire. It is worth mentioning that some of the responses contained mistakes and that they were not considered in the subsequent statistical analysis.

Secondly, the median ( $m$ ) was determined for each study question as the central measure of the group of experts' response tendency. That is to say, the median in this study is the group's response. Moreover, the interquartile range ( $k$ ) was calculated to measure sample dispersion, which was inversely proportional to the group consensus (that is, the greater the range, the lesser the consensus). Complementary indicators were also established: arithmetic mean ( $\mu$ ), mode ( $Md$ ) and standard deviation ( $\sigma$ ). These values were very useful in the



questions on hierarchy as they helped determine the relative order among items with an equal median.

In the first round, the stability criterion equalled the consensus criterion; that is, the result was stable if there was a consensus. Yet in the second round, the stability criterion was independent of that of the consensus. Group response stability was understood as not being likely to change in the short term (regardless of their being a consensus or not). To assess it, the relative interquartile range ( $r$ ) variation of each response was used. The relative interquartile range was the interquartile range divided by the median and its variation ( $Vr$ ), which is the equivalent to the difference between the relative interquartile ranges of the two successive rounds ( $Vr = r_j - r_i$ ). Group response stability was understood to have been achieved when the relative interquartile range ( $r$ ) variation was between -0.25 and 0.25 (and, therefore, it was not likely to change in successive rounds). The response was taken as stable irrespectively of their being a consensus or not.

### 5.3 Weighting the results

In order to compare the valuations made, the results obtained were weighted in terms of the experts' knowledge on credit cooperatives. In this way, each expert was asked to self-assess his or her knowledge about the sector. The literature about the Delphi method demonstrated how self-assessment does not generate distinctive results if compared with an external assessment (Landeta, 1999).

### 5.4 Segmentation of the results

For the purpose of studying the differences in the experts' opinions according to their profile, an analysis was done of the results at the end of the first round in terms of the experts' profession (academic, institutional, director/manager or consultant), where they came from (according to Spanish Autonomous Communities), their gender and their age. This segmented analysis was not done at the end of the second round because the merging of opinions due to the methodology minimised differences in the experts' opinions. Therefore, this involved lack of power to account for the biases in the opinion according to each expert's profile.

## 6. Analysis of the results

The studies conducted in this field have identified human capital as the main group of intangibles in credit cooperatives (Seguí and Server, 2009). Nonetheless, relational capital has also been assessed to a large extent by keeping it at a short distance from human capital (which is a good example of its greater relevance in the financial sector). As Table 1 shows, the distance separating relational capital from human capital is not so broad; indeed, a large number of experts believed that relational capital was the fundamental intangible in cooperative banking.

Group	INTELLECTUAL CAPITAL	m
1	Human capital (capacities, attitudes, etc.).	1.32
2	Relational capital (relationships with customers, social capital, etc.).	1.86
3	Structural capital (processes, technology, etc.).	2.82

Table 1. Hierarchy of the Intellectual Capital elements in credit cooperatives

## 6.1 Relational capital in the credit cooperative system

### *Analysis of the process*

The first study round identified the weak and strong points of relational capital in credit cooperatives. As a statistical analysis proved impossible, the conclusions drawn are presented in the analysis of the results.

The second study round contained ten relational intangibles to be valued on a scale from zero to ten. The 22 experts participating in the second round assessed all ten items they were asked about.

The third study round included six questions used to compare relational capital in credit cooperatives with the remaining associations in the credit sector. Once again, all the experts participating in the second round answered all the questions.

Finally, the last section was about the objectives of alliances (where an open question was used), as well as the relationship between dimension and corporate reputation. For this purpose, the experts assessed the reputation of seven credit cooperatives of various dimensions (in terms of mean total assets and employees).

### *Analysis of the results*

First of all, it was worth mentioning the two open questions made in the first study round (the weak and strong points of relational capital of credit cooperatives). Given the open nature of these questions and the fact that a subsequent statistical analysis proved impossible, a decision was made to design Tables 2 and 3, which contain the analysis of this information.

Order	STRENGTHS OF RELATIONAL CAPITAL IN CREDIT COOPERATIVES	No.
1	Widely established in territories – Proximity in relationships with customers, suppliers, members, Public Administrations, etc.	17
2	Tradition, identification and implication with surroundings (including Cooperative Promotion and Training activities).	11
3	Better knowledge about customers' needs and solutions for specific problems (empathy, custom-built services and satisfaction).	10
4	Knowledge and commitment with members, especially in smaller-sized credit cooperatives.	5
5	Trust and reputation.	4
6	Customer loyalty.	3
7	A large number of members.	1
8	Alliances.	1
9	Important social capital network.	1
10	Members' democratic participation.	1
	TOTAL	54

Table 2. Strong points of relational capital in credit cooperatives

As shown, the experts suggested that the intangibles relating to credit cooperatives' extensive implementation and their proximity were their relational capital's main strong

point (with the consequent results of more implication, trust, etc., among their different users). Likewise from their social capital viewpoint, their tradition and implication with the area in which they operate also stood out (where the Education Fund was a powerful instrument). Finally, it was also worth pointing out that better knowledge about the specific needs of their clientele type was also a strong point, which appears to empathise to a great extent with the clientele by providing more custom-built services and generating greater satisfaction.

Order	WEAKNESSES OF RELATIONAL CAPITAL IN CREDIT COOPERATIVES	No.
1	Lesser range of financial products (only traditional ones). Lack of innovation and ignorance of customers' new needs.	9
2	Bureaucratised attention, poor professionalism and little commercial spirit. Young personnel with no cooperativism awareness and with a poor sense of belonging.	7
3	Corporate reputation and image (negative or unknown).	6
4	Position in the market, competition, dimension and lack of resources in organisations. Not possible to cover all the demand.	5
5	Denaturalisation and lack of incentives as members. Poor usage and participation of members.	4
6	Attitudes, institutional position and attention by the administration.	3
7	Loyalty and a feeling of belonging among customers	2
8	Mature sectors of influence.	2
9	Poor communication of corporate social responsibility (CSR).	1
10	Poor implication in the economic development process with the surroundings.	1
11	Autonomy.	1
12	Insufficient alliances.	1
13	Excessive commercial sense.	1
14	Relationships with suppliers.	1
15	Efficiency	1
	<b>TOTAL</b>	<b>47</b>

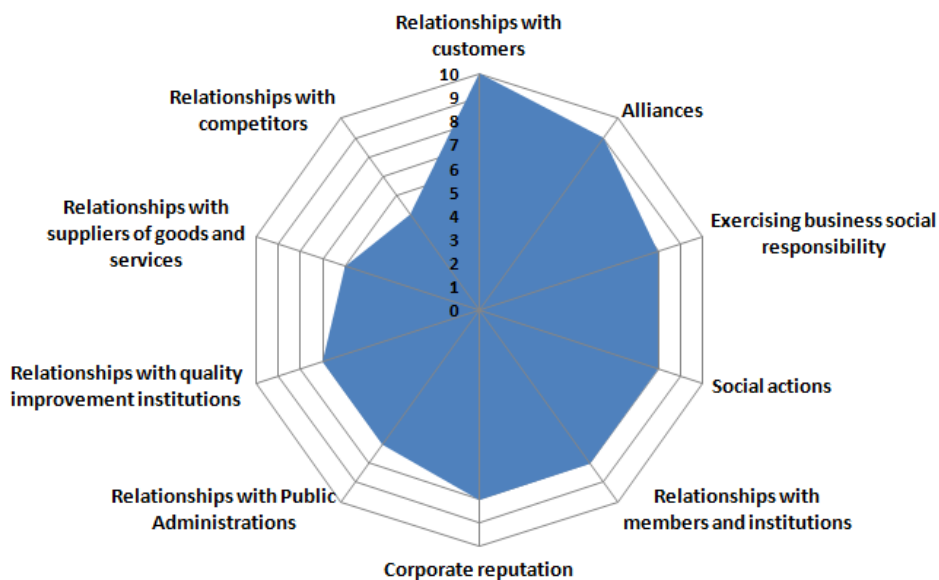
Table 3. Weak points of relational capital in credit cooperatives

Fundamentally, on the other hand, the negative perception of the range of financial products offered by credit cooperatives stood out as a weak point. This offer was perceived as being a traditional one that is unable to cover customers' new needs. Furthermore, another weak point of these organisations' relational capital stemmed from their personnel; that is, the service they offer was perceived as being bureaucratised, not very professional and with poor commercial spirit.

As a result, cooperatives' reputation and corporate image was another weak point identified in this sector (either because it was negative or this type of organisations is unknown). The rest of the weak points identified by the experts were not as relevant, although lack of incentives for members, and position in the market and lack of resources in these organisations stood out. Save reputation, the remaining weak points corresponded to the intangibles linked to the business capital in credit cooperatives.

As regards the assessment made of the cooperatives' relational capital variables, the results of the statistical analysis obtained after the second study round revealed an absolute consensus in the group response (which exceeded the two opinions that did not reach a consensus in the first study round). With these assessments, it was possible to determine a new hierarchy of the relational capital variables in terms of their importance for credit cooperatives.

Figure 2 graphically depicts the former results in a radial diagram. In this way, the graph evidences the profile portrayed of the social intangibles in credit cooperatives.



Source: Authors.

Fig. 2. Assessment of the Relational Capital intangibles in credit cooperatives.

Order	HIERARCHY OF RELATIONAL CAPITAL INTANGIBLES	m	$\mu$
1	Relationships with customers	10.00	9.42
2	Alliances	9.00	8.30
3	Exercising CSR	8.00	8.13
4	Social actions	8.00	7.96
5	Relationships with members and institutions	8.00	7.96
6	Corporate reputation	8.00	7.96
7	Relationships with the Public Administrations	7.00	6.71
8	Relationships with quality improvement institutions	7.00	6.42
9	Relationships with suppliers of services and goods	6.00	5.98
10	Relationships with competitors	5.00	5.33

Table 4. Hierarchy of relational capital intangibles

Table 4 shows that the most outstanding relational intangibles in credit cooperatives were those relating to relationships with customers and business alliances (both of which

correspond to the business capital). On a second level, and with high scores, we found social capital intangibles such as exercising CSR, social actions, relationships with partners and institutions, and corporate reputation.

Conversely, the lowest values obtained for relationships with the Public Administrations and quality improvement institutions proved significant (both of which were social intangibles with a score of seven out of ten). Finally, business intangibles such as relationships with suppliers and competitors stood out as being the least valued by experts (in sharp contrast with the remaining business capital components).

The results of the second round shown, as in all the assessed intangibles, that a consensus existed as regards the experts' opinions, which improves the situation in relation to the three consensus reached in the first round. Nonetheless, the assessments (in terms of the median) were identical, thus the study conclusion was stable in this chapter.

Given the closeness of the assessments for four of the five intangibles assessed, the hierarchy of the social capital elements scarcely changed after the second round. There were only very minor changes among the elements with an equal median, and only social responsibility and social action interchanged as the main social intangible. Nevertheless, relationships with the administration were still perceived as the least relevant social capital intangible in credit cooperatives.

No significant differences were noted when weighting the results obtained for the experts' knowledge on credit cooperativism if compared with what this work has presented so far.

Despite relationships with customers was the most valued intangible for all the profiles, it was worth mentioning that the capital business elements, according to profession, were most significantly valued by the directors and/or managers of credit cooperatives than by the academic community. Moreover, alliances or reputation were most valued by directors/managers than by academics. Something similar occurs with relationships with members (undervalued by academics). Conversely, academics least value these business intangibles and better value elements such as exercising CSR or social actions (the exact opposite to directors and managers). However, both segments coincide in that relationships with competitors and the Public Administrations were the least relevant intangibles.

When segmenting in age terms, the fact that the youngest group of experts prioritised a business intangible like business alliances (which was the most important for the < 45 years age group), while they undervalued exercising CRS, was interesting. The intermediate age group (45-55 years) particularly valued (by giving a score of 9) intangibles such as relationships with members and reputation. Finally, no significant differences were found for the oldest age group (> 55 years) in relation to the overall results.

Segmentation by gender showed clear contrasts. So it was that the female experts valued social actions as the most important relational intangible and exercising CSR at the same level as relationships with customers and corporate reputation. This sharp contrast if compared with the male experts may be justified by the bias that most of the female experts were academics; indeed, only one of the general directors of the cooperatives was female.

The next section of the questionnaire was designed to perform a comparative analysis between the main groups of relational capital intangibles in credit cooperatives and in the remaining credit entities: banks and savings banks. The results obtained are presented in Table 5.

GROUP	Much less	Less	Similar to banks & savings banks	More	Much more
Type of existing customers (per age)				X	
The current prioritised business segment (class)		X			
Customers loyalty and satisfaction as a result of geographical or sectorial links.				X	
Participation in the quantity and quality of members.				X	
Level of relevance of alliances.			X		
Possibility of reaching agreements with competitor cooperatives.				X	

Table 5. A comparison of Relational Capital intangibles (cooperatives vs. rest of credit associations)

Likewise after the second study round, a consensus had been reached in comparing the relational capital in credit cooperatives with the rest of the credit sector. In this way, a unanimous agreement was reached for the opinions that customers loyalty and satisfaction were more powerful than in banks and savings banks (resulting from credit cooperatives' geographic and sectorial links). Similarly, participation of members was classified more highly in credit cooperatives than in the other credit associations. This study concluded that the level of relevance of alliances is similar to that in other credit entities, and that it was neither a relative strong point nor a relative weak point. However, the possibility of reaching agreements with competitor cooperatives was perceived as being more likely than with the competition.

Another noteworthy finding was that cooperatives' clientele was of a mean older age than that of their competitors (this implies a competitive threat) and that the priority business segment corresponds to mean lower incomes than the rest of the credit associations (average and low-to-average).

In the second study round, the group's opinion barely changed, and remained stable. Only one question managed to reach a consensus, which was not the case after the first round (the level of relevance that alliances have). In fact in both rounds, it was worth pointing out that the most frequent response also considered that credit cooperatives have better connections, with the mean, mode and median practically coinciding.

Once more, weighting the results obtained by the experts' knowledge on credit cooperatives provided no significant differences.

The next questionnaire section asked the experts about the objectives of alliances. An open question was employed to identify the motivations to establish alliances. The analysis of the results enabled to hierarchise the objectives, which are based mainly on improving the organisations' business capital. They were presented and ordered according to their higher to lower level of relevance:

- Improving position in the market: a better offer of products and services, and greater visibility. Offer of complex products and greater added value, increasing competitive

- capacity and achieving more important operations. Possibility of jointly accessing markets with liquidity. Reputation.
- Generating economies of scale and improving efficiency: sharing the costs of newly developed strategies (international expansion, new technologies). Cutting overheads by sharing services and technology.
  - Increasing intercooperation: crossing attention with customers and “virtual networks”. Sharing experiences and improving practices. Developing shared businesses and technological functions, and generating management systems synergies.
  - Improving relationships with institutions and the shared image. Acting as a true financial “group” with other credit cooperatives by being seen as being different from the rest of the organisations in the financial sector.
  - Developing local and regional economy.

## 7. Conclusion

Firstly, it is worth highlighting that relational capital is highly relevant for financial associations (it comes very close in importance to human capital which predominates in most sectors). This is a logical peculiarity in a sector which bases its business on trust between the organisation and its customers, a fact which has been seriously affected by the banking crisis in the last years. Consequently given today’s scenario, a strategic window opens out to those organisations that better manage their relational capital.

In this sense, the fact that cooperative banking belongs to the so-called social economy confers it with an ideology which, a priori, should generate powerful social intangibles. Thus within relational intangibles, credit cooperatives’ adequate management of social capital should be able to generate future income returns. In this way, the policies recommended by experts to face the banking crisis, such as diversifying income or cutting operation costs, discover their main form of change in relational capital.

Secondly, it is necessary to insist that cooperative banking is a series of most heterogeneous realities (where exclusively local organisations co-exist with others that cover a much more extensive territory) and which, therefore, prove very complicated to draw valid conclusions and to make well-founded comparisons with for every reality that comes over in this chapter.

The analysis of Spanish credit cooperatives’ current relational capital is characterised by their proximity, which results from extensive implantation destined to develop greater trust and implication with their clientele. Credit cooperatives’ commitment with members (particularly the small-sized ones) also comes over as one of their strong points. Likewise, social intangibles like tradition and implication of credit cooperatives with their areas of operation are also stressed (where the Education Fund is a powerful instrument).

Among the weak points in credit cooperatives’ relational capital we find that the negative perception of their range of financial products is a major one (understood as traditional and unable to cover customers’ new needs). The other basic weak point encountered is the attention their personnel pays (perceived as highly bureaucratised, not very professional and with poor commercial spirit). Accordingly, the corporate reputation and image of Spanish Credit cooperatives proves negative or unknown for the vast majority of the population.

Given the study results presented in this work, the first specific conclusion drawn seems obvious: the legal form significantly determines the structure of a credit association’s

relational capital as it presents structural weaknesses in its business capital, whereas it has advantages deriving from its social capital. Consequently in a hypercompetitive environment such as banking, cooperatives' future strategy should overcome the disadvantages resulting from their business intangibles, and they should make the best use of their social capital opportunities.

Specifically, it is necessary to indicate that a credit cooperatives' relational capital especially stands out for the good appraisal of most of its intangibles. So it is that the most relevant relational intangibles in cooperative banking are those of a business kind: relationships with customers and business alliances. Then, we find social intangibles such as corporate social responsibility, social actions, relationships with members and institutions, and corporate reputation. In contrast, the poor relative assessments made of the relationships with the Public Administrations, with quality improvement institutions, suppliers and competitors evidence how relational intangibles are the least valued by the experts. As a result, the weak points indicated in the previous analysis correspond to the best valued relational intangibles (which exacerbate the competitive disadvantage and the need for policies that change this situation for most firms in this sector).

Credit cooperatives' social intangibles are generally at higher levels than those of the remaining credit associations, which is an evidently strong point that generates a competitive advantage. Accordingly, "geographical and sectorial links" and "the participation of members" should continue to be promoted in credit cooperatives considering the advantage they have over banks and savings banks.

It is interesting to note the high scores obtained for those firms exercising CSR and social actions. Despite it being a highly topical subject, the practical transfer to the broad sectors of our firms is still a long way off. Consequently, it would seem that credit cooperatives wish to remain at this point in the business avant-garde.

In a similar fashion to what savings banks did, credit cooperatives should strengthen those policies which address increasing their social capital. Savings banks originate from the same domain (social economy) and have known how to make firm in citizens' minds that social works are, perhaps, their main competitive advantage over banks. Therefore, the Education Fund should be an advantage that distinguishes credit cooperativism. However in practical terms, this has not been transferred to the perceptions of institutions and citizens. Thus, the Education Fund's communication policy should be promoted because, undoubtedly, greater efficiency would increase credit cooperatives' social intangibles. However, this sector's heterogeneous nature interferes in such a way that many credit cooperatives cannot have an important communication policy. So it seems logical that this communication task (events, advertising campaigns, etc.) should resort to intercooperation as an optimum way to seek synergies and economies of scale.

One outstanding contrast as regards segmentation according to professions is that the business capital elements are clearly more highly valued by the directors and managers of credit cooperatives than by the academic community. In contrast, academics better assess social intangibles such as exercising CSR or social actions. The fact that the youngest age group (< 45 years) of experts prioritised a business intangible like business alliances (it was the most important intangible for this age group), undervalued exercising CSR, while the intermediate age group (45-55 years) especially valued intangibles such as relationships



with members and reputation, is interesting. When segmenting for gender, a sharp contrast was found as social actions were estimated as the most important relational intangible (perhaps because of the bias based on the majority being academics).

When comparing the relational capital of credit cooperatives with the remaining credit entities, a unanimous result was found in that customer loyalty and satisfaction were more powerful in credit cooperatives than in banks and savings banks (as a result of their geographical and sectorial links). Along these lines, participation of members was superior in credit cooperatives than in the other credit associations. This study concludes that the level of relevance of alliances was similar to the other organisations (it was neither a relative strong point nor a relative weak point), although the possibility of reaching agreements with competitor cooperatives was perceived as being more feasible.

Finally, the main objectives of alliances in credit cooperatives essentially aim to improve their position in the market, generate economies of scale and improve efficiency. In second place, they wish to increase intercooperation, improve relationships with institutions and shared image, and develop local and regional economy.

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# Statistics for Rural Development Policy

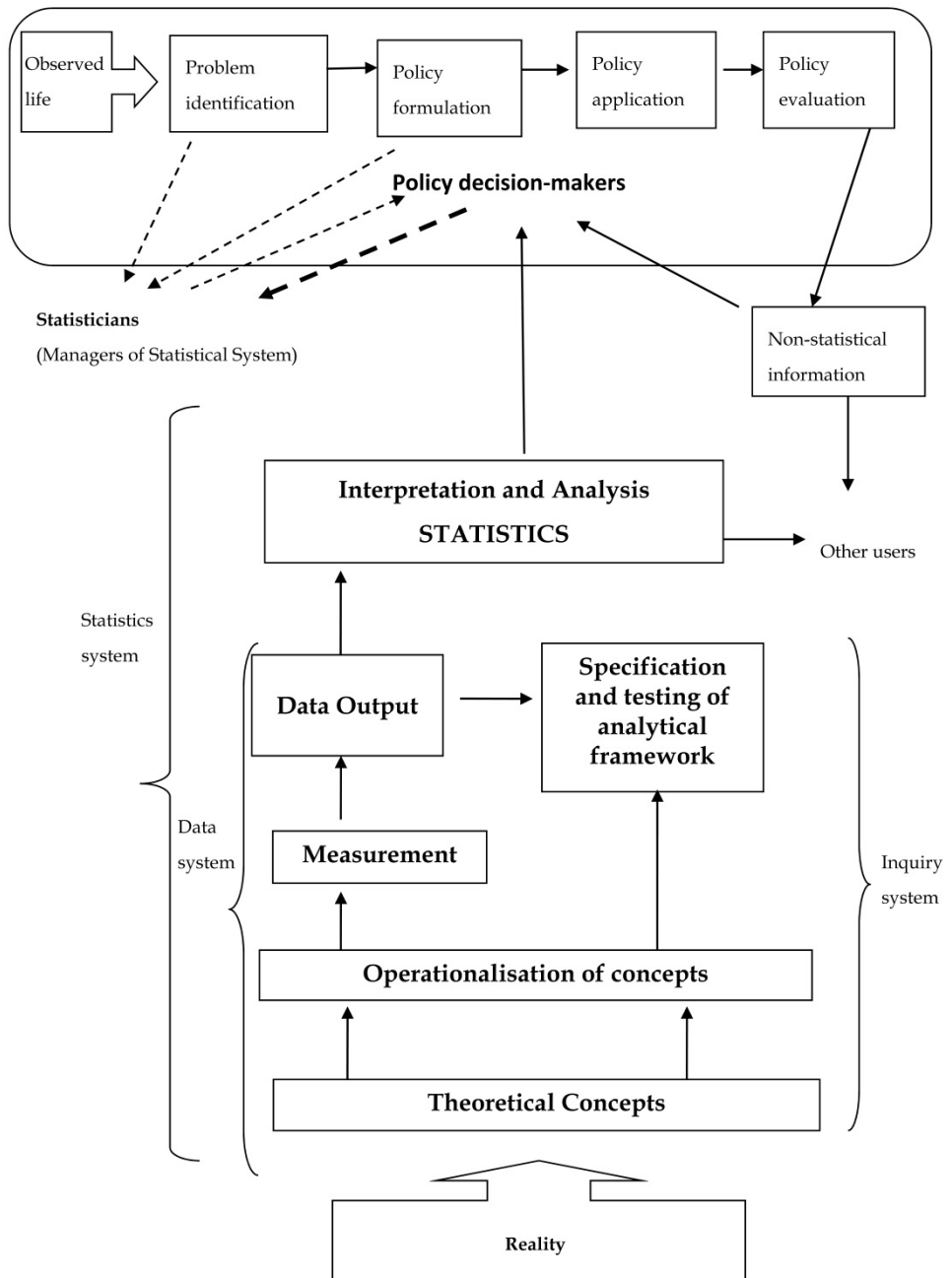
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## 1. Introduction

Modern rural development policy claims to be 'evidence-based', as indeed do many of the actions carried out by governments. While the rationale may be a mix of motives – typically those of equity, improving economic efficiency, and political economy – the details are often dependent on statistical information, particularly that coming from (or issued on behalf) the government's statistical authority. Official statistics typically carry a degree of quality assurance, and official statisticians are often keen to assert the accuracy, relevance and objectivity of what they generate.

Statistics can make a contribution at all stages of the policy process (see Figure 1), and this applies with particular potency to rural development policy. They can help throw light on the nature of the problems to be tackled (problem formulation), whether these be economic, social or environmental. While individuals or pressure groups can raise awareness of what, to them, are issues requiring intervention by government, public action is far more likely if the problems can be described using quantitative information, whether this be a decline in biodiversity, high levels of unemployment, low wages, homelessness, lack of social participation, or whatever. Statistics can assist in setting the objectives that have to be achieved to address the problems, such as increasing the percentage of the rural population with educational qualifications. They will be relevant to the choice and effectiveness of instruments employed, in particular by providing evidence on how they have performed on previous occasions. And statistics will form an integral part of evaluating the performance of rural development policy. In a well-designed system, statistics should be available that allows the extent of change from the pre-policy situation to be measured, and evaluators will be tasked with judging the extent to which any improvements in the situation can be attributed to the policy intervention and how much to other factors. Sometimes contextual factors (such as the state of the general economy) can change conditions in rural areas and be more influential than any policy actions targeted specifically at rural development, and official statistics can be useful in identifying such factors. A major issue that evaluators have to face is the establishment of the counter-factual – what would have happened had the policy actions not been taken. Statistics extending over time and space (particularly in control areas from which policy actions are absent) are immensely helpful in this respect and point to the additionality flowing from government intervention.

Figure 1 also portrays the system that provides the information necessary to serve the needs of decision-makers in rural development policy by collecting data (the 'data system') and



Source: Hill, B (2012) Understanding the CAP.

Fig. 1. The information system and the policy process

analysing and interpreting. High-level policy staff cannot be expected to be totally familiar with the methods by which figures appearing in statistics have been obtained, including the limitations imposed by the sources of basic data or the strength of the inferences that can be drawn from the figures. Some digestion and interpretation by experts are usually required, and this is what turns the statistics into information. Only then can policy-makers use it as an input to their decision-taking.

Three distinct steps must be taken before data can be produced which purport to represent reality. In the terms used by the US agricultural economist and statistician Bonnen (1975, 1977), these are: (a) 'conceptualisation'; (b) 'operationalisation' of the concepts (definition of empirical variables), and (c) measurement, meaning the actual collection of data. Concerning the first, concepts central to policy (such as 'standard of living' of the rural population or 'biodiversity') often cannot be measured directly, and for the information system to be practical it is necessary to define proxy indicators (substitute measurable entities, such as the income of households resident in rural areas or numbers of farmland wild birds) which are as highly correlated with the object of enquiry as is possible. The choice of indicator will be governed by the objective for which the measurement is taking place. Sometimes there will be a trade-off between desirability and practicality. For example, consumption expenditure might be theoretically preferred as a means of operationalising the concept of standard of living but, because measurement is difficult to carry out, some form of income measure may be an acceptable substitute. While biodiversity ideally would involve counting all wildlife in an area, cropland bird numbers are far easier to assess and they reflect in an acceptable way the general state of biodiversity. Often there is a temptation to use indicators simply because the information exists, but this is likely to result in ineffective and inefficient policy actions. The starting point should be the object of policy that the information system exists to serve.

As will be seen below, a critical concept that needs to be made operational is that of a 'rural area'. Statistics for rural development are largely concerned with describing the conditions in areas that can be labelled as rural and comparing them with what is found elsewhere.

The collection and analysis of data (the measurement part of the *data system*) and its interpretation forms only part of the larger information system needed to service policy shown in Figure 1. In parallel with the direct servicing of policy there is generally a system of scientific inquiry (the *inquiry system*) which is designed to test the basic assumptions of the data system and its interpretation and analysis. Though civil servants who are concerned with generating statistics are often the most familiar with the details of their methodologies, they are also usually preoccupied with the difficulties of getting results calculated and making them available to users, often publishing to a regular timetable. They may well not have the resources to reflect on the suitability of their statistics for the purpose to which they are put, or the validity of the assumptions that lie behind them. This is where academics, outside commercial consultants or specialist review groups from elsewhere in the government service can be useful. They can ask the awkward questions that ultimately cause revisions in the provision of statistics, and thereby lead to an improvement in their quality and to the chance of better policy decisions based on them. In statistical areas that are relatively young, such as for rural development, the inquiry system may be of particular importance. Not least, questions can be asked such as 'what is a rural area?' and 'how does it differ from a non-rural area in the sorts of problems found there?'

## 2. Definition of rural and of areas deemed to be rural

A key issue in the construction of statistics on rural areas for the purpose of assisting rural development policy is the method by which such areas are distinguished from non-rural areas. As will become apparent, this is context-sensitive and may reflect a number of factors.

There is an apparent dichotomy of views as to what sort of definition should be used. The UN Statistical Division argues that “given the variety of situations in the countries of the world, it is not possible or desirable to adopt uniform criteria to distinguish urban areas from rural areas [...]. Clearly, national statistical offices are in the best position to establish the most appropriate criteria to characterize urban areas in the respective countries” (UN, 2002 p. 106). In contrast, the OECD had originally agreed on a uniform single criterion (population density set at 150 inhabitants per Km<sup>2</sup>) for application in its members to separate urban and rural communities. Later, it added another criterion, which is the presence of an urban centre in the region, representing no less than 25% of the regional population.

This variety of approaches is part of a broader debate that encompasses:

1. The purpose for which the classification is required (which may be to reflect lifestyles in social, cultural and environmental terms, the functions performed by rural and urban areas, and public policy). For comparisons over time for the same country a national definition appropriate to the local conditions may suffice, but this may not be satisfactory where the interest is in making international comparisons.
2. The use of multiple and heterogeneous criteria to define rural areas, or a small reduced list, or even a single criterion. The last may be more easily implemented for comparing a multiplicity of countries but may omit some variables that are considered of local importance. In practice, a reduced list may be difficult to agree across national boundaries (Rodriguez, 2010).
3. Whether a dichotomic (rural/non-rural) or gradient approach should be used. Gradients permit the identification of different types of territories, from the distinctly rural (dispersed rural), going through intermediate categories, up to those that are eminently urban. (e.g. metropolitan areas).

In practice no single accepted official definition of “rural” exists among the richer industrialised countries; a survey in 2003 by the UNECE on Rural Development statistics highlighted the great number of definitions of rural then in use (UNECE, 2007; FAO, 2011)). In a number of them, rural is treated as a residual category, defined negatively in the sense of not being “urban” or “agglomerated” rather than being explicitly specified by its own properties. Urban definitions vary somewhat amongst countries, but in general urban areas are thought of as agglomerate with a high density of persons per square kilometre. The particular circumstances of some countries have led them to develop specific approaches to defining their rural areas. Nevertheless a definition put forward by the OECD (OECD 1994, 1996, 2006, 2007) is the most used at international level in territorial analysis. It is based on three criteria, combining features of population density, distribution and size. Details, and the typology of areas developed from their use, are described below.

In many cases, administrative and political subdivision of areas is based on geographical characteristics (rivers, mountains, coasts, etc.) and borders are designed based on them.

However, in other cases administrative boundaries have been geometrically designed only on maps<sup>1</sup>. In the latter, new technologies based on remote sensing and digital photos allow the identification of rural areas with high degrees of approximation and enable them to be delimited at a small area scale (Smith *et al.*, 2009). At the state of the art, the main limits to using this kind of solution stem from economic constraints and data availability.

Three parameters are critical when considering the definition of rural areas:

- The size of the territorial units and the level of geographic hierarchy;
- The criteria used to characterize the units at the respective levels;
- The quantitative thresholds used to define the boundary between rural and other areas or to establish the basis of setting a gradient between the various degrees of rurality (OECD, 1996).

## 2.1 Size of territorial unit

Among OECD countries, the basic territorial units used in national definitions of rural vary considerably in size, both with regard to population and area. For example, French Communes, which are the smallest administrative units in Europe, have an average population of 1,500 inhabitants and a surface area of 15 square kilometres, while English Local Authority Districts encompass on average 118,000 inhabitants in areas of more than 500 square kilometres. Counties, which in the United States are used as the basic building blocks for rural analysis, have an average population of 80,000 inhabitants and an average surface area of almost 3,000 square kilometres. In terms of area, these American Counties are much smaller in the East than in the West (OECD, 1996).

Within OECD countries, local and regional administrations perceive rural issues and implement rural policies mostly with reference to the local community level. In contrast, national, as well as supra-national administrations often deal with rural issues at the more aggregate regional level (OECD, 1996). *A priori*, neither level of territorial detail is more appropriate than the other. The “right” choice will depend on the analytical purpose or on the policy problems that have to be solved. In practice two levels of territorial hierarchy are used for rural classification and analysis.

- **Local community level:** At this level, the territorial grid is very detailed. It consists of small, though not necessarily the smallest possible, basic administrative or statistical units. Rural analysis is usually based on these local units when it is concerned with characteristics of “homogeneous” areas that can be classified as being either rural or urban. In practice, several levels of local units may be in use simultaneously where the policy interest goes down to small areas, such as where there are pockets of identifiably rural problems in close proximity to built-up areas. For example, the definition adopted in the UK for England and Wales starts from the characteristics and contexts of each 1 hectare squares in the national grid, this fine-grained approach being appropriate to the intermixing of what is perceived as rural areas (with distinct sets of policy problems) and urban settlements in regions that, by the criteria used elsewhere, might not be classed as rural at all.

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<sup>1</sup> As in some ex-colonial African countries.

- Regional level: Here the territorial grid is less detailed. The geographic building blocks are larger administrative units or functional zones, such as provinces or labour market areas. At this level, the emphasis of rural analysis is on functional relations and on the wider context in which rural development takes place. Usually these larger zones cannot be classified in terms of either rural or urban but as more or less rural, according to their degree of rurality.

Without this distinction between the two hierarchical levels of territorial detail it would be impossible to accurately describe the complexity of rural problems in their various national and regional contexts. A too narrowly designed scheme for territorial analysis would not properly reflect the diversity of analytical and policy perspectives concerning rural development both within and between countries.

## 2.2 Criteria for designating areas as rural

In terms of the criteria for the designation of “rural” areas, a wide range is found in use. For example, these may include:

- Size of population (total or agglomerated, absolute or relative);
- Population density (in relation to total or usable area);
- Commuting intensity (towards major cities or labour market centres);
- Share of agriculture (either in employment or in value added).

The choice of criteria used to identify rural areas is not independent of the size or hierarchical level of the territorial units to which they are applied. To define rural at the local community level, most OECD countries use a population size criterion. For larger functional or administrative regions, which in most cases will include at least some urban elements, criteria such as density and distance or others such as economic base are more commonly applied (OECD, 1996).

## 2.3 Quantitative thresholds and gradients

Even when the same criteria are used, the thresholds set for defining the boundary between rural and other categories vary considerably. For population, the size of the agglomerated units used by OECD Member countries varies between 1,000 (Australia and New Zealand) and 20,000 (Korea); 2,000 is the most common threshold. Where the share of agricultural employment has been used (though this is no longer applied in the OECD), the minimum considered for classifying an area as rural differed between 1.5% (Luxemburg) and about 20% (Greece).

It is clear that the use of alternative definitions will not only yield different results with regard to the scope of rural areas (the percentage of the population resident there etc.) but will also create different pictures of their problems and perspectives. For example, if the share of “rural” population in France were to be calculated using the French, Italian, Spanish and Greek definitions, the respective results would be: 27%, 51%, 30% and 27%. None of these definitions or their results, not even the French one, should be considered incontrovertibly as the “right” one (OECD, 1996).

Increasingly, a simple rural/non-rural binary classification is regarded as too crude, and gradients of rurality are preferred. Though these could be constructed using a single criterion, in practice combination of several factors is often employed.



In summary, there is no single “correct” definition of rural. National definitions are continuously under debate and are in fact adjusted from time to time, reflecting, for example, changes in socio-economic and administrative structures or in mobility and communication (OECD, 1996).

### 3. Typology of areas

Given the primacy of the OECD approach to rurality, it is worth focussing on the classification of regions that it has generated, a typology that has been widely adopted for international studies. Since rural is about people and territory, the OECD selected population density, calculated as inhabitants per square kilometre, as the most relevant and practical criterion for identifying rural at the level of local communities. Population density reflects characteristics of settlement, distance and even intensity of communication and land use. It is a concept that is both intuitive to users and simple for providers of rural indicators to calculate. The OECD critical density was set at 150 inhabitants per square kilometres for Europe, North America, Australia and New Zealand. Setting thresholds always involves some arbitrary judgment. The decision to use 150 as the dividing line was, however, based on a series of empirical investigations including the implications of alternatives. Japan was treated as an exceptional case. Its population density is exceptionally high, being one of only three OECD countries where average national population density exceeds 300 inhabitants per square kilometre. Its settlement pattern is extremely diverse; while the population tends to be concentrated in certain parts of the country, other parts remain unpopulated. Mountains and islands create many natural barriers that limit accessibility. After intensive explorations, it was decided to use the same criteria and methodologies but to apply a higher density threshold of 500 inhabitants per square kilometre (OECD, 1996).

Under the OECD’s working definition, rural areas are homogeneous in one dimension: their density is relatively low. This does not mean, of course, that their problems and perspectives are homogeneous. On the contrary, rural areas in the OECD are heterogeneous in several dimensions and it is an important task to understand this diversity further. The differences cannot, however, be explained only by the characteristics of the rural areas themselves. They often result from the type and intensity of relationship the rural communities have to other places in the wider region of which they are a part (OECD, 1996).

Once rural is fined, the performance of rural areas can be measured and compared by the use of indicators. With descriptions provided by the indicators, it may be of interest to create further problem- or policy-related typologies. This should not be confused, however, with the question of what “rural” is. It would be misleading to embed preconceived outcomes of rural analysis in the very definition of rural.

#### 3.1 OECD – An example of regional classification

The typology of regions used by the OECD is an example of a gradient measure, though it starts from a dichotomy based on population density. The OECD territorial scheme distinguishes two levels of geographic detail: local communities and regions. It is based on three criteria, combining features of population density, distribution and size.

The first criterion identifies rural communities according to *population density*. A local community (small, basic administrative units appropriate to the country concerned) is

defined as rural if its population density is below 150 inhabitants per square kilometre (500 inhabitants for Japan to account for the fact that its national population density exceeds 300 inhabitants per square kilometre).

The second criterion classifies regions according to the *percentage of population living in rural communities*. Thus, a region is classified as:

- *Predominantly Rural (PR)*, if more than 50% of its population lives in rural communities.
- *Intermediate (IN)*, if between 15% and 50% of its population lives in rural communities.
- *Predominantly Urban (PU)*, if less than 15% of its population lives in rural communities.

The third criterion is based on the *size of the urban centres*. Accordingly:

- A region that would be classified as PR on the basis of the general rule is classified as IN if it has an urban centre of more than 200 000 inhabitants (500,000 for Japan) representing no less than 25% of the regional population.
- A region that would be classified as IN on the basis of the general rule is classified as PU if it has an urban centre of more than 500 000 inhabitants (1,000,000 for Japan) representing no less than 25% of the regional population.

As the geographic and population size of a “region” can vary significantly both within and between countries, the OECD has also established a systematic classification of territorial units within each Member country. The classifications, and therefore the regional typology, are based on two Territorial Levels (TL). The higher level (TL2) consists of about 300 macro-regions while the lower level (TL3) is composed of about 1,700 micro-regions (OECD, 2009).

The criterion used to create the typology at the regional level is the share of the population of the region living in rural communities. Thus, the typology reflects the *degree of rurality* of the whole region (OECD, 1996). In 1990, about a third of the OECD population lived in rural communities that covered over 90% of the OECD territory. About a quarter lived in predominantly rural regions (OECD, 1994).

The OECD typology of regions has been refined recently to take into account remoteness of rural regions: the extended typology comprises remote rural regions, rural regions close to a city, intermediate and predominantly urban regions. It has been developed jointly by DG Regio of the EU Commission and OECD (OECD, 2010), who suggest including a criterion on the accessibility to urban centres (Ruiz and Dijkstra, 2010). The results show a clear distinction between remote rural regions and rural regions close to a city in terms of declining and ageing population, level of productivity and unemployment. This extended typology, which includes a measure of distance from cities for the population living in a rural area, is applied to North America and Europe. The authors aim to extend it in the future to the other OECD countries and evaluate the feasibility to apply a similar method to non OECD countries.

### **3.2 Rural area typology in England and Wales (UK)**

In contrast to the OECD’s regional typology, an example of a much more detailed classification is provided by the system applied in England and Wales (United Kingdom). This enables Census Output Areas (CAOs), which are units connected to the ten-yearly population census, containing of approximately 125 households, to be placed into one of

eight different area types, as shown below, according to its settlement type and context. The process by which COAs are allocated involves using a grid of 1 ha cells and a “moving window” that examines both the population density of that cell and the characteristics of its surrounding area. Thus two characteristics, *morphology* and *context* are at the basis of the definition. It should be noted that “rural” comprises the six types that are not explicitly “urban”.

The core classification of COAs has been adapted for larger geographical units that comprise multiple COAs, including the 354 Local Authority Districts (LADs) which are the unit on which much official data are collected. These are allocated to one of six broad classes based upon the number and proportion of their populations in the main settlement types derived from the “local” rural definition. Three classes are predominantly *urban* in nature (“Major Urban”, “Large Urban” and “Other Urban”) comprising 176 LADs in all. The main *rural* types, of which there are 178, are called “Significant Rural”, “Rural-50” and “Rural-80”, identified by the proportion of people in rural settlements of all kinds: “Rural-80” LADs have between 80 and 100 percent of inhabitants in rural settlements, “Rural-50” LADs have more than 50 percent, whilst “Significant Rural” LADs have more than the national average of 26 percent. These broad classes can, if required, be further broken down into the different *types* of specifically rural settlement they contain. Most “Rural 80” LADs, for example, have a predominance of people living in villages.

Settlement type	Context
Urban >10,000	Less sparse
Town and fringe	Less sparse
Village	Less sparse
Hamlet and isolated dwellings	Less sparse
Urban >10,000	Sparse
Town and fringe	Sparse
Village	Sparse
Hamlet and isolated dwellings	Sparse

Source: CRC (2007), Defining rural England.

Table 1. England: Classification of Census Output Areas by Settlement Type and Context

A key point for both the OECD regional and the England and Wales detail classification is that they apply universally in the countries where they are applied. In other words, the rural areas are a subset of a general disaggregation of the national picture, and whatever indicators are generated for rural areas will have parallels for non-rural areas. Thus any use of the term ‘rural statistics’ is misguided, as there is nothing unique about their rural nature. Rather, it is better to refer to ‘statistics for areas that have been classed as rural’.

#### 4. Indicators for rural areas – Choice of content coverage

Statistics on rural development are used by policy makers and private sector decision makers to inform their decisions regarding a variety of important issues. It is these issues that drive the choice of indicators to be developed and the core data to be collected. Many of

today's critical issues are not new, but they have increased in importance, have come to be framed differently or have been newly recognized. One important finding of the *Global Strategy to Improve Agricultural and Rural Statistics* (UN, 2010), which relates to countries at all stages of economic development, was the considerable overlap between the issues identified by different stakeholders. Many users expressed the need for new and improved indicators on prices, energy and biofuels, agricultural environments, climate change, trade, water, land, soils, household consumption, food security, socio-economic data, economic accounts, management of natural disasters and fisheries. They also had high expectations for geospatial and remote sensing data and expressed the need for improved integration and for more accessible and searchable databases. The most critical issues are not independent from each other, and much of the data are needed for more than one indicator. The goal of the *Global Strategy* is to capture the interrelationships of these emerging issues and to ensure that appropriate indicators are defined and underlying data provided. This points to a major problem with current statistics; many of the issues have been considered in isolation, and this does not allow the cross-cutting analysis that is now needed.

When considering what indicators should be available special mention must be made of the relationship between statistics on agriculture and rural development. It is clear that agriculture as an activity is an identifying factor in making an area rural. While farming and forestry dominate land use in most countries, and therefore are important in determining countryside appearance and its biological content and diversity, in OECD countries these sectors typically represent only a small (and declining) share of economic activity taking place there and of the income of the people who live there. Much more comes from the other sectors, and statistics that attempt to describe the economic picture in rural areas must move beyond agriculture and farmers to embrace the other residents, entrepreneurs and business units located there. While agricultural statistics are relatively well-established, those for rural areas in general are far more recent and less comprehensive.

It is also necessary to point out that 'rural development' can be perceived in various ways, and thus the statistics needed to service it will vary. For example, in the EU rural development policy has a strong environmental strand because of the way that it has developed as a part of the Common Agricultural Policy, and this sits alongside the economic and social aspects. Furthermore, as the legislation that enables sums to be drawn from the European Union General Budget specifies a list of activities that can be supported (in broad terms relating to the competitiveness of agriculture and forestry, the environment, and a subset of issues that affect the quality of life in rural areas), rural development policy does not cover things like rural housing, access to health and education services, or transport and communications infrastructure for the general population. Consequently, statistics needed to service EU rural development policy do not cover many issues that are important to the residents of rural areas, though such statistics may be provided to assist in the operation of EU regional policy and national policies for education, healthcare and so on. Conversely, in the US rural development focuses on economic issues (mainly incomes and employment). While there is an increasing concern with environmental conditions, climate change and so on, these are seen as part of environmental policy rather than rural development (Blandford and Hill, 2008).

The selection of indicators for rural areas must be guided in part by the principles applicable to any set of indicators (relevance, accuracy, sensitivity, timeliness, accessibility etc) as

articulated by many international statistical bodies and set out by the FAO when creating its the CountrySTAT database. But it must be driven even more by characteristics that are specific to rural development. There are three basic aspects which any reasonable assessment of conditions in rural areas and trends must take into account:

- *Territory*: Rural development is a spatial concept. It deals with territorial differences in problems and perspectives, options and opportunities. Such differences can be considered positively (diversity) or negatively (disparities). In either case, the territorial distribution determines the overall performance and viability of economic, social and environmental systems as well as the effectiveness and efficiency of related policies.
- *Themes*: Rural development is a multi-sectoral concept. It is concerned with a wide range of demographic, economic, social and environmental issues. It stresses the importance of a cross-sectoral perspective and often provides an appropriate framework for the horizontal integration of various activities and policies.
- *Time*: Rural development is a dynamic concept. It is concerned not with the mere passing of time but with concrete, historical dynamics which are reflected in changing technological options, economic structures, or social attitudes and perceptions.

Any set of indicators for rural areas, therefore, has to provide information on a variety of economic, societal and environmental subjects. It has to do so in a territorially differentiated manner and it should be capable of reflecting changes over time (OECD, 1996). Within the themes, a statistical reduction of strongly correlated indicators is encouraged to reduce overlapping information (where closely similar indicators tell the same story), to further economy in the provision of public services, and to avoid the negative effect of excess information that produces 'noise' for users and potentially reduces their understanding (Gianfaldoniet *al.*, 2009).

In terms of what themes indicators should attempt to depict, clearly this depends on the nature of the problem and policy in hand. The observation of rurality can be done from several perspectives, suggested by different theories of development, which in turn lead to corresponding themes of interest. For example, if the focus is on the development process, the discussion on indicators might start from a framework for understanding "sustainable livelihoods" as suggested by the UK's Department for International Development (DFID). DFID defines livelihood as the combination of "the capabilities, assets and activities required for a means of living"<sup>2</sup>.

Within this livelihood context the core analytical framework starts from the so-called asset pentagon, which contains the following five categories:

1. natural capital
2. financial capital
3. human capital
4. physical capital
5. social capital

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<sup>2</sup> Introduction to the Sustainable Livelihoods Approach ([www.livelihoods.org/info/info\\_guidancesheets.html](http://www.livelihoods.org/info/info_guidancesheets.html))

Communities and regions achieve desired outcomes by applying strategies that exploit these assets. Indicators or statistics on strategies are difficult to conceptualize and, typically, the strategy that works for one community or region will not be appropriate for another. However, some indicators or statistics may be proposed that measure the potential for development, requiring a further (sixth) category:

6. The capacity of the community/region to generate and to implement strategies .

International organisations have lists of indicators that they consider appropriate and recommend for statistic on rural development (World Bank, FAO, OECD, European Commission – all reviewed in FAO, 2011). The list suggested by the OECD is given in Table 2. The European Commission uses a set when compiling its annual reports on rural development in the EU (Commission, 2009); these are somewhat narrower than the OECD suggested coverage, reflecting the baseline indicators set out for actions that are supportable under the Rural Development Regulation (for the period 2007-13 this is Council Regulation (EC) 1698/2005) that implements the Pillar 2 (rural development element) of the Common Agricultural Policy.

Demographic statistics	Regional accounts	Innovation
Population by age and sex Average population Regional surface Population density	GDP Per capita GDP GVA by sector	R&D Expenditures by performing sector R&D Personnel by sector Educational attainments of the labour force
Social indicators	Regional labour markets	Enrolment by level of education Employment in high-technology sectors High and medium high-technology manufacturing (as % of total manufacturing) Knowledge intensive services (as % of total services) High and medium high-technology manufacturing (as % of total employment) Knowledge intensive services (as % of total employment) Percentage of households with access to broadband
Age-adjusted mortality rate Number of physicians Number of physicians per 1000 inhabitants Crime Volume of municipal waste Volume of municipal waste per capita Number of private vehicles Number of private vehicles per 100 inhabitants Voter turnout rate	Labour force by sex Employment by sex Employment by industry Unemployment by sex Unemployment rate Participation rate Long term unemployment incidence Business statistics Total number of establishments by industry Number of employees by industry	

Source: OECD website

([http://www.oecd.org/document/62/0,3343,en\\_2649\\_34413\\_36878718\\_1\\_1\\_1\\_1,00.html](http://www.oecd.org/document/62/0,3343,en_2649_34413_36878718_1_1_1_1,00.html))

Table 2. OECD's basic rural development indicators classified by themes

#### 4.1 Sets of stage-related indicators to evaluate rural development policies

A prominent example of the use of statistics is found within the EU's Common Monitoring and Evaluation Framework (CMEF) that applies to Rural Development Programmes

operated under the Common Agricultural Policy (European Commission, 2006). Though the CMEF uses a particular terminology, the principles it embodies, including its sets of indicators, are of general applicability.

Statistics are used to set out situations in rural areas before policy intervention is undertaken, that is to establish a *baseline*. This information also feeds into an analysis of the Strengths, Weaknesses, Opportunities and Threats (SWOT) that underlies the rationale for policy action. As noted previously, not all aspects of rural areas and their development are covered; the range is restricted to the forms of support that can be actioned under the Rural Development Regulation. Under the CMEF two types of baseline indicator are encountered. The first (called *objective-related*) directly relates to the issues under concern and on which rural development policy focuses (for example, the incomes and productivity of rural residents). The second type (*context-related*) relates to factors that are anticipated to affect the issues under concern in addition to the policy intervention itself (such as the pattern of land use and the proportion of the working population in rural areas). As policy actions are implemented there will be interest in how these indicators have moved from their initial levels. Evaluators will be concerned with the extent to which interventions have been the cause of shifts in levels or of alterations in trends.

However, evaluation of rural policy also involves indicators that measure the direct resource use and immediate impacts of interventions. While rural statistics are not likely to be concerned with the *inputs* or *outputs* of policy actions (for example with the cost of providing vocational training or the number of people trained), they will be increasingly affected by indicators of *results* (such as the gross number of jobs created) and the *impacts* of the interventions (the net number, once other factors such as displacement and multipliers have been accounted for)<sup>3</sup>. Evaluators will need to examine how the baseline indicators have changed over the life of a rural development policy and to explain how many of the observed changes can be attributed to the policy interventions that have taken place. Various techniques have been suggested by which this may be achieved (e.g. European Commission, 2010), though the less-than-ideal circumstances in which evaluation typically takes place (including data deficiencies) means that a degree of subjective judgement is always present. Thus while baseline indicators, to which statistics for rural areas bear a close relationship, are important to evaluating the performance of rural development policy, they do not provide a complete description of the process by which policy interventions work and how its performance can be assessed. Other information and process-linked indicators of inputs and outputs will also be needed.

## 5. Data issues

Data are essential for the provision of statistics for rural development. Of the three legs on which statistics stand (the design of statistical methodology, its application and interpretation, and the provision of data), the last is often the poor relation in terms of the

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<sup>3</sup> The indicators at the various stages of policy interventions are a feature of the *Logical Framework Approach (LFA)*, a process and a tool often used in developing countries to help strengthen analysis and design during formulation, implementation, evaluation and audit. In the LFA context, the term "outcome" is used in place of "result".

attention paid to it and the esteem in which its practitioners are held. Yet without data that are of good quality the other parts of the information system soon lose their effectiveness.

The supply of data is essentially something that has to be tackled at a national level. While there may be international obligations to provide data, especially for Member States of the EU to meet the statistical commitments of membership, the cost of doing so falls largely on the individual country. Data for rural areas come from a variety of sources. These include administrative records (such as the beneficiaries of welfare payments, educational attainment, health care services), taxation data, official censuses and surveys (including population censuses, labour force surveys, household budget surveys and panels that trace developments in incomes and living conditions over time, agricultural surveys), and special studies. The use of many of these for statistical purposes will often not have been considered in their design, and statisticians will be challenged to integrate them in a meaningful way. To an increasing extent links using geo-referencing or personal identification numbers (or both) are helping to facilitate their assembly into integrated datasets for specific and identified small areas. Some countries, such as those in Scandinavia, have a history of being able to integrate various datasets (population censuses, agricultural censuses, taxation records etc.) and this can be a highly efficient way of delivering statistical information for rural residents. However, such bringing together is sometimes technically difficult because, for example, the lack of a common definition of what is a rural area or of the household unit. In some countries there are legal obstructions to combining datasets or it is banned. The use of taxation data may be particularly sensitive in this regard..

In OECD countries there are some surprising data gaps; for example, though diversification by farm families is frequently encouraged as a way of promoting rural development, the EU has no system in place that can provide data on overall incomes of farm households and the way that non-agricultural activities are contributing to their total earnings.

The World Bank has recognised that, while a problem of data availability to construct indicators may be found in OECD countries, it is most acute in developing countries. Not only is there a problem with the quality and reliability of rural data in many developing countries but vital data may simply not exist there. Even when data are collected, most are aggregated at the national level with no possibility of breaking this down to urban-rural and regional levels. Recently, a joint team – composed by staff from the Global Donor Platform for Rural Development, the World Bank and FAO – has published the *Sourcebook of indicators for monitoring and evaluation (M&E) agriculture and rural development in less-than-ideal conditions* (GDPRDet al., 2008). This work provides a number of workable approaches for designing an M&E system that would be of great relevance to different rural development activities, projects and programmes, and degrees of data availability. The construction of the GDPRD rural development statistical framework was based on three main requirements: comparability, availability and relevance – qualities familiar from the early parts of this chapter. A set of 19 priority indicators have been identified in order to allow international comparisons. Though primarily aimed at developing countries, there is much that is relevant universally.

## 6. Acknowledgment

The author gratefully acknowledges that much of the material contained here is condensed from the 2011 edition of the Wye Group Handbook *Statistics on Rural Development and*



*Agricultural Household Income*, of which he was a main author and general editor. This is to be made available on the FAO website later in 2011.

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# Integrated Marketing Approach as a Rural Development Tool

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## 1. Introduction

Rural development consists of a wide variety of new activities such as the production of high quality and region-specific products with a particular regional image, nature conservation and landscape management, rural tourism and the development of short food supply chain (SFSC). In order to provide the rural development, there is a strong interaction among the producer, manufacturer, marketer, government official and consumers. In other words, the farmers should attitude rationally with a production model protecting the generic and rural sources, stimulating the rural potential and spurring the rural development by considering the effective production planning and farm management at the agricultural food production circulation. On the other hand, at the marketing line, the marketers should design/process the food products by accounting the consumers purchase models, as well. In order to do so, it should be analyzed the target consumer markets, and determined the consumers purchase attitude and behaviours towards the food products along with their purchase powers due to production and consumption effectiveness.

Rural development is defined to be a multi-dimensional process encompassing improved provision of services, enhanced opportunities for income generation and local economic development, improved physical infrastructure, social cohesion and physical security within rural communities, supporting active representation in local political processes and effective provision for the vulnerable (Topcu, 2008; Topcu & Yavuz, 2008).

Rural development, more specifically, covers three different but interrelated dimensions (Topcu, 2009): the first is the economic dimension including in both capacity and opportunities for the poor and low-income rural households to benefit from the economic growth process and measures to reduce intra/inter-sectoral income inequalities to reasonable levels. The second is the social dimension supporting social development of poor and low-income households or disadvantaged groups, eliminating inequalities in social indicators, promoting gender equality and women's empowerment and providing social safety nets for vulnerable groups. The third is the political dimension creating the opportunities for the poor and low-income communities in rural areas, including women and ethnic minorities, providing effectively and equally participate in the political processes at the village level and beyond compared with any other categories of the population within and outside rural areas.

As a result, the priorities of the rural development supported by developed countries and EU focuses not only on improving the competitiveness of the agricultural and non-agricultural sectors (*Axis-1*) targeting measures at promoting knowledge and improving human potential, restructuring and developing physical potential and promoting innovation, improving the quality of agricultural production and products; and improving the environment and rural areas (*Axis-2*) based on the measures targeting the sustainable use of agricultural and non-agricultural lands, but also on the quality of the life in rural areas and diversification of the rural economy (*Axis-3*) involving the needed conditions to diversify the rural economy comprising diversification into non-agricultural activities, the creation and development of micro-enterprises with a view to promoting entrepreneurship and developing economic production and encouragement of rural tourism activities, to improve the quality of the life in the rural areas, to realize a training and information measure for economic actors and a skills-acquisition and animation measure with a view to preparing and implementing a local development strategy; and the leader approach (*Axis-4*) related to area-based local development strategies intended for well-identified sub-regional rural territories, local public-private partnerships, bottom-up approach with a decision-making power for local action groups concerning the elaboration and implementation of local development strategies, multidisciplinary design and implementation of the strategy based on the interaction between actors and projects of different sectors of the local economy, the implementations of innovative approaches and cooperation projects and networking of local partnerships (Beckett, 2005).

The rural development in this context places emphasis on facilitating change in rural environments to enable poor people to earn more, invest in themselves and their communities, and contribute toward maintenance of the infrastructure key to their livelihoods. To improve the quality of the life in rural area and enable the rural communities to earn more by taking into consideration four Axes and the economic, social and political dimensions of the rural development, therefore, producers, marketers and policy-makers have considerably focused on the scarce source management, effective agricultural production and marketing planning, and new food markets.

As a result, the rural development in terms of the effective source management, production, and marketing planning has increasingly consisted of a wide variety of new activities such as the production of high quality and region-specific products with a particular regional image, nature conservation and landscape management, rural tourism and the development of short food supply chains (*SFSC*) for the last decades in developing countries, (Knickel & Renting, 2000). Really, the number and variety of the new activities is much larger, and the first of which is the reconfiguration of the rural resources used in both within the farm and between agriculture and other rural activities based on the technique and economic effectiveness for the production of the agricultural products. Another is the *SFSC* providing a link between urban consumers and rural food producers being valuable in developing sustainable communities, and it bases on integrated marketing approaches fulfilling a number of functions for the farm, household, region and society at large.

In recent years, the emergence of new forms of dynamism in agricultural commodity markets has increasingly necessitated integrated marketing tactic and strategies based on not only the creation, operation and evaluation of the new or alternative *SFSC* considering

consumer-oriented marketing mix or strategies (consumer wants and needs, cost to satisfy, convenience to buy, and communication) and being one of the key dimensions of new rural development patterns (Topcu, 2006), but also marketing tactics resulting from the segmentation of food markets (segmentation), target segment of the oriented market (targeting) and position of food products (positioning) (*STP*) (Topcu, 2009).

The construction of the new *SFSC* configurations forms a crucial element in the strategies underlying these new practices as organic/natural, local and specific food farming, quality production and direct selling; and thus, it covers actors who are directly involved in the production, processing, distribution, and consumption of new food products (Renting *et al.*, 2003). The differences of quality along the *SFSC* which consumer demands and new producer supplies are associated with specific production techniques result from a diversity in farming systems and territorial settings, different cultural and gastronomic traditions, a diversity in the organizational structures of the *SFSC*, variations in consumer perceptions, and also from substantial differences in institutional and policy support.

The development of the new *SFSC* has attracted much more attention with a new food process, innovation politics beginning to fill gaps left by conventional government regulation and with the growing public concern over the provenance and manipulation of foods. From a rural development point of view, this new resurgence of interest in more natural or more local types of food comes at the critical time for the land-based production sector. It offers potential for shifting the production of food communities out of their industrial mode and to develop supply chains that can potentially short-circuit the long, complex and rationally organized industrial chains within which a decreasing proportion of total added value in food production is captured by primary producers (Marsden *et al.*, 2000). For the production sector this means that through developing new quality definitions associated with locality or region or specialty and nature, new associational networks can be built which involve radically different types of the *SFSC*. The *SFSC* engenders different relationships with consumers and may engage different conventions and constructions of quality.

A key characteristic of the *SFSC* is their capacity to re-socialize/specialize food, thereby allowing the consumer to make value-judgments about the relative desirability of foods on the basis of their own knowledge, experience, or perceived imagery. Commonly such foods are defined either by the locality or even the specific farm where they are produced; and they serve to draw upon and enhance an image of the farm and/or region as a source of quality foods. The *SFSC* seeks to redefine relationship between the producer and consumer by giving clear signals of the origin of the food product. They are also expressions of attempts by producers and consumers alike to match new types of supply and demand. Notable here are the additional identifiers which link price with quality criteria and the construction of quality. However, a common characteristic is the emphasis upon the type of relationship between the producer and the consumer in these supply chains and the role of this relationship in constructing value and meaning.

The *SFSC* being the ability to engender some form of connection between food consumer and producer/processor includes three main types (Marsden *et al.*, 2000) accepted as face-to-face: consumer purchase a food product direct from the producer/manufacturer on a face-to-face basis; spatial proximity: products are produced and retailed in the specific region of production, and consumers are made aware of the local nature of the product at the point of

retail; and spatial extended: value and meaning laden information about the place of production and those producing the food is translated to consumers who are outside of the region of production itself and who may have no person experience of that region. The *SFSC*, here, was taken into consideration the supply-side direct marketing based on farming type of food products, but the demand-side of the *SFSC* based on consumers purchase attribute and behaviours toward food products and their buying models is deficient, and thus, it should be made up for this deficiency for the rural development by making the needed production planning through the scarce source management providing the technical and economic effectiveness and by producing supply amount responding to consumers purchase patterns. That is, spurring the rural development and stimulating the rural potential through effectively management of the scarce sources in rural area could be accomplished with some combination of the consumer-oriented (demand-side) integrated marketing tactic and strategies.

In a highly urbanized society, integrated marketing tactics and strategies in agricultural sector provides a link between urban consumers and rural food producers that can be valuable in developing sustainable communities. Farmers, rural advocates and government officials, therefore, look to integrated marketing as a means of identifying alternative income sources, preserving small farms, strengthening economic and social ties between farms and urban residents, and as an outlet for organic and specialty farm products (i.e. local products). Direct sales to consumers that are one of the most effective tolls of the integrated marketing with consumer-oriented can benefit small farms and rural communities in general by channelling a large share of urban residents' spending on food and recreation back to the communities where food is grown. On the other hand, direct purchases from farmers provide city residents with a source of cheap fresh produce and an opportunity to get in touch with their rural roots (Gale, 1997).

Today, most local foods move from the farm gate to the consumers through a highly efficient food marketing system taking advantage of scale economies and specialization to keep processing and distribution costs low. Most farmers are content to devote their limited time to what they know best (planting, growing, harvesting food) and leave the processing and marketing to agribusiness, however direct sales to consumers seems to be gaining popularity among farm producers.

The outward spread of suburbs and residential development of rural farming communities has spurred direct marketing by reducing alternative food networks or by using the *SFSC* between farmers and consumers. On the other hand, increased interest in food safety, the environment and alternative agriculture has also supported growth of direct sales. Local or organic agricultural products are frequently grown by small farmers favouring direct marketing at farm-gate price. Consumers of these products like to deal face-to-face with growers to ensure that the specific products were grown as chemical-free and higher quality, or with other techniques. Complementing that preference, ecological awareness spurs the interest of consumers in agricultural tourism, farm-based recreational activities, and direct-selling arrangements involving contact with farms and farmers. Community supported agriculture (*CSA*) as a new form of direct selling spurred by interest in organic, local and specific products and ecological awareness (Gale, 1997). *CSA* usually involves a cooperative arrangement in which consumers pay nearby farmers a fixed amount of money at the beginning of the growing season and over the course of the season receive a bag each

week containing whatever produce is being harvested at that time. In some CSA arrangements, consumers pick up their produce at the farm, while in others a central distribution point is established in town. CSA producers usually use organic and specific product growing methods, and participants generally value the freshness and organic nature of the produce and direct contact with the people who grow their food. It helps growers with cash flow, since they are paid at the beginning of the season. Consumers shoulder more of the risk in CSA because they pay a fixed amount, regardless of the quality and quantity of the harvest.

As a result, integrated marketing approach accounting the relationships between the product diversification and design based on the target consumers purchase attitude and behaviours, and production planning making it possible to make effective use of rural resources plays a role in rural development by encouraging an environment of entrepreneurship and innovation, attracting agricultural tourists, and promoting alternative forms of agriculture.

On the other hand, integrated marketing tactic and strategies could have positive economic and social impacts on rural and urban communities, and its clearest impact is the direct flow of the income from the target consumers to farmers. Farmers selling directly to the consumers by using the SFSC retain the value added to their food products through various transportation and marketing activities that are usually performed by urban-based wholesale and retail establishments. A larger portion of the consumer's retail food expenditure returns to the rural communities where food is growing or processing. Premium or retail prices, furthermore, accepted as cost proving consumer satisfaction for organic, local and specialty food product sold directly to target consumers are often higher than farm-gate prices for the similar items. The price differences for some directly marketed or processing food products provide an additional economic benefit to local rural economy. By providing convenience to buy for target consumer masses, additionally, direct marketing could also contribute to the rural economy by preserving small farms.

By adding a recreational component to food consumption, many marketing enterprises draw urban people to farm communities, where they may spend additional dollars on restaurant/home meals prepared by local, organic or specific food products, shopping, and other service. Such agricultural tourism could have a multiplier effect on local economies. Agricultural tourism is associated mainly with types of direct marketing that include an on farm recreational component. Other direct marketing efforts require that farmers do most of the travelling, and thus, the economic impact of direct marketing on the farm community is much lower when farmers instead of consumers do most of the travelling. As considered the farmers' markets and distribution channels for CSA groups, it is stated in some study that they are often at urban and suburban locations and the vendors making full-time and part-time growers travel approximately 35.5 and 19.5 km to farmers markets (Gale, 1997; Marsden *et al.*, 2000).

While most of the travelling to food markets is done by the vendors, consumers also travel either to purchase the specific food product (local, organic) or to eat the processed traditional specific foods through agricultural tourism, and to patronize farmers' markets. The markets in many communities just outside the urban fringe are close enough to draw urban and suburban consumers to their communities. More remote communities need to work harder to draw urban visitors to farmers' markets by establishing an identity

associated with a locally grown product, lifestyle, heritage or a concentration of farms offering products and services for sales.

The *SFSC* and direct marketing of the most important components of integrated marketing as a rural development tool cover not only economic activities in rural communities but also social issues. Social factors are among the important reasons to spur the rural development and to introduce easily or increase popularity of integrated marketing tactics and strategies. In order to stimulate the rural development potential by improving life quality of rural communities and creating a social connection between rural and urban communities through diversification of rural economy based on agricultural and non-agricultural activities are always needed the integrated marketing approaches. The integrated marketing tactic and strategies take into consideration, therefore, all dimensions of the social, cultural and economic relationships among the market actors, and provide opportunity to target individual consumer satisfaction/loyalty and to the effective production planning according to the allocation of the optimal scarce sources based on the specific food products by connecting to related units the interactions between demanders and suppliers. To do so, marketers must first divide the individual customers into homogenous market segments by taking into consideration consumers purchase attitude and behaviours through integrated marketing tactics (*STP*), and then redesign the marketing strategies for the target customer masses by considering the specific or local food product attributes (marketing mix) (Topcu & Uzundumlu, 2009).

In order to reach to these aims, Ispir sugar bean<sup>1</sup> growing in only Ispir<sup>2</sup> rural area, being a local branded product with region of origin, and playing an important role in rural development models by making it possible to make effective use of natural resources, and stimulating rural development potential was selected as a case food product, and then integrated marketing tactic and strategies were used for the product. This study, therefore, was designed to explore firstly the individual consumers purchase attitude and behaviour towards Ispir sugar bean by using the factor, cluster and descriptive with cross-tabulation and ANOVA analyses for the integrated marketing tactics accounting the product, consumer and marketing environment-related factors, and then to design integrated marketing strategies based on the marketing mix covering the intrinsic and extrinsic attributes of Ispir sugar bean by using conjoint analysis.

## 2. Material and methods

### 2.1 Material and determination of sample size

The data of the present research were obtained from a survey conducted in Erzurum, Turkey. In order to determine the sample size, while minimizing sample bias and representing the population correctly; the city centre was divided into three sub-districts: the east and south-sides Yakutiye with 44075, the west-side Aziziye with 11500, and the north-side Palandoken with 30022 households (Anonymous, 2009). To determine the sample size, following formula was used (Topcu, 2009a):

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<sup>1</sup> The species being one of the most popular dry bean ecotype is usually called as "Ispir Seker Fasulyesi" in both the research area and Turkey.

<sup>2</sup> Ispir district of Erzurum province located in Northeast part of Turkey is a microclimate small town along Coruh valley with an altitude of 1250 m of sea level.



$$n = \frac{Z^2 * p * (1 - p)}{c^2} = 250$$

Where;

n = Sample size

Z = Z value, (used 1.96 for 95% confidence level)

p = percentage picking a choice, (0.8 used for sample size needed)

c = confidence interval, (used 0.05 = ±5)

Then, based on the population of each sub-district, weighted sample size and distribution of the surveys for each district were determined proportionally. Out of 250, the number of questionnaires of Yakutiye, Palandoken and Aziziye sub-districts were 128, 88 and 34, respectively.

Using the information obtained from food science and marketing literatures and prior experiences of the researchers, a draft questionnaire was prepared. Then, in order to control non-sampling error which stems from ambiguous definitions, poor instructions, questionnaire wording, format and length, pre-test was done on randomly selected 14 (6, 5 and 3) consumers at the target regions. The flow and naturalness of the questionnaire were tested, and the order and timing of the questions were re-arranged. The questionnaire was modified before starting the fieldwork.

In order to select consumer households in each district for this final questionnaire, simple random sampling method (i.e., each member of the population has an equal chance of being chosen) was used. For this end, each district was divided into sub-districts. Then, face to face survey method was done with randomly selected heads of households (this could be either wife or husband) in various parts of the sub-districts in order to represent the population adequately. The survey was conducted either at their residence or at shopping centres.

## 2.2 Questionnaire and data used for integrated marketing tactics

Participants in the survey were asked to respond to each statement, indicating the significance level of the food attributes for them using a Likert-format 1-5 scale (where 1 refers to the least important, and 5 refers to the most important attributes). Of the 41 factors affecting the consumers purchase attitude and behaviours towards Ispir sugar bean, the six are related to the sensorial attributes (taste and flavour, texture and aroma, hardness and relish, quality standard, quality stability and colour and appearance after cooking of the product); the seven are stated by the physical and chemical properties (freshness/newness, calibre size, longer shelf life, thinness of bean-crust, shorter cooking period, organic product, being more resistant against to diseases and pests); the ten are covered by the extrinsic food attribute referring the marketing mix (Ispir region of origin, cost to satisfy, price-quality relation, local brand, willingness to be private label and manufacturer branded product, advertisement, package design and attraction, convenience to buy the product and promotion); the five are determined by consumer-related factors covering personal and psychological attitudes (on the special invitation and days, the popularity of the product, the protection of the generic sources, confidence to the product, compliance with other dishes); the four are explained by the social environment (the effects of customs, previous experience

related to the product, the effects of the reference group and social environments and the effect of social statute); the three are determined by trust to the SFSC (more hygienic production and marketing, trust to the manufacturer and retailer) and the six are represented by the factors spurring the rural development (to provide the effective usage of the rural scarce sources, to contribute to the supply stability, employment opportunities and economy of the rural region, to decrease the rural migration from rural to urban area, representing the rural area).

Each question was reduced to a single statement to which responses were collected using the Likert scale described above. We also gathered demographic and socioeconomic information (gender, age and occupation groups, education, total and food expenditures and the income levels of the consumers) in the survey. Age, monthly total and food expenditures and incomes of the consumers were calculated at three different levels.

### 2.3 Statistical methods used for integrated marketing tactics

After editing and coding the data, we first analyzed them by the factor analysis to determine the main factors affecting the consumers purchase attitude and behaviours towards Ispir sugar bean, and then by cluster analysis to form the homogeneity food market segments of the target consumer mass by taking into consideration the results of the factor analysis, and finally by descriptive analysis using the cross-tables to determine the food market segments of the homogeneity food consumer based on their demographic and socioeconomic characteristics. SPSS statistical software was used to perform these analyses.

These techniques has been used widely in many marketing researches on food attributes including food products such as beef (Oliver *et al.*, 2006), cheese (Murray & Delahunty, 2000), conventional food (Wadolowska *et. al.*, 2007; Topcu *et al.*, 2009), pasteurized milk (Topcu, 2006), soft drink (Enneking *et al.*, 2007); liquate oil (Topcu *et al.*, 2008; Topcu *et al.*, 2010) and yogurt (O'Connor *et al.*, 2006; Haddad *et al.*, 2007).

Factor analysis is a data reduction technique that reduces the number of variables used in an analysis by creating new variables (called factors) that combine redundancy in the data (SPSS 15.0, 2006). The first step in a factor analysis is to determine the number of relevant factors. Therefore, the factor analysis conducted for this study reduced the number of food attributes from seventeen to five factors having Eigen-values greater than 1.0, determined by Principal Component Analysis<sup>3</sup> using Varimax rotation method<sup>4</sup>. Factor analysis was employed initially to identify underlying dimensions that may explain the correlation among a set of food attributes and the associated consumption values. The affiliated purpose of factor analysis in this study was to identify from all the attributes those that accounted for a relatively large proportion of the variance of the sample. This subset could then be used for consumer segmentation.

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<sup>3</sup>A factor extraction method used to form uncorrelated linear combinations of the observed variables. The first component has maximum variance. Successive component explain progressively smaller portions of the variance and are all uncorrelated with each other. Principal component analysis is used to obtain the initial factor solution. It can be used when a correlation matrix is singular.

<sup>4</sup>This method is an orthogonal rotation method that minimizes the number of variables that have high loading on each factor. It is simplifies the interpretation of the factors.

The second step of the analysis involved using k-means cluster analysis. Clustering algorithms can be classified into two categories: hierarchical and non-hierarchical. Hierarchical clustering algorithms start with  $n$  clusters, equal to the number of observations, and proceed until all observations are in one cluster. In non-hierarchical clustering, the researcher specifies the number of clusters in the data set *a priori*. Since in this study nine consumption/preference value categories were identified, the number of classes could be specified, thus non-hierarchical k-means clustering was used. The k-means procedure selects “ $m$ ” random points from the data set. These are used as cluster seeds and all other points are assigned to the nearest cluster seed. Successive iterations involve replacing the current cluster seed by the cluster mean, and then reassigning all points to the nearest new cluster seed. The process continues until there is no change in cluster means from the previous iteration or the difference is very small. Hence, the clusters of consumers were generated on the basis of relative homogeneity of their attitudes towards food attributes based on consumers’ food expenditure and income levels. The pattern of consumption values associated with these attributes could be identified through examining the outcome of the segments.

The final step was to use cross-tabulation to examine the distribution of the clusters deal with the three food expenditure and income levels, and demographic and socioeconomic attitudes. In order to measure if the relation among personal characteristics and their positions is or not, it was used chi-square test of independence. If the p-value is not less than 0.05, the null hypothesis is accepted. This means that demographic characteristics and their position levels are statistically independent (Yildiz *et al.*, 2006).

#### **2.4 Generation of orthogonal design and questionnaire for integrated marketing strategy**

Conjoint analysis is a multivariate technique based on the assumption that purchasing behavior reflects a choice, within a product category, among products which possess a set of differentiating attributes. This technique has been used widely in many marketing researches including food products such as oil, yogurt, cheese, milk, bean etc. (Krystallis & Ness, 2005; Topcu, 2006; Haddad *et al.*, 2007; Mtimet *et al.*, 2008; Topcu & Isik, 2008; Topcu, 2009a; Topcu *et al.*, 2010).

In this study, to determine the factors influencing consumer purchasing decisions for Ispir sugar bean, pre-market researches were done in July, 2009 to learn its origin, prices, weight in grams, brand and package types and calibre sizes. After obtaining these data based on factors and factor levels in Table 1, the plan file which consists of product profiles to be rated by the respondents were generated by using the orthogonal design procedure in SPSS statistical program (SPSS 15.0, 2006a).

With 9 factors and total 30 factor levels, we get 41472 potential product profiles which is quite unmanageable number to deal with<sup>5</sup>. In order to avoid this problem, we need to

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<sup>5</sup> Nine factors affecting consumers purchase attitudes for Ispir sugar bean are brand types, origin, caliber size, price, package types, weight, production types, selling points and promotion. There are total 30 factor levels, of which four factor levels for brand type; four factor levels for price; four factor levels for package type; four factor levels for selling point; three factor levels for origin; three factor levels for caliber; three factor levels for weight in grams; three factor levels for production type; and two

Factors	Factor Levels			
<b>Brand types</b>	Manufacturer (MB)	Private label (PL)	Local brand (LB)	Generic (GB)
<b>Prices (€/kg)*</b>	5.6	5.1	4.7	3.7
<b>Origin mark</b>	Karsur (KR)	Hortik (HR)	Ispir (ISP)	
<b>Package types</b>	Nylon bag (NB)	Plastic box (PX)	Paper bag (PAB)	Paper box (PAX)
<b>Selling Points</b>	Market (MM)	Selling cooperative (SC)	Food shop (FS)	E-market (EM)
<b>Calibre size (mm)</b>	Less than 8 (SM)	Between 8 and 10 (ME)	More than 10 (LA)	
<b>Weight (kg)</b>	1	2.5	5	
<b>Production types</b>	Organic (OR)	Conventional (CO)	Not important (NI)	
<b>Promotion</b>	Yes			No

\*The prices of the products were converted from Turkish Lira (TL) to Euro (€) using the exchange rate on July 15, 2009. The conversion rate used was 2.15 TL/€.

Table 1. Factors and their levels for Ispir sugar bean used in conjoint analysis

generate a representative subset known as an orthogonal design, typically the starting point of a conjoint analysis. After generating orthogonal design, the number of product profiles has been reduced to 34 cases (Table 2). Survey forms were designed based on these 34 product profiles. SPSS conjoint uses the full-profile approach, where respondents rank, order, or scores a set of profiles, according to preference (SPSS 15.0, 2006a). In this study, respondents were asked to rank the 34 profiles from the most to the least preferred.

## 2.5 Statistical methods used for integrated marketing strategies

The data file was created with the preference ranking of these profiles collected from the respondents. Before analyzing the data with the conjoint procedure, *factors* subcommand must be described. We can specify the model describing the expected relationship between factors and rankings via *factors* subcommand (Topcu, 2006; Topcu, 2009a; Topcu *et al.*, 2010). The discrete model indicates that factor levels are categorical and no assumption is made about the relationship between the factor and the ranks. On the other hand, the linear model indicates an expected linear relationship between the factor and ranks. The expected direction of the linear relationship can be specified with the keywords *more and less*. The linear-less indicates that lower levels of a factor are expected to be preferred, while the linear-more indicates that higher levels of a factor are expected to be preferred. Specifying more or less will not affect estimates of utilities (Hair *et al.*, 1998; SPSS 15.0, 2006a).

According to the characteristics of the factors, we used discrete, linear-less and linear-more models in this study. Selling point and brand type, origin, calibre size, package type, production type and weight in grams were modelled as discrete because there is no prior knowledge as to the influence of Ispir sugar bean attributes on purchase intent. Price and

factor levels for promotion. The combinations of 30 factor levels give us the total of 41472 potential product profiles ( $4 \times 4 \times 4 \times 4 \times 3 \times 3 \times 3 \times 3 \times 2 = 41472$ ).

Card no	Brand	Origin	Calibre	Price	Package	Weight	Production	Selling points	Promotion
1	MB	ISP	LA	3.7	PAB	1	OR	FS	Yes
2	MB	HR	ME	4.7	NB	5	OR	SC	Yes
3	GB	KR	SM	4.7	PAB	1	OR	EM	No
4	LB	ISP	LA	4.7	PAB	1	CO	FS	Yes
5	PL	ISP	LA	5.1	PX	5	OR	SC	No
6	GB	HR	ME	5.1	PAX	1	CO	FS	No
7	LB	HR	SM	5.1	PAB	5	OR	MM	No
8	MB	HR	SM	5.6	PAB	1	CO	SC	Yes
9	MB	HR	SM	5.6	PAX	5	NI	FS	No
10	GB	ISP	SM	4.7	PAX	5	OR	MM	Yes
11	PL	KR	ME	5.1	NB	1	OR	FS	Yes
12	GB	HR	SM	3.7	NB	1	OR	SC	Yes
13	MB	ISP	ME	3.7	PAB	2.5	OR	EM	No
14	LB	KR	ME	4.7	PAX	2.5	NI	SC	No
15	LB	HR	LA	3.7	NB	1	NI	MM	No
16	PL	HR	ME	5.6	PAB	1	OR	MM	No
17	LB	KR	SM	5.6	PX	1	OR	SC	No
18	PL	HR	SM	4.7	PX	1	NI	EM	Yes
19	MB	HR	LA	4.7	PX	1	OR	FS	No
20	MB	KR	SM	3.7	PX	2.5	CO	FS	No
21	PL	HR	SM	4.7	NB	2.5	CO	MM	No
22	PL	KR	SM	3.7	PAB	5	NI	FS	Yes
23	GB	KR	SM	5.6	NB	5	CO	EM	No
24	LB	HR	ME	4.7	NB	5	OR	FS	Yes
25	GB	HR	LA	5.1	PAB	2.5	NI	SC	Yes
26	LB	ISP	SM	5.6	NB	2.5	OR	FS	Yes
27	GB	ISP	ME	5.6	PX	1	NI	MM	Yes
28	LB	HR	ME	3.7	PX	5	CO	EM	Yes
29	LB	HR	SM	5.1	PAB	1	OR	EM	Yes
30	GB	HR	SM	3.7	PX	2.5	OR	FS	No
31	PL	HR	LA	5.6	PAX	2.5	OR	EM	Yes
32	PL	ISP	SM	3.7	PAX	1	CO	SC	No
33	MB	ISP	SM	5.1	NB	1	NI	EM	No
34	MB	KR	SM	5.1	PX	2.5	CO	MM	Yes

Table 2. Combination for Ispir sugar bean used in conjoint analysis

promotion, however, were modelled as linear-less and linear-more, respectively. Price was assumed to follow a linear-less model since it, typically, shows an inverse relationship with purchase intent. On the other hand, promotion was assumed to follow linear-more relationships in that consumers are expected to exhibit more positive attitudes towards product promotions (Haddad *et al.*, 2007; Topcu, 2009).

The conjoint analysis of the data generates a utility score, called a part-worth, for each factor level. These utility scores, similar to regression coefficients, provide a quantities measure of the preference for each factor level, with larger values corresponding to greater preference. Utility values are expressed in a common unit, allowing them to be added together to give the total utility, or overall preference, for any combination of factor levels (Topcu, 2009a).

### 3. Results and discussion

#### 3.1 Results of the factor analysis for the integrated marketing tactics

Market segmentation being one of integrated marketing tactics and related to the target consumers purchase attitude and behaviours towards Ispir sugar bean attributes including

the product, consumer and marketing environment-related factors separated the target food market into some consumers segments according to the main factors derived from the factor analysis being the first step of the market segmentation based on the main factors.

Kaiser Normalization (*KMO*) which compares partial correlation coefficients with observed ones, therefore, was calculated as 0.93 for Ispir sugar bean attributes, and this meant that the data set for the factor analysis was at a perfect level since the test score was greater than 0.50 (Table 3). The principal component analysis using Varimax rotation method grouped the forty-one variables related to the bean attributes into the night factors with Eigen-values greater than 1.0, which these factors explained the 65.92% of the total variance.

Being the first of these factors, *F1* explained the 36.00% of the total variance, and consisted of the factors related to the generic and rural natural sources of Ispir sugar bean (being more resistant against to diseases and pests of the product, confidence to the product, organic product, trust to producer/manufacturer, more hygienic production and marketing, longer shelf life, freshness/newness, quality stability, protection of the generic sources and thinness of bean-crust). *F1*, therefore, could be called by the protection of the generic and rural natural sources of Ispir sugar bean.

Referring to 6.20% of that, *F2* gave us some important information about the rural development based on Ispir sugar bean with regard to the effective usage of the rural scarce sources, contribution to the supply stability, employment opportunities and economy of the rural region and the rural migration decrease etc. It, thus, could be determined by the rural development based on Ispir sugar bean/local product. Reporting 4.77% of that, *F3* gathered together the variables related to willingness to demand a branded product with Ispir region of the origin of the consumers, which covered the private label (*PL*), local (*LB*) and manufacturer branded (*MB*) products, registration with Ispir region of the origin, representing the rural area, and it could be named by brand awareness/demand with Ispir

Variables	Factor loadings*								
	F1	F2	F3	F4	F5	F6	F7	F8	F9
<b>Protection of the generic and rural natural sources (F1)</b>									
Resistant against to diseases and pests	<b>0.681</b>	0.173	0.057	0.003	0.127	0.246	0.042	0.130	0.149
Confidence to the product	<b>0.637</b>	0.129	0.107	0.237	0.291	-0.011	0.162	0.008	0.077
Organic product	<b>0.605</b>	0.189	0.086	0.309	0.108	0.159	0.170	-0.043	0.013
Trust to producer/manufacturer	<b>0.603</b>	0.332	0.082	0.174	0.223	-0.085	0.319	0.161	0.094
Freshness/newness	<b>0.600</b>	0.130	0.149	0.270	0.008	0.241	0.390	0.101	-0.080
Quality stability	<b>0.556</b>	0.140	0.117	0.201	0.138	0.374	-0.079	0.163	-0.164
Protection of the generic sources	<b>0.555</b>	0.276	0.002	-0.002	0.221	0.427	0.120	-0.045	0.143
Longer shelf life	<b>0.548</b>	0.317	0.228	0.180	-0.054	-0.022	0.115	0.319	0.001
Hygienic production and marketing	<b>0.537</b>	0.185	0.146	0.279	0.213	-0.053	0.133	0.352	-0.054
Thinness of the bean-crust	<b>0.506</b>	-0.001	0.242	0.437	0.142	0.119	0.032	0.069	0.188
<b>The rural development based on local product (F2)</b>									
Contribution to employment opportunity	0.301	<b>0.794</b>	0.159	0.083	0.069	-0.084	0.105	0.088	0.048
Protection the supply stability	0.275	<b>0.791</b>	0.199	0.137	0.048	0.043	0.059	0.121	-0.008
The effective use of the scarce sources	0.192	<b>0.783</b>	0.135	0.126	0.136	0.251	0.125	0.037	-0.005
The rural migration decrease	0.238	<b>0.692</b>	0.015	0.043	0.215	0.294	-0.011	0.133	0.047

Variables	Factor loadings*								
	F1	F2	F3	F4	F5	F6	F7	F8	F9
Contribution to region economy	0.384	<b>0.502</b>	0.433	0.204	-0.035	-0.126	-0.127	0.223	0.055
<b>Consumers' brand demand with Ispir region of origin (F3)</b>									
Willingness to buy a <i>PL</i> product	-0.009	0.108	<b>0.735</b>	0.052	0.368	0.042	0.143	0.072	0.072
Willingness to buy a <i>MB</i> product	0.123	0.147	<b>0.731</b>	0.065	0.407	-0.037	0.069	0.037	0.038
Willingness to buy a <i>LB</i> product	0.402	0.160	<b>0.556</b>	0.034	-0.082	0.316	0.176	0.064	-0.042
Registration with Ispir region of origin	0.227	0.182	<b>0.532</b>	0.270	-0.005	0.275	0.156	-0.028	-0.019
Representing the rural area	0.241	0.183	<b>0.513</b>	0.112	0.077	0.375	0.247	0.150	-0.140
<b>Sensorial quality attributes (F4)</b>									
Taste and flavour	0.249	0.058	-0.007	<b>0.789</b>	0.084	0.115	0.143	0.155	-0.119
Texture and aroma	0.160	0.181	0.174	<b>0.775</b>	0.053	0.100	0.113	0.160	0.196
Hardness and relish	0.412	0.181	0.126	<b>0.612</b>	0.084	0.059	0.285	0.068	-0.092
Product quality	0.200	0.112	0.141	<b>0.523</b>	0.191	0.312	0.216	0.271	-0.200
<b>The effectiveness of the SFSC (F5)</b>									
Promotion	0.245	0.140	0.067	0.158	<b>0.668</b>	-0.071	0.022	0.293	0.140
Advertisement	0.083	0.035	0.328	0.011	<b>0.612</b>	0.154	0.017	0.141	0.303
Convenience to the product	0.300	0.167	0.171	0.002	<b>0.600</b>	0.137	0.246	0.119	-0.110
Trust to the retailers	0.435	0.109	0.110	0.227	<b>0.551</b>	0.080	-0.014	0.152	0.000
<b>Social statute (F6)</b>									
The effect of the customs	0.214	0.134	0.172	0.143	0.051	<b>0.662</b>	0.061	0.212	0.273
Prior experiences related to the product	0.156	0.205	0.176	0.309	0.162	<b>0.557</b>	0.062	-0.021	-0.063
The effect of the social classes	-0.071	0.336	0.178	0.126	0.466	<b>0.550</b>	0.151	-0.006	0.123
The effect of social/reference groups	-0.039	0.427	0.277	0.128	0.289	<b>0.495</b>	0.268	0.031	0.093
<b>The appearance and taste quality after cooking (F7)</b>									
The shorter cooking period	0.202	0.111	0.094	0.178	0.129	0.011	<b>0.736</b>	0.158	0.002
The popularity of the product	0.121	0.111	0.362	0.237	0.155	0.110	<b>0.570</b>	0.083	0.245
The appearance and colour after cooking	0.395	0.020	0.290	0.303	0.035	0.235	<b>0.492</b>	-0.006	-0.097
The calibre size of the product	0.316	0.304	0.350	0.108	0.046	0.087	<b>0.462</b>	0.217	0.131
<b>Hedonic quality (F8)</b>									
The cost to satisfy	0.071	0.121	0.051	0.186	0.329	-0.010	0.135	<b>0.744</b>	0.036
Price and quality relation	0.261	0.113	0.064	0.131	0.137	0.216	0.100	<b>0.736</b>	0.025
<b>The package appearance and attraction (F9)</b>									
The appearance and design of package	0.084	0.051	0.020	-0.044	0.157	0.047	0.040	0.019	<b>0.821</b>
<i>Eigen-value</i>	<b>14.758</b>	<b>2.541</b>	<b>1.996</b>	<b>1.798</b>	<b>1.404</b>	<b>1.337</b>	<b>1.125</b>	<b>1.053</b>	<b>1.013</b>
<i>Share of explained variance (%)</i>	<b>35.996</b>	<b>6.196</b>	<b>4.868</b>	<b>4.386</b>	<b>3.425</b>	<b>3.261</b>	<b>2.743</b>	<b>2.567</b>	<b>2.472</b>
<i>Cumulative ratio of explained variance (%)</i>	<b>35.996</b>	<b>42.192</b>	<b>47.061</b>	<b>51.448</b>	<b>54.873</b>	<b>58.133</b>	<b>60.876</b>	<b>63.444</b>	<b>65.915</b>
<i>KMO (Kaiser-Meyer-Olkin) Statistic</i>									0.928
<i>Bartlett's test of Sphericity</i>									(Chi-square, df: 820): 5844.46 (p: 0.000)

\*Bold numbers indicate the largest loading for each variable.

Table 3. Factors and correlated variable loadings related to Ispir sugar bean attributes.

region of origin for sugar bean. Characterized by 4.39% of that, *F4* could be represented by the sensorial quality attributes covering taste and flavour, texture and aroma, hardness and relish and quality of Ispir sugar bean.

Considering the 3.43% of that, *F5* was constituted by some marketing mix related to promotion, advertisement, convenience to the product, trust to retailer of Ispir sugar bean, and thus it could be entitled by the effectiveness of the *SFSC* or direct marketing taking into consideration the relationships between the consumer and the food retailers. Taking in 3.26% of that, *F6* became from the combinational of relative relationship among the effects of the social environment and class, the reference groups and customs on the consumers purchase attitude and behaviours and the prior experiences related to the product, and thus it could be termed by social statute of the target consumers.

Implicating 2.74% of that, *F7* informed about the shorter cooking period, the popularity of the product, the colour and appearance after cooking and calibre size, and it could be dominated by the appearance and taste quality after cooking. Accounting for 2.57% of that, *F8* indicated the relationships between the cost to satisfy and price-quality relation for Ispir sugar bean, therefore, it could be styled by the hedonic quality. Finally, taking into consideration 2.47% of that, *F9* associated with the package appearance, design and attraction, and thus it could be called by the package appearance and attraction.

### **3.2 Results of the cluster analysis for the integrated marketing tactics**

The cluster analysis being the second step of the market segmentation taking into consideration the main factors obtained from the factor analysis separated the target food market into the homogenous consumer market segmentations, and then the consumers' want and needs were determined homogeneously at each the food market segment. This had a very important for the dynamic actors of the food markets. Because, the marketers or producers could implement the food production and marketing tactics and strategies considering the wants and needs of the target homogenous consumer segments and based on Ispir sugar bean attributes into target homogenous market segments.

Three clusters had group means that could be explained reasonably. The final cluster centres and the number of cases in each cluster are shown (Table 4). The total number of cases was 250. Cluster 3 (*C3*) was the largest group with 141 (56%) consumers. Consumers in this group cared more about the effectiveness of the *SFSC* (*F5*), the appearance and taste quality after cooking (*F7*) and hedonic quality (*F8*). Cluster 2 (*C2*) was the smallest group, made up of 30 (12%) consumers. The rural development based on local product (*F2*), consumers' brand demand with Ispir region of origin (*F3*) and the package appearance and attraction (*F9*) were the dominant factors for consumers in this group. As for Cluster 1 (*C1*) being the second largest consumer segment, there were 79 (32%) consumers in this group, and the protection of the generic and rural natural sources (*F1*), the sensorial quality attributes (*F4*) and the social statute (*F6*) were the most important factor in their preference decisions.

### **3.3 Results of target market segmentation for integrated marketing tactics**

Cross-tabulation giving some fundamental information about the relationships between three food market segments of the consumers and their demographic and socioeconomic characteristics makes the supplier/marketers or the manufacturer/producers to orient into



Factor interpretation	Clusters <sup>6*</sup>		
	C1	C2	C3
<i>Protection of the generic and rural natural sources (F1)</i>	<b>0.554</b>	0.366	-0.256
<i>The rural development based on local product (F2)</i>	-0.055	<b>0.181</b>	0.025
<i>Consumers' brand demand with Ispir region of origin (F3)</i>	0.191	<b>10.807</b>	-0.078
<i>Sensorial quality attributes (F4)</i>	<b>0.027</b>	-0.783	-0.008
<i>The effectiveness of the SFSC (F5)</i>	-0.122	0.036	<b>0.056</b>
<i>Social statute (F6)</i>	<b>0.048</b>	-0.143	-0.021
<i>The appearance and taste quality after cooking (F7)</i>	-0.931	0.088	<b>0.432</b>
<i>Hedonic quality (F8)</i>	-0.463	-0.287	<b>0.217</b>
<i>The package appearance and attraction (F9)</i>	-0.058	<b>120.155</b>	-0.045
<b>Number of cases in each cluster</b>	<b>79</b>	<b>30</b>	<b>141</b>
<b>% of total cases in each cluster</b>	<b>31.6</b>	<b>12.0</b>	<b>56.4</b>

\*Final cluster centre scores are very important in 0.01 significant levels according to F statistic.

\*Bold numbers indicate the largest final cluster centre scores for each factor. The total number of cases (n): 250

Table 4. Final cluster centres and the number of cases in each cluster

the relevant food market segments, and it were shown in Table 5. These characteristics of the target consumers included gender, age, education, occupation, monthly total and food expenditure, and income.

The results of the target market segmentation showed that there were more male than female consumers in all the consumer groups. C1, C2 and C3 market segments of the target consumers dominated the highest male/female ratios with 87%, 83% and 71%, respectively. The results of the distribution of the consumers based on their age groups indicated that C1, C2 and C3 had the highest portions with 42%, 37% in the middle-age group (41-55 age group) and with 38% in the younger-age group (24-40 age group), respectively. As for the education levels of consumers, the lowest ratio in all the clusters was made up of literate (i.e., those who can read and write but do not have a diploma) people. The consumers with a college degree dominated C1 (45%) and C3 (36%), while high school graduates dominated in C2 (70%).

The results of the occupational distribution among the clusters stated that white-collar state employee, small-scale retailer and blue-collar state worker had the highest ratios, but housewife, student and unemployment had the lowest ones in all the clusters. Especially, C1, C3 and C2 were embodied the white-collar state employee (with 34% and 36%) and the small-scale retailer (with 44%), respectively. As accounted the total and food expenditures of the households, the results showed that while monthly total expenditure were commonly less than €425 in C2 with 53% and C3 with 51% but between €425-€850 in C1 with 50%, monthly food expenditure were less than €160 in all the clusters. As for income levels, those

<sup>6</sup> The numbers in this table indicate final cluster centres which displays for each case the final cluster assignment and Euclidian distance between the case and cluster centre used to classify the case.

Demographic characteristics		Number of cases in each cluster					
		C1		C2		C3	
		High-income White-collar employee		Middle-income Small-scale retailer		Low-income White-collar employee	
		Number	%	Number	%	Number	%
Gender	Male	69	87	25	83	100	71
	Female	10	13	5	17	41	29
		$\chi^2$ test of independence					
		$(\chi^2 = 6.725, df = 2, p: 0.035)**$					
Age Groups	24-40 age	32	40	10	33	54	38
	41-55 age	33	42	11	37	51	36
	56-75 age	14	18	9	30	36	26
			$\chi^2$ test of independence				
		$(\chi^2 = 3.995, df = 4, p: 0.407)*$					
Education	Literate	1	1	0	0	4	3
	First school	17	21	21	70	38	27
	High school	26	33	5	16	48	34
	College	35	45	4	14	51	36
			$\chi^2$ test of independence				
		$(\chi^2 = 8.079, df = 8, p: 0.426)*$					
Occupation	White-collar state employee	27	34	10	33	52	36
	Blue-collar state worker	16	20	3	10	20	14
	Businessman	1	1	0	0	11	8
	Small-scale retailer	15	19	13	44	26	18
	Pensioner	18	24	4	13	28	20
	Housewife	1	1	0	0	2	2
	Student	1	1	0	0	1	1
	Unemployed	0	0	0	0	1	1
			$\chi^2$ test of independence				
		$(\chi^2 = 21.096, df = 22, p: 0.515)*$					
Total Expenditure	Less than €425***	34	43	16	53	72	51
	Between €425 and €850	39	50	14	47	63	45
	More than €850	6	7	0	0	6	4
			$\chi^2$ test of independence				
		$(\chi^2 = 2.232, df = 4, p: 0.693)*$					
Food Expenditure	Less than €160***	44	56	16	53	72	51
	Between €160 and €325	28	35	12	40	61	43
	More than €325	7	9	2	7	8	6
			$\chi^2$ test of independence				
		$(\chi^2 = 3.643, df = 4, p: 0.456)*$					
Income Groups	Less than €450***	24	30	11	37	69	49
	Between €450 and €900	40	51	14	47	63	45
	More than €900	15	19	5	16	9	6
			$\chi^2$ test of independence				
		$(\chi^2 = 3.446, df = 4, p: 0.468)*$					

\*\*\*The prices of the products were converted from Turkish Lira (TL) to Euro (€) using the exchange rate on August 15, 2011. The conversion rate used was 2.8 TL/€.

\*\*p>0.01

\* p>0.05

Table 5. Demographic characteristics and cluster number of cross-tabulation cases.

with less than €450 income dominated in C3 with 45%, whereas the respondents in C1 and C2 had an income between €450 and €900.

### **3.4 The characteristics of the target consumer segments for the integrated marketing tactics**

Based on the final cluster centres of the factors and demographic characteristics of the consumers in each cluster, the cluster profiles were determined. The main demographic characteristics of C1 depicted the white-collar state employee consisting of the mature-aged consumers (41-55 age group) with higher income and education (college degree) levels. This cluster is called "mature-aged high-income white-collar state employee". The most important factors in this cluster, on the other hand, were the protection of the generic and rural natural sources, the sensorial quality attributes and the social statute. The consumers with high education and income gave a major importance to the natural local food products based on the protection of the natural and generic sources, and could create a strong demand for these food products by combining their purchase power along with their wants and needs.

The dominant demographic characteristics in C2 determined the mature-aged consumers (41-55 age group) occupied the small-scale retail with a middle-income level and first education graduate, and thus C2 can be called "mature-aged middle-income small-scale retailer". The most important main factors in C2 were the rural development based on local product, the consumers' brand demand with Ispir region of origin and the package appearance and attraction. These factors indicated that respondents in C2 took into consideration the rural development models based on branded local food products.

Finally, the main characteristics of the respondents in C3 were mostly described by the white-collar state employee figuring on younger consumers (24-40 age group) with a low-income level and high education graduate. This group was called "young low-income white-collar state employee", and the effectiveness of the SFSC, the appearance and taste quality after cooking and hedonic quality were the most influential factors on the purchase decisions or the wants and needs of the respondents in C3. This means that the highest significance was ascribed to consumer satisfaction with the SFSC of Ispir sugar bean based on hedonic quality before and after cooking.

The producers and marketers determining not only the consumers' want and needs related to Ispir sugar bean through the food market segmentation but also their purchase models through the target market segments by analyzing their purchase powers and attitude and behaviours according to their socioeconomic and demographic characteristics could rearrange the farming and marketing systems. In order to respond to the target homogenous market segments through the SFSC, they could effectively produce new food product, and introduce the redesigned food products (with integrated marketing strategies-marketing mix) into the target market segments, and thus they could reach to the position of the target food market. By doing so, the active dynamics at the food market could use effectively the rural scarce sources responded to the purchase models of the target consumers, increased the diversification of the rural economy, protecting the generic and natural sources and stimulating the rural potential, tend the rural tourism to the rural areas, and thus they could support the rural development by improving the quality of the rural life and contributing the rural economy.

### 3.5 Results of the conjoint analysis for the integrated marketing strategies

While the producer/manufacturers taking into consideration the purchase patterns/demands of the target consumers have made the effective farm management and planning based on the rural potential and the food product diversity in recent years, the marketer/retailer have also redesigned the food products according to the consumer-oriented actual marketing strategies or marketing mix including the data/information obtained from the market/marketing research by means of the marketing tactics. For this end, the suppliers have generally used the conjoint analysis.

The results of this study showed that it was correlations between observed and expected preferences, the utility values (part-worth) for each factor level and relative importance for each factor which has an important effective on the marketing mix to be introduced by taking into account the customer-based integrated marketing strategies for Ispir sugar bean as shown in Table 6. Pearson's R and Kendall's tau statistics measured as 0.987 ( $p:0.000$ ) and 0.875 ( $p:0.000$ ), respectively imply that it was a significant correlation between the observed and expected preferences, and the ordinal data set obtained from respondents was appropriate for conjoint model (Topcu, 2009).

The part-worth (utility value) coefficients with the highest positive and the lowest negative of factor levels obtained from conjoint analysis results indicated that these factor levels were preferred more than other factor levels. The results also show that while the most preferred brand types and origin marks for sugar bean were manufacturer brand (*MB*) and Ispir origin mark (*ISP*), the least preferred factor levels for these two factors were generic brand (*GB*) and Hortik origin mark (*HR*), respectively. As expected, utility values of respondents were maximized by the manufacturer brand and Ispir origin mark based on brand strategy derived from brand types and origin marks which bring about a meaningful identification to any product.

As for calibre sizes and selling points, the factor levels of Ispir sugar bean with more than 10 mm (*LA*) as calibre size which refer to standardization of agricultural food products and food shops (*FS*) as a selling point which implement retailing strategy were preferred much more, for the part-worth coefficients of these factor levels are higher than that of other ones. Calibre sizes of dry beans could have an important function for texture, convenience during cooking and appearance after cooking. Food shops functioning at retailing sector, which is one of the most important chains of the marketing channel take part at the end of the supply chain, and buy the food products in large quantities from either producers or manufacturers, or could manufacture their own food products, and then directly sell the food products to the end-consumers.

Due to shortening of their marketing chains, marketing margin of food shops is lower than that of other retailers. In addition to, they have a broad food product diversification, a wide food line and an effective shelf depth, and are the most important sellers for local food products, as well. They, hence, could service with a lower price and a wide food variety to the end-consumers, and completely create customers retailer loyalty (Topcu & Uzundumlu, 2009).

On the other hand, factor levels of Ispir sugar bean with organic production (*OR*) as a production type, selling promotion (*Yes*), with paper bag (*PAB*) as a package type, 1 kg as

Factors	Factor Levels	(Part-worth)	Relative importance (%)	Standard Error
Origin marks	HR	-0.511	12.343	0.250
	KR	-0.106		0.293
	ISP	0.617		0.293
Brand types	GB	-2.027	14.790	0.325
	LB	0.260		0.325
	PL	0.627		0.325
	MB	1.139		0.325
Calibre sizes (mm)	SM	-2.093	12.320	0.250
	ME	0.385		0.293
	LA	1.708		0.293
Selling Points	SC	0.813	6.396	0.325
	EM	-2.056		0.325
	FS	1.116		0.325
	MM	0.127		0.325
Weight in grams (kg)	1	0.542	4.445	0.250
	2.5	-0.600		0.293
	5	0.058		0.293
Package types	NB	-0.582	5.100	0.325
	PX	-0.265		0.325
	PAB	0.729		0.325
	PAX	0.118		0.325
Prices (€/kg)	3.7	-2.290	26.734	0.168
	4.7	-4.580		0.335
	5.1	-6.870		0.508
	5.6	-9.160		0.671
Production types	OR	1.605	13.483	0.252
	CO	0.255		0.293
	NI	-1.890		0.293
Promotion	No	-3.287	4.389	0.375
	Yes	-1.644		0.750
Constant ( $\alpha$ )		24.787		0.737
<b>Correlations between observed and estimated preferences</b>				
		<b>Value</b>		<b>Significance level</b>
Pearsons's R		0.987		0.000
Kendall's tau		0.875		0.000

Table 6. Conjoint analysis results for Ispir sugar bean

weight in grams had the highest part-worth coefficients among that of these factors. In other words, respondents paid more attention for Ispir sugar bean with these factor levels, and preferred those rather than the other factor levels. Consumers have recently preferred much more organic products instead of conventional products so that organic products could be purified from toxic substances such as pesticide, hormone etc. which are harmful for public health. On the other hand, retailers, in recent years, have separately established the organic and conventional food departments in order to provide customer satisfaction, to attract new customers and to retain current those (Topcu, 2009).

In point of economic theory, selling promotions have always increased consumer demands as if having a price discount; hence they have an effect as if buying more food products. In other words, the products with selling promotion could considerably decrease costs to consumer and their ratios among total food expenditures, and create a significant demand

increase. Not only do paper bags (*PAB*) selected as a package type maximize respondents' utility values, but also they give a measurement of their sensibilities related to environment. Since while a paper material may be decomposed in about one year on the earth, a nylon material may be decomposed in a longer time period than thirty years, and then could also threaten the biological life on the earth. On the other hand, today, conventional family structure that has more family members has increasingly turned into core family structures; hence, food consumption of core families could be less than that of conventional families, and people could pay more attention smaller packaged food products in order to prevent decay of food attributes such as nutritive value, texture, flavour etc. For example, dry bean could keep indefinitely if stored in a cool and dry place, but as time passes, their nutritive value and flavour degrade and cooking times lengthen.

With regard to price of Ispir sugar bean, the results of this study also show that there was an inverse relationship between prices and their utility values, as expected. This means that consumers preferred dry bean with lower price (€3.7) per kg to those with higher price (€5.6) per kg in view of the fact that lower prices led to higher utility values. Prices that are an effective instrument during introduction and application of marketing strategies should be regulated to target consumer masses and created price diversification according to income levels of the target homogenous consumer groups. This finding is supported by previous researches related to how affecting the marketing strategies and consumers' demands of food product prices (Yi & Jeon, 2003; Topcu, 2006; Topcu & Isik, 2008; Topcu et al., 2009; Topcu, 2009).

The results also show relative importance of each factor that has an important effect on integrated marketing strategies focusing on individual customers purchase attitude and behaviours in Table 6. Price having the most important effect on target consumers' buying models played a characteristic role on customer-oriented marketing strategies with 26.73% relative importance among all factors preferred. So, marketers to introduce Ispir sugar bean to target markets or consumer masses should pay more attention its price, and create price diversification according to both its attributes such as calibre size, brand types, origin marks etc. and socioeconomic attitude of the target markets and customer masses. Following this factor, the most second factor for respondents was brand types with 14.79% relative importance; but to give purchase decision of a specific brand should be focused on the factor levels of brand types. This means that respondents took into consideration the brand type of a product after its price, and then also preferred a specific brand by comparing the utility values of each brand levels.

Third and fourth important factors affecting purchase decision of target consumers for Ispir sugar bean were production types and origin marks with 13.48% and 12.34% relative importance, respectively. There is a close relationship between production type and origin mark of an agricultural product; therefore, for people have a lot of information about attributes and nature of the product they could give a decision about if not preferring it. Just as these two factors have a close relationship, so do the brand type and origin mark.

On the other hand, calibre size and selling point of Ispir sugar bean were preferred as fifth and sixth factors with 12.32% and 6.40% relative importance, respectively. With calibre sizes, agricultural products could be standardized and diversified by product category management strategies. With regards to selling points, retailers not only easily reach to individual customers but also increase the product lines and shelf depths by means of

product category management and retailing strategies (Topcu, 2004). Therefore, retailers could design private label products with integrated marketing strategies, and create loyal customers by using advantages of a closer relationship with individual customers. The least significant three factors affecting respondents' Ispir sugar bean preference were promotion, weight in grams and package types with 4.39%, 4.45% and 5.10% relative importance, respectively. As a result, to develop and introduce designing integrated marketing strategies for Ispir sugar bean, marketers could apply these last three factors after the first six factors.

The results of this study also show consumers' total utilities in Table 6 derived from utility values of each factor level in Table 4 by being taken into consideration 34 product profiles designed with orthogonal cards in Table 2. In other words, calculated from utility values of each factor level with orthogonal card profiles obtained from orthogonal design, total utilities were given in Table 7. For example, the total utility (*TU*) of Ispir sugar bean with *MB* as brand type, *ISP* as origin mark, *LA* as calibre size, €3.7 as price per kg, *PAB* as package type, 1 kg as weight in grams, *OR* as production type, *FS* as selling point, and Yes as promotion for card number 1 is:

$$TU = \alpha + U(\text{MB}) + U(\text{ISP}) + U(\text{LA}) + U(\text{€3.7}) + U(\text{PAB}) + U(1 \text{ kg}) + U(\text{OR}) + U(\text{FS}) + U(\text{Yes});$$

$$TU = 24.787 + 1.139 + 0.617 + 1.708 - 2.290 + 0.729 + 0.542 + 1.605 + 1.116 - 1.644 = 28.309$$

As calculated the total utilities for 34 Ispir sugar bean profiles in Table 7, product profiles with card number 1 and card number 23 were maximized and minimized respondents' total utilities with 28.309 and 5.789, respectively. In light of these findings, which the integrated marketing strategies based on the target consumer mass for Ispir sugar bean could marketers design and then, apply? The answer of this question could be given by being analyzed the cards maximizing and minimizing the total utilities of the target consumer mass in Table 7. Referred to the cost to customers of Ispir sugar bean, price levels in the card number 1 and 4 are lower than that in the card number 23 and 9; therefore, price which have the highest relative importance could firstly be differentiated according to attitudes and socioeconomic characteristics of the target consumer mass and Ispir sugar bean attributes, and marketers should apply price strategies with lower price levels for the consumers.

The second most important strategy of marketing for Ispir sugar bean also was brand strategy, which *MB* was preferred more than the other brands. This brand has a function as both national and international brand, and respondents demand introduction of Ispir sugar bean under a *MB* name to the target markets. Marketers, accordingly, should design it with the *MB* names registered by manufacturers, and introduce it with this brand name to target markets. Additionally, origin mark and production type along with a brand name could also be used to bring about an effective identification to food products by brand strategies. To provide identification to Ispir sugar bean, therefore, marketers who focus on respondents' purchase attribute and behaviours should also put together *OR* production type and *ISP* origin mark under a *MB* name. As doing so, they could combine with *MB* management strategy as an important part of the integrated marketing strategies with 40.62% relative importance of these factors affecting preferences of the target consumer mass.

On the other hand, with product category management strategy, Ispir sugar bean with calibre sizes, package types and weight in grams could diversify with 36 marketing mix combinations, which have Ispir sugar bean with *LA*, *PAB* and 1 kg maximizing the

Card #	Brand	Origin	Calibre	Price	Package	Weight	Production	Selling points	Promotion	Total utilities	Ranking
1	MB	ISP	LA	3.7	PAB	1	OR	FS	Yes	28.309	1
2	MB	HR	ME	4.7	NB	5	OR	SC	Yes	21.470	4
3	GB	KR	SM	4.7	PAB	1	OR	EM	No	13.514	28
4	LB	ISP	LA	4.7	PAB	1	CO	FS	Yes	23.790	2
5	PL	ISP	LA	5.1	PX	5	OR	SC	No	19.793	9
6	GB	HR	ME	5.1	PAX	1	CO	FS	No	14.508	24
7	LB	HR	SM	5.1	PAB	5	OR	MM	No	14.805	21
8	MB	HR	SM	5.6	PAB	1	CO	SC	Yes	14.857	20
9	MB	HR	SM	5.6	PAX	5	NI	FS	No	10.277	33
10	GB	ISP	SM	4.7	PAX	5	OR	MM	Yes	16.968	14
11	PL	KR	ME	5.1	NB	1	OR	FS	Yes	19.860	8
12	GB	HR	SM	3.7	NB	1	OR	SC	Yes	18.600	13
13	MB	ISP	ME	3.7	PAB	2.5	OR	EM	No	21.029	5
14	LB	KR	ME	4.7	PAX	2.5	NI	SC	No	15.900	17
15	LB	HR	LA	3.7	NB	1	NI	MM	No	18.864	12
16	PL	HR	ME	5.6	PAB	1	OR	MM	No	15.844	18
17	LB	KR	SM	5.6	PX	1	OR	SC	No	13.096	29
18	PL	HR	SM	4.7	PX	1	NI	EM	Yes	12.917	30
19	MB	HR	LA	4.7	PX	1	OR	FS	No	22.254	3
20	MB	KR	SM	3.7	PX	2.5	CO	FS	No	16.366	16
21	PL	HR	SM	4.7	NB	2.5	CO	MM	No	14.143	27
22	PL	KR	SM	3.7	PAB	5	NI	FS	Yes	19.294	10
23	GB	KR	SM	5.6	NB	5	CO	EM	No	5.789	34
24	LB	HR	ME	4.7	NB	5	OR	FS	Yes	20.894	6
25	GB	HR	LA	5.1	PAB	2.5	NI	SC	Yes	14.495	25
26	LB	ISP	SM	5.6	NB	2.5	OR	FS	Yes	14.306	26
27	GB	ISP	ME	5.6	PX	1	NI	MM	Yes	11.472	31
28	LB	HR	ME	3.7	PX	5	CO	EM	Yes	18.979	11
29	LB	HR	SM	5.1	PAB	1	OR	EM	Yes	14.749	22
30	GB	HR	SM	3.7	PX	2.5	OR	FS	No	16.435	15
31	PL	HR	LA	5.6	PAX	2.5	OR	EM	Yes	14.874	19
32	PL	ISP	SM	3.7	PAX	1	CO	SC	No	20.089	7
33	MB	ISP	SM	5.1	NB	1	NI	EM	No	10.307	32
34	MB	KR	SM	5.1	PX	2.5	CO	MM	Yes	14.730	23

Table 7. Total utilities of Ispir sugar bean profiles under orthogonal design

respondents' total utilities. Marketers, in that case, could considerably increase the product line and depth of Ispir sugar bean by this marketing strategy. Respondents, then, could successfully select the product varieties being fit for them and maximizing their total utilities (Table 8). As conducting retailing strategy together with product category management; retailers could significantly enlarge their shelf depths, and effectively use selling promotions. As a result of this, consumers could more prefer Ispir sugar bean designed with category management and retailing strategies at food shops where work with wider food product varieties according to their socioeconomic characteristics and purchasing attitudes.

Consequently, integrated marketing strategies with individual customer-focused maximizing the consumers' total utilities for Ispir sugar bean consisted of the price strategy with lower price; of the MB strategy registered with ISP origin mark and selected OR production type, of the product category management with LA calibre size, PAB package type and 1 kg weight in gram, of the retailing strategies with FS selling point and applying selling promotion.



Card #: 1	Card #: 23
Brand types : Manufacturer brand	Brand types : Generic brand
Origin mark : Ispir	Origin mark : Karsur
Calibre sizes (mm) : More than 10 mm	Calibre sizes (mm) : Less than 8 mm
Price (€/kg) : €3.7	Price (€/kg) : €5.6
Package types : Paper bag	Package types : Nylon bag
Weight in grams (kg) : 1 kg	Weight in grams (kg) : 5 kg
Production types : Organic	Production types : Conventional
Selling point : Food shop	Selling point : E-market
Promotion : Yes	Promotion : No
<b>a) Maximum Utility</b>	<b>b) Minimum Utility</b>

Table 8. Product profiles maximizing and minimizing consumers' total utilities

#### 4. Conclusion

The aim of the study was to analyze the integrated marketing tactic and strategies as a rural development tool through the target market segmentation considering the purchase patterns of the homogenous consumer segments at the target food markets and the market positioning envisaging the redesign of Ispir sugar bean as a local food product in developing countries. The factor and cluster analyses were used to determine the marketing tactics, and then the conjoint analysis was also used for the marketing strategies.

The results of the study showed that the food market for Ispir sugar bean designed as three different segments by means of the target food market segmentation according to the interactions among the consumers purchase attitude and behaviours, their socioeconomic and demographic characteristics along with Ispir sugar bean attributes. The first market segment was restructured by high-income white-collar state employee overrating the natural Ispir sugar bean by thinking the production of the generic and the rural natural sources. For this segment, therefore, it could implement the marketing strategies with the organic production/farming type and the region of the origin as Ispir rural area.

On the other hand, middle-income small retailers constructed the second market segment, and they gave careful attention the marketing tactics with the rural development models based on branded local Ispir sugar bean, and supported the rural economy. So, the marketers could utility from the marketing strategies such as the brand including Ispir region of the origin, packaging and the farming type based on the local food products. As for final market segment, it was formed by low-income white-collar state employee accounting the consumer satisfaction with the SFSC for Ispir sugar bean. The supplied market dynamics could considerably use the marketing strategies covering low-price applications, standardization, quality, retailing and direct sales.

The producers (farmers and manufacturer) producing by taking into consideration the integrated marketing tactics and strategies using the consumer-oriented data and information obtained from the market research based on the target food market segmentation could decrease meaningfully the production costs without the surplus supply by allocating the rural scarce sources to the local food product patterns with relative superiority for the rural area or adapting well to the rural region and by reconfiguring the farm departments and lands with an effective farm management. The competitiveness of the farms and other firms, moreover, based on agriculture improved by means of the protection

of the generic sources and the improvement of the rural natural environment could also gain a major momentum to the rural tourism. On the other hand, the marketers of the rural local food products processing and designing Ispir sugar bean by considering the marketing tactics and strategies implying the marketing information through the target food market segmentation of the consumers could meet effectively the market demands, and thus they could also provide the consumer satisfaction or loyalty.

The integrated marketing approach providing a string positive interaction among the producer, marketer, consumer, the rural advocates and government officials could improve the quality of life in the rural area, and strengthen the economic and social ties between the farms and urban residents with the increasing diversification of the rural economy. As a result of those, the integrated marketing tactics and strategies could play a major role on the rural development by encouraging an environment of entrepreneurship and innovation, attracting the agricultural tourists, and promoting alternative forms of agriculture, could spur the rural development based on local food products by stimulating the rural potential, and could create a positive economic and social impacts on the rural and urban communities, which farmers could retain the added values to their products through various transportation and gained marketing margins and the consumers could also buy the food products with a lower market price. The market dynamics and the rural advocates, therefore, should look to the integrated marketing as a means of identifying alternative income sources, preserving small farms, strengthening the rural economic and social structures and an outlet for the organic and specialty farm products.

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# Development Potentials of Rural Areas – The Case of Slovenia

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## 1. Introduction

Rural areas in the European Union (27 member states) make up 91% of the territory and over 56% of the population (European Commission, 2008). They include a great variety of cultures, landscapes, natural environments, and economic activities that shape different rural identities. Farming and forestry remain crucial for land use and the management of natural resources in the EU's rural areas, and as a platform for economic diversification in rural communities. In Slovenia as well, rural areas represent a significant part of its space and society. Slovenia is one of the smallest European countries, sharing borders with Italy, Austria and Croatia. 2,050,189 people live in a land area of 20,273 km<sup>2</sup>, for an average population density of 101,1 inhabitants per km<sup>2</sup> (January 1st 2011). In 2010, the country's gross domestic product (GDP) per capita was 17,560€. Slovenia's location between the Alps, the Dinaric mountains, the Adriatic Sea and the Pannonian Plain is the reason for the country's diverse climate: there is a continental climate in central Slovenia, an Alpine climate in the northwest, and a sub-Mediterranean climate in the coastal area and its hinterlands. Consequently, landscapes and agricultural production conditions are also diverse, as are the cultural identities of individual rural areas. Based on the 2002 population census, rural areas make up more than 90% of the territory and are inhabited by 58% of the total population (Perpar, 2007). The Slovenian countryside is highly heterogeneous, distinguished by various natural conditions and obstacles, and diversified demographic, economic, and social structures (Perpar & Kovačič, 2002).

In recent decades rural areas have been exposed to many different changes and challenges, and have had to cope with a range of economic and societal needs, some of them new. Agricultural and forestry activities make rural areas the most important providers of food, and important contributors to the production of fibers and construction materials. Furthermore, rural areas are increasingly important as centers of energy production, from biomass and other renewable sources such as water resources, and have rich biodiversity and highly varied natural environments. They are also important from an economic aspect since new economic sectors are now developing in rural areas, such as rural tourism and other activities linked to their natural and cultural assets. But they are relatively isolated areas, removed from the centers of decision-making, economically and socially heterogeneous, largely dependent on natural resources, highly sensitive to exogenous modernization dynamics through linkages with urban areas, with often a kind of collective

sense of lasting crisis and a deterministic and fatalistic vision of the future. At the same time, rural areas are a specific type of complex system, a social-ecological system shaped by the relationships between ecological and human subsystems (Ambrosio-Albalá & Bastiaensen, 2010), and characterized by an intrinsic fragility in economic, environmental and social terms. Rural development is therefore a vitally important policy area world-wide.

### 1.1 Defining rural development, its aims and sustainability

The concept of rural development has changed significantly during the past few decades. Until the 1970s, rural development was synonymous with agricultural development, and focused on increasing agricultural production (Fernando, 2008). This focus has been driven primarily by the interests of industrialization to extract surpluses from the agricultural sector to reinforce industrialization (Francks et al., 1999, as cited in Fernando, 2008). In the early 1980s the concept changed and now encompasses “concerns that go well beyond improvements in growth, income, and output”. These concerns include an assessment of changes in the quality of life, broadly defined to include improvement in health and nutrition, education, environmentally safe living conditions, and reduction in gender and income inequalities (Chino, 2000, as cited in Fernando, 2008). Today there seems to be a universal consensus that the ultimate objective of rural development is to improve the quality of life of rural people.

*Rural development* is therefore a continuous process facilitated by governments, non-governmental organizations (NGOs) and different actors at the international, national and local levels, to sustain the growth of rural economies, improve the livelihoods of rural communities and to promote food security through the improvement of food supply, employment and income (Halwart et al., 2003).

According to De Haas et al. (1997, as cited in Elands & Wiersum, 2001) rural development comprises two dimensions: *contents* and *process*. The *contents* of rural development concern the implementation of a large variety of measures aiming at improvement of the rural economy, the quality of life of the community, the landscape identity, the protection of the environment, and the attractiveness of rural areas (Elands & Wiersum, 2001; ECRD, 1996). Regarding the *process* dimension of rural development, a major aspect to be considered is the renewal of rural institutions, procedures and culture, and their impact on the rural space. Institutional renewal should enable innovating processes and practices to be applied to the use of the rural space. In this context, much attention is given to community participation and involvement in rural development efforts.

*Sustainable rural development* can be defined as a process of multidimensional change affecting rural systems (Polidori & Romano, 1996, as cited in Pugliese, 2001). Economic growth, improvement of social conditions, and conservation of natural values are all equally important features in sustainable rural development, which should be induced according to a bottom-up approach, through the participation and sustainable use of local endogenous resources (environment, labor force, knowledge, patterns of production, consumption, and communication). Sustainable rural communities should be able to recognize and internalize exogenous chances of growth, i.e. markets, policies, and technology opportunities, properly integrating and balancing them with the need to preserve and enhance rural specificities and diversity (Long & Van der Ploeg, 1994, as cited in Pugliese, 2001).

## 1.2 Exogenous and endogenous rural development model

Often two processes are distinguished: *exogenous* and *endogenous* development (Van der Ploeg & Long, 1994; Lowe et al., 1995; Nemes, 2005) (Table 1). *Exogenous development* is conceived as a process in which rural development is the result of forces emanating from outside rural areas; it is externally determined (Slee, 1994). Such forces consist of both economic market forces and (inter)national government policy measures. This kind of model was common in the first decades after World War II, when many European countries invested in rural regions, and investments were used mainly for branch plants, relocation of firms, the creation of growth poles and improvements in infrastructure (Terluin, 2001). Terluin notes that the impact of this model on the rural economy was not always successful. Expected multipliers of the new firms in terms of linkages with local firms, benefits of skill formation, technology transfer and reinvestment of profits in the rural economy did not often occur. Lowe et al. (1995) notes that recession in the 1970s resulted in the closure of many branch plants and a growing sense that inward investments made rural economies highly vulnerable to fluctuations in the global market and distant boardroom decisions. In contrast, *endogenous development* is conceived as a process in which rural development is the result of local initiatives (Elands & Wiersum, 2001) and grounded largely in local resources (Terluin, 2001). The benefits of development tend to be retained in the local economy and local values are respected (Slee, 1994). Terluin (2001) as prerequisites for the success of the endogenous model notes intensive interaction, information exchange and cooperation among local actors, while special attention should be given to improvement of infrastructure. These two processes are often characterized as being ‘top-down’ and ‘bottom-up’, respectively. Traditionally, the exogenous model dominated thinking concerning rural development. However, at present a major concern regarding the process of rural development is the need to strengthen endogenous development by stimulating local community initiatives and bottom-up planning processes (Van der Ploeg & Long, 1994).

	<i>Exogenous development</i>	<i>Endogenous development</i>
<i>Key principle</i>	Economies of scale and concentration	Use of local (natural, human and cultural) resources for sustainable development
<i>Dynamic force</i>	Urban growth poles (drivers exogenous to rural areas)	Local initiative and enterprise
<i>Functions of rural areas</i>	Food and primary products for expanding urban economies	Diverse service economies
<i>Major rural development problems</i>	Low productivity and peripherality	Limited capacity of areas and groups to participate in economic activity
<i>Focus of rural development</i>	Agricultural modernisation: encourage labour and capital mobility	Capacity buildings (skills, institutions, infrastructure): overcoming exclusion
<i>Criticism</i>	Dependent, distorted, destructive and dictated development	Not practical in contemporary Europe

Source: Galdeano-Gómez et al., 2010.

Table 1. Exogenous and endogenous rural development models

Endogenous approaches are based on the assumption that the specific resources of an area (natural, human and cultural) hold the key to its sustainable development (Gaeldano-Gómez et al., 2010). Whereas exogenous rural development saw its key challenge as overcoming rural differences and distinctiveness through the promotion of universal technical skills and the modernisation of physical infrastructure, endogenous development sees the key challenge as valorising difference through the nurturing of locally distinctive human and environmental capacities (Gaeldano-Gómez et al., 2010; Van der Ploeg & Long, 1994; Van der Ploeg & Dijk, 1995; Shucksmith, 2000). In this model local resource endowments (climate, land fertility and environmental quality) and the specific characteristics of human and cultural capital provide the fundamental conditions for long-term rural development. The main purpose of this perspective is to improve local economic and social circumstances through mobilising internal resources.

Some authors (Lowe et al., 1993; Nemes, 2005) have criticized endogenous development perception. The argumentation is that the notion of local rural areas pursuing socio-economic development without outside influences (such as globalization, external trade, governmental actions, etc.) may be ideal but it is not a realistic proposition in contemporary Europe. Terluin (2001), too, notes that today, in the global perspective, rural areas are affected by all kind of global forces. This implies that the development process in rural areas is largely dependent on the interplay of local (endogenous) responses and global (exogenous) forces. Both of them are mediated through national structures in which local actors should seek room for maneuver so as to determine the outcome of the process. Terluin also talks about the mixed exogenous/endogenous approach, which rejects the polarization between the two models. It relates rural development to the process of increasing globalization, mainly due to rapid changes in the information and communication technologies. In a changing global context, actors in rural areas are involved in both local and external networks, but the size, direction and intensity of networks vary among regions. Galdeano-Gómez et al. (2010) notes that the critical point is how to enhance the capacity of local areas to steer these wider processes, resources and actions to their benefit. This is the notion of *neo-endogenous development* (Table 2). The focus then is on the dynamic interactions between local areas and their wider political, institutional, trading and natural environments, and how these interactions are mediated.

	<i>Neo-endogenous development</i>
<i>Key principle</i>	The interaction between local and global forces
<i>Dynamic force</i>	Globalisation, rapid technological change in communications and information
<i>Functions of rural areas</i>	Knowledge economy, dynamic participation of local actors in local and external networks and development process
<i>Major rural development problems</i>	Resources allocation and competitiveness in a global environment
<i>Focus of rural development</i>	Enhancing local capacity and actors participation to direct local and external forces to their benefit
<i>Criticism</i>	Operates at a level of insufficient empirical evidence

Source: Galdeano-Gómez et al., 2010.

Table 2. Neo-endogenous rural development model



*Neo-endogenous rural development* follows the arguments that rural areas are not isolated but part of a globalized world, so exogenous forces should also be taken into account. It means that the key to local development lies in building a local institutional capacity able to both mobilize internal resources and cope with the external forces acting on a region (Galdeano-Gómez et al., 2010). This perspective emphasizes not only that economic or business development needs to be embedded in the region, but that the means of achieving this objective is through the participation of local actors in internal and external development processes. Central to the approach is that a local area has, or must acquire, the capacity to assume some responsibility for bringing about its own socio-economic development (Ray, 2006). Neo-endogenous development has two primary characteristics. First, economic and other development activity is reoriented to maximize the retention of benefits within the local territory by valorizing and exploiting local resources (physical and human). Second, the development is contextualized by focusing on the needs, capacities and perspectives of local people.

### 1.3 The aims of rural development

The aims and approaches to rural development between countries differ but the overall goal is to maintain socio-economic vitality of rural communities and sustainable development of rural areas. The aims of rural development can be achieved through the reduction of comparative disadvantages for competition and the finding of new ways to reinforce and utilize rural resources (Nemes, 2005). Main rural development efforts are focused on the equalization of income among rural and urban residents, equal access to social and economic services, creation of equal employment opportunities, providing freedom of choice of residence and work, and maintaining the identity of rural communities (OECD, 1998).

*The objectives of rural development* in OECD member countries are different, but there it is also a different relative importance of each objective. In general key objectives of rural development policies are the following (OECD, 1998):

- increasing competitiveness of rural areas and maximizing their contribution to general economic development,
- providing opportunities for the rural population to achieve a living standard comparable to national norms,
- conserving and developing the natural environment and cultural heritage of rural areas,
- maintaining the population of rural areas, and where depopulation is already going on trying to stop the process,
- improving farm income and promoting different employment opportunities to compensate for decreasing employment in agriculture,
- improving living conditions in rural areas and decreasing the differences in living and working conditions between rural and urban areas,
- preserving and developing landscape and protecting the natural and cultural environment.

Theories related to agriculture and rural development in general distinguish two approaches (Barbič, 1990): a *sectoral or partial approach* where development is focused on the development of one specific area (i.e. agriculture, forestry, infrastructure, services, tourism,

etc.) and an *integrated approach* as a comprehensive development that reflects the complex linkages and interactions within the rural system (Kostov & Lingard, 2001).

## 2. Development potentials of rural areas

In recent decades literature in the field of rural development has dealt mainly with development problems and possibilities. Today's new terminology and methodology of rural studies focus mostly on the identification and evaluation of various "*types of capital*" that rural areas have (economic, human, social, cultural and environmental) and their endogenous development potential. Several studies (for example, the DORA (Dynamics of Rural Areas) and RUREMPLO (Rural Employment) projects) have tried to answer why some rural regions show better economic performance than others. General findings are that economic performance is multi-dimensional and influenced by the complex interplay between economic, human, social, cultural and environmental capital, which is unevenly distributed among rural areas (Agarwal et al., 2009). Economic capital relates generally to "capital resources that are invested and mobilized in pursuit of profit" (Lin, 2001). Human capital may be associated with individuals and relates to the skills and knowledge that individuals possess as well as the demographic characteristics and quality of life of an area. Social capital refers to connections among individuals and social networks and to the reciprocity which arises from these connections (Putnam, 2000, as cited in Agarwal et al., 2009). Cultural capital according to Bourdieu (as cited in Agarwal et al., 2009) derives its analytical contribution from notions of social practice and from the social reproduction of symbols and meanings. Environmental capital plays a key role in encouraging or limiting economic growth and development. The growing perception of the rural environment as an area of consumption combined with the increase in "green" consumerism has created opportunities for both farmers and entrepreneurs, particularly in those environments which are endowed with high quality natural assets. Thus, the quality of the environment is proving to be of increasing importance to the economic growth, development and performance of rural areas, particularly in light of changes in agriculture and the growth of tourism and recreation (Hoggart et al., 1995).

Rural areas thus have different types of capital, and each type has different development resources or potential. Potočnik Slavič (2010) defined "*development potential*" as the resources, attractiveness and capital of a particular area which can be used today or in the future for its sustainable development. Factors affecting the exploitation of the resources, attractiveness and capital are their availability, utility, accessibility, technology, the market, etc. Endogenous development potential forms the basis for the development of different activities in rural areas (agriculture and forestry, entrepreneurship, tourism, recreation, residence, etc.). Resources and attractiveness are foundations upon which different kinds of capital can be built, while potential, as a valuable category, occurs in the phase when we have the possibility to develop the evaluated resource or attractiveness, taking into account the capital stocks. Endogenous development as a process is based on the activation of the characteristic and/or suitable endogenous resources and potential of an area.

### 2.1 Human potential – A prerequisite for rural development

The basis of rural development is represented by people. If a rural area has massive out-migration of young people or an unfavorable age structure, it will be very difficult to initiate

endogenous economic growth. The human dimension also includes the educational level of the population, their cultural identity and their social structure. Human factors are relevant not only in rural areas: we also have to consider the impact of urban lifestyle changes on rural areas, such as changes in leisure activities or food consumption of the urban majority (Perpar, 2007). The degree of engagement and participation of the local population (together with the local actors) is also an important factor in successful development planning and implementation (Lampič & Potočnik Slavič, 2007). In the past rural development measures did not sufficiently take into account the human potential. The local population is often not capable of evaluating its own capital or activating numerous sources, which are very often developed through "top-down" help and suitable networking. Social capital is also a very important factor. Partnerships and cooperation between different levels of governance and local actors enhance the possibilities for successful rural areas and enable the exchange of positive experience.

## **2.2 Economic potential – Employment possibilities**

If there is no viable economic basis for rural life, there will be no rural life. Other sectors besides agriculture and forestry, such as rural industry or rural services, are gaining in importance. In recent years there have also been economic developments in rural areas that could be summarized under the term "new economy". These include not only facilities and services of the information and communication technology industry, but also biotechnology firms and others. The "new economy" is sometimes combined with traditional production, heritage and tourism. Lack of employment opportunities is a major problem in rural areas in Slovenia. Due to globalization, existing jobs in rural areas are being eliminated and moved to urban areas. At the same time, there are possibilities to reinforce rural economies through diversification of economic activities through entrepreneurship, crafts, supplementary activities on farms and also for non-agricultural activities and services (Perpar, 2007). Support should be directed also to innovation, research and knowledge, and technology transfer.

In the continuation we will focus more on those activities and development potential of rural areas that are most characteristic and most associated with rural development, like agriculture (including organic farming and farm diversification), forestry, rural tourism and renewable energy production. In addition to some general background, we will focus in particular on the situation in Slovenian rural areas.

### **2.2.1 Agriculture and rural areas**

Agriculture has played a dominant role in the development of rural areas and in the shaping of rural landscapes and rural settlements, and has had a decisive influence on economic and social life in rural areas. Although agriculture today for many rural areas remains an important economic activity and an important factor for the creation of wealth and employment (both directly and indirectly), its once dominant role in the rural economy is declining (Van Huylenbroeck et al., 2007). But society is formulating new expectations of the role of agriculture, beyond its economic contribution due to food production. In this new context, agriculture is acquiring some other important social, recreational and environmental functions. Agriculture (and the primary sector as a whole) is important also for employment but this varies considerably from one rural area to another, depending on

the extent to which the primary sector has been modernized and the availability of alternative income options. In most areas in the European Union the primary sector accounts for less than 10% of total employment. In a third of rural areas its share is less than 5%. However, in some areas its share is still over 25% (European Commission, 2008). Nowadays we talk about the multifunctionality of agriculture. However, there is no comprehensive definition of this concept. Multifunctionality originates in the supposition that agriculture, apart from the production of food, also has other broader social functions and aspects, such as maintaining production potential, encouraging rural development (maintaining population of rural areas, maintaining the landscape and heritage) and protecting the environment (Majkovič et al., 2005). Generally it is concluded that the multifunctionality of agriculture can be defined as the joint production of commodities and non-commodities by the agricultural sector (Figure 1). Hence multifunctionality refers to the fact that an economic activity may have multiple outputs and may contribute to several societal objectives at once (Majkovič, 2005; Durand & Van Huylenbroeck, 2003; OECD, 2001). Multifunctionality is therefore argued to be the new unifying paradigm to bring post-modern agriculture in accordance with the new societal demands. It is emphasized that in addition to producing food and fiber, agriculture also produces a wide range of non-commodity goods and services, shapes the environment, affects social and cultural systems and contributes to economic growth. Authors talk about at least four kinds of functions of agriculture. For a more picturesque definition of the individual role of agriculture different colors are used. The “green functions” include landscape management and maintenance of landscape amenities, wildlife management, the creation of wildlife habitat and animal welfare, the maintenance of biodiversity, improvement of nutrient recycling and limitation of carbon sinks. “Blue services” are the other public benefits created by agriculture and comprise water management, improvement of water quality, flood control, water harvesting and creation of energy. “Yellow services” refer to the role of farming for rural cohesion and vitality, ambience and development, making use of cultural and historical heritage, creating

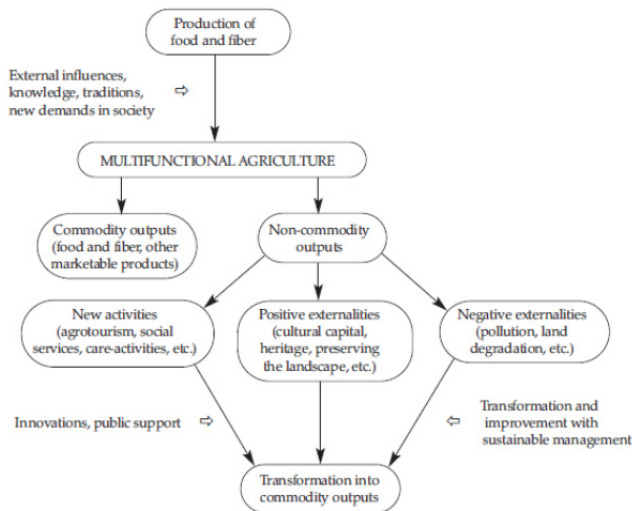


Fig. 1. Agriculture with its multiple function (Majkovič et al., 2005)

a regional identity and offering hunting, agro-tourism and agro-entertainment. Food security and safety represent the "white functions" of agriculture (Van Huylenbroeck et al., 2007).

The economic and social roles of agriculture contribute significantly to the vitality of rural areas. Today, agriculture is also faced with new challenges arising from globalization of the world economy, population growth, and climate change. These challenges cannot be met without sustainable agricultural and rural development, and clear and effective agricultural and rural development policy.

### 2.2.2 Agriculture in Slovenia and its development potentials

Agriculture in rural areas still presents an important (and in some areas still prevalent) economic activity and a source of employment. The significance of agriculture in the economy of many rural areas is higher than the national average (Perpar, 2007; Perpar & Kovačič, 2002). Some main characteristics of Slovenian agriculture are the following:

- According to the first provisional data of the 2010 agricultural census, Slovenia has 74,711 agricultural holdings (around 14% fewer than in 2000) which all together have in use around 476,556 hectares of agricultural land and raise 416,547 livestock units (LU). Compared with the farm structure in most of the European Union, farms in Slovenia are extremely small: on average farms have 6.4 ha of utilized agricultural area (UAA) and keep on average 5.6 livestock units (LU) (SORS, 2011).
- The size structure of farms in Slovenia is not comparable to the size of farms in the European Union. In 2005 23.3% of farms had less than 2 ha of utilized agricultural area (UAA); 36.1% have between two and five hectares of UAA, 37.0% of farms have between 10 and 20 hectares, while only around 4% farms have more than 20 ha of UAA.
- Fewer than 20% of farms in Slovenia are full-time (professional) farms, while all the others are too small to ensure the necessary income only from farming, so they must combine additional income sources with additional on-farm activities or with off-farm employment (Udovč et al., 2005).
- The natural conditions for agriculture in Slovenia are not favorable. Almost 85% of the national territory (72.5% of all utilized agricultural land) belongs to less favorable areas (LFAs), and 60% of the territory is covered by forests (MAFF, 2008).
- Because the natural and structural conditions in Slovenia to a large extent dictate the orientation of agriculture production, stock farming dominates agricultural production. In plant production field crops dominate, although the production of fruits and grapes represents an important part of the total agricultural production.
- Slovenia is a net importer of agricultural products. The degree of self-sufficiency is higher for animal than for plant products. Permanent surpluses appear only for hops, poultry meat, milk and fresh apples. Supply of beef and meat from sheep and goats is more or less balanced, while a permanent deficit is present for sugar, vegetable oil, vegetables, cereals, fresh fruits (except apples), potatoes, pork, honey and eggs. In wine production the import-export status is changing, Slovenia is a net exporter of quality wine and a net importer of table wine (Perpar & Udovč, 2010).
- A specific problem faced by Slovenian agriculture is the age structure of farmers on family farms. The share of those younger than 45 years is only 18.8%, a slightly higher share of farmers is seen in the 45 to 55 years age group (24.3%), whereas most farmers are more than 55 years old (56.9%).

- Along with unfavorable structure problems of Slovenian agriculture are also considerable fragmentation of the property, low labor intensity of production, low level of professionalization, low level of professional skills among farm holders and workers, and low productivity (0.17 annual work units (AWU) per hectare) (SORS, 2011).
- The share of agriculture in the gross domestic product (GDP) is slightly lower than the European average and comes to just under 2%, while the share of agriculture in total employment is 8.6% (2008).

Despite the small share of GDP, agriculture's significance in Slovenia is greater than seems at first sight. The multipurpose roles of agriculture in Slovenian rural areas are publicly recognized and financially supported. Despite the unfavorable characteristics and problems mentioned above, agriculture in Slovenia offers much development potential, when all the possible roles that it can play are taken into consideration:

- Due to a low degree of self-sufficiency, the role of agriculture as food producer can be empowered. The importance of local food supply has been recognized as well as a result of an even more unstable food supply on a global level, climate changes with more frequent extreme circumstances and natural catastrophes, globally organized trade chains, decreasing amount of agricultural land due to urbanization, etc. The recognition that locally produced food is of greater quality and healthier, and local production and consumption contribute to the maintenance of the countryside and employment, to protection of the environment, to better soil quality and biodiversity, enhances the importance of locally grown food, giving agriculture new development potential.
- Not only conventional but also organic farming has great potential.
- A great variety of landscapes, local products, natural and cultural heritage offer many possibilities for activities from which agriculture can also benefit (rural tourism, recreation and sport activities, horseback riding, etc.).
- Farms in Slovenia have also been recognized as having potential for the care of elderly people, children or the handicapped (so-called care farms). The idea that farms might be included in the system of social services for people with disabilities is a complete novelty in Slovenia. Vadnal initiated a pilot project of care farming in Slovenia some years ago and put a lot of effort into providing a "space" for such activities in the Agricultural Act, as a precondition for the further development of health/care farming on Slovenian farms. Exploratory research on farmers' readiness to take up health/care farming indicated that there is a particular group of farmers who are willing to start this new activity: holders of smaller farms, aged 45 to 55 years, who used to be part-time farmers but became unemployed due to the reconstruction of the industry. At their age, they can hardly find a new job, and are obliged to make their living on the farm (Vadnal, 2006).
- Part-time farming is an increasingly important feature of rural areas, as agricultural production on family farms is combined with other economic activities. Their potential is to implement some kind of on-farm activities which can be directly connected with agriculture (farm tourism, farm machinery services, food processing, etc.). Because of the small size of Slovenian farms such activities are even more important as an additional source of income and employment of farm family members. Agricultural policy has had special support measures for the diversification of farms for a long time

already, but greater support and clear legislation are the results of Slovenia's entry into the European Union.

Due to their special importance and potential for rural development, organic farming, supplementary activities on farms, and care farming will be explored in more detail in the continuation. As Darnhofer (2005) noted, farms seeking an alternative may shift their focus from the production of cheap food towards the provision of public goods and services. Involvement in rural development results in new forms of social cohesion as new interrelations are established not only with other farms but also with different segments of the rural and urban population. Farmers try to reduce dependence on external markets and additional income sources with the diversification of their farm activities beyond the production of raw materials. This diversification can take place on-farm and/or within the local economy, within or outside agriculture (Van der Ploeg et al., 2002, as cited in Darnhofer, 2005). Thus rural development activities can be broadened to landscape management, agri-tourism, the production of high quality and region-specific products, direct marketing or new activities such as care activities for the disabled (Figure 2).

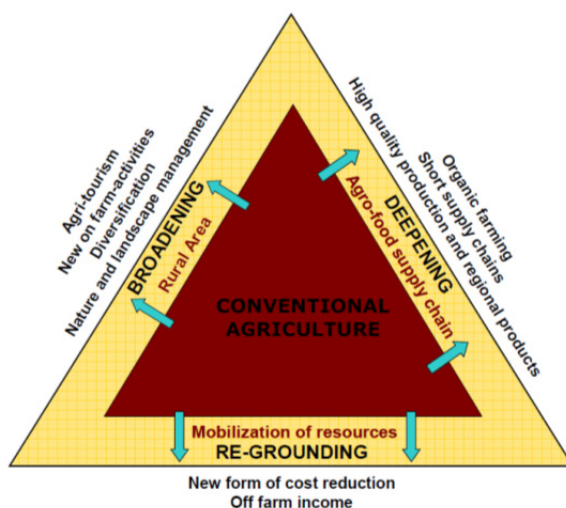


Fig. 2. Multifunctional diversification (Source: Van der Ploeg et al., 2002)

### 2.2.3 Organic farming and rural development

Organic farming is an environmentally friendly agricultural production system and more sustainable than most conventional farming systems. Different authors analyze its positive impact: on the cultural landscape (Tress, 2000, as cited in Darnhofer, 2005), on the creation of employment opportunities in rural areas (Knickel & Renting, 2002), on increasing farm income (Nieberg & Offermann, 2002), on better allocation of family labor (Juvančič & Erjavec, 2005), on possible benefits to the regional economy (Pugliese, 2001). Most studies focused on the on-farm value added, or through on-farm processing or direct marketing. Organic farming is often seen as alternative or short food supply chains (Renting et al., 2003) or as a highly differentiated production that has the capacity to respond to consumer

concern related to food safety and quality (Zanoli, 2004, as cited in Darnhofer, 2005). As Marsden et al. (1999, as cited in Darnhofer, 2005) note, short food supply chains represent a "defense" strategy against the prevailing trends of globalization and further industrialization of markets, reduction of transport costs and emissions of CO<sub>2</sub> (Perpar & Udovč, 2010), and have an impact on the broader aspect of rural development. Organic farming is thus a way to increase farm income and to restructure farms towards greater diversity and flexibility of farm activities through higher product prices and direct payments and through some requirements (crop rotation, limited external inputs). Conversion to organic farming may thus not only be motivated by economics in the sense of short-term profit maximization, but also by strategies for risk avoidance, regaining control over resources and increasing the quality of life and work on farm and in rural areas in general (Darnhofer, 2005). Organic farming can offer specific synergies that encourage rural development and stimulate more interactions in the rural economy.

#### **2.2.4 Organic farming in Slovenia**

Organic farming is often seen as a panacea for addressing the environmental, animal welfare and food safety concerns driving Common Agricultural Policy (CAP) adjustment (Darnhofer, 2005). The perceived link between organic farming, on-farm processing and direct marketing, and the potential contribution of short food supply chains to rural development, make it even more attractive to policy makers. Some evidence from studies suggests that organic farming can support a reconfiguration of on-farm activities. This in turn encourages the redirection of resources towards a wider variety of activities, leading to greater involvement in the local economy, in the food sector or outside it. As Darnhofer (2005) notes, these new activities expand income sources and reduce the farm's dependence on commodity prices. A contribution to rural development can be achieved not only through alternative food chains but also through engagement in some supplementary activities on farms.

In the last decade the production of organic food and the consumer demand for organic food have increased significantly in the European Union and in Slovenia. The first Slovenian Organic Farmers Association was founded in 1997, although organic farming in Slovenia began earlier. But this was the first national association of pioneer organic farmers who were producing for the market, and who were therefore interested in the development of a certification system. Standards for organic production/processing were prepared by the Institute for Sustainable Development (ISD) and were available for the first time in 1998 (Slabe, 2000). In 1999 a Slovenian certification body was established and the Ministry of Agriculture, Forestry and Food introduced direct payments for organic farmers, as preconditions for further development of organic farming. Support measures which are available under the agricultural policy resulted in an increased number of organic farms and farms which are converting to organic production. The dynamics of growth are shown in Figure 3. In 2008, organic farming in Slovenia was performed on 2.7% of farms (2,046 farms) with 4.8% (29,836 ha) of total agricultural land engaged in such production (SORS, 2011).

We can observe some differences among adopters and non-adopters of organic farming in Slovenia in information adoption and attitudes towards sustainability. The groups of farms use different information sources, and are members in different associations. The level of environmental awareness is higher among adopters, but with respect to many other characteristics the differences are not significant. This indicates that organic farming has a



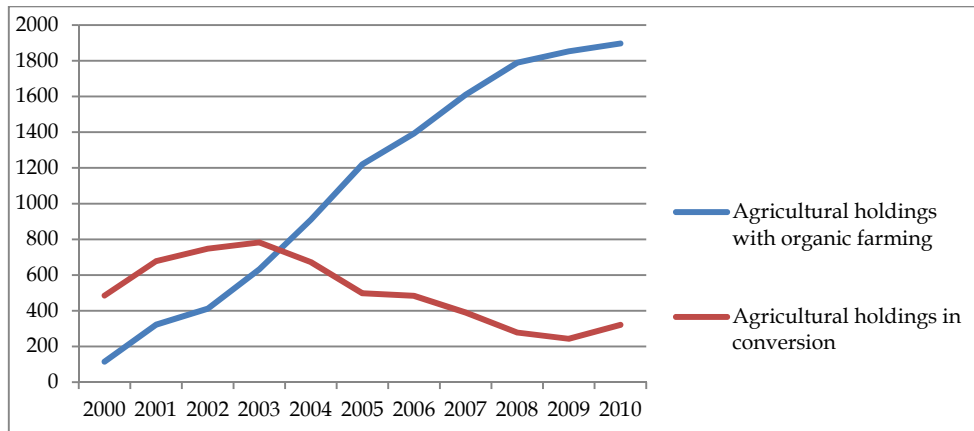


Fig. 3. Agricultural holdings with organic farming and agricultural holdings in conversion, Slovenia 2000 - 2010 (Source: SORS, 2011)

certain development potential in Slovenia, but limited as is the case in other European countries. This is confirmed also by the future plans of non adopters, where a significant proportion of farms are undecided regarding the conversion of their farms to organic agriculture in the next 10 years (Udovč & Perpar, 2007).

The future success of organic farming in Slovenia depends on the ability to link organic farming and tourism and on the development of organic food processing (Slabe, 2000). Slovenia has a very attractive and well-preserved natural environment. Several conservation areas are now in the process of being established, which may further the development of organic farming in those areas. However, since Slovenian agriculture is unable to compete with cheaper production in other countries due to its natural conditions and the agricultural structure, organic farming may be an important opportunity to produce high-quality food products primarily for the domestic market and for tourist consumption. The demand for organic products in Slovenia is still higher than the domestic supply. With agricultural policy and support measures oriented towards multifunctional agriculture, there is a good chance that the number of organic farms will still grow in the future.

### 2.2.5 Supplementary activities on farms

Due to the fact that in Slovenia there are not many large professional farms and that agriculture in most Slovenian rural areas is not the most important economic activity anymore, diversification on farms has increased over the last decade, mostly as an additional activity on part-time farms which are not big enough to be economically efficient or farms with a surplus of labor. Farms search for additional sources of income mainly through on-farm diversification, mostly farm tourism and/or food processing, but the list of possible supplementary activities<sup>1</sup> (as we call them in Slovenia) is much broader. Among the activities permitted by the regulation are food processing on the farm, farm tourism, farm

<sup>1</sup> Bryden et al. (1992, as cited in Darnhofer, 2005) refer to such activities as para-agricultural activities.

mechanization services, provision of renewable energy, educational activities etc. The decision regarding the choice of the type of supplementary activity and the extent of the activity on the farm is based on various factors and their combinations within the farm and also on legislation. The search for additional income sources within rural households is being encouraged by both exogenous and endogenous factors. As exogenous, Potočnik Slavič (2010) noted a lack of employment opportunities in general, unemployment, increased interest in living in a natural environment, increased demand for local agricultural products etc., while endogenous factors are the available resources on the farm (land, people, knowledge and traditions on the farm etc.).

The idea of farm diversification is not new in Slovenia. Some early measures were introduced as early as in the 1970s, with support for the establishment of farm tourism and later also for some other activities. A more noticeable increase in the number of farms implementing some kind of on-farm supplementary activity is evident after agricultural policy reform began in 1999, when diversification on farms was also seen as a "survival strategy" for smaller farms and rural areas in a new European perspective (Slovenia joined the European Union in 2004). From 2004 to the present, the number of registered supplementary activities in Slovenia has been increasing steadily, due also to permanent support measures from the Rural Development Program of Slovenia. 2,215 supplementary activities were registered in 2004 (Klemenčič et al., 2008) and the number increased to 4,716 in 2008 (a 113% increase). The latest data from the Register of Supplementary Activities (under the supervision of the Ministry of Agriculture, Forestry and Food) shows an increase in the number of registered supplementary activities to 7878<sup>2</sup> (May 2011). This is a further increase of 59%. The possible reasons for the increase are available forms of support and probably also the economic crisis, when many people lost their jobs and hence mobilized their available farm potential.

The introduction of supplementary activities can have both positive and negative effects. As positive Klemenčič et al. (2008) cites additional income for farm family members, improved living standard and social security of farm households, new investments on farms, more interest on the part of the younger generation in staying on the farm etc., while negative effects are more difficult adjustment of different interests within the farm family, disruptions of agricultural production, less free time for family members and more financial risks. When focusing on the reasons why motivated farmers register some kind of on-farm diversification activity, Potočnik Slavič (2010) found that the most important is economic motive, i.e. the need for additional income and better use of available farm assets (economic capital), other important motives are also available agricultural products and family traditions and knowledge (human and social capital).

### **2.2.6 Forestry and rural development**

Forestry is increasingly recognized as one of the activities to be considered in rural development; however, there are different opinions about how it can best contribute to it. The reasons for this are the changed meanings of the concept of rural development and

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<sup>2</sup> The number of farms with registered activities is smaller because each farm can register more than one supplementary activity.

the changing perceptions about the precise role of forestry (Elands & Wiersum, 2001). In the past, most attention was focused on the primary production function of forests in order to stimulate the economic advancement of rural areas (by providing income, employment and raw materials). Nowadays increasing attention is being given to its role in maintaining and (re)creating ecological and amenity services as a means of contributing towards environmentally attractive living and leisure areas for the rural and urban population. The role of forests can be positive but also negative. As positive we can mention the following:

- At the regional level forests can contribute to the maintenance of an attractive rural landscape, while at the farm level they may contribute towards the development of multi-active farms, in which forest-related production and leisure activities are integrated with agriculture (Elands & Wiersum, 2001).
- Forests provide some quality products, and maintain biodiversity as well as environmental services (water storage, carbon dioxide reduction, etc.).
- In rural areas with a diversified economic structure the landscape function of forests is important in order to increase the recreational attractiveness of the area. Forests can contribute to the strengthening of the ecological infrastructure in order to increase the natural values of the countryside and add to its recreational attractiveness. New "wilderness" areas can be created and incorporated into rural areas as a means of providing both experience of nature and tranquility for urban people (Mormont, 1987). For remote areas this means that they can best be devoted to large national parks. Eco-tourism is often considered as a major economic activity in such areas.
- In areas adjacent to urban agglomerations as well as areas with a diversified economic structure, new forms for the integration of forests with housing estates, business parks and/or recreation facilities are possible.
- Rural forestry development can contribute to the farm and regional economy by optimizing the income-earning capacity. Forestry can contribute to the prevention of economic decline and maintenance of community stability in existing forest areas (Schallau, 1990, as cited in Elands & Wiersum, 2001). This can be achieved by measures aimed at sustaining forest-dependent communities, e.g. by optimizing labor employment in forest management and forest-related industries, or by optimizing forest production as a complement to farm production (Elands & Wiersum, 2001).

As a negative aspect of forestry in rural development, Elands and Wiersum (2001) mention that forestry should not become too dominant in any area, because it can endanger the identity of rural areas as areas under the farmer's stewardship and can lead to further marginalization. This can be especially true for remote areas (Selby & Petäjistö, 1995), where farmers with difficulty accept afforestation. One reason is economic: forests provide fewer employment and income opportunities than agricultural land (especially in the short-term perspective). From the landscape identity perspective, increased forest area means the loss of open agricultural space and loss of attractive landscapes, and at the same time also more damage caused by game.

### **2.2.7 Forests and its role for rural development in Slovenia**

Forests cover 60% of Slovenia's surface area and are one of the most recognizable spatial elements. In terms of forest cover, Slovenia is in third place in Europe, after Sweden and

Finland. Forests constitute a significant market opportunity and a comparative advantage of Slovenia and its rural areas. Most are in good condition due to sustainable management principles, with good quality timber which is important not only as a raw material for the wood processing industry, but also as an important renewable energy source. Rich forest biodiversity is a result of the diverse natural resources at the intersection of three major climatic systems: the Atlantic, Mediterranean and continental. Predominantly beech, fir-beech and beech-oak forests with a relatively high production capacity are involved. 72% of the forests are privately owned, with the remaining 28% being owned by the state and municipalities. For the most part Slovenian forests are managed according to the general forest management plans prepared by the Slovenian Public Forest service, which is preparing guidelines for forest management irrespective of ownership based on the concept of sustainable and multi-purpose management. Forest owners as land owners have the right to harvest timber from their forests according to a management plan and sell it on the open market. Two thirds (67%) of forest owners own less than 1 ha of forested land, and their combined property covers 9% of the total forest area. There is a predominance of owners in the category 5 to 15 ha, accounting for 31.1% of all forest area, followed by owners in the size category of 1 to 5 ha with 27.8%. Just 2% of Slovenia forest owners own a third (32.2%) of all forests in the category over 15 ha size (Medved et al., 2010). Among forest owners there are also members of commons whose property was nationalized in the 1950s and 60s and then returned through the restitution process. Ownership types are not precisely studied by categories which would be comparable over the longer period of time. Among 77% of private forests we find 30% of family farms (Medved et al., 2010), common property regime, individual forest owners, who in fact usually co-own their property with their relatives and other institutional owners (e.g. the Church). Such fragmentation makes professional work and optimal wood utilization difficult.

The growing stock and increment of Slovenian forests have been increasing for more than 50 years. According to the Forest Service of Slovenia, growing stock in 2009 amounted to more than 327 million m<sup>3</sup>, and the annual allowable cut in that year amounted to 3.4 million m<sup>3</sup>. The annual allowable cut, despite the long tradition of sustainable forest management, is far behind the increment, especially in private forests, so that as forests grow older, the wood quality is worsening. The reasons for the non-utilization of this potential have already been mentioned: fragmentation, poor access for machinery, and long distances to deliver the wood to appropriate places for further transport, which adds significantly to the cost of labor. In recent years, there remain at least 2 million m<sup>3</sup> of standing timber, and logging will continue to be increased (intensified forest management); this will have a positive impact on the stability of stands, the quality of the trees and the income from forests. Due to global warming, the habitats of tree species are also changing, and different pests spread much more quickly and cause some damage. Forests are also more exposed to natural disasters (wind, sleet, snow) than in the past, and besides the increased risk of forest tree insects (especially the bark beetle), this is one of the most common reasons for sanitary felling (i.e. of sick and damaged trees). This is about a third of the total harvest and the proportion of nursing required logging. This reduces the planned forest management, and also the ecological stability of forests.

In the structure of forestry production from 2000 to 2009, round wood for industrial use was dominant (including logs for sawmills, veneer wood for pulp and panels and other

industrial round wood). The value of the share of round wood decreased from 83% to 66% from 2000 to 2009, on account of the increased price of firewood. The value of firewood in 2009 amounted to more than 20% of the total value of production (31 million €). The share of forestry services also increased (Gale, 2011).

The added value generated by the exploitation of forests in Slovenia is low. The share of value added of forestry in the gross domestic product (GDP) mostly accounted for 0.3% from 2001 to 2009. In the same period the gross value added per employee in forestry activities increased slightly (Table 3). The seasonal nature of employment in forestry must be taken into account, and is measured in annual work units (AWU). One AWU is equivalent to a person who is fully employed in forestry or forestry unit of agricultural activity for one year (1800 hours). In 2009, the gross value added per employee was around 17,000 €.

Year	Production (mio €)	Gross value added (mio €)	No. of employees (AWU)	Gross value added per employee (€)
2001	77.7	60.1	5,033	11,936
2002	82.7	61.6	5,645	10,906
2003	93.2	68.0	5,189	13,096
2004	98.1	67.5	4,653	14,511
2005	104.4	68.2	5,994	11,381
2006	150.0	98.4	5,858	16,794
2007	149.1	114.4	6,037	18,943
2008	163.2	120.5	6,173	19,520
2009	152.9	105.0	6,051	17,357

Source: SORS, 2011, as cited in Gale, 2011.

Table 3. Forestry production, gross value added and employment in Slovenia, 2001-2009

The importance of forests and timber has been increasing in recent times since the processing of wood is not energy extravagant and it is environmentally friendly. For Slovenia, wood as energy is one of the most important renewable energy sources to replace fossil fuels. For energy purposes, in addition to round wood (which is mostly consumed by households) wood waste is also important (these are mainly used in the wood processing industry to meet their own needs for heat and electricity and district heating systems). Total consumption of wood in Slovenia increased slightly in the period 2002-2009: in 2002, more than 2.6 million m<sup>3</sup> was used for some energy production and in 2009 just over 3 million m<sup>3</sup> of wood.

One recent major area of use of wood is wood construction. Wood is a traditional construction material and an excellent material for buildings of modern architecture, especially in combination with other materials. Wood and wood products are also important for carbon sequestration, which temporarily contributes to a more favorable balance of greenhouse gases. Wood stores carbon dioxide throughout its lifetime. According to the Slovenian Forestry Institute a hectare of forest in Slovenia accumulates in overhead and underground mass about 9 tons of carbon dioxide on average per year (Gale, 2011). Even in the future, forests will play an important role in Slovenia in so-called green energy because the potential of forest biomass is large and not fully utilized. The future of forests, as seen by

forestry experts and forest holders, lies in their integration within forest proprietors associations, joint wood sales and certification. Forests are not only environmental, but also civilizational and cultural assets of the country, which should be considered in their management and for their integration into rural development through their economic, social and environmental role.

### 2.2.8 Rural tourism

Tourism has become an important activity in the countryside and for the associated rural communities. Lane (1994) defines rural tourism as a complex multi-faced activity which is more than just farm-based tourism. It includes farm tourism but also holidays in nature and eco-tourism, walking, climbing and riding, adventure, sport and health tourism, hunting and angling, educational travel, arts and heritage tourism, etc. Nowadays, a major requirement for rural tourism is to provide peace, quiet and relaxation in rural surroundings. Rural tourism developed intensively in the mid-1990s when it became obvious that the agricultural sector alone was no longer the key to rural development (Verbole, 1999). Tourism has been seen as a possible "savior" for improving the quality of life in rural areas and slowing rural exodus (Garcia Ramon et al., 1995, as cited in Verbole, 1999) by generating additional income for farms and rural communities, creating new jobs, thereby stabilizing the rural economy and providing support for existing business and services and contributing to the creation of new ones.

Rural tourism can have different impacts in and on rural areas. In the general literature three main categories of impact are defined: economic, socio-cultural and environmental (sometimes defined also as physical). Economic impacts are associated with the costs and benefits that result from the development and use of tourist facilities and services, and physical impact with the way tourism contributes to alterations in both the natural and man-made environment, as the two are connected. The socio-cultural impacts are associated with the ways in which tourism contributes to a change in the values system, individual and community behavior, family relationships, collective lifestyles, safety levels, moral conduct, traditional ceremonies and community structure (Mathieson & Wall, 1982, as cited in Robert & Hall, 2001).

Positive effects of tourism and recreation in rural areas summarized from different sources (as cited in Robert & Hall, 2001) are:

- *socio-economic*: provide a source of new alternative or supplementary income and employment, help to reduce gender and other social power imbalances, encourage collective community activity, provide opportunities for retaining population in areas that might otherwise experience depopulation, enable areas to be repopulated, overall multiplier effects, although in rural areas these tend to be lower;
- *cultural*: reinvigorate local culture, instill a sense of local pride, self-esteem and identity;
- *physical (built and natural)*: contribute to conservation and protection, assist refurbishment and re-use of abandoned properties;

Negative effects of rural tourism:

- *socio-economic*: can cause economic leakages, local price inflation, labor in-migration, distort local employment structure, distort local housing market, reinforce perception of

women's employment as low paid and part-time and an extension of "the domestic role", self-contained complex with tenuous links to the local economy, seasonal patterns of the demand; conflicts in the traditional understanding of land use; a shift in labor away from agriculture towards service industry;

- *cultural*: manufacture or distort local "culture" for commodification and staged authenticity, destroy endogenous culture; commercialization of rural life;
- *physical (built and natural)*: habitat destruction, littering, emissions and other forms of pollution, congestion, new construction sprawl, perhaps grafted on to existing settlement.

Some of these impacts may have a twofold result, since some may benefit and others not. Of course, not all impacts will necessarily occur in a given local community and/or rural area; their intensity and effect will vary from situation to situation.

The rural tourism development process involves many social actors who continually reshape and transform plans and policy through interaction and negotiation. Local people are not passive recipients of the consequences of rural tourism development policy, but are instead capable of making the most out of a given situation (i.e. initiating a developmental project through the bottom-up approach). It is of vital importance to understand the socio-political dynamics of the process taking place within the local communities as rural tourism develops. This is necessary to ensure that the development of rural tourism is sustainable, including allowing for the participation of the local community in development, as well as for participation of all the members in the given community (Verbole, 2000).

Slovenia, as a mostly rural country, has great potential for rural tourism. Different forms of rural tourism have emerged but one of the most important forms is tourism on family farms. Some rural areas of Slovenia, such as Gorenjska and the Upper Savinja Valley, have a long tradition of rural tourism, especially farm tourism. After the Second World War tourism in rural areas stagnated as efforts were redirected to the development of tourist resorts in coastal and mountainous areas. Increase of farm tourism occurred in the late 1970s, fueled in part by the government's growing concern to secure additional income for mountain farmers, related to the small size of the farms, limited production conditions and continuing depopulation trends in some more remote rural areas. Over the last 25 years, various forms of farm tourism have expanded slowly across Slovenia, primarily to provide a secondary source of income for farm family households (Verbole, 1999). These include stationary farm tourism, with farms offering full board, half board or bed and breakfast arrangements, and guests staying either with the farm family or in a guest house; and excursion farm tourism revolving around "open-door farms", where tourists can eat and explore farm life for a few hours, and the recent phenomenon of "camping on the farm". The interest in farm tourism and in other forms of rural tourism increased as the socio-economic situation in Slovenia changed in the late 1980s, owing to the political, economic and social transformations at that time (Verbole, 2000). Privatization, for example, provided the foundations for economic restructuring, including the development of alternative forms of rural tourism, recreational enterprises and attractions and different forms of accommodation. The newly emerging private rural enterprises developed rapidly, providing various activities which include rafting and mountain biking, and they began to compete with family farms for the available resources and income. To be able to follow up the demands and meet the needs of the changing situation in Slovenia's countryside, the Ministry of Agriculture, Forestry and Food

established a Center for Rural Development and Village Revitalization (CRPOV) in 1991. Subsequently, CRPOV promoted the development of rural areas through specific projects in which rural tourism is often given an important role. Later on, rural tourism was supported through the diversification measures performed in the renewed agricultural and rural development policy of the Ministry of Agriculture, Forestry and Food, while support from the Ministry of Economics was directed to the development of accommodation (mostly in spa resorts in rural areas) and to the general promotion of Slovenian tourism, in which rural areas have great potential due to the diverse natural and cultural heritage (customs, culinary, landscapes, etc). Over the past 10 years the number of tourist farms in Slovenia has doubled and now have a capacity of over 3,000 beds in total. A fine example of humans and nature co-existing in Slovenia are ecological tourist farms. These farms (10 of them right now) offer a healthy living environment and organic food, certified by the official organization.

However, it is argued that rural tourism development should aim at being sustainable and be based on activating local development to realize the endogenous potentials of rural areas in their geographic, cultural and natural diversity. This approach requires coalitions and linkages between different stakeholders such as the state, institutions and local communities and people (Udovč & Perpar, 2007a).

Protected areas have become one of the most important sources of value and already represent an important part of the tourism infrastructure (information centers, trails, accommodation, etc.) and attraction. 36% of Slovenia's territory is included in the Natura 2000 network, while protected areas (national park, landscape parks, natural reserves) represent 12% of the territory. Data show that more than 30% of foreign tourists come to Slovenia mostly because of unspoiled nature and natural attractions, and also that 30% of Slovenes spend their free time in nature. In the future, protected areas will be one of the top themes in tourism development. They mean an "above standard offer" with peace, unspoiled nature, and nature-connected activities. Slovenia has great possibilities for sustainable tourism in protected areas because of its diversity; the question is just what kind of tourism and activities are appropriate for protected areas and in what extent (Perpar & Udovč, 2007). It depends on each protected area's characteristics as well. Recognition of protected areas and their values as well as the appropriate definition of values in these areas can contribute importantly to sustainable rural and regional development. From the standpoint of development, protected areas incorporate environmental, cultural, social and human potential which, according to the protection mode, have certain direct and/or indirect applied value as well as the value of "unused". Protected areas should be understood not only as areas of protection but also as areas of great and in Slovenia not yet recognized and poorly used potential (Lampič & Mrak, 2008; Zorc & Udovč, 2009).

### **2.2.9 Renewable energy sources**

Energy is one of the main inputs for rural development and economic development. Rural areas have great potential for the production of renewable energy sources: wind power, solar power, hydro-electric power, tidal power, geothermal energy and biomass, which are essential alternatives to fossil fuels. Their use reduces greenhouse gas emissions, diversifies energy supply and reduces dependence on unreliable and volatile fossil fuel markets (in particular oil and gas). The growth of renewable energy sources also stimulates employment



in Europe, the creation of new technologies and improves the trade balance (European Commission, 2011). Slovenia has great potential for better development of this field, but some problems occur due to some decisions which are sometimes in contradiction with sustainable principles (i.e. competing food and biomass production on the best agricultural land). There is much unused potential from forests, waste etc.

### **3. Development potential and rural development policy**

Discussions and concern about the effectiveness of agricultural policy have become increasingly common over the last decade. Special emphasis has been given particularly to agricultural subsidies as the predominant component of public intervention for rural areas, especially in the European Union. Common agreement is that agricultural subsidies bring lots of support into rural areas but they are focused on a small segment of the rural population - farmers and others connected with agricultural production - rather than on rural places or areas. Some findings (OECD, 2006) from the European Union and United States of America suggest that current subsidies-based policies are not effective in addressing some of the most pressing socio-economic challenges facing rural communities, and have uneven impacts across the rural territory. To answer these challenges, policy objectives and instruments have to focus on improving the competitiveness of rural areas using their own capital, thus diversifying economic activities, enhancing business assistance, investing in human and social capital, commercializing and maintaining natural and cultural amenities, finding market niches for local products, providing public services, etc. Thus, rural policy has now gone beyond agricultural policy in many countries, offering new trajectories of development for rural areas (Pezzini, 2001).

In many rural areas employment opportunities in the primary sector are declining, even if farming is still important in shaping rural land use. Some rural areas experiencing out-migration of young people as a result of lack of employment opportunities and inadequate access to educational and leisure activities on the one hand, and in-migration of retirees to some areas on the other, are undergoing aging of the population. Such a demographic structure is often not sufficient to supporting the provision of adequate public services. Rural areas alone often have difficulty providing the necessary critical mass of facilities, producer services and investment to support economic development, so entrepreneurs have difficulty starting up businesses in the area. But some rural areas also show strong economic performance, sometimes even better than some urban areas, so rural areas cannot be treated as synonymous with decline. As Pezzini (2001) noted, macroeconomic policies (ensuring national growth together with stable process and healthy government finances), as well as structural policies (improving the efficiency of markets), will not be sufficient to deal with new and more intense rural problems and challenges. Thus by loosening national ties and enforcing international competition, globalization confronts rural areas both with development opportunities but also with threats not previously encountered. Globalization brings gains to economies in their totality but also poses severe problems of adjustment for many rural areas. Also some traditional territorial policies, concerned with the equitable geographical distribution of resources, are not an appropriate answer to the new conditions engendered by globalization. Pezzini noted that there is a widely held view that a change in emphasis from fiscal policies to endogenous development strategies can add impetus to the restructuring of national economies by reinforcing the capacity for self-generated change.

Mobilization of local (endogenous) resources and local collective goods to support comparative advantages for local firms, local entrepreneurship and innovation and social cohesion can be better strategies. One of the reasons for change in thinking about rural policy, together with divergent growth patterns, are concerns toward sustainable development. This means a shift in thinking from the idea of development as a process mainly linked with economic growth to the approach based on increases in quality of life and environment. Rural areas are not just quality living places for the rural population but contribute also to the quality of life of society and its public goods such as clean environment, attractive landscapes, natural and cultural heritage, food production capacities, contribution to CO<sub>2</sub> reduction, leisure and recreation possibilities, traditional skills and knowledge, people etc. This wide range of resources and amenities (endogenous development potentials) can be a source for future development, either through the direct exploitation of resources or through the creation of conditions for sustainable development of rural areas. Potential economic opportunities, which are a prerequisite for a balanced social and environmental development, range from rural tourism (farm tourism, nature holidays, theme routes, discovery of natural and cultural heritage) to promoting local products (traditional farm products, locally produced materials, crafts, skills, heritage) to attract residents and enterprises to the area. Special attention should be given to improvement of the business environment or to building social and human resource capital. Often endogenous development capacities and entrepreneurship are latent in rural areas (Pezzini, 2001), so some specific measures to encourage them are needed in order to bring out local dynamics of business creation and development. The diversity of rural areas makes it difficult to design a national rural development policy that will take into account local specifics and needs, so active and effective citizen participation in decision making at different levels of government (local, regional, national, international) and cooperation are needed (decentralization of decision making).

Due to the changed situation in rural areas and globally, OECD (2006) suggests three factors that influence rural policy:

1. *focus on amenities*: the wide range of resources (beyond a narrow focus on agriculture) of rural areas and their use must be taken into account to assure sustainable rural development. The stewardship of the multiple features of rural areas has become a key pillar of place-based policies for rural development.
2. *pressures to reform agricultural policy*: the question is how to sustain a system of subsidies due to budgetary pressures, international trade agreements; in many cases real farmers are not “happy” with subsidies and want adequate prices for their products instead;
3. *decentralization and trends in regional policy*: experiences show that just channeling money to rural areas is not enough to solve their problems and help them develop. Policies and programs have to make rural areas more competitive by mobilizing their endogenous development potential. Also regional development policies have to shift from a top-down, subsidy-based strategy to reduce regional disparities to a much broader policy to improve regional competitiveness (focused on infrastructure, the availability of suitable workforce, greater focus on local assets and knowledge, etc.).

OECD (2006) suggested a “new rural paradigm” which is characterized by two principles: a focus on places instead of sectors, and on investment instead of subsidies. The European

Union in the period 2007-2013 also directed rural policy toward promoting restructuring, modernization and innovation in both agriculture and the wider rural economy (for example measure to support micro-firms in rural areas). Also the LEADER Initiative is one well-known European rural development program, conceived as an integrated and endogenous bottom-up approach to rural development. The program has been widely recognized as a success due its innovative, endogenous potential use character and because of the results obtained in many rural areas despite the relatively limited budget.

Slovenia implemented similar rural development programs to LEADER called CRPOV (Integrated Rural Development and Village Renewal) from 1991 until joining the EU. The program was also based on the local initiative, bottom-up approach, local partnerships and an endogenous approach supported rural people and local communities in diversifying their economies (mostly support for the development of supplementary activities on farms), maintaining rural heritage, village renewal, development of rural tourism, etc. Since joining the European Union, Slovenia has been implementing measures defined in the Rural Development Program for Slovenia 2007-2013 as measures that are enabled in the Common Agricultural Policy (CAP). As a problem from the rural development perspective we can say that these measures do not take into account the situation and specific problems of individual rural areas, which are also very heterogeneous in Slovenia, but they are tailored for general use in EU. Furthermore, regional development policy and rural development policy in Slovenia still have not “met” properly to ensure a synergistic effect.

It is widely argued that rural development policy and practice have to allow diversity in the goals and objectives; it should include economic, social, cultural and environmental dimensions and should allow for democratic processes at all levels. Rural development also does not happen in a vacuum, but is embedded in a given social, economic, political and historical context that has to be taken into account to meet a changing society's needs. One pre-condition for the achievement of a balanced and sustainable development of rural areas is a target-oriented rural development policy, based upon promotion of their endogenous potential and competitive advantages (Juvančič, 2001).

#### **4. Conclusion**

In the past the countryside was mostly used for its space, natural resources, and workforce needed in the industrial and urban centers. As in many developed countries in Europe and worldwide, development in Slovenia was concentrated mostly in the urban areas. The influence of this process reached the countryside as well, but consideration for the typical characteristics of the rural area and its inhabitants was not sufficient. Consequently, rural areas lagged behind in development, their cultural qualities were disturbed, and development potential was neglected. Hence the demographic situation and the aging structure of the rural population became worse. Simultaneously encountering the environmental and social problems caused mainly by a profit-directed development of modern civilization encouraged the developed societies to discover qualitative possibilities for more acceptable and sustainable development in the countryside and to realize the importance of treating rural areas as a specific subject with its own particularities. Today the development of rural areas receives special attention and most developed states formulate special development policies regarding the needs of the countryside. Research findings show that it is possible to overcome the lagging behind of rural areas through appropriate

use, empowerment and development of their endogenous development potential. Among the rural areas that have already identified, evaluated and are marketing their potential it is possible to recognize mostly positive economic effects (empowerment of economic capital and higher income), positive demographic trends, better social connectivity and empowerment of social capital, but also stronger and frequent land use conflicts (environmental perspective). The empowerment of endogenous potential improves their development ability, but on the other side the local disparities are even bigger. The positive impact is evident only in local communities that possess the activation capacity of endogenous development potential. According to the theory of complex systems, the contemporary rural system comprises elements of stability and vulnerability. Its development orientations depend on its capability to adjust to wider network factors and sustainable use of its endogenous potential.

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# Tracing the Consequences of Economic Crisis in Rural Areas – Evidence from Greece

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## 1. Introduction

Rural areas play a vital role in the European Union (EU), as they cover more than 90 percent of the European territory, and host about half of its population and economic activity. Diversity is the main characteristic of rural areas, with both decline and dynamism present. Notwithstanding their diversity, rural areas in the EU share some common characteristics and evolution patterns. There are no significant differences between rural and urban areas, in terms of the age structure of the population, as well as employment/unemployment rates. The income per inhabitant in rural areas is 25-30% lower, coupled with a different social structure. Besides, the economic importance of agriculture in rural areas is declining, while the services sector is continually gaining momentum.

For quite a long time international economy has been undergoing rapid changes such as globalization of markets, improved communications, reduced transportation costs, changing trade patterns, the concentration of power across the agrifood chain, and the diversification of activities in rural regions. Significant opportunities as well as threats are the obvious result of these changes for rural areas. The recent crisis accelerated these changes and aggravated existing problems. Concurrently, a sweeping restructuring process is well under way in rural areas, encompassing the whole structure of the economy and all aspects of rural life. Rural labor markets are profoundly affected by this process, in all their dimensions, especially the structure of employment (Copus et al., 2006).

Meanwhile, the structure of the farm sector is evolving continually in response to internal and external conditions. One of the fundamental elements of farm structures is the labor force employed in agriculture. As the farm sector is integrated into local and regional economies in various ways, the intersection of rural labor markets with the multiple forms of farm employment is presumably a hot issue.

Poverty is another distinguishing feature of rural areas. Rural poverty is a widespread phenomenon, since at least 70 per cent of the world's very poor people are found in rural areas and this is not likely to change in the immediate future, despite widespread urbanization and demographic changes in all regions (IFAD, 2011). However, it is sufficiently documented in the literature that rural poverty is qualitatively 'different' from its urban counterpart, as, for example, it is considered invisible or irrelevant to the urban

preoccupations of most analysts and policy-makers (Tickamyer, 2006). Moreover, inequalities within agriculture surpass inequalities among non-agricultural households while agricultural inequalities and poverty differ structurally from those in the rest of society (Pauw, 2007; Commins, 2004). Some other dimensions of poverty are nowadays at the forefront of the research interest, such as the incidence of “in-work poverty” in the EU (Allègre, 2008).

As a result of the renewed interest on the conditions and development dynamics of rural areas, a range of typologies has been used for the sub-national data collection in a multi-national context. In particular, from the mid-1990's the OECD established a territorial scheme for the classification of the various types of areas (OECD, 1994). According to this methodology, which has been widely used, regions are classified as *predominantly urban* (PU), *intermediate* (IR), or *predominantly rural* (PR), based on the percentage of population living in local rural units. Drawing on a variation of the original OECD methodology the EU has recently introduced a revised urban-rural typology (Eurostat, 2010), resulting to a reclassification of several regions.

All rural areas today face important economic, environmental and territorial challenges. These include the rise in income of people living in rural areas, the protection of the environment and natural resources, the valorisation of rural landscapes, the improvement of services and infrastructures, the economic recovery from the recent crisis, etc. In the near future, of particular importance are the challenges of growth, creation of new jobs and sustainability especially for the rural areas that are isolated, depopulated or dependent on agriculture. Of paramount importance are the challenges emanating from the continual restructuring and modernization of European agriculture. It is expected that “in EU-15 some 2 million workers on a full time basis will leave the sector by 2014. In addition, 1-2 million full-time workers may potentially leave the sector within the ten New Member States, and 1-2 million workers in Bulgaria and Romania. To this must be added around 5 million hidden unemployed persons on European farms” (CEC, 2006).

Greece is experiencing one of its most severe crises after the Second World War. From 2009 the Greek economy has entered into recession. The unprecedented crisis of the Greek economy has already been painfully felt by its citizens, as disposable income has decreased, unemployment rates have reached record levels, productive activities have shrunk and income inequalities have widened. GDP is expected to contract by 3% in 2011. The only encouraging sign comes from the increase of exports, as well as the creation of new jobs in agriculture during the last three years, in contrast to the disappointing progress of all the other macroeconomic indicators. Greece still has an extensive farm sector with a predominantly small-scale structure and multiple productive systems combined in various ways with a heterogeneous rural space. Moreover, according to recent data Greece has the highest risk of poverty for employed individuals among all EU countries (14% in comparison to 8% for the EU as a whole) (Allègre, 2008).

This chapter aims to trace the consequences of the current economic crisis in rural areas of Greece. This is pursued by addressing the dual question: How has the current crisis affected rural areas and how have rural areas responded to the crisis? More specifically, what impact has this crisis had on labor markets, poverty, farm structural adjustment, and what kind of adjustment patterns were adopted in various types of areas? The analysis is undertaken at

the level of PU-IR-PR areas, as they are defined in the recently revised EU urban-rural typology. The empirical investigation is based both on the compilation of existing statistical data and the elaboration of original micro-data of various data sources (see below).

The chapter is organized into six main sections. After the introduction the conceptual framework is outlined, followed by the methodology and data sources. In the fourth section the results are presented, with a focus on the structure of the economy and on some critical dimensions of rural labor markets such as employment, poverty incidence, in-work poverty risk; an analysis follows of farm structures in relation to rural labor markets as well as an examination of the economic performance of agriculture. The results are then discussed within the broader framework of relevant literature and the chapter is completed with the conclusions.

## 2. The conceptual framework

Rural areas are inherently diverse, hence affected in different ways, and to differing extents, by the external forces with which they interact (Bryden & Bollman, 2000). Global or regional economic crises constitute one of the major driving forces of change in both rural and urban areas. The variety of impacts of recent crises on different areas has been documented (see for example Fallon & Lucas, 2002; Trivelli et al., 2009).

Given the profound changes rural areas throughout Europe are experiencing some recurrent themes emerge from the relevant literature. These include urbanization or counter-urbanization, unemployment rates, convergence of industrial structures and the extent of self-employment. However, due to the complex nature of rural labor markets simple indicators have to be viewed in interaction with the demographic trends, the capabilities of the rural workforce, the indirect impact of infrastructure and basic services as well as the alternative employment opportunities for farm households (Copus et al., 2006).

It has to be noted that there's no consensus on the way the "crisis" is perceived. As Bessant (2007) notes: "...the terms farm crisis, agricultural crisis and rural crisis lack clear and concise meaning. Much of the debate revolves around four main themes: farm financial difficulties, structural changes in agriculture, rural livelihoods and international dimensions. The examination of these interrelated levels of analysis offers a valuable framework for interpreting the multifold contexts, meanings, and responses to crisis".

Employment in agriculture is a multidimensional phenomenon, which occurs with a multiplicity of forms. Depending on the particular focus of the research interest, employment in agriculture – both of the head and the other members of the household – is occasionally approached from various angles: disguised unemployment, full-time/part-time employment, pluriactivity, off-farm employment, diversification of activities within and outside the farm, etc. There's also a continuous complementarity or substitutability of family- and non-family work in agriculture.

This multiplicity is the result of the distinct nature of the basic farm production unit which, like other small family businesses, is inextricably linked to the consumer and social unit (household and family, respectively). It is also in direct connection with the adoption of modern technology by farmers, developments in other sectors of the economy, as well as with the respective policies. Moreover, agricultural employment assumes a clear spatial

dimension, when examined in different types of areas, such as the rural, urban, etc. Thus, the combination of sectoral and spatial character of agricultural employment is of particular interest.

As a result, the agricultural labor markets are in a constant process of structural change in their characteristics as well as adaptation to changing economic conditions. Additionally, agricultural labor markets retain some distinctive characteristics in relation to the labor markets of the secondary and tertiary sector, as the latter extend to much larger geographic areas, due to the nature and ease of mobility of their respective production activities. In contrast, in the case of agriculture, labor markets are much more locally-tracked. However, the frequent participation of rural households' members in different labor markets through multiple forms of employment points out the direct relationship of agricultural labor markets with the changes in the structures of local and regional economies.

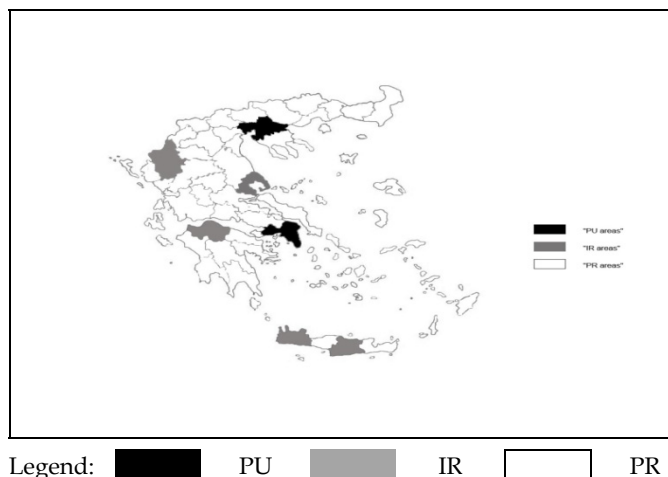
Therefore, the examination of rural labor markets in relation to those critical characteristics of farm structures provides a clear insight into the adjustment process of rural areas, facilitating at the same time the assessment of the recent crisis impacts. Also, this perspective allows for the analysis of concrete dimensions of poverty as, for example, it has been found that among the most important risk factors for working poverty in the EU are the part-time or less than full-year work and a combination of low pay, under-employment and family structures (Allègre, 2008).

Furthermore, as a result of the recognition of the spatial heterogeneity, various territorial classifications have been developed. The OECD methodology proceeds in two successive phases (OECD, 2007). Firstly, the rural local administrative units at level 2 (LAU2s) are defined and secondly the various areas are classified as PU, IR and PR, on the basis of the population share living in rural LAU2s. The discrepancy in surface area of both LAU2 and NUTS III regions has been recognized as the main constraint of this methodology. In an effort to overcome this constraint, Eurostat has adopted a new typology at the NUTS III level since 2010. "NUTS" is the acronym of the EU system of territorial classification, from the French "Nomenclature des Unités Territoriales Statistiques".

This new typology creates clusters of adjacent urban grid cells and then classifies as rural all the remaining clusters. Urban grid cells have a threshold of 5000 inhabitants and 300 inhabitants per km<sup>2</sup>. A local administrative unit at level 2 (LAU2) is classified as rural if at least half of its population lives in rural areas. After a re-grouping of 'small' NUTS III regions (less than 500 km<sup>2</sup>), it categorizes all NUTS III regions as PU, IR and PR according to the share of population in rural grid cells. It also treats the large urban centers as the OECD methodology does. This revision has resulted in a "predominantly rural" population living in NUTS III regions of EU countries, at a rate of 24%, four percentage points greater than that obtained from the standard OECD methodology (Eurostat, 2010). Finally, the three categories of areas at the NUTS III level in Greece are depicted in Map 1.

### 3. Methodology and data

Within the aforementioned conceptual framework, our study aims to cover the whole period between 1993 and 2011, during which there is available data. Over this time span, some representative years were selected as landmarks, signaling some major events for the Greek and European economy and considered to have affected rural labor markets. In 1993



Map 1. Greece: PU-IR-PR Areas according to the new Eurostat typology (NUTS III)

the McSharry reform of the Common Agricultural Policy (CAP) took place. This effected a reduction in institutional prices and provision of income subsidies, coupled with the area or number of animals. As well, in 1993 the single European market was created and the country started to prepare for accession to the economic and monetary union (EMU). In 2000, the CAP reform had already been implemented, the “Agenda 2000” program was initiated, the Euro-Mediterranean agreements were applied and the World Trade Organization started running. The same year represents the point just before the entry of Greece into the EMU. Furthermore, 2006 was the first year of application of the most recent reform of the CAP – with income support decoupled from the type and level of production – , the EU had been enlarged with 12 additional countries and the Greek economy was fully integrated within EMU. Finally, 2010 is the most recent year with available data, and the Greek economy is going through a period of recession and deep crisis at all levels. Thus, our analysis refers to the sub-periods 1993-2000, 2000-2006 and 2006-2010 or 2006-2011.

The data for our empirical investigation derive from a series of statistical surveys, conducted from both Eurostat and the Hellenic Statistical Authority (HSA), such as: Population Census, National Accounts, Labor Force Surveys (LFS), Household Budget Surveys (HBS), Farm Structure Survey and a report with statistical and economic information of EU regions (EU DG Agr., 2011). Where data from LFS and HBS were used, we estimated various indicators and figures by elaborating the micro datasets of these surveys; this is denoted by the phrase “original micro-data” in the description of the sources in the tables. Stemming either from the elaboration of micro-data or from published datasets, data is then compiled at NUTS II or NUTS III level, depending on its availability.

## 4. Results

### 4.1 Importance of rural areas

Greece could be characterized as one of the most “rural” countries in the EU. Greece, along with Ireland, Portugal, Finland and Estonia are the EU countries in which PR areas occupy

the vast majority of territory. The consideration of some basic indicators reveals a polarized pattern of spatial organization (Table 1). The most distinguishing characteristic is the dominance of PR areas in the distribution of territory, population, gross value added (GVA) and employment; in most of these cases, Greek PR area performance is almost double the respective EU average. The opposite applies for IR areas, which lag behind. However, these disparities are smoothed out if one considers the PR and IR areas as a single entity. PU areas account for almost half the total population and employment and more than half the total GVA, even though they extend to only 5.6% of the national territory.

		PR	IR	PU	All Areas	PR+IR
% Territory, 2007	Greece	82.2	12.1	5.6	100.0	94.3
	EU 27	56.6	34.3	9.2	100.0	90.9
% Population, 2007	Greece	43.2	10.5	46.3	100.0	53.7
	EU 27	23.7	35.5	40.9	100.0	59.2
% Gross Value Added, 2007	Greece	32.5	8.8	58.6	100.0	41.3
	EU 27	16.6	31.8	51.6	100.0	48.4
% Employment, 2007	Greece	40.8	10.8	48.4	100.0	51.6
	EU 27	21.4	34.6	44.0	100.0	56.0

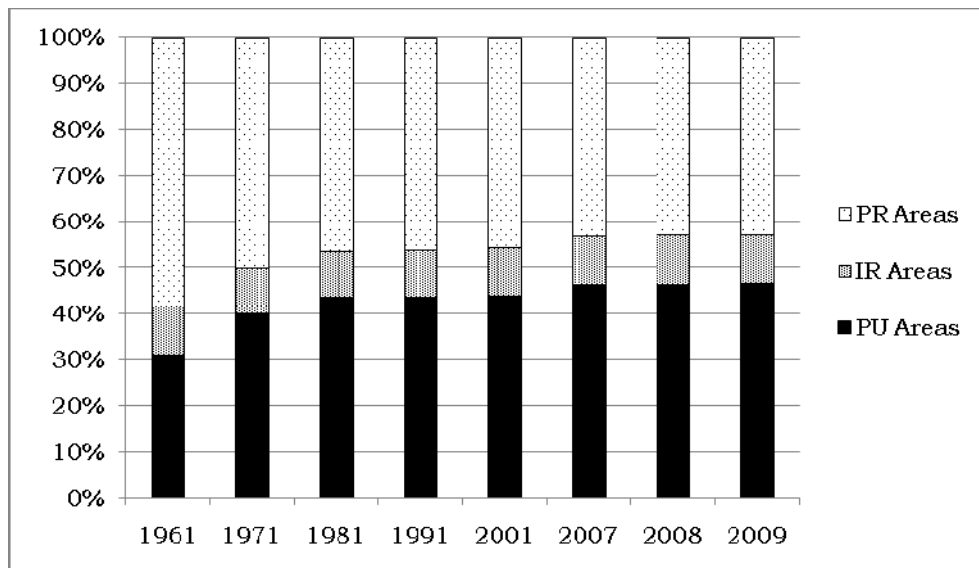
Source: EU DG Agr., 2011, NUTS III data

PR: Predominantly Rural Areas, IR: Intermediate Areas, PU: Predominantly Urban Areas

Table 1. Importance of rural areas in Greece and EU, 2007

PR areas do not seem to have benefited from the demographic changes of the last 50 years (Fig. 1). Between 1961 and 2009 PU areas increased their share of the total population of the country from one third to almost half, whereas IR areas retained a constant share of 10.5%. In contrast, the population of PR areas decreased from 58% to 43% of the total population over this time span. These trends are the result of the processes of rural exodus and urbanization, particularly prominent in the 1960's and 1970's; they also relate to demographic changes, such as birth rates and immigration. Interestingly, the share of PU areas in the total population from 2001 through 2009 increased by almost three percentage points at the expense of PR areas, after twenty years of relative stability.

Likewise, from 1993 to 2010, PU areas exhibited the highest employment growth, whereas the absolute number of unemployed almost doubled in PR areas and grew by 85.1% in IR areas (Table 2). Unemployment rates, on the other hand, seem to converge, even though IR areas were above and PR areas slightly below the national average in 2010. During the recent crisis unemployment rate increased by three percentage points in the whole country, with the highest rise in PU areas (3.5 points) and the lowest in PR areas (2.5 points). Concurrently, all areas except for PR have lost jobs and the number of unemployed people increased everywhere, most notably in PU areas.



Sources: 1961-2001 Hellenic Statistical Authority, 2007-09 Eurostat (2011a), compiled from NUTS III data  
 PR: Predominantly Rural Areas, IR: Intermediate Areas, PU: Predominantly Urban Areas

Fig. 1. Distribution of population in Greece (1961-2009)

		1993	2000	2006	2010	1993-2010	2006-2010
PU	Employed (persons)	1348104	1434918	1660574	1652998	22.6%	-7576
	Unemployed (persons)	175871	202045	147089	217461	23.6%	70372
	Unemployment rate	11.5%	12.3%	8.1%	11.6%		
IR	Employed (persons)	881912	970896	1051546	1026875	16.4%	-24671
	Unemployed (persons)	78270	126361	104618	144879	85.1%	40261
	Unemployment rate	8.2%	11.5%	9.0%	12.4%		
PR	Employed (persons)	1490162	1694205	1740696	1747119	17.2%	6423
	Unemployed (persons)	116409	191336	175704	231692	99.0%	55988
	Unemployment rate	7.2%	10.1%	9.2%	11.7%		
All Areas	Employed (persons)	3720178	4100019	4452816	4426992	19.0%	-25824
	Unemployed (persons)	370550	519742	427411	594032	60.3%	166621
	Unemployment rate	9.1%	11.3%	8.8%	11.8%		

Source: HSA, Labor Force Surveys, compiled from NUTS II original micro-data  
 PU: Predominantly Urban Areas, IR: Intermediate Areas, PR: Predominantly Rural Areas

Table 2. Employment and unemployment in Greece (1993-2010)

#### 4.2 The structure of the economy

Noteworthy changes in the structure of the economy have taken place throughout the examined period. The domination of the tertiary sector seems to have been enhanced in the

national economy between 1996 and 2008. In particular, two service branches increased their share of the total GVA, in contrast to all other economic activities (Table 3). These are, firstly,

		1996	2000	2006	2007	2008
PU	All activities	100.0	100.0	100.0	100.0	100.0
	Agriculture; fishing	1.7	1.1	0.6	0.6	0.5
	Industry	19.6	18.5	16.2	15.4	14.8
	Industry (except construction)	13.9	13.1	11.2	10.7	11.5
	Construction	5.7	5.4	5.1	4.7	3.2
	Services (except extra-territorial organizations)	78.7	80.4	83.2	84.0	84.7
	Wholesale, retail trade; hotels, restaur; transp.	30.7	31.4	35.7	36.2	35.5
	Financial intermediation; real estate	23.8	25.2	22.7	22.9	22.5
	Public administr., community services; hh act.	24.3	23.8	24.8	24.9	26.6
IR	All activities	100.0	100.0	100.0	100.0	100.0
	Agriculture; fishing	14.2	8.0	5.0	4.4	4.1
	Industry	20.6	18.9	20.5	19.1	19.0
	Industry (except construction)	14.1	11.0	13.1	12.8	13.4
	Construction	6.5	7.9	7.4	6.3	5.7
	Services (except extra-territorial organizations)	65.1	73.1	74.5	76.5	76.9
	Wholesale, retail trade; hotels, restaur; transp.	28.6	31.8	34.4	36.0	35.6
	Financial intermediation; real estate	18.1	17.2	15.7	15.9	15.8
	Public administr., community services; hh act.	18.5	24.1	24.4	24.6	25.5
PR	All activities	100.0	100.0	100.0	100.0	100.0
	Agriculture; fishing	16.3	13.1	7.8	7.3	6.7
	Industry	25.8	24.6	23.6	23.5	22.7
	Industry (except construction)	18.5	15.6	14.4	14.4	15.2
	Construction	7.3	8.9	9.3	9.2	7.5
	Services (except extra-territorial organizations)	57.9	62.3	68.5	69.2	70.6
	Wholesale, retail trade; hotels, restaur; transp.	23.9	28.1	32.1	32.3	32.7
	Financial intermediation; real estate	20.7	15.6	14.7	14.9	14.9
	Public administr., community services; hh act.	13.3	18.6	21.7	21.9	23.0
All Areas	All activities	100.0	100.0	100.0	100.0	100.0
	Agriculture; fishing	9.1	6.6	3.7	3.4	3.1
	Industry	22.3	21.0	19.4	18.8	18.1
	Industry (except construction)	15.9	13.9	12.5	12.3	13.1
	Construction	6.5	7.0	6.9	6.5	5.1
	Services (except extra-territorial organizations)	68.6	72.5	76.9	77.8	78.7
	Wholesale, retail trade; hotels, restaur; transp.	27.6	30.1	34.2	34.8	34.5
	Financial intermediation; real estate	21.9	20.6	19.0	19.2	19.0
	Public administr., community services; hh act.	19.1	21.7	23.6	23.8	25.2

Source: Eurostat (2011b), National Accounts, compiled from NUTS III data

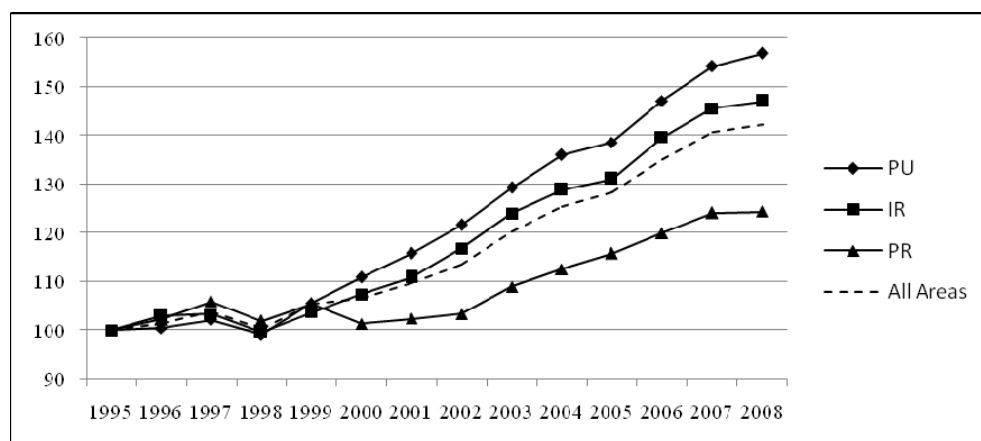
PU: Predominantly Urban Areas, IR: Intermediate Areas, PR: Predominantly Rural Areas

Table 3. Distribution of Gross Value Added by Branch (1996-2008)



the wholesale and retail trades, hotels, restaurants and transportation, and secondly, public administration, community services and household activities. These two sectors accounted for 60% of the total GVA in 2010. The other service branch - financial intermediation and real estate - has followed a slightly downward course. Despite their decreasing trend, industrial activities, apart from construction, have recovered since 2007. The share of agriculture and construction has shrunk everywhere. It has to be noted that PR areas have surpassed the national average and all other areas in agriculture, construction and other industries; the latter comprise mainly the agrifood sector. Also, PU areas have specialized in all types of services, while IR areas are similar to that of the national economic structure.

Various areas are also diverse in terms of economic growth. After a rather uniform course in the mid-90's, real gross domestic product (GDP) diverges among the three types of areas (Figure 2). Thus, starting from 1995 with an index of real GDP equal to 100, in 2008 PU areas have reached 157, IR areas 147 and PR areas 124. The rate of growth decreased everywhere in 2007-2008, but mainly in PR areas.



Source: Eurostat (2011b), National Accounts, compiled from NUTS III data

PU: Predominantly Urban Areas, IR: Intermediate Areas, PR: Predominantly Rural Areas

Fig. 2. Gross Domestic Product at constant 1995 prices, Index 1995=100

### 4.3 Rural labor markets

#### 4.3.1 Employment

Important modifications are observed in the structure of employment over the 1993-2010 period. The highest net change in absolute numbers of total employment (22.6%) from 1993 to 2010 is registered in PU areas, compared to 17.2% in PR areas and 16.4% in IR areas (Table 4). During the same period, the tertiary sector increased steadily, mostly in PR and IR areas, whereas the secondary sector showed a positive change only in PR areas (by 19.3%). PR areas are the only ones that have had a positive balance in employment during the recent crisis. Particularly, in contrast to the tertiary sector, job losses have occurred in the secondary sector in all types of areas. A noteworthy increase of employment in the primary sector has been registered in IR and to a lesser degree in PU areas.

		1993	2000	2006	2010	1993-2010	1996-2010
PU Areas	Primary Sector	15227	18216	10969	16645	9.3%	5676
	Secondary Sector	376524	346590	370851	326965	-13.2%	-43886
	Tertiary Sector	956353	1070113	1278754	1309389	36.9%	30635
	Total	1348104	1434919	1660574	1652999	22.6%	-7575
IR Areas	Primary Sector	234813	216275	155005	169585	-27.8%	14580
	Secondary Sector	223590	230466	242045	201710	-9.8%	-40335
	Tertiary Sector	423511	524155	654497	655580	54.8%	1083
	Total	881914	970896	1051547	1026875	16.4%	-24672
PR Areas	Primary Sector	543815	479788	370105	365443	-32.8%	-4662
	Secondary Sector	299774	349295	367941	357741	19.3%	-10200
	Tertiary Sector	646573	865123	1002652	1023935	58.4%	21283
	Total	1490162	1694206	1740698	1747119	17.2%	6421
All Areas	Primary Sector	793855	714279	536079	551673	-30.5%	15594
	Secondary Sector	899888	926351	980837	886416	-1.5%	-94421
	Tertiary Sector	2026437	2459391	2935903	2988904	47.5%	53001
	Total	3720180	4100021	4452819	4426993	19.0%	-25826

Source: HSA, Labor Force Surveys, compiled from NUTS II original micro-data  
 PU: Predominantly Urban Areas, IR: Intermediate Areas, PR: Predominantly Rural Areas

Table 4. Structure of Employment (Persons by Sector) in Greece (1993-2010)

The above changes in the absolute level of employment are also reflected in the structure of employment in the various types of areas. As far as the percentage contribution of each sector is concerned, the main trends are the relatively strong presence of the primary sector, despite its continuous downward course, the enhancement of the already dominant position of the tertiary sector, along with the decline of the secondary sector (Table 5). The structure of employment in PR areas is a combination of the highest share of tertiary and primary sectors along with a non-hysteresis of the secondary sector.

		1993	2000	2006	2010
PU Areas	Primary Sector	1.1	1.3	0.7	1.0
	Secondary Sector	27.9	24.2	22.3	19.8
	Tertiary Sector	70.9	74.6	77.0	79.2
IR Areas	Primary Sector	26.6	22.3	14.7	16.5
	Secondary Sector	25.4	23.7	23.0	19.6
	Tertiary Sector	48.0	54.0	62.2	63.8
PR Areas	Primary Sector	36.5	28.3	21.3	20.9
	Secondary Sector	20.1	20.6	21.1	20.5
	Tertiary Sector	43.4	51.1	57.6	58.6
All Areas	Primary Sector	21.3	17.4	12.0	12.5
	Secondary Sector	24.2	22.6	22.0	20.0
	Tertiary Sector	54.5	60.0	65.9	67.5

Source: HSA, Labor Force Surveys, compiled from NUTS II original micro-data  
 PU: Predominantly Urban Areas, IR: Intermediate Areas, PR: Predominantly Rural Areas

Table 5. Structure of Employment (% employment by Sector), 1993-2010

A more detailed picture is derived at a disaggregated level from 2000 to 2008. Here, the dominant position of services is due to the increasing share of public administration and financial intermediation (Table 6). The share of employment in industry seems rather

		2000	2006	2007	2008
PU	All activities	100.0	100.0	100.0	100.0
	Agriculture; fishing	1.9	1.1	1.1	1.1
	Industry	21.6	20.3	20.9	20.8
	Industry (except construction)	15.4	13.1	13.2	13.1
	Construction	6.2	7.2	7.8	7.7
	Services (except extra-territorial organizations)	76.5	79.0	78.7	78.9
	Wholesale, retail trade; hotels, restaur; transp.	36.4	35.2	34.7	34.9
	Financial intermediation; real estate	10.9	13.4	14.1	14.3
	Public administr., community services; hh act.	29.2	30.4	29.9	29.7
IR	All activities	100.0	100.0	100.0	100.0
	Agriculture; fishing	19.9	14.1	12.9	12.9
	Industry	17.6	19.0	18.0	17.8
	Industry (except construction)	9.8	9.7	9.2	9.1
	Construction	7.8	9.3	8.8	8.7
	Services (except extra-territorial organizations)	62.4	66.8	68.8	68.9
	Wholesale, retail trade; hotels, restaur; transp.	32.8	31.0	32.9	33.1
	Financial intermediation; real estate	5.4	7.4	7.7	7.8
	Public administr., community services; hh act.	24.2	28.4	28.1	28.0
PR	All activities	100.0	100.0	100.0	100.0
	Agriculture; fishing	32.0	23.8	23.1	23.0
	Industry	18.3	18.5	18.7	18.6
	Industry (except construction)	10.6	10.6	10.5	10.5
	Construction	7.7	7.9	8.2	8.1
	Services (except extra-territorial organizations)	49.7	57.2	57.5	57.6
	Wholesale, retail trade; hotels, restaur; transp.	27.1	29.0	29.1	29.3
	Financial intermediation; real estate	3.9	5.6	5.6	5.6
	Public administr., community services; hh act.	18.7	22.6	22.8	22.7
All Areas	All activities	100.0	100.0	100.0	100.0
	Agriculture; fishing	17.0	11.9	11.3	11.3
	Industry	19.8	19.4	19.7	19.6
	Industry (except construction)	12.7	11.7	11.6	11.6
	Construction	7.1	7.7	8.1	7.9
	Services (except extra-territorial organizations)	63.3	68.7	69.0	69.1
	Wholesale, retail trade; hotels, restaur; transp.	32.0	32.2	32.2	32.4
	Financial intermediation; real estate	7.3	9.5	9.9	10.1
	Public administr., community services; hh act.	24.0	27.0	26.8	26.7

Source: Eurostat (2011c), Labor Force Surveys, compiled from NUTS III data

PU: Predominantly Urban Areas, IR: Intermediate Areas, PR: Predominantly Rural Areas

Table 6. Distribution of Employment by Branch in Greece (2000-2007)

unchanged, as a result of diverging trends of its constituent parts, and agriculture steadily decreased. In comparison to national averages, PU areas enjoyed a greater share in industry, except for construction and all kinds of services, IR areas in agriculture, constructions and trade-hotels-transportation and PR areas in agriculture and constructions.

Additionally, employment rates differ slightly among areas (ranging from 61.3% in PR areas to 64.8% in IR areas in 2007) and lag behind EU averages by four percentage points. Nonetheless, over the 2003-2007 period they showed a positive change in IR and PU areas (by 3.5 and 2.4 percentage points, respectively) while in PR areas they shrunk by 1.8 percentage points. On the other hand, PR and IR surpass PU areas in the incidence of self-employment by almost 16 percentage points (36% in contrast to 20%) (EU DG Agr., 2011).

### 4.3.2 Poverty incidence and in-work poverty risk

The examination of rural labor markets would be incomplete without an assessment of the significance of poverty incidence in various areas. To that end, we estimate poverty rates by defining five different poverty lines. The first line corresponds to 5% of the poorest households while the other four lines vary from 40% to 70% of the median of the distribution of equivalent expenditure or equivalent disposable income. It has to be mentioned that for comparisons of poverty among its Member States, the EU most frequently uses the line which corresponds to 60% of these medians, usually called the “central” poverty line. In Table 7 the percentages of households below every poverty line are depicted.

Poverty line (% of mean equivalent expenditure)					
	At 5% of the poorest	40%	50%	60%	70%
PU	3.4	4.3	9.2	14.9	22.2
IR	7.7	9.1	14.6	21.2	29.7
PR	9.7	11.8	20.2	27.5	36.6
All Areas	6.9	8.4	14.8	21.3	29.6
Poverty line (% of mean equivalent income)					
PU	3.9	3.8	7.7	12.4	18.5
IR	7.4	6.9	13.3	21.1	30.1
PR	7.9	7.5	13.6	23.2	32.6
All Areas	6.3	6.0	11.3	18.7	26.8

Source: HSA (2008), Household Budget Survey 2008, Elaborated original micro-data  
 PU: Predominantly Urban Areas, IR: Intermediate Areas, PR: Predominantly Rural Areas

Table 7. Poverty rates (percentage of households below the poverty lines) without imputed incomes, 2008

The same figures are calculated with imputed expenditure and imputed income (Table 8). It is well known that the inclusion of imputed expenses and imputed income in those calculations might alter the results of poverty incidence. This is so because, for example, in Greece 4/5 of all families and a far greater proportion of poor families reside in their own

Poverty line (% of mean equivalent expenditure, including imputed expenses)					
	At 5% of the poorest	40%	50%	60%	70%
PU	2.2	1.2	6.0	10.6	16.8
IR	7.2	5.7	10.7	19.4	27.4
PR	8.2	6.5	9.9	19.3	30.6
All Areas	5.7	4.3	10.1	17.3	25.8
Poverty line (% of mean equivalent income, including imputed income)					
PU	3.8	2.8	5.1	11.5	18.5
IR	6.5	4.2	11.3	17.5	26.2
PR	5.3	3.5	14.0	22.7	32.6
All Areas	5.0	3.4	8.7	16.1	24.7

Source: HSA (2008), Household Budget Survey 2008, Elaborated original micro-data

PU: Predominantly Urban Areas, IR: Intermediate Areas, PR: Predominantly Rural Areas

Table 8. Poverty rates (percentage of households below the poverty lines), including imputed expenses and incomes, 2008

homes. Consequently, imputed rent represents a significant element of both their expenses and incomes. In rural areas, the percentage of owner-occupiers approximates to almost 100%.

Thus, based on the central line of poverty (60% of median income or expenditure) without the imputed expenses and income, 18.7% (or 21.3% based on cost) of the population was below the poverty line in 2008. If imputed income (or imputed costs) of households are included in disposable income (or in financial expenditure) then the proportion of the poor is limited to 16.1% or 17.3%, respectively. The corresponding figures for rural areas are larger than the country as a whole, almost double the poverty rates in PU areas and significantly greater for the population residing in IR areas of the country. Finally, the inclusion of imputed income (or expenditure) reduces the poverty rates significantly and disproportionately. In PR areas the highest reduction is observed – from 27.5% to 19.3% for the central line of mean equivalent expenditure – because of the greater importance of imputed expenses and the higher rate of poor households in those areas compared to PU and IRs.

Furthermore, the index of in-work poverty risk is assessed only for households that had wage-labor or unemployed members. Therefore, this index refers mainly to the risk of poverty in relation to employment/unemployment in secondary and tertiary sectors, as the vast majority of agricultural employment is on a self-employment basis. The index is calculated for every household and ranged from zero, when all the active members of the household work as employees and paid over € 1,000 a month, to one, when all members of the household were unemployed and received no unemployment allowance.

As seen in Table 9, from the 1<sup>st</sup> quarter of 2009 until the 1<sup>st</sup> quarter of 2011, the risk of in-work poverty was higher in IR areas. It also deteriorated in all types of areas in that period, when the current crisis was well under way. The most rapid worsening has taken place in PU areas, increasing by 43.2% in the last two years.

	2009 I	2009 II	2009 III	2009 IV	2010 I	2010 II	2010 III	2010 IV	2011 I	2011 I - 2009 I (%)
PU	0.165	0.172	0.185	0.195	0.205	0.209	0.217	0.230	0.236	43.2%
IR	0.217	0.212	0.225	0.224	0.240	0.246	0.255	0.268	0.290	33.8%
PR	0.221	0.195	0.183	0.203	0.232	0.217	0.207	0.241	0.269	21.7%
All Areas	0.192	0.186	0.191	0.199	0.212	0.214	0.218	0.237	0.254	32.3%

Source: Adaptation from Zografakis & Mitrakos, 2011

PU: Predominantly Urban Areas, IR: Intermediate Areas, PR: Predominantly Rural Areas

Table 9. Risk of in-work poverty in Greece, 2009-2011

### 4.3.3 Farm structures and rural labor markets

Notwithstanding the presence of agriculture all over the country, farm structures are quite diverse and differentially evolving. Although IR and PR areas have similar average farm sizes – in both physical and economic terms – in 1990, after 17 years the distance between them has widened in favor of IR areas (Annex Table 1). The same observation holds for the share of the most “entrepreneurial” farms (those having an economic size greater than 40 ESU). In addition, IR areas exhibited the highest rate of change in the total number of farms during the 2005-2007 period. In PU areas on the other hand, there seems to be a strong and increasing presence of very small farms, which increased their share from 55.5% in 2005 to 59.6% in 2007.

Ageing of farming population is a widespread phenomenon. As we see from Table 10, more than one third of all holders were 65 years old or more. It has to be noted that this problem was less acute in IR areas, despite deterioration everywhere.

	2000	2003	2005	2007
PU	32.2%	39.6%	39.1%	39.6%
IR	23.9%	29.7%	31.2%	32.5%
PR	33.4%	37.2%	38.5%	38.9%
All Areas	31.0%	35.5%	36.8%	37.4%

Source: Eurostat (2011d), Farm Structure Survey, compiled from NUTS II data

PU: Predominantly Urban Areas, IR: Intermediate Areas, PR: Predominantly Rural Areas

Table 10. Holders aged 65+ years/Total Holders (2000-2007)

To get a clearer picture of the demographic prospects of Greek farms, we constructed the “holders’ renewal” index, defined as the percentage of holders with an age of less than 35 years old to holders older than 65 years old (Table 11). It is again the IR areas which ranked first, even though the index steadily worsened in all areas.

	1990	1993	1995	1997	2000	2003	2005	2007
Total Agricultural Area (ha per farm)								
PU					2.1		2.1	1.9
IR	4.7	4.9	5.1	5.1	5.3	5.7	5.8	5.8
PR	4.2	4.1	4.2	4.0	4.2	4.5	4.6	4.5
All Areas	4.3	4.3	4.5	4.3	4.4	4.8	4.8	4.7
Economic Size Units per farm (1 ESU=1200 €)								
PU					3.4		4.7	4.9
IR	5.3	7.4	8.1	7.6	8.2	7.9	8.4	9.2
PR	4.1	5.9	5.4	5.2	5.8	5.8	6.1	6.6
All Areas	4.4	6.2	6.1	5.8	6.3	6.3	6.6	7.2
Percentage of farms in Less Favoured Areas								
PU					12.1%		12.8%	13.9%
IR	48.5%	48.7%	47.7%	48.0%	50.4%	51.3%	52.2%	53.1%
PR	63.9%	63.4%	63.4%	62.6%	63.8%	62.9%	64.4%	65.2%
All Areas	59.9%	59.6%	59.3%	58.9%	58.9%	60.1%	59.9%	60.7%
Percentage of farms with Economic Size < 2 ESU								
PU					60.5%		55.5%	59.6%
IR	35.6%	28.8%	24.6%	27.8%	27.6%	31.0%	29.9%	26.8%
PR	45.4%	34.0%	37.4%	37.8%	36.2%	39.6%	37.0%	35.2%
All Areas	42.9%	32.7%	34.0%	35.3%	34.9%	37.5%	35.9%	34.0%
Percentage of farms with Economic Size > 40 ESU								
PU					0.6%		1.6%	1.8%
IR	0.4%	1.5%	1.6%	1.3%	1.8%	1.9%	2.5%	2.8%
PR	0.3%	0.7%	0.6%	0.4%	0.7%	1.1%	1.2%	1.6%
All Areas	0.3%	0.9%	0.8%	0.6%	1.0%	1.3%	1.5%	1.9%
Change in the number of farms								
	1990-93	1993-95	1995-97	1997-2000	2000-03	2003-05	2005-07	
PU								2.8%
IR		-4.0%	-2.0%	-1.7%	-4.2%	0.5%	0.3%	4.4%
PR		-3.5%	-2.0%	3.8%	-3.6%	5.5%	-2.9%	2.8%
All Areas		-3.6%	-2.0%	2.4%	-0.5%	0.9%	1.1%	3.2%

Source: Eurostat (2011d), Farm Structure Survey, compiled from NUTS II data  
 PU: Predominantly Urban Areas, IR: Intermediate Areas, PR: Predominantly Rural Areas  
 ESU: European Size Units

Annex Table 1. Basic Farm Structure Indicators

	2000	2003	2005	2007
PU	20.2%	11.0%	11.1%	9.7%
IR	42.4%	32.0%	29.0%	28.6%
PR	25.1%	18.1%	16.1%	16.5%
All Areas	28.1%	20.7%	18.5%	18.8%

Source: Eurostat (2011d), Farm Structure Survey, compiled from NUTS II data

PU: Predominantly Urban Areas, IR: Intermediate Areas, PR: Predominantly Rural Areas

Table 11. Holders' renewal index (Holders aged <35 years/holders aged 65+ years), 2000-2007

Additional insights about farm structures are derived from the decomposition of "farmers" i.e. all those who identified themselves as "farmers" in the list of the professional statuses of Labor Force Surveys (Table 12). Thus, at the national level, over the 1993-2010 period, self-

		1993	2000	2006	2010
PU	Self-employed without hired labor	52.6	53.5	44.7	61.2
	Self-employed with hired labor	12.5	6.0	6.9	8.4
	Assistant in the family business	19.7	20.7	12.4	14.2
	Hired worker	15.2	19.7	36.0	16.3
	Total	100.0	100.0	100.0	100.0
IR	Self-employed without hired labor	52.1	53.3	60.5	57.4
	Self-employed with hired labor	6.5	10.1	8.2	15.3
	Assistant in the family business	38.7	35.0	28.4	23.2
	Hired worker	2.6	1.6	2.9	4.1
	Total	100.0	100.0	100.0	100.0
PR	Self-employed without hired labor	56.4	58.0	65.2	72.7
	Self-employed with hired labor	3.4	6.4	6.0	6.1
	Assistant in the family business	38.0	33.4	25.6	18.0
	Hired worker	2.3	2.1	3.2	3.2
	Total	100.0	100.0	100.0	100.0
All Areas	Self-employed without hired labor	55.0	56.5	63.3	67.5
	Self-employed with hired labor	4.5	7.5	6.7	9.1
	Assistant in the family business	37.8	33.5	26.1	19.5
	Hired worker	2.6	2.5	3.9	3.9
	Total	100.0	100.0	100.0	100.0

Source: HSA, Labor Force Surveys, compiled from NUTS II original micro-data

PU: Predominantly Urban Areas, IR: Intermediate Areas, PR: Predominantly Rural Areas

Table 12. Occupation "Farmer", by type (% of total occupation "Farmer"), 1993-2010



employed farmers without hired labor comprised the majority, reaching two thirds of the total in 2010 [with increasing trends], while assistants in the farm family business experienced a spectacular drop in their contribution [share] by half. In parallel, self-employed farmers with hired labor doubled their share. In PR areas, the aforementioned trends of the self-employed without hired labor along with assistants in the farm family business developed at a more rapid pace, in contrast to self-employed with hired labor and hired workers, who were less pronounced than in the whole country. IR areas displayed the highest share of both self-employed farmers with hired labor and assistants in the farm family business. PU areas diverged significantly, with hired workers having a quadruple share than the national average, although that was reduced by 20 percentage points from 2006 to 2010. Also, the lowest share of the assistants in the farm family business was observed in PU areas.

Only 8.0 percent of the total family labor force is employed full-time on agriculture (Table 13) which means that the vast majority of farm family members engage in agriculture on a part-time basis. The lowest and more rapidly shrinking rate of full-time employment is seen in PU areas.

	2000	2003	2005	2007
PU	8.0%	3.6%	5.5%	3.9%
IR	10.9%	8.6%	8.0%	8.4%
PR	9.8%	8.1%	8.0%	8.0%
All Areas	10.0%	8.1%	7.9%	8.0%

Source: Eurostat (2011d), Farm Structure Survey, compiled from NUTS II data

PU: Predominantly Urban Areas, IR: Intermediate Areas, PR: Predominantly Rural Areas

Table 13. Family labor force full-time employed (2000-2007)

Furthermore, in 2007 the percentage of holders who besides agriculture are engaged in other gainful activities ranged from 22.7% in PR areas to 25.8% in PU areas (Table 14). A similar pattern is observed in the EU, although at a much higher level.

	PU	IR	PR	All Areas
Greece	25.8	25.0	22.7	23.2
EU 27	36.8	38.8	35.8	37.0

Source: EU DG Agr., 2011, NUTS III data

PU: Predominantly Urban Areas, IR: Intermediate Areas, PR: Predominantly Rural Areas

Table 14. Holders with other gainful activities (%), 2007

It has to be noted that the percentage of pluriactive farm holders decreased over time since in 1990/91. It was 24% in “most rural” regions and 31% in “intermediate” regions, in contrast to 26% in the country as a whole (Post & Terluin, 1997).

From the combination of data concerning part-time employment in agriculture and pluriactivity, an estimation of hidden unemployment could be derived (Terluin et. al., 1994). Thus, almost two thirds of part-time farm holders do not have any other profitable activity.

Even though this figure is high, there exists a difference of 5.5 percentage points between IR and PU areas (Table 15).

	PU	IR	PR	All Areas
% part-time holders [1]	95.3	89.0	89.3	89.4
% holders with other gainful activities [2]	25.8	25.0	22.7	23.2
Estimation of hidden unemployment [1] – [2]	69.5	64.0	66.6	66.2

Source: Authors' estimation, based on Tables 13 and 14

PU: Predominantly Urban Areas, IR: Intermediate Areas, PR: Predominantly Rural Areas

Table 15. Estimation of hidden unemployment, 2007

A final dimension of rural labor markets concerns immigrants working in agriculture. According to official data, they represent 8.2% of all employees in agriculture in 2010 (Table 16). Although these figures seem to be underestimated, three interesting findings emerge. Firstly, immigrants' share in total agricultural employment increased 16 times between 1993 and 2010. Secondly, the ratio of immigrants without Greek nationality to those with it is 3:1 on a national scale. Thirdly, the highest share of immigrants was observed in PU areas (20.4% in 2010), more than triple the IR areas. Despite the fact that the contribution of immigrants to farm employment progressively increased, presumably the figures in Table 16, to some degree, are due to the improvement of the quality of statistical data and a higher rate of registration of immigrants to the official statistical surveys. In addition, a significant

		1993	2000	2006	2010
PU	Immigrants with Greek Nationality	0.0	3.2	8.8	7.0
	Other Immigrants	0.9	0.8	10.4	13.4
	All Immigrants	0.9	3.9	19.1	20.4
IR	Immigrants with Greek Nationality	0.1	0.1	1.2	1.8
	Other Immigrants	0.5	0.4	2.4	4.8
	All Immigrants	0.6	0.6	3.6	6.6
PR	Immigrants with Greek Nationality	0.2	0.5	1.8	2.0
	Other Immigrants	0.3	0.8	3.7	6.4
	All Immigrants	0.5	1.3	5.5	8.3
All Areas	Immigrants with Greek Nationality	0.2	0.5	1.8	2.1
	Other Immigrants	0.3	0.7	3.5	6.1
	All Immigrants	0.5	1.2	5.3	8.2

Source: HSA, Labor Force Surveys, compiled from NUTS II original micro-data

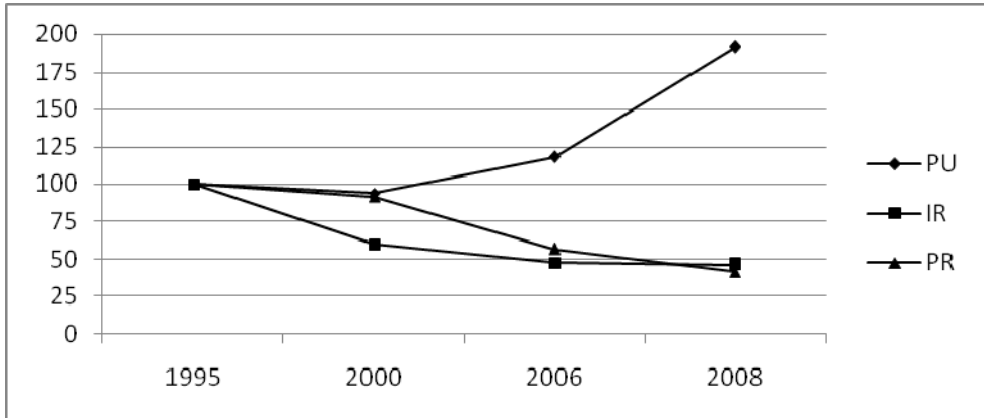
PU: Predominantly Urban Areas, IR: Intermediate Areas, PR: Predominantly Rural Areas

Table 16. Immigrants employed in agriculture (% total employment in agriculture), 1993-2010

and growing part of those immigrants have established their own farm holdings, after some years of employment as farm hired workers.

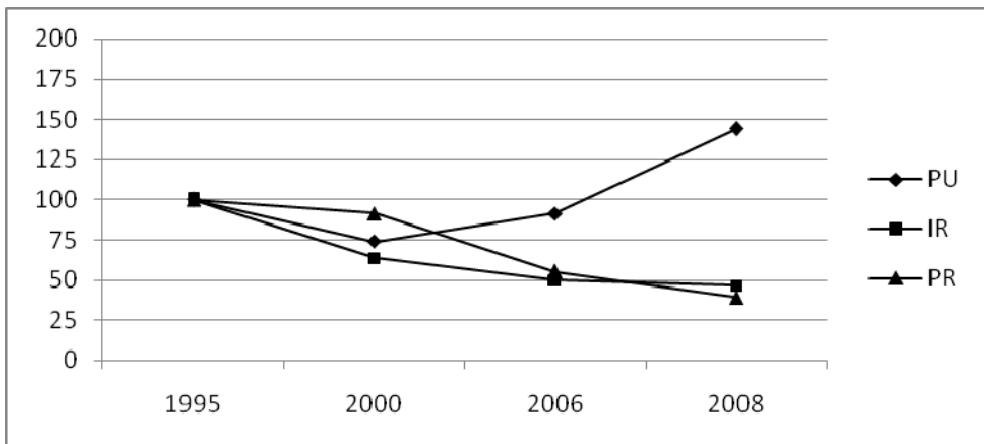
#### 4.4 Economic performance of agriculture

Apart from structural characteristics and labor market issues, various areas are diverse in terms of economic performance. Farm income in Greece exhibits a steady decline since the mid 1990's. Although at a varying pace, this decline concerns all farm income indicators (Karanikolas, 2011). In Figures 3 and 4 we see the course of the net entrepreneurial income



Source: Eurostat (2011e), compiled from NUTS II Eurostat data, PU: Predominantly Urban Areas, IR: Intermediate Areas, PR: Predominantly Rural Areas

Fig. 3. Entrepreneurial income of agriculture, constant 1995 prices, index 1995=100



Source: Eurostat (2011d & 2001e), Authors' calculations, compiled from NUTS II Eurostat data PU: Predominantly Urban Areas, IR: Intermediate Areas, PR: Predominantly Rural Areas

Fig. 4. Entrepreneurial income per farm, constant 1995 prices, index 1995=100

of agriculture, which is the net income of family farms after the remuneration of all non-family production factors.

Thus, net farm family income, either as an absolute figure or on a per farm basis declines in all areas from 1995 through 2000. However, after 2000 the indexes in PU areas exhibit a remarkable rise, in contrast to IR and PR areas, where the declining course continues.

## 5. Discussion

The preceding analysis has revealed some long-term trends in the evolution of labor markets. To sum up, both diverging and converging trends among areas are present. PU areas have benefited most from population and employment growth. Demographic analysis showed that, in contrast to many European countries and regions, the process of counter-urbanization does not seem to be confirmed in the Greek case, at least not from the population point of view. In terms of employment and GVA a declining role of agriculture is observed along with less declining shares of industry and expanding services, indicating a continuous diversification of the economy. At the same time, unemployment rates progressively converge, with IR and PR areas reaching PU areas. Changes in the sectoral structure of employment pose the question whether decline in agricultural employment is counterbalanced by growing employment in other sectors (Bryden & Bollman, 2000). As far as the sectoral specialization is concerned, PR areas specialize in agriculture and construction while they exhibit a certain dynamism in the agrifood sector - with regard to GVA and job growth.

On the other hand, diverging trends are observed, in relation to rates of employment. In particular, from 2003 to 2007 employment rate increased in IR and PU areas by 3.5 and 2.4 percentage points, respectively, whereas in PR areas it fell by 1.8 percentage points. This fact raises questions about the long-term prospects of rural areas, given the ambitious policy targets put forward by the EU, such as the 'Lisbon' objective on labor market participation without undermining cohesion. Furthermore, self-employment is a wide-spread phenomenon, especially in IR and PR areas; in the latter it also increases most rapidly over the 2005-2009 period.

With regard to the current crisis, according to the foregoing analysis, it emerges that, despite the changing profile of all areas, PR areas continue to lose population, while IR hold, and PU areas increase their population share. Unemployment rate has increased by three percentage points in the whole country, with the highest rise in PU areas (3.5 points) and the lowest in PR areas (2.5 points). Concurrently, the number of unemployed people has increased everywhere, most notably in PU areas, but PR areas enjoy a slight job growth in contrast to IR and PU areas which suffer a loss in job positions. The critical question is: Could this job growth be sustained? It seems that the answer is "no", since more recent evidence displays job loss in all economic sectors. Specifically, from the first quarter of 2010 through the first quarter of 2011 total employment fell by 7.7% in agriculture, by 13.8% in industry and by 2.2% in services (Zografakis & Mitrakos, 2011). Noteworthy changes occurred at the sectoral level, too. In contrast to the tertiary sector, job loss has occurred in the secondary sector in all types of areas. A remarkable increase of employment in the primary sector - contrary to the general trend - has been registered in IR and, to a lesser degree, in PU areas. Our data showed a slower rate of economic growth in PR areas after mid-1990's and a stagnation in

2007-08. Nonetheless, the most recent data (1<sup>st</sup> Q.2010 – 1<sup>st</sup> Q.2011) suggest that the whole country is already experiencing a sharp contraction of economic activity, though there's no indication regarding the relative performance of various types of areas.

Over time pluriactivity is decreasing and is more equally distributed among areas. The slight precedence of PU and IR areas in terms of pruriactivity must be attributed to the ability of local and regional labour markets to offer employment opportunities beyond agriculture. The relationship of pluriactivity with farm-exit rates is one of its main dimensions. As we have seen, the speed of change in farm structures seems to be much higher in IR areas; this is also the case where the rate of farm exit in the 1990's is concerned, as well as the rate of the creation of new farms after 2005. It seems that this is in contrast to other research findings, e.g. from Western Germany, indicating that farmers quit agricultural occupation at faster rates in regions with small farms and a high share of part-time farming (Glauben et al., 2006). A similar contention is supported for the relationship between large farms and the probability of farm exit, which has been found to be negative (Mishra et al., 2010); but our data indicates that farm exit rates are higher in the areas with the largest and growing average farm size, that is in IR areas.

Moreover, the decision of a farm operator for off-farm employment varies depending on farm size. Alasia et al. (2009) suggest that although human capital and farm characteristics are important determinants for both smaller and larger holdings, for smaller agricultural holdings the decision to work off-farm is heavily influenced by family, community and regional characteristics; also, urban regions are not the main labor markets for the operators who are involved in off-farm labor hence their main linkages are with the rural labor market itself. This stresses the need for a more detailed research on the intersection between rural labor markets and farm structural, farm holder and area characteristics. Although not based on micro-data, our analysis of off-farm employment implies that the three types of areas, despite their differences in labor markets and farm structures, have no substantial differences in pluriactivity.

As we have seen, poverty rates for PR areas are larger than those of the country as a whole, almost double the poverty rates in PU areas and significantly greater for the population residing in IR areas of the country. The inclusion of imputed income (or expenditure) reduces the poverty rates significantly and disproportionately. The highest reduction is observed in PR areas- from 27.5% to 19.3% for the central poverty line - because of the greater importance of imputed expenses and the higher rate of poor households, compared to PU and IR areas. Ownership-occupancy is thus a prime mechanism for the mitigation of the consequences of the crisis: A poor family that lives in its own property is clearly in a better position than other families which rent a house, since low income does not entail the risk of eviction and loss of housing which is the greatest fear of the poor who have no such guarantee. Therefore, poverty rate indicators reveal the fragile socio-economic status of rural households.

Our results are in line with earlier research findings, showing that farm households are one of the most vulnerable and low-income groups in society (Hill, 2000). Moreover, in Greece, employment in the agricultural sector, along with old age, residence in rural areas, low educational qualifications and, to a lesser extent, lack of employment have been identified as closely associated with acute poverty; this conclusion is drawn irrespective of the welfare

indicator, the level of the poverty line, or the size of the equivalence scales used in the analysis (Tsakloglou and Panopoulou, 1998).

Poverty risk for the working population is another serious and progressively worsening threat throughout all areas. A comparative analysis of this issue among EU countries showed that Greece ranks first in all workers and second (after Portugal) in part-time employees (Allègre, 2008). Apparently, this concerns the majority of the farm population, as farm employment in all areas is carried out on a part-time basis.

What ensues, then, is that farm households as well as rural households are among the low-income groups in society. It has been documented that after a decade of relative stability of inequalities (1988-1999), a decrease in the income and well-being discrepancy between farm and non-farm households took place over the period 1999-2005 (Karanikolas et al., 2008). Nevertheless, social and economic situation during the current crisis raises deep concern. Unemployment is rising dramatically, the nominal and real incomes are shrinking, the welfare state is suffering because of the financial adjustments and social indicators of inequality and poverty seem to worsen (Leventi and Matsaganis, 2011). An empirical question for future research concerns the spatial variation of poverty, as prior experience shows that during a crisis the incidence of poverty increases more in rural than in urban areas (Fallon & Lucas, 2002).

Another set of data clarified the type of the structural adjustment of agriculture during the period under study; this is done by examining the evolution of farm structures, the agricultural labor markets and the real farm income (Table 17). As was displayed in detail in the previous section, PR areas show stagnation in farm structures and stagnation/decline in the agricultural labor markets. The latter is evident from the highest rate of increase of the 'self-employed without hired labor' along with the highest rate of decrease of 'assistants in the farm family business' and the lowest level of 'hired labor'. The above indicate a shift towards a "lone-farmer" model. In addition, although their agri-food sector exhibits certain dynamism, real per farm income has suffered a spectacular drop by 61% over the 1995-2008 period.

On the contrary, farm structures in IR areas are more dynamic, as is evident from the evolution of both physical and economic sizes of farms, the higher rate of replacement of

	PU Areas	IR Areas	PR Areas
Farm Structures Evolution (1993-2008)	dynamic	dynamic	stagnant
Agricultural Labor Markets (1993-2010)	dynamic	dynamism and retention of family characteristics	stagnation/decline
Real per Farm Income			
1995-2000	-26%	-36%	-8%
2000-2008	70%	-17%	-52%
1995-2008	44%	-53%	-61%

PU: Predominantly Urban Areas, IR: Intermediate Areas, PR: Predominantly Rural Areas

Table 17. Summary of farm structures evolution and structural adjustment of agriculture

holders and the relatively low share of elderly farmers. As far as the agricultural labor markets are concerned, IR areas exhibit a combination of dynamism (the highest share and rate of change of the 'self-employed with hired labor') and retention of family characteristics (the lowest reduction of 'assistants in the farm family business'). Nevertheless, the farming sector in these areas has sustained a heavy loss in real per farm income especially from 2000 to 2008.

PU areas diverge significantly, with hired workers having a quadruple share than the national average, along with the lowest share of the assistants in the farm family business and the highest share of immigrants employed in agriculture. PU are the only areas with a substantial rise of real per farm income over the 2000-2008 period, after a decrease from 1995 to 2000. On the other hand, of particular importance is the strong and increasing presence of very small farms, which have augmented their share from 55.5% in 2005 to 59.6% in 2007. It is very unlikely that this increase concerns "hobby farmers" or "lifestyle farmers" or "semi-subsistence farmers" (though the above do exist), as those data come from interviewees with the professional status of "farmer". Consequently, most likely it refers to tiny farms in terms of utilized area, but not in their economic size; the most prominent examples are intensive greenhouse farms cultivating fresh fruits and vegetables, and intensive dairy farms, both relying on extended use of immigrant labor force. It seems that this might be an alternative to the economic crisis, given the economic performance of farms in PU areas.

Thus, the aforementioned differences help to "recognize the multidimensional or multilevel nature of farm-related crises, the complex nature of precipitating factors, and the varied implications for farm livelihoods, rural communities, and the agricultural sector" (Bessant, 2007).

Greek rural areas, as their European counterparts, "face particular challenges as regards growth, jobs and sustainability in the coming years... In intermediate areas, the challenge will be to avoid the risk of exclusion associated with lack of skills and low incomes. In remoter areas with higher levels of agricultural employment, the management of the restructuring process will play a significant role in the broader rural economy" (CEC, 2006). Hopefully, the preceding analysis has contributed to the clarification of some critical dimensions of spatial differentiation. Moreover, at this level of analysis, perhaps some intra-area characteristics and differences are insufficiently depicted. This underlines the urgent need for a more disaggregated analysis. Additionally, there's scope for improvement in the adopted methodology, taking into account, for example, that the use of data with a different territorial reference (NUTS II and NUTS III) could weaken the consistency of the results.

## 6. Conclusion

The aim of this chapter has been to trace the consequences of the current economic crisis in rural areas of Greece. The central question of the study has been: How the current crisis has affected rural areas and how rural areas have responded to this crisis? The analysis at the level of predominantly urban (PU), intermediate (IR) and predominantly rural (PR) areas – as recently redefined by Eurostat – has revealed some critical dimensions of spatial differentiation.

All types of areas in Greece are experiencing rapid changes in their labor market characteristics, poverty rates and structural adjustment of agriculture. Both diverging and converging trends among areas are present. In the context of a continuous diversification of

the economy, PU areas have benefited most from population and employment growth, while unemployment rates progressively converge, with IR and PR areas reaching PU areas. In all areas but PR, rates of employment have increased, self-employment has spread especially in PR and IR areas, and in the course of time the all-pervading pluriactivity has decreased.

Households in PR areas along with farm households, irrespective of their place of residence, proved to be some of the most vulnerable parts of the population to the risk of poverty. Ownership-occupancy is a key mechanism for the mitigation of the consequences of the crisis, most importantly in PR areas. In-work poverty risk is another serious threat for the working population in all areas, particularly disturbing to those with a part-time employment such as the majority of farmers. Notwithstanding the presence of agriculture all over the country, farm structures are quite diverse and differentially evolving, most rapidly in IR areas. Generally speaking, the structural adjustment of agriculture is characterized by dynamism in PU areas, by stagnation/decline in PR areas and by dynamism/steadiness in IR areas. Moreover, within the adverse environment of the current crisis diverging trends are enhanced, unemployment is rising dramatically, the nominal and real incomes are shrinking, and social indicators of inequality and poverty seem to worsen after a period of relative convergence.

The above findings assume a prime importance considering the challenges that rural areas face. The analysis has elucidated the distinct patterns of adjustment pertaining to various types of areas. The fact that intra-area characteristics and differences might be insufficiently depicted underlines the urgent need for a more detailed analysis and for area-specific policy responses. In addition, as the economic crisis is in full swing, a critical question emerges about its long-term implications, even after the recovery of the economy.

Finally, our analysis indicates that the participation of Greek economy in successive stages of the European integration and its consequent exposure to a more competitive environment are coupled with asymmetric effects on various types of areas. It also turns out that the concurrent implementation of EU rural development policy, despite its apparent cohesion effects, has not been enough to restrain the diverging spatial trends.

## 7. Note

The authors have an equal contribution to this chapter.

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# Direct Food Marketing at Farm Level and Its Impacts on Rural Development

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## 1. Introduction

As a consequence of the tough competition in the market, the strict conditions set up by the concentrated commercial sector, and the policies of the European Union which subsidises most larger producers, the number of agricultural producers decreases. In many developed economies, processing, transportation and marketing may account for as much as 80 percent of the cost of food paid by the consumer. This indicates that the average farmer now receives only 20 percent of the retail food price. To reverse this tendency, measures must be taken to facilitate the process of food production and distribution by farmers. Such corrective action may increase farm income through direct sales.

In many countries farmers sell their products directly, with many of these countries having their own regulations and practices concerning direct sales. Such regulation also exists in Hungary, but the actual rules are not sufficiently practical and it is quite expensive to meet these regulations. The modification of rules concerning direct sales would allow direct distribution to local shops and restaurants. This could potentially boost rural communities and would also be likely to lead to an environmental advantage, since the transportation distance of products would be reduced. Marketing of the local products directly from producer to consumer is a form of 'guarantee', with the added bonus of conviviality and interpersonal exchange.

## 2. Direct sales practice

In the case of economies which have been in major transition, like Hungary, the market organizations in the food chains are still not fully established in each sector. The lack of these organizations poses numerous difficulties, primarily in coordination. The well-organized nature of large, multinational companies eliminates many of these difficulties. A large majority of agricultural producers are more likely to face market uncertainty without possessing technical knowledge of risk management. This generally applies to small, fragmented farms and the fruit and vegetable production sectors. (Picture: 1.)

Selling directly to consumers can be very advantageous to both small farms and fruit and vegetable producers. Direct sales allow farmers, to sell continuously at a premium; thus, leading to income gains. Furthermore, it is important for these farmers to improve consumer opinion of food producers by selling quality goods. Selling direct to consumers is one



Picture 1. In a traditional village market two generations are selling their own fresh produce and flowers together.

opportunity for farmers to increase their share of the consumer price and to cut some mediators from the distribution chain for these products. In summary, direct sales is a distribution or commercial activity made by local farmers who utilise communication skills that make the purchasing experience of the consumers enjoyable and memorable.

The key to direct sales is “mutual advantage,” in which both the producer and customer are winners. The producer has work and experiences gains in income, while the customer is provided with healthy and high quality food. Hence, the customer no longer has to worry about products beyond the expiry date that have been repackaged or re-dated. Local recipes do not change because quality is more constant ([www.ams.usda.gov](http://www.ams.usda.gov)).

The farmers who will benefit the most from direct sales are primarily those who possess the necessary labour force, capacity and knowledge. Further, direct sales are more conducive to an environment in which consumers are welcome, and also where the producers are located near the targeted consumers. In these cases, it is important for agricultural and rural development advisers to acquaint farmers with related subsidy opportunities, as well as to help them combine their labour forces and take part in continuing training. Primarily small and medium-sized producers prefer direct sales techniques. By taking on the role of direct seller, they must compete with an increasing number of hypermarkets, supermarkets and wholesale markets.

In performing direct sales, it is very important to abide by the set rules and regulations, to produce products of superior quality, and to ‘awake’ consumers purchasing behaviour by introducing the products. It is also very important to possess the managerial abilities that re-enforce successful retail sales. (Picture: 2,3,4,)



Picture 2. Several farmers cooperatively built a local shop for selling fresh and processed food products.



Picture 3. A young organic agricultural producer showing and selling her own products in her shop on the farm

When talking about direct sales, it means that farmers sell their products directly to customers. There are more options: (i) sale in their own shop of farm, (ii) through a catalogue and (iii) delivery directly to restaurants and shops.





Picture 4. In many cases, farmers have created their own small retail shops for receiving buyers and presenting local products according to the seasons.

Advisers are also helping farmers select the right sales channels to diversify their marketing activities. Until now, we have little credible statistical data on the direct sale of farmers' own produced and processed products. The rural development programs can provide a lot of assistance to help farmers' develop strategies for direct sales. However, specialized advisers are needed to provide farmers with continuing professional education so they can implement the strict food safety regulations and controls.

In the field of direct sales, numerous cases studies are known in the EU, and applying them would be useful, in regulations and practice. The existing key factors are the importance of professional training and the ability to change consumer consciousness and to encourage new forms of cooperation. For example in France, the Markets of local farmers (The *Marchés des Producteurs de Pays*) reserved exclusively for farm producers or artisans, are places for farmers and of colourful welcome. They are regulated by a charter which requires that products on the market come directly and exclusively from local farms. Based on 2011 figures, 29 departments are participating in the process, with 370 places of markets and 2 000 markets held throughout the year and 2500 country producers ([www.marches-producteurs.com](http://www.marches-producteurs.com)).

The primary key to successful direct selling is the same as the key to all successful marketing. The producer must recognize that the consumer is "king". The wants and desires of the consumer, not the producer, must dominate the marketing strategy. Thus, the producer must find a reason as to why consumers will prefer direct sales to hypermarket sales. Part of the reason might reside with a desire for what the consumer feels is a higher quality or fresher product. Consumers may also be looking to combine the buying experience with a pleasant drive away from the crowded city and into the slower pace of the

countryside, or to search for organic or natural products. Another reason maybe to locate non-traditional products, such as hog meat from the traditional breeds or eggs from free range chickens.

It may not be sufficient to simply offer a high quality product. Often other characteristics of the buying experience are just as important in attracting customers to direct sales. Another aspect of successful direct farmer to consumer marketing is the buying experience itself. The consumer often receives additional satisfaction by speaking to the farmer, or a member of his or her family. Some consumers feel this puts them in touch with their roots and reminds them of their childhood. Salespeople dressed in traditional costumes, who display products in buildings of the old-time or traditional design, might add to the ambience of the direct sales buying process for consumers. In order for direct farm to consumer sales to be successful, the consumer must enjoy the buying experience, which involves not only a high quality product but also a high quality interaction with the salesperson. A farm to consumer marketing strategy should not overlook the training of salespeople.

The advantages of direct sales are:

- It assists local job creation
- Growing ability to keep the population in rural areas
- It increases the value added of the products
- It differentiates and enlarges the supply of the products
- It helps farmers' marketing orientation
- It improves farmers' bargaining position
- It increases consumers' trust and affects public opinion about food production and supply as a whole
- It augments farmers' income and reduces claim for social benefits in rural areas
- It heightens the market share of rural areas in the food chain and in services
- It respects environmental and animal welfare requirements
- It promotes the development of rural tourism
- It can reduce the need for and the costs of transportation

### **3. Forms of direct sales**

In many countries farmers sell their products directly, with many of these countries having their own regulations and practices concerning direct sales. Such regulation also exists in Hungary, but the actual rules are not sufficiently practical and it is quite expensive to meet these regulations. The modification of rules concerning direct sales would allow direct distribution to local shops and restaurants. This could potentially boost rural communities economies and would also likely lead to an environmental advantage, since the transportation distance of products could be reduced.

In the case of economies which have been in transition, like Hungary, the market organizations in the food chains have not yet been fully established in each sector. The lack of these organizations poses numerous difficulties, primarily in coordination. A large majority of agricultural producers are more likely to face market uncertainty without possessing technical knowledge of risk management. This generally applies to small, fragmented farms.

Direct sales allow farmers to sell continuously at a premium; thus, leading to income gains. Furthermore, it is important for these farmers to improve consumer opinion of food producers by selling quality goods. Selling to direct consumers is one opportunity for farmers to increase their share of consumer prices and to cut some intermediaries from the distribution chain for these products. In summary, direct sales is a distribution or commercial activity undertaken by local farmers who utilise communication skills that make the purchasing experience of the consumers enjoyable and memorable.

In performing direct sales, it is very important to abide by the set rules and regulations, to produce products of superior quality, and to 'awake' consumers buying behaviour by introducing the products. It is also very important to possess the managerial abilities that re-enforce successful retail sales.

In the field of direct sales numerous cases studies are known in the EU, and applying them would be useful including in terms of meeting regulations in practice. The existing key factors are the importance of professional training and the ability to change consumer consciousness and to encourage new forms of cooperation.

Farmers have many options in developing a direct sales form. They may sell the product in their own shop, through a catalogue, and/or deliver to restaurants and shops. Direct sales channels, beyond those already mentioned include: on-farm sales, wayside stands, and in local markets where they sell their own products of the given season. In recent years, more and more organic markets play an important role in the direct sales market segment.

Direct sales to customers is most widely found in fruit production. This type of operation is commonly known as "u-pick," where it is the customers who pick and transport the fruit. Another version of direct sales is when farmers use "mobile shops" to sell their products, so producers transport products to the customers in the city. (Picture:6.)

The hyper- and supermarkets also recognize the marketing possibilities in product differentiation. This is why there are more and more customer buying options, such as ordering products via 'phone or through the internet at the beginning of the week.(Picture:5.) Producers then transport them directly to the retailer in a refrigerated van and avoid many distribution platforms. Recently, restaurants and hotels have also come forward with a higher demand for delivery services from the producer. (Hajdú-Lakner 1999)

The more recent development of IT tools has facilitated the launch of electronic means of direct sales, called "internet marketing." This form of marketing provides a new opportunity to develop direct sales patterns. For example, traditional direct sales methods in wine production can be complemented with internet sales.

Several wine producers use electronic marketing successfully as a response to the increasing number of online wine trading societies. This will continue to be a growing and important marketing method for wine producers as more affluent consumers continue to purchase computers (Rouzet, Seguin 2003). Advisers are also helping farmers to choose the right sales channels to diversify their marketing activities.

#### **4. An example of direct sales**

An example of direct sales is one action of the Chamber of Agriculture of Bács-Kiskun County called the "Cellar-tour" or " Kamra túra" ("Pantry-tour"). The "Cellar-tour" is a





Picture 5. Shopping in hypermarkets is very common in the larger towns. Consumers like to shop twice a month, buying large quantities from the large assortment of choices available.



Picture 6. When the buyers pick and transport the fruits themselves, children can actively participate and have their first food selection experience.

website for farmers to practice direct distribution, where farmers adhere to the conditions of the website offer their products. The website is an opportunity for farmers producing vegetables, fruits, organic products, milk, dairy products, honey, pork meat, poultry, rabbits, eggs, fish, pickles, wild products, and mushrooms to widen their market. The website helps consumers find farmers, from whom they can purchase the products desired. Parts of the website provide an introduction to the farms, their place and their activities. However, their products cannot be purchased through the internet. ([www.kamra-tura.hu](http://www.kamra-tura.hu))



The website represents 95 farmers with 129 products. Most of the farmers joining the programme are leaders in ecological production. Some of the farmers sell fresh vegetables and fruits, others offer prepared products such as marmalade, dried fruits, etc. The program was designed to increase rural tourism, because these activities can serve as complements to one another. On this particular market both products and leisure services are supplied. (Picture: 7.)



Picture 7. 30-40% price advantages can be reached by using an automatic milk dispenser in the town.

As part of the programme, common marketing promotion and communication actions have been set up for the participating farmers.

One of the most successful elements of this programme is that farmers become familiar with quality assurance and the rules of food safety during training sessions. A significant part of the consumer-focused approach is that it provides opportunity for the consumer to get to know the origin of the food he/she purchased. In the instance of agri-tourism based farms, the consumer can check the source of the food during a visit if he/she so desires.

According to the new regulations, farmers – once the required license is acquired – have the opportunity to produce and process “basic agricultural raw material goods” in small quantities. For instance, small producers can slaughter and process poultry and rabbit on their own farms. Larger livestock for resale are only allowed to be slaughtered in authorized slaughterhouses. However, farmers can cut, pack process and sell the processed meat products themselves. The rules are simpler for fruit and vegetables.

It is also important to mention the new direct-from-farm on-line food sale networks, that are already running in many EU countries. This is part of the popular rural tourism, where the customer can get to know the conditions of food production, and meet the producer in person. (Picture: 8.)



Picture 8. In a French village market tourists are the main clients during the Summer season. The the local government supports the functioning of the market.

According to international and Hungarian experiences, consumers increasingly prefer food purchased directly from the producer and they are becoming more interested in organic products. Producers should recognize the opportunities of this trend, and create the conditions for direct sales and gain the confidence of consumers. Even though the legal



conditions of direct sales are specified, it is still important to gain consumers' confidence. This requires a marketing plan and communication designed to reassure consumers that locally produced products are of high quality.

Despite the fact that agricultural producers do not have the appropriate facilities for retail or processing of foodstuffs, they are obliged to respect the basic rules related to food-sale. (Picture:9.) For instance, if the producer sells the basic product (poultry, rabbit meat) to a local retailer or catering facility, the producer should give the certified copy of the official veterinary document to his business counterpart. In the case of packed goods, the so-called small producer ID, or in the case of honey, the producer ID should be indicated.



Picture 9. A goat cheese processing unit on a farm is strictly regulated and must maintain hygienic conditions in accordance with high standards.

Moreover, a special law specifies the necessary marks and information on the packed product. In the case of unpacked basic products, the small producer's name, address or the farm's address, the name of the product, the best before date or guaranteed storage period, storage temperature, etc. have to be indicated at the place of sale.

Retailing is not normally one of the main commercial activities at farm level. In many circumstances, markets provide the dominant form of retail facility and are a major land use. In understanding the context of markets, therefore, it is also necessary to comprehend their relationship to the process of urbanization. The critical issues to be examined when considering interventions in the rural marketing system are the relationship of the market facilities to the pattern of rural settlements, the location and nature of agricultural production areas, and how the regional road system is evolving.

## 5. Regressive and subservient consumer trends in direct sales

Numerous factors constrain spreading the popularity of direct sales in Central Europe. A major issue is the ruling consumer behaviour which basically influences the way consumer channels choice of food trade. Currently, it appears that consumers consider buying food a leisure activity. To meet these expectations hyper- and supermarkets respond with large floor areas, but 'hard' discounts are also popular because of their low prices. These retail chains (aside from the discounts) have a great variety of goods and offer favourable prices for customers, who value highly being able to buy everything in one place. Present tendencies show that most customers stick to these traditional, non-direct methods of trade.

Although convenience is key, in recent years trends have shown that some factors have decreased consumer trust in mass-produced goods. Reasons for this distrust include the lack of transparency in the food supply chain, the growing number of food scandals (dangerous spices, paprika case of toxin, dioxin-polluted poultry, BSE), and new technologies alarming consumers.

In response, today's consumers are searching for food that:

- is safe to consume and aren't harmful to one's health,
- is of proven origin, and their producer is authentic,
- the consumption of which is delightful,
- and the production of which suits the growing aspects of the environment and animal welfare (Berke, Szakály Z., 2004).

Both inland and international trends show that consumers increasingly associate these preferences with regional (traditional and country-character) and organic (bio-) products.

## 6. Links between rural development and direct sales

Diversification of farm activities contributes to the well-being of local people in rural areas. These activities contribute to increased employment and to the development of manufacturing and service activities of complementary/ outside worker jobs, in commerce, and tourism. Such activities may also foster cooperation among many other sectors of the economy.

Many nations still prefer that rural economies in the future should remain in agriculture and silviculture production, through continued processing, services, commerce and a better infrastructure. One of the possibilities to diversify one's activities is to build up a direct sales system. The other possibility is to produce local specialities (product diversification) to increase value-added. The aims and priorities of the local and EU rural development programs are shown in Table 1 below (Fehér and Koródi 2008).

This grouping presented in Table 1 can be useful in analysing the impacts of diversification. The effects that these measures have on rural society and the economy confirm their integrative role.

The table above shows that value-added also participates in the development of the direct sale system and fosters multifunctional agriculture. It must be mentioned that the

IT REALISES MAINLY INTEGRATED DEVELOPMENT	IT CAN REALISE INTEGRATED DEVELOPMENT
Diversification of economic activities	Protection and preservation of cultural heritage
The development of local and agricultural production infrastructure	Reasonable utilization of natural and human resources
Involvement of active population into the flow of information and the creation of rural development information centres	Amelioration of the structure of age and the qualification of the active population and reinforcement of young entrepreneurs' attachment
Amelioration of living conditions	Protection of natural and built environment
Development of local markets and special products	Elevation of the general education of the population
Village development, renovation of villages and farms	Diminution of social and employment strains
Re-establishment of professional and civil communities	Amelioration of social attendance and care

Table 1. Links between development measures and integrated rural development

development of specialty local products means the products represent a common local value and are principally those that can be associated with a specific village or territorial place due to their historical heritage or tradition.

There is no standard or official definition for specialty local products that includes all the possible factors. Efforts of marketing and rural development experts are needed to identify and market these specialty products to the appropriate target consumer groups.

Meanwhile, it is noticeable, mainly in Europe, that the definition and the possibilities of product regulation concerning geographical origin, are clearly defined and well-known. However, the "protection of geographical origin" is not the same as the "specialty local products" mentioned above. In a wider sense, these can be described from the marketing point of view as "local products" or "common products," that interconnect and integrate villages, people and approaches, but are not regulated and protected legally. These products mentioned above reach the consumer in relatively small quantities, through direct sales, and they are often attached to the services of rural tourism. The local products are also developed to ensure high quality products for the consumer or to attract tourists. People can be proud of them since they are unique to that particular location (Lengyel 2011). (Picture: 10.)



Picture 10. 4-5 farmers work together at a common market on a farm, where once a week they sell their products to regular buyers and tourist as well. The number of buyers can reach 80-100 persons.

In any rural development programme there will be a clear need to coordinate the upgrading of rural markets at farm level with that of associated infrastructure and services if the maximum benefits to agricultural production are to be obtained. This may include upgrading extension services and the improvement of feeder and access roads as well. It should also be noted that directly serving direct marketing at farm's levels may also be critical links in the transport system.

## 7. Instrument of rural development in the service of direct sale

The appropriation made by budget of the Ministry of Agriculture and Rural Development for rural development, funded purely from national sources, played a significant role in the foundations of Hungarian rural development. Of this, HUF 16.9 billion was appropriated for tendering support in 2000-2003, including investments of small plants, distilleries, bakeries, wine bottling facilities, etc. that processed traditional agricultural products, collected in the HÍR (Traditions, Tastes, Regions) Program. Support was similarly granted to establish and expand local markets and acquisition depots.

During 2000-2004, these bidding possibilities were offered in SAPARD (Special Accession Programme for Agriculture and Rural Development), and after the accession among the ARDOP (Agricultural and Rural Development Operational Program).

Currently, the priorities of agriculture and rural development for the development period 2007-2013 are as follows:

- Improvement of the competitiveness in the agricultural, forestry and food conversion sectors and forcing of structural changes;

- Initiation of the human conditions of competitive agriculture, especially concerning innovation and market-oriented aspects;
- Enhancing the guarantees of sustainable farming;
- Easing the employment concerns in rural area, broadening income opportunities; improving life quality, relieving admittance to services;
- Developing local communities.

In the frame of the axes I and III of the New Hungary Rural Development Programme (ÚMVP) the opportunity exists for farmers to collect subsidies that can help generate an increase of direct sales. The aim of these subsidies is to improve rural and agricultural tourism, to develop economic safety nets, and to increase quality and value added in agriculture.

### **8. Legal regulation of direct sales**

In EC regulations 852/2004/EC and 853/2004/EC, the hygienic conditions of producing and distributing foods are presented. These regulations provide members states with the opportunity to create their own regulations concerning directly and locally distributed food, according to the EU-principle of tradition and flexibility. This national regulation is 14/2006. (II. 16.) Ministry of Agriculture and Rural Development- concerning terms of food production and distribution.

According to this regulation, farmers have the opportunity to sell products made on the farm at certain places in a certain amount. The regulation is aimed at providing a more enabling environment for direct sales. Farmers can sell products produced, collected and harvested by themselves. Farmers must report beginning, changing, pausing and ending of farming activity to the local agricultural authorities. In the case of animal food products, the local veterinarian inspects the health of animals and the hygienic conditions at the facility. If farmers want to produce food, at least one chamber must be provided. This place can be in homes, but it may only be used for private functions only apart from the production period.

Under these regulations, farmers are allowed to produce 5000 kg of honey, 6000 kg of fish and 20 000 kg of vegetables and fruit in a year, to slaughter at most 4 swine, 1 cow, 4 sheep or 4 goats weekly on their own or at an official slaughterhouse. This meat can be prepared by the farmers and they may produce meat-products from it, and then it can be sold directly by them. The fresh meat of these animals must not be sold by farmers.

Weekly, farmers are allowed to slaughter 200 hens or 100 ducks, geese, or 50 rabbits. The meat must not be separated into parts and sold this way (apart from the liver of geese and ducks). Farmers are allowed to sell 50 kg of meat, 360 eggs, 100 kg of pickles, 20 kg of vegetable products, 100 kg of mushrooms, 50 kg of collected wild fruit and vegetables per week; daily they are allowed to sell 200 litres of milk or 40 kg of dairy-products with local restrictions.

Goods must not be sold to retail or catering units by farmers. A constraint limiting the spread of farmer shops and country shops and for the development of rural tourism is that prepared goods are only allowed to be sold locally. They are not allowed to be sold in shops ([www.elotiszaert.hu](http://www.elotiszaert.hu)).



Civil society organizations interested in the improvement of the conditions for farmers decided to address the important issue of the legal environment and launched efforts to improve the regulation, so that it would better serve the intentions of the regulator.

Civil society organizations suggestions are the following:

- Prepared farmer products – marmalade, sausage, cheese – now cannot reach local shops and restaurants. They consider this an unnecessary restriction, that is against the aims of rural development and tourism, as according to the current regulation the benefit of preparation does not go to the farmer, and the supply of local shops remains poor without these products.
- New categories in the regulation are needed to help farmers appear on the market: farmers' fairs, village days and festivals could be enhanced with a new AGORA, this way products such as house-baked bread could be sold at farmers' fairs.
- The recent regulation refers to "local" shops concerning direct sale, and allows it only up to the border of the locality. For example, in a village of 200 inhabitants the local market is too small, so expansion is suggested up to a circle of 50 km.
- That farmers should be tax-exempt up to a revenue of 400.000 HUF (about 2000 euro) concerning non-prepared goods and additionally 400.000 Ft concerning prepared goods.

## 9. Lessons to learn

In the case of economies which have been in transition, such as in Hungary, the market organisations in the food chains have still not yet been fully established in each field. The lack of these organisations poses numerous difficulties, mainly in coordination. The well-organized nature of large multinational companies eliminates many of these difficulties. A large majority of agricultural producers are more likely to face market uncertainty without possessing the technical knowledge about risk management. This applies especially to small, fragmented farms and the fruit and vegetable sectors.

Why do these agricultural producers want to sell directly to consumers? First of all, they intend to sell continuously and at a higher price, and gain additional income. Furthermore, it is important for them to improve consumer's opinion of food producers by selling quality goods.

One may ask, which farmers should diversify into direct sales? Mainly those who possess the necessary labour force capacity and knowledge, and where consumers are welcomed, and also where the producers are located close to consumers. In these cases, it is an important task for advisers to acquaint farmers with related subsidy opportunities, as well as help them combine their forces and take part in continuing training. Therefore, the training and the motivation of advisers is crucial.

It is frequently asked, what are the main principles in connection with direct trade? First of all, one should respect the appropriate rules and laws, produce a high quality basic commodity, raise buying interest by advertising the goods, and also have the ability to develop a successful marketing strategy that fulfills the needs of the consumer.



Picture 11. Meat products must be refrigerated and kept in accordance with the hygienic standards. Mobile butcher trucks or trailers are one solution.



Picture 12. Grading and packaging at the farm is very important and requires the help of all members of the family.

The defining feature is that farmers sell their products directly to the final consumer, bypassing the conventional channels of trade and distribution. Vast positive EU experience in the field of direct sales can prove useful when regulations are applied. Furthermore, specialized education, the intention to change consumer behaviour, and the introduction of successful forms of cooperation are of key importance. (Picture: 11.)

## 10. Conclusions

Due to the price-squeezing nature of food-trading chains as a consequence of the strong competition between them; to the non-inflation matching increase of agricultural product prices; to drops in prices because of hard competition - producers focus increasingly on direct sales.

The direct sales of agricultural products plays an important role in the diversification of the activities of the rural population and helps to develop the rural areas. On the one hand this form ensures the provision of healthy food for consumers, while on the other hand, it provides increased income to farmers, allowing farmers to remain in the countryside. To achieve increases in direct sales marketing, changes in both producer and consumer consciousness are necessary.

To sum up, direct sales is a selling and trading activity performed by a local resident who is involved in primary agricultural production, or a joint or cooperative holding that does not have legal commercial status, and obligations or financial regulations of that nature do not apply to them.

Educational efforts are aimed at helping both sides clearly see that direct sales are a possible way of achieving sustainability. Direct sales are not widespread in Central Europe, as they are in some other European countries. One of the main problems for example within Hungary is that current regulation constrains direct sales into a narrow frame. To ease these problems legal regulations are being modified. Through these modifications, it is likely that this means of production and distribution will increase.

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# The African Experience with ICT for Rural Women's Development

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## 1. Introduction

### ICTs for the development of rural women

Information and Communication Technologies (ICTs) such as radio, internet, telephone, television, computers and mobile phones can facilitate communication, processing and transmission of information. Singh (1999) defines rural development as the process that lead to sustainable improvement of the quality of life of the rural poor. Rural women play a major role in rural development.

ICTs have the potential to improve the quality of lives of the rural women. Information and Communication Technologies for Rural Women's Development (ICT4WD (Joseph 2007) research stems from the lack of understanding of rural women's capabilities for their development through the use of ICTs. ICT4WD is an ongoing project that facilitates the development of rural women using ICTs. The aim of this project is to create awareness of the potential of ICTs and to improve the quality of life of rural women through the use of ICTs in developmental projects. This chapter covers only some aspects of the above ICT4WD research project.

The following meta-theoretical considerations guide this research.

- ICTs have the potential to develop rural women.
- Rural poverty can be addressed through the use of ICT-enabled projects.
- The political arrangements, cultural and social barriers would hinder rural women in accessing communication technologies.
- Mere provision of low cost technologies, good ICT infrastructure and access to the technologies may not necessarily empower rural women. The ICTs should be suited to the rural women's needs.
- Providing more opportunities for the empowerment of rural women can enhance women's capabilities and lead to rural development.

After almost seventeen years of democracy and implementation of many transformative strategies, South Africa still faces many challenges to empower the rural communities. The Constitution of South Africa (Act no 108, 1996) guarantees to improve the lives of all citizens and free the potential of each person. Most of the rural women in South Africa still lack socio-economic opportunities and come from female-headed households. They were deprived of access to land partly due to cultural norms and live in poverty.

Some of the South African rural women still lack basic needs, and have other economic hardships related to HIV / AIDS as well as Tuberculosis in their family. Some women are subjected to human rights abuses and violence against women. When their physical needs were met rural women were satisfied. ICT-enabled developmental projects will provide more opportunities for African rural women's development.

## **2. Objectives and scope of the study**

The aim of this chapter is to highlight the opportunities ICTs can provide for rural women's development and to propose strategies for their development. The key research question here is "Can the expansion of capabilities through the use of ICTs develop the rural women in Africa?". The chapter provides novel ways to understand ICT4WD through Sen's human development paradigm - the 'Capability Approach' (Sen 1999 a. 1999 b.). The chapter will provide insights and experiences on the lives of rural South African women through the use of case studies and visual methods.

There was a need to understand the opportunities provided to the rural people in South Africa in order to expand the choices of rural women. The deep understanding of the quality of life of rural women in South Africa, the challenges they face and the associated capability of the rural people to function is crucial to this ICT4WD study.

The study examines the need for rural women's partnership in the ICT projects to improve their quality of lives. Some of the rural women working in Johannesburg, South Africa are migrant laborers from other African countries and other provinces of South Africa. The study explores how and why these rural women came to cities of South Africa as well as the role of ICTs in the rural women's developmental goals. The literature review would throw light on similar initiatives elsewhere in Africa that enable rural women empowerment through ICTs.

The sub-objectives of this research are:

- To explore the lives of rural women in Africa;
- To analyze the role of women agency in rural women's development;
- To identify the opportunities that ICTs can provide for African rural women's development;
- To identify factor impeding rural women's development;
- To apply Sen's capability approach to conceptualize African rural women's development through the use of ICTs.
- To propose strategies for African rural women's development.

## **3. Research methodology**

Qualitative research (Denzin, N. K., & Lincoln, Y. S. 2000; Silverman 2010) was used as it allowed active and direct involvement of rural women, organizations and the researcher to understand the role of ICTs in rural women's development. Literature review enabled a deep understanding of rural women's capabilities and insights on the livelihood of rural women in Africa. Qualitative research tends to be systematic, inductive and subjective. As a result it tends to produce results that cannot be generalized. The data analysis is specific to the participants in the African context only.

The research methods used for this study are case study approach and 'visual methodology' (Rose 2004). Case study and visual methodology helps to interpret and make sense of rural women's life experiences and the world in which they live. The rationale behind the single case study is that it is a 'longitudinal case'; a 'critical case' and a 'unique case' (Yin 2009).

A 'typical' and unique case study (Yin 2009) based on the National Movement of Rural Women (NMRW) and its' role in empowering rural women are provided. *"The case study is in a sense a kind of simulation of a real-life situation in which the experience is second-hand and probably condensed. The important merit of the case study is that it allows a problem to be studied in a complex form, including elements of real-life events..... The main virtue of case studies is the way in which they can efficiently integrate a wide diversity of subject matter"*(Jaques 1994: 94).

Data collection methods involved in the case study approach involved interviews with rural women from different age groups, locations and the rural women's organization in South Africa. During sampling, 'convenient sampling' was used for both research methods. Interviews allow for a sustained interaction and the discernment of subtle nuances of unfamiliar perspectives (Bell, 1993:89). Unstructured questions were posed to the rural woman during face-to-face interview during the period October- November 2010 to a rural woman in NMRW. The organization and its role in developing rural women are of national importance.

The case study of another rural woman intending to work in a similar woman's organization was collected in the year 2010 and reexamined in June 2011. These case studies are 'typical' story of the life of women in Africa and will provide insights on the lives of rural women in South Africa as well as the role of ICT in their daily lives. I had to also rely on interviews with rural women and 'visual methodology' (Rose 2004) as well for such a study.

Michael Emmison (2011) opines the two-dimensional images (photos) are a constituent feature of social life. The photographs provided a way to 'see' the lives of rural women and the use of ICTs by women for their development, as opposed to just 'listening' to their stories. The visual still images were selected from a 4 year period. A major growth is certain in the use of video given the affordability of the new digital technologies (Michael Emmison 2011).

The main data analysis technique used to analyze the visual data and the text is content analysis. 'Content analysis has been defined as a systematic, replicable technique for compressing many words of text into fewer content categories based on explicit rules of coding' (Krippendorff, K. 1980). In the case of videos the unit of observation is 'video segments'. Some videos consist of many still images. The unit of analysis is sentence unit that indicate the main category 'ICT for African rural women's development'.

Table 1 shows the search criteria used for final sampling of videos. Themes based on the categories were also identified. Although seven videos were initially analyzed from relevant international organizations such as ITU (2010), World Bank (2007), FRI(2008) and other women's organizations, only four were selected.

### **3.1 Case study 1: National Movement of Rural Women (NMRW), South Africa**

National Movement of Rural Women (NMRW) is an independent, Section 21 non-profit making organization made up of poor rural women from South Africa. The movement came about after forced evictions from ancestral land by the apartheid system in South Africa. The movement concentrated in areas where the black people suffered as the result of the evictions.

Search criteria used in You tube(2011) for the 'final sampling' of video:

- Rural women of South Africa
- Radio by farmers
- Female broadcasters
- Village phone
- Potential of ICTs
- Telemedicine in rural areas

Table 1. Search criteria used for the final sampling of video

The customary law made African women minors. In certain instances husbands left them seeking jobs in urban areas. Most of the decisions for the women were taken by their husbands. Traditional leaders had an equal role in certain decisions in their lives. Women had unequal succession rights to the land. Moreover wealth was calculated in livestock. Women were allowed to buy cows with husband's remittance, but could not sell without the permission of husbands. During land removals men were organising alone. Women in those areas came with different agendas that tackled other issues such as customary marriages, inheritance, abusive men, issues of poverty.

The movement has extended to other rural areas where these and other issues were also tackled. Some income generating strategies or projects were used to address issues of poverty and empowerment of rural women. Rural women from Limpopo are trained to do internet banking, work on computers and sell agricultural products. As part of the chicken farming initiative the farmed chicken are cut into pieces and sold to the local communities. This project is active in provinces such as Limpopo, Kwazulu Natal, Mpumalanga and NorthWest.

I (author) was invited to train many rural women working in NMRW, Johannesburg at the end of the year 2010. The rural women working in the organization were provided basic training in computers, file managing, spreadsheets, creating documents, fax, faxtoemail, mail and paint programs. During the year 2011 other provincial co-ordinators will be provided similar training. The women will use these skills to run small business in their areas.

These women will enhance the capabilities and provide ICTs skills or training to other rural women with guidance and support from NMRW located in Johannesburg. At the end of the training session, I interviewed some of the women working in NMRW, Johannesburg.

### 3.2 Case study 2: Life of rural women in South Africa

The following section provides the life of two rural women in South Africa. One rural woman (Cynthia Khulam) is already working in NMRW and the other woman (Lethabo Mashego) intends to join the women's organisation for her development. Some of the unstructured questions posed to the rural women were :

- How did you make a living?
- What did you spend your wages for?
- What are the traditions and customs followed during marriage?
- Did you use ICTs such as computer, mobile phone, radio, internet etc. and for what purpose?



### **i. Life of Cynthia Khumalo**

Ms. Cynthia Khumalo(not her real name) is a rural woman who was living in the rural areas of South Africa. Cynthia's family is from Lesotho, but she has been residing in South Africa for many years and she is now staying permanently in South Africa. Cynthia is 56 years old and a mother of three children. Cynthia had gone through a customary marriage (not a polygamous marriage), had a lebola ceremony and later her marriage was registered through a legal office.

She says her marriage helps her community and family to acknowledge what wealth she brought to her family. Many of her friends had gone through a polygamous marriage. The traditional leaders, 'to be' husband and elders made these decisions for them. Although the first wife in the marriage has to take major decisions in rural women's lives, often the above people made choices in polygamous marriages.

Cynthia mentioned her friends sell jewellery and other crafts made of beads to generate income for the family members. Other friends made a living by selling eggs, 'African beaded(or printed)' mobile phone pouches, pen cases and vegetables. Cynthia herself used to make a living by selling tupperwares until NMRW identified her as a candidate to 'provide ICT training'. She currently works as an administrator for NMRW in Johannesburg. Now that she knows how to use ICTs, Cynthia mentioned it would have been ideal for these rural women to market products or generate income through 'ICTs skills' as well.

Cynthia currently uses ICTs such as mobile phone, computer, internet(email), fax, newspaper, TV and radio. Radio was mostly used for listening to music or news. There was no objection from her family members in buying or owning the above ICTs. Some of the ICTs such as TV and radio were bought by the family members, and they shared them. She mentioned she used ICTs to communicate, to exchange information, for security reasons and to learn new ICT skills especially through the use of computer as well as the internet. The South African newspapers (such as Times(2011) and Mail and Guardian(2011)) enabled her to increase her vocabulary as well as enhance her knowledge. She also mentioned the Internet, email and newspaper helps her to understand what is going on around her.

### **ii. Life of Lethabo Mashego**

Ms. Lethabo Mashego (not her real name) is 22 years old and is a rural woman from the Venda tribe in Limpopo South Africa. She speaks Sepedi. Lethabo was 17 years when she delivered her first child. She was still at school when she fell pregnant and her daughter's father was her classmate. Her daughter's father dropped out of school to find a job to support their kid for two years only. Her mom was disappointed due to Lethabo's teenage pregnancy, but decided to support Lethabo and her child.

Lethabo is traditional, but does not believe in Sangomas (traditional healers), as she is now a 'converted' Christian. Lethabo's mum suffers from Tuberculosis and her aunt died of HIV/AIDS related ailments. Lethabo says she is glad that she has not attended any funerals for the past few years as the anti-retroviral medication is readily available now in Limpopo.

Lethabo's father used to work as a chief for the local King Mashego (who passed away recently). He used to help the rural people to purchase the land from the king. Even now her mom has to pay money to the king's son (the new King) to stay in the current land. Lethabo

and her mom are surviving with Lethabo's father's pension money as her father passed away in 2009.

Her mom had to sell atchar, cold drinks and old clothes to make a living. Her mom could make only R30 a day by selling these things. She spends some of money for bread, meat and milk on a daily basis. Lethabo mentioned water is free in Bushbuck ridge, and R100 a month from her mom's earnings was used for electricity in the past. During the month end, her mom collects money (R350) from a group of friends and uses the small amount from her husband's pension money to buy groceries in bulk. She buys groceries such a sugar, maize meal, washing powder, tea flour, cooking oil and shares it with her friends and family. She says buying in bulk is cheaper. Lethabo's mom had to pay R250 per year as school fees while she was studying. Nowadays education and food, during school hours is provided for free in most rural areas of Limpopo.

Although Lethabo completed grade 12 (matric) she had to move to Johannesburg and work as a helper in one of the houses to earn and send money to her mom to support her kid. She earns R1700 per month as a domestic worker, out of which she sends R400 to her mom to support her daughter as well. She visits her mom and her daughter twice a year for a few weeks. Another R350 is spent on transport per month, and R500 per month to rent (includes water and electricity) a one room outhouse in Johannesburg and R100 for food. She saves only R350 per month while working in Johannesburg.

She also describes how her sister got married. Uncles, aunts, and the traditional leaders (and indunas and chiefs) discussed the 'lobola' (bride price). Phulamelong (amount paid for initial ceremony) even to talk about such a lobola ceremony can be as high as R250. The amount the bride's family asks for lobola from groom's parents can be as high as R10000. There were instances when families paid R20000 for lobola. Lobola is paid as cattle each worth R2000 or more.

The money is first introduced to the ancestors, to make sure that her sister left the house. Lethabo explains if the bride does not fall pregnant or is not a hardworker the bride should go back to their father's family. Half or full amount of the lobola should be paid back to the bridegroom. Lethabo's uncle will decide her lobola, and her future husband, as he is involved in cattle-rearing and agriculture.

While in Limpopo, she uses radio to listen to the station Thobela FM (2011), watches TV (news and soapies). She used computers in the Centre for youth (Department of Home Affairs (2011)), mobile phones just to connect to people and to call family when 'there is something bad'. Library was something that she saw only in Johannesburg, and printed media (such as newspaper, books) were not popular there. Lethabo will be approaching NMRW soon.

### **3.3 Visual methodology**

Visual methodology (Rose 2004) is yet another means of visual inquiry employed for this ICT4WD research. The photos and video links enabled rural women to share their life experiences with the rest of the world. These experiences were unavailable in writing. Still photographs used are based on other related projects. Both the case study and the photography help us to understand the role of ICTs in rural women's development and the life of rural women in Africa.

### 3.3.1 Photos

Figure 1, illustrates the rural women from remote areas of South Africa are provided ICT training in NMRW office in Johannesburg. The two rural women in this photo taken in the year 2010 have used ICTs for the past one year to expand their capabilities.



Fig. 1. ICT Training provided for the rural women by the women's organization in Johannesburg.

Figure 2, illustrates the rural woman using mobile phone.

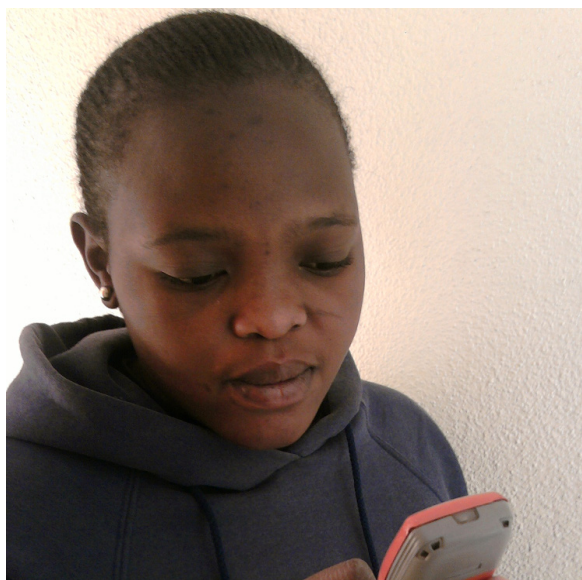


Fig. 2. A rural woman from South Africa using mobile phone.

Figure 3 illustrates the life of the rural women in Kenya. The woman in the picture is making a video on the conditions in rural areas. This photo taken in 2006 is part of the Practical Action project.



Fig. 3. Practical action. Photographer -Zulu

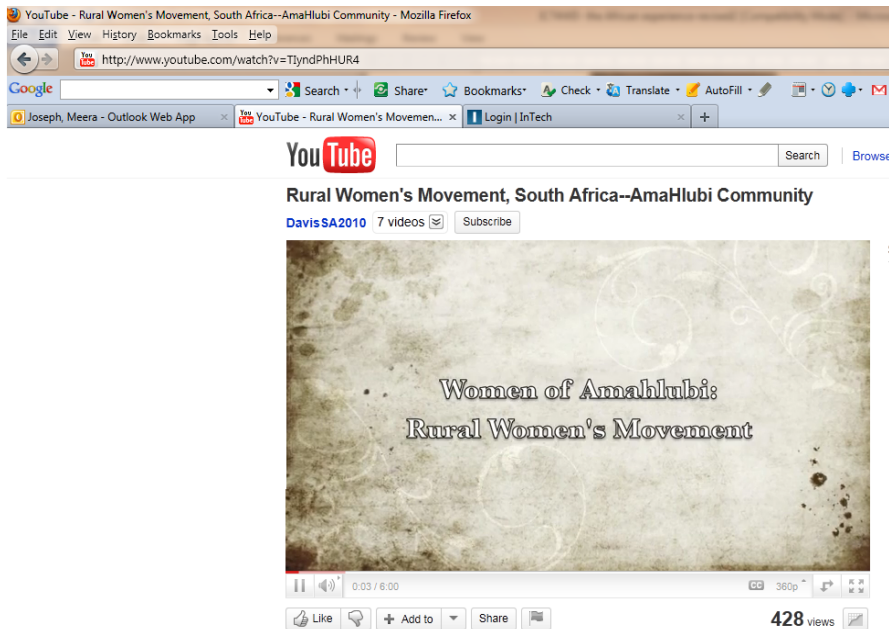
Figure 4 illustrates the rural women and peri-urban women getting ICT training at a community centre in Johannesburg, South Africa.



Fig. 4. ICT training at a community centre.

### 3.3.2 Videos

The living conditions and the quality of life of the rural women of Amahlubi, Kwazulu Natal, South Africa are evident in Video 1. The rural women lack facilities and there is clearly a lack of good infrastructure, inadequate water supply and lack of housing facility in the specific area as seen in the video. It is clear from Video 1 the rural women in the area under study face sexual and emotional abuse, domestic violence and HIV/AIDS. They use a community garden to produce the agricultural crops for sustenance. RWM used ICTs to address social injustice and to address land ownership rights.



Video 1. Rural Women's Movement (RWM), South Africa - Women of Amahlubi (Rural Women's Movement 2011): Source: Link: <http://www.youtube.com/watch?v=TIyndPhHUR4> (accessed 1 June 2011)

Video 2 illustrates how the Village phone initiative and the phone ladies in Nigeria (World Bank (2007)) helped the economically disadvantaged women in the rural areas of Nigeria with employment opportunities. Video 2 illustrates how the phone ladies used village phones to make a living and improve their quality of life.

Video 3: illustrates how the female radio broadcaster checks the commodity prices on Tuesdays. The lady in the video goes around the local market in Ghana, asking for prices of commodities and broadcasts it on radio ADA (2011). Farm Radio International has provided this tailor made ICT solution to market the products and improve rural women's quality of life.

ITU (2011) is the leading United Nations agency for Information and Communication Technology issues. Video 4 explores how tailor made ICT solutions were used for the diagnosis in the hospitals that were many miles away. Getting access to e-health was a



The screenshot shows a web browser window with the YouTube page for 'The World Bank - Village Phone Nigeria'. The browser's address bar contains the URL <http://www.youtube.com/watch?v=crHS9YEx4lg>. The search bar contains the text 'south africa culture+ you tube'. The YouTube interface shows the video title 'The World Bank - Village Phone Nigeria', the channel name 'THE WORLD BANK' with 1,025 videos, and a 'Subscribe' button. The video player shows a scene with two women at a market stall. A subtitle at the bottom of the video reads: 'When I joined the Ogene Ladies with the phone calls and all that, I make more than 10,000 Naira (\$80) in a day.' The video has 25,127 likes and is in 360p resolution.

Video 2. World Bank- Village Phone Nigeria (World Bank 2007) Source: Link: <http://www.youtube.com/watch?v=crHS9YEx4lg> (accessed 5 June 2011)

The screenshot shows a web browser window with the YouTube page for 'Female Broadcaster Radio ADA in Ghana - Farm Radio International'. The browser's address bar contains the URL <http://www.youtube.com/watch?v=PnKHPaXVYPw>. The search bar contains the text 'south africa culture+ you tube'. The YouTube interface shows the video title 'Female Broadcaster Radio ADA in Ghana - Farm Radio International', the channel name 'FarmRadioInt' with 28 videos, and a 'Subscribe' button. The video player shows a scene with several chickens in a field. The video has 1,507 likes and is in 240p resolution.

Video 3. Female Broadcaster Radio ADA in Ghana (Farm Radio International(FRI)2008) <http://www.youtube.com/watch?v=PnKHPaXVYPw>

dream for the majority of Kenyans. Video 4 illustrates how telemedicine allows the less experienced doctors to liaise with specialist doctors many miles away and get assistance.

Video 4: Telemedicine: Episode from "ICTs for a Better Future" (ITU-Telecommunication 2010) <http://www.youtube.com/watch?v=T2dgTs0b-44>

#### 4. Data analysis and results

This section analyses the data provided by the National Movement of Rural Women case study, case study on the life of rural women, and the data used for visual research. The content analysis revealed three categories provided in three tables in this section. The ICT-enabled opportunities that various organizations provide for the development of African women are elaborated in Table 2.

Some of the ICTs that were used by rural women in Africa	Opportunities that ICTs can provide for African rural women's development	According to the data in
Computer, internet, phone, radio	ICTs to improve the quality of life	RWM(Video 1), ITU(Video 4), World Bank(Video 2), FRI (Video 3), NMRW, Lethabo's and Cynthia's case study
Computer and Internet	ICT training - a community based approach	Community centre in Johannesburg, RWM, NMRW, Cynthia's case study; Figure 1, 4
Digital camera	ICTs to address social injustice	RWM(Video1), Practical action
Mobile phone, radio, computer	ICTs to address land ownership rights	RWM(Video1), NMRW
Radio	Tailor made ICT solutions for women's development	Radio ADA(Video3), ITU(Video4), World Bank(Video 2)
Computer, Digital camera Radio and Internet	ICTs to enhance collaboration with women's organization and women's agencies	RWM, NMRW, Cynthia's case study

Table 2. Category 1: Opportunities that the ICTs can provide for African rural women's development

Table 2, shows the type of ICTs that were used by the rural women of Africa for their development and the various opportunities it can provide for them. These opportunities are based on the analysis of case study and the visual methodologies used. Figure 2, Cynthia's and Lethabo's case study reveal ICTs such as TV, radio and mobile phone were also used by women for entertainment as well.

Factors impeding rural development include: low accessibility and quality of telephone facilities, especially in rural areas; weak and inadequate Internet infrastructure, as well as lack of accessibility to ICTs due to high costs (AFRRRI (2011)). Some of these factors that

impede women's development are also evident in Table 3. Table 3 illustrates the social injustice and factors impeding some rural women's development which include: HIV/AIDS related illness, unwanted teenage pregnancy, domestic violence, lack of good housing facility, inadequate water supply and the effects of land ownership rights.

<b>Social injustice/menace in Africa and factors impeding African rural women's development</b>	<b>According to the visual methods</b>	<b>According to the data in interviews with women/ interview with organization</b>
HIV/AIDS related illness	Video 1 (RWM)	Lethabo's case study
Unwanted teenage pregnancy		Lethabo' case study
Domestic violence	Video 1 (RWM)	
Lack of good housing facility	Figure 3. Practical Action	Lethabo' case study
Inadequate water supply in rural areas	Video 1(RWM); Figure 3: Practical Action	
Effects of land ownership rights	Video 1(RWM)	RWM, NMRW

Table 3. Category 2: Factors impeding African rural women's development

The factors that are often cited as having an influence on ICT use are: gender; income; level of education and skills; age; and the available infrastructure in an area (World Bank 1998, UNDP 2001, Madhusudan 2002). Table 4 adapted from the above illustrates the factors influencing use of ICTs by the rural women under study. They include: available infrastructure, income, age, level of ICT skills, costs of ICTs and the knowledge of opportunities ICTs can provide for women's development.

<b>Factors influencing use of ICTs</b>	<b>According to the visual methods</b>	<b>According to the data in interviews with women/ interview with organization</b>
Available ICT infrastructure	Figure 4: Community centre	NMRW- Cynthia's case
Income		Cynthia's case
Age		Cynthia's case
Level of ICT skills	Video 2: World Bank; Video 3: Radio ADA (FRI)	Cynthia's case
Costs of ICTs	Video 2: World Bank; Video 3: Radio ADA (FRI)	Cynthia's case
Knowledge of opportunities that ICTs provide	Video 2: World Bank; Video 3: Radio ADA (FRI) Video 4: ITU	Cynthia's case

Table 4. Category 3: Factors influencing use of ICTs

Figure 3 reveals the quality of the housing facility in one of the rural areas in Kenya. The picture clearly reveals the condition of their shelters and the living conditions in general in the remote area. The Rural Women's Movement (video 1) provided illustrates the remote rural areas of Kwazulu Natal, South Africa. Video 1: Illustrates the women lack resources and there is clearly a lack of good infrastructure, inadequate water supply and housing facility.



Figure 4, illustrates the use of computer and Internet facility by the rural and peri-urban women in the community centre in Katlehong, Johannesburg. The peri-urban men provide ICT training to these women.

Video 4 illustrates how telemedicine and the ICTs such as the scanner, digital camera and broadband connection and the video conferencing facility enabled to transform the hospital in Kenya.

It is evident from the interviews, the typical rural women, lack skills to use technology, have to meet cultural expectations and they have to hold on to their traditions. Lethabo's case reveals a 'typical' rural woman in South Africa earned as low as R30 a day for instance by selling various products. Women also sold other traditional and agricultural products such as eggs, 'African beaded(or printed)' cell phone pouches, pen cases and vegetables to make a living. Video 2 illustrates the village phone model used in Nigeria. Video illustrates the rural women were able to make more than \$80 per day using this concept and improve their quality of life.

The rural women who participated in the study have tried their best to hold on to their culture and traditions even in difficult times. Eventhough Cynthia came from a traditional background, ICTs such as printed media, computer, internet and mobile phone has played a role in Cynthia's development. Although Lethabo passed matric 5 years ago, the economic realities, the unwanted pregnancy and limited opportunities for growth have inhibited Lethabo's developmental goals. She had to move to a city and adapt to the city life and make a living.

Letsoalo(1987) argues the chief is in control of the land and once it is allocated to individual households his authority ends. There were cultural obligations that Lethabo's father had to the local king. As a tribal authority her father governed the rural landscape and the land tenure system has impacted Lethabo's rural household. Cynthia's story highlights the role of ICTs in her day to day life. It also reflects the life of other rural women and how they made a living.

#### **4.1 Strategies for African rural women's development through the use of ICTs**

Human development is about "creating an environment in which people can develop their full potential and lead productive, creative lives in accordance with their needs and interests.... Development is thus about expanding the choices people have to lead lives that they value" (United Nations Development Programme (UNDP) 2001).

Even after many years of democracy the inequalities in income and wealth, as well as disparity in accessing education, health care, housing and other social infrastructure (Bloch 2009; Chisholm 2004; Fiske & Ladd 2004; Soudien 2004) exist in South Africa. Although many broad-based black South African citizens enjoyed the economic growth to a certain extent, the South African National Planning Commission's diagnostic document(2011) identifies the key challenges the country faces (even in the year 2011) to reduce inequality and eliminate poverty.

They are: high unemployment, poor education; disease and associated burden for health system; uneven performance in public service; marginalisation of the poor by spatial pattern that forced people to live far from jobs; damaged social ethics that led to corruption; a crumbling infrastructure and divided communities.

For the rural women the work within the rural household involves productive work outside such as providing basic needs to other family members, for example, food water and fuel (Bryceson 2008). The poultry keeping has been practiced by African village communities for many generations (Guèye, E.F. 2000). The grandmother is the main care provider for children of absent daughters: a phenomenon observed in most countries in Southern Africa.

Both poultry and cattle played a major role in rural African women's life. Cattle have been thought to constitute basis of wealth in South Africa (Quin 1959:94; Monig 1967). The cattle were used to pay *lebola* (to exchange the cattle to the father of the bride in exchange for the productive and reproductive capacity of his daughter) (Kuper 1982:167). Cattle are also used to settle fines by Pedi and other tribes of South Africa (Quin 1959:94). The cattle were slaughtered only in special occasions, rituals and ceremonies and not used as regular food (Quin 1959:96).

The ICT services and information are tools to develop traditional African women. NMRW has supported many rural women in South Africa to provide opportunities to use ICTs for empowerment. NMRW employs rural women from all provinces of South Africa. Richardson (2000) opines the women with access to ICT services increase their ability to generate income and plays a role to empower other rural women. NMRW case study in the following section provides insights on the women agencies' role in women's development and the life of rural women in Africa.

Table 2 illustrates the type of ICTs that were used by the rural women of Africa for their development and the various opportunities it can provide for them. These opportunities are based on the analysis of case study and the visual methodologies used. The environment that ICTs created to develop women's potential for their interests and needs are explained below.

**ICTs for improving the quality of life of rural women:** The life of rural women as revealed in video 1 (RWM) illustrates the quality of life they have. There is high rate of death in Africa due to malnutrition and diseases and the impact of HIV/AIDS should be examined with other factors such as food insecurity, high climate variability, market fluctuations, and poor governance (Alam, Meyer and Ziervogel 2006). The video 3 illustrate how some rural women farmers have used radio to broadcast commodity prices. Village phone (video 2) illustrates rural women's status has been enhanced through ICT (such as phone) and it has given rural women freedom. The phone booth and the phones helped to alleviate poverty and provide more services to other community members via the phone ladies. Mobile banking and determining commodity prices will be the future services offered through such an initiative. The ITU film (video 4) explores how ICTs contribute to a better life of the rural people of Kenya.

**A community based approach to provide ICT training:** Education for women in Sub-Saharan Africa has been noted to have a powerful developmental effect (Kongolo M. and Bamgose OO 2002). ICT can be a tool for education and development of women. Figure 3 is a typical example of a community based approach that provides ICT skills and basic training. Once internet is available in the remote areas of Africa, ICT will provide more e-learning opportunities for rural women's development. ICT training is an essential component for women's development as evident from the visual research (Figure 3, Figure 1) and the case study. In all the pictures that were provided, the presence of a 'women's

space', and a community based approach to providing ICT training is evident. Most of the training centres were also owned by the community itself.

**The use of ICTs to address social injustice:** Figure 3 illustrates how the video woman in the picture (provided by Practical action project) could use video to voice issues in the settlements in rural areas. ICTs can address associated burden for health system. More than 60% of all people infected with HIV/AIDS are living in sub-Saharan Africa, even though this region has just over 10% of the world's population (Alam, Meyer and Ziervogel 2006). Other social injustice such as unwanted teenage pregnancy, HIV/AIDS in Africa, rape, crime can be addressed to an extent through the use of appropriate ICTs such as social networking sites, mobile phone as well as Internet. Video 1 also reveals social injustice in the rural areas of South Africa.

**The use of ICTs to address land rights issues:** There is still a major debate whether the rural landscapes that the tribal authorities hold on to is 'communal' (Ntsebeza 2000 p. 287) or not. In the post-apartheid era it is necessary to address such land ownership rights issues through the use of social networking sites, mobile phones and radio and discussions with the tribal authorities. The organization such as National Movement of Rural Woman and Rural Women's Movement came about after forced evictions from ancestral land by the apartheid system in South Africa.

Due to the cultural expectations, although I acknowledge traditional leaders and elders should play a role in rural women's well-being, any misuse of such 'power' should be addressed through the use of SMS and other ICTs. *"It is in its avoidance of discussing power that the fundamental weakness of the literature on women and development lies"* (Rowlands 1997).

As part of the UmNyango Project, RWM(2011) made podcasts on evictions of widows from their marital homes, women's inheritance rights and the impact of HIV/AIDS, sexual violence against young girls, forced/arranged marriages, young women and employment and grandmothers and orphans. These issues receive little mainstream media attention.

**Tailor made ICT solutions for rural women's development:** ICTs can help to process and disseminate information suited for rural women's needs. The only thing that is going to change for rural women is in the way in which one would disseminate information. Tailor made ICTs are essential for specific areas and based on the needs of rural women. The tailor made creative ICT solutions taking into account rural women's needs are evident in the Village Phone model (Video 2), Video 4 and Video 3. The rate of women's participation in development initiatives is strongly influenced by their educational levels (Kongolo and Bamgose 2002) and computer skills. The need for women's participation in the developmental programmes is evident from forums such as the Beijing Declaration, and the United Nations Development Fund for Women (2000). People-centred approach to development and tailor made solutions for the benefit of rural women are essential to address women's developmental goals. *"Both on who gets what, when and how and who gets left out and how"* (Bachrach and Baratz 1970, 105) depends on rural women's active involvement in developmental programmes.

**ICT to enhance collaboration with other women and women's agencies:** The case study (NMRW) and video 1 reveals the role of women's organization in rural women's development. Some women's organizations and community centres helped to expand the

capabilities of rural women through the use of ICTs. Women agencies collaborated with the rural women and improved the confidence in using ICTs. Although women from rural areas faced many constraints, these agencies assisted in women's development the existing ICT resources. These organizations also provide a meeting place to share their views with other women. Women agencies can facilitate discussions on the traditional knowledge that should be passed to younger generations. Apart from basic ICT training and capacity building, some women's organizations have used social networking sites, websites and podcasts to communicate, network and collaborate with other rural women.

#### 4.1.1 Applying Capability Approach to conceptualize African rural women's development through ICTs

The Capability Approach (CA) is a human development paradigm and a framework for assessing social arrangements, quality of life, inequality, poverty and justice. Capabilities *"are notions of freedom, in the positive sense: what real opportunities you have regarding the life you may lead"* (Sen, Hawthorn & Muellbauer 1988, p.36).

Figure 5 (adapted from Alampay, E. 2006) illustrates how the capability approach (CA) can be applied to the use of ICTs for rural women's development. In this case the CA is about realized 'functionings' - about the things a person does and the 'capability set of alternatives' that women has - about the things a person is substantively free to do (Sen 1999, p.75).

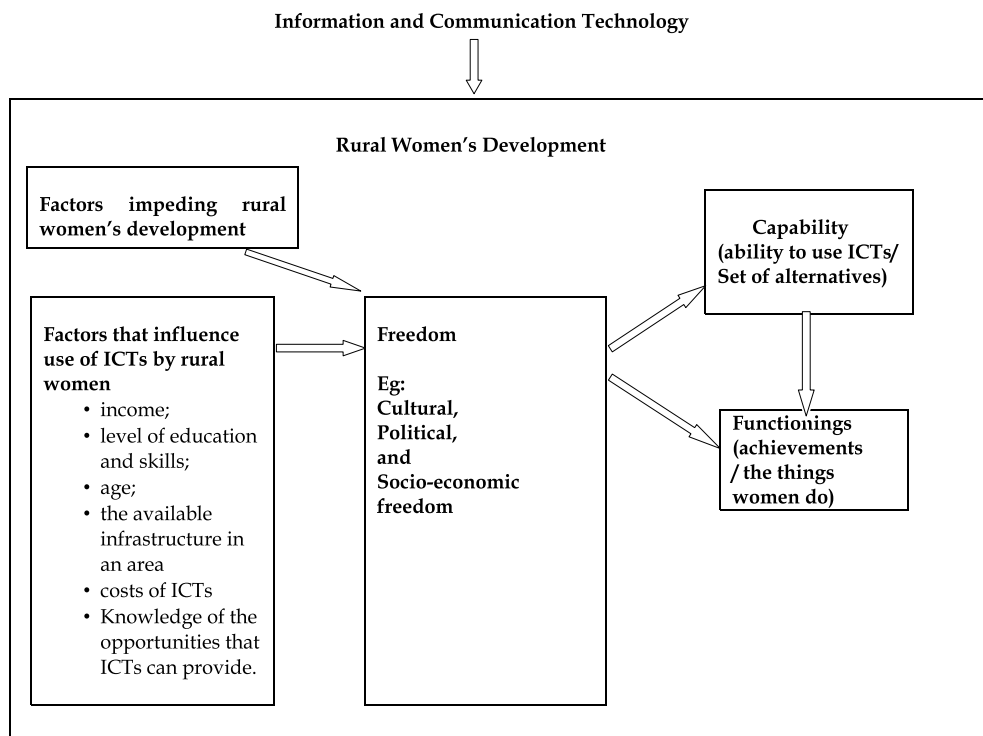


Fig. 5. Capability approach applied to the use of ICTs for rural women's development

Sen (1999 a.) clarifies individual capabilities (women's capabilities) depend on socio-economic, political arrangements, among others. The political arrangements, living conditions and the socio-economic situation in rural areas of Africa will influence rural women's capabilities to use ICTs. The cultural freedom (UNESCO 1996), political freedom and the socio-economic freedom depend on the factors that influence use of ICTs by rural women. The factors such as adequate infrastructure, low cost ICTs and reliable ICTs have influenced use of ICTs as well.

The factors such as HIV/AIDS related illness, unwanted teenage pregnancy, domestic violence, lack of good housing facility, inadequate water supply and the effects of land ownership rights which impede rural women's development will influence all types of 'freedom' and their capability to use ICTs.

The expansion of capabilities of rural women depends on the real opportunities that ICTs provide for them and their living conditions. The capability and functionings will also depend on rural women's freedom to choose the life they want to lead. The "commodities and functionings" are crucial for African women's development. The expansion of rural women's capabilities through the use of ICTs will have a direct impact on the functionings and their development. Rural women's development will enable the development of the rural areas of Africa.

If the commodities (eg: basic needs such as food and shelter) are unequally distributed it will affect the well-being of the individuals. The functionings reflects what rural women can do (in this context through the use of ICTs). As long as the inequality in the quality of life and the disparity between rich and poor exists in Africa it will affect the functionings of rural women or their ability to achieve anything.

## 5. Conclusion

Rural women are the agents of rural development. Rural women's development is a complex process which needs participation in developmental activities that shape their lives. Rural women were keepers of agricultural and health-related knowledge. Their role was mainly reproduction (giving birth) and production (agriculture related). ICTs can enable the participation of rural women in the developmental projects to alleviate poverty, provide them with education and training as well as other informal employment opportunities. In the South African context access to ICTs, as well as education, freed women from the crippling and discriminating concept of Bantu education, are crucial elements that form the building blocks of the concept of empowerment (Intelecon Research 2000:38). The economic realities and poverty in Africa are linked to the education realities.

ICTs are enablers of rural women's development and an instrument for bridging the gap between the rich and the poor. ICTs can provide rural women, access to information about agricultural market and health information. ICTs can also ensure participation in political changes. A women friendly approach to development (Huyer 2005), pro-poor growth policies (Huyer & Mitter 2003) and inclusion of gender issues in ICT policies, plans and strategies (Buskens & Webb 2009) will provide more opportunities for African rural women.

Sen (1999 a.) clarifies individual capabilities (women's capabilities) depend on among others, socio-economic and political arrangements. The political arrangements, living conditions and the socio-economic situation in rural areas of Africa will influence rural women's capabilities to use ICTs. The paper highlights the role of ICTs and opportunities it

can provide to the development of rural women in South Africa. The paper elaborates a single case study – National Movement of Rural Women (NMRW), South Africa and its role in ICT4WD. There is scope for further research on the use of social networking for rural women's development.

Rural women's development refers to the freedom and the capabilities and functionings that they value, the quality of life and the resources they would like to use. The ability to use ICTs, situation the rural women are in (for example, location of use, wealth) and exclusion from basic needs will affect capability of rural women. Rural women's development through the use of ICTs is the opportunities ICTs can provide to meet their values and goals.

## 6. Acknowledgments

I am grateful to Ms. Likhapa Mabatha, National Movement of Rural women, South Africa for giving me the opportunity to openly discuss as well as understand role of women's organization in women's development. I am grateful to Ms. Sizani Ngubane, Rural Women's Movement South Africa, Ms. Kristina, World Bank and Farm Radio International for providing videos. I would like to thank other rural women who participated in the interviews based on 'their lives in South Africa'. This material is based upon work supported financially by the National Research Foundation, South Africa and the University of Johannesburg, South Africa.

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# When Life Style Entrepreneurs Establish Micro-Businesses in Rural Areas – The Case of Women in the Danish Countryside

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## 1. Introduction

Entrepreneurship in rural areas is a key to promote better living conditions in the countryside. Agriculture and production businesses have been the main economies in the European countryside over the last decades, but both not longer offering sufficient employment opportunities to the inhabitants. Unless you can commute over long distances many seem to be prevented from staying or settling in the rural areas. Especially for women it is difficult as the local labour markets mainly have been made up of masculine jobs. Women generally get higher educated than men and then may have even more difficulties in finding local, sufficient employment (Tanvig, 2010a). Nevertheless, this paper discovers new kinds of self-employed businesses in the Danish countryside often started by women that whether being caused by push or pull effects, may be a key to overcome the unbalance and make it possible for well educated people to live and newcomers to settle and contribute to revitalization. This kind of businesses have so far been ignored or underestimated.

Distinctions between rural and urban businesses abound in literature. The knowledge-based and more globally oriented businesses are concentrating in the metropolitan areas and rural areas characterized by local businesses in the decreasing primary and traditional industries. From this perspective the few new rural businesses, among which many are businesses in retail and local workshops, do reproduce the apparently weak local structures.

However, the border between rural and urban and local versus global in several ways is becoming blurred. Physically metropolitan areas do integrate former rural areas functionally which has addressed the notions of 'peri-urban' or 'rurban' areas covering a mixture. Albertsen et al., 2007; Sieverts, 1999 show how metropolitan areas develop into large functional city-regions made up of both built-up and rural areas that have also become places of consumption. Other literature (Champion, 1998; Johansen & Eskildsen, 2008) calls for attention to counter-urbanisation that is significant to some areas. In Denmark while a continuing migration to the city also goes on, an outmigration of people to smaller and medium sized towns and rural areas nevertheless has taken place in varying degrees over many years (Johansson & Rauhut, 2005; Aner, 2007). A unilateral migration from rural to urban areas does not cover the whole picture. Murdoch et al. (2003) show how rural areas

rather can be understood as 'a differentiated countryside', with growing differences due to a various set of local preconditions and how counter-urbanisation might work in the areas, e.g. the influx of the middle class. Such new spaces of 'rurality' might be universal but manifest themselves differently in the specific rural area.

The aim of the chapter is to explore new modes of rural entrepreneurship set in the interplay between the local and the global and urban and rural. The rural might be peripheral in the physical sense but new global market conditions, increased mobility, new technologies and the specific use of rural areas open novel possibilities for entrepreneurship in rural areas and challenge the notion of rural business. It is this interplay and the possibilities and barriers to take advantage of these new spaces that the chapter explores in the study of micro-business and especially female self-employment in the Danish countryside. We search for different kinds of female entrepreneurship and discuss how they contribute to rural development. The chapter is based on three studies all looking into new business in the Danish countryside. In total 105 rural entrepreneurs have been interviewed.

## 2. Previous research

According to statistics the entrepreneurial rate is lower in rural areas than in city areas. But a disaggregation and closer examination leads to a more blurred picture. The female entrepreneurial rate is relatively higher than men's in rural areas (Tanvig, 2003), and new mapping (Erhvervs- og Byggestyrelsen (2010); eStatistik.dk (2011) reveals that the largest entrepreneurial rates (in 2008) are to be found on a couple of small islands, with female entrepreneurship in front, and that entrepreneurship in the periphery is not as affected by general crisis (2010) as it is in city areas. Also there are indications that incomers nowadays start business in larger numbers than locals (Persson et al., 1997; Bosworth, 2009, Stockdale, 2006). Bosworth (ibid.) even suggests the notion of counter-commercialisation when explaining incomers' entrepreneurship in rural areas. A broader definition of entrepreneurship than being applied in statistics may certainly show an even more blurred correlation between localisation and entrepreneurship. Other studies demonstrate that like the need of a nuanced approach to 'rural' there is a need to a nuanced approach to entrepreneurship in rural areas, obviously affecting each other. At least three essentially different modes of entrepreneurship have been identified (Bosworth, ibid.; Tanvig, 2010b): local entrepreneurs (people having lived in the area for many years also tend to set up old businesses), managerial entrepreneurs being incomers having planned to set up a business and situated their business in a rural area due to specific local comparative advantages, and opportunity entrepreneurs setting up new businesses having discovered opportunities after having settled. They do act and contribute differently in the local space and community, some driven by traditional business motives and others rather by private, social and cultural motives. In this paper we search for different kinds of entrepreneurship and how they contribute to rural development.

Warren-Smith (2009) stresses that the incomer businesses might be more inventive and in new sectors than local firms but they do not add to the rural area. They do not take part in strengthening the community as does the local business. This can be in the form of sponsorships and being active in local organisations. Stockdale (2006) finds that incomer businesses are associated with little new job-creation due to self-employment but at the same time their higher human capital and skills attained outside the rural area are crucial

for rural change and revitalisation. Yet, most incomers do not get the opportunity to use their skills in the rural area and to support rural development as there are no employment opportunities for them (Stockdale, 2004). In this chapter we look particularly into the lifestyle entrepreneurs (locals and incomer businesses) and how they contribute to rural development, and as shown later on we can make additions to the abovementioned. When analyzing life style entrepreneurship in a rural setting, you discover a spatial interplay that calls for attention to more than the individual entrepreneur's self-employment.

The complex interplay between new spaces and entrepreneurship affects the notion of rurality. The interrelation of 'spaces of flows' and 'spaces of place' (Castells, 1996) can explain how locality and globality can meet differently resulting from different networks and variations and position the local areas and societies differently. This is the main explanation why 'rural' no longer shall be simplified and analyzed as the counterpart of 'urban', or the agro-environmental zone, or regionally as a product of e.g. distance, physical accessibility or population density.

Following the same line, for instance Ray (1999) argues that 'rurality' as such does not explain very much and rather the conception should be 'different local communities in rural areas'. Ray also introduces the concept of 'neo-endogenous' development and how different local capitals can be mixed and areas can be transformed by local/extra-local agency. Disparities emerge from various mixes of local capitals, local capabilities and how locals act in a 'neo-endogenous' model consisting of both local horizontal and extra-local vertical networks. 'Rurality' is reflected by the physical local capital or the bio-physical element (nature, land) and how the locals do make use of and adapt to this element. This can, however, be done in numerous ways leading to growing local disparities. In the context of rural change, differentiation and 'neo-endogenous' governance it is natural to ask if and how new local economies and employment is affected or do affect rural development. In this paper the focus is on the new micro-businesses in the rural area.

Agency in the form of entrepreneurship and how another mode of entrepreneurship than practiced by 'economic man' can benefit from rural values (nature, land et al.) is theoretically highlighted by Anderson (2000); Jack & Anderson, (2002). Here the notion of the 'peripheral mode of entrepreneurship' is suggested to best describe a tendency where immigrating, well educated people settle in a rural area aiming at finding quality of life close to nature, and who soon identify and realize new economic opportunities. They are commodifying 'the otherness', the local amenities and very often 'left over qualities' in such a way that a local revalorizing is said to take place. They do build up new symbiotic relations between man, economy and place. The embeddedness includes local relations that can be measured in more than one way, e.g. both socially and physically. 'The economic man' does not in the same way relate to and integrate the local social and physical context, unless this offers a comparative economic advantage for his business. For him business and economic growth goes in front and success has to do with mere business rather than quality of life. Both may hold strong vertical relations. The first – with both local, horizontal as well as vertical relations – suggests how locals can hold down the global for the benefit of development at a local level and therefore how individual micro-business can play an important role in the transformation of rural areas. So to speak, initiatives at a micro-level do draw upon and affect meso-level (the local environment and community).

Heilbrunn (2010) followed the same lines when demonstrating different spatial contexts and relationships behind entrepreneurship. She distinguished between localized relations from space and relations that are place-bound. Relations from space may be localized or held down by local infrastructural or economic incentives, in her interpretation called 'economic capital' that can be at a high or low level. Relations from place can be measured in the shape of social capital, which also can exist at a low or high level. The most prosperous local context for entrepreneurship is when both forms of capital are represented at a high level. But different combinations can be found. When e.g. social capital is high and economic capital is low, the local asset for entrepreneurship is mainly place bound and lacking from economic space-bound correlations.

We can picture many combinations between place and space as well as weak ties to either place or space may be represented, new businesses being desert islands in the local area because of lack of local social capital or new businesses that are not economically sustainable or able to perform extra-locally because of lack of economic relations. However, we also need to supplement Heilbrunn's (2010) model to understand how entrepreneurship can bring forward dynamism in the local areas, and bridge place and space. In our work in the rural area the approach to 'place' must also include how physical assets (nature, land, local surroundings) can influence entrepreneurship in new ways.

Going back to Castells, Ray and Anderson et al., the prerequisite is still networks that work in-between and relate place and place based assets, with vertical space based conditions and opportunities for economic development. This also calls for attention to specific networks and the individual entrepreneurs' outreach.

In this chapter we therefore ask the following research questions: Can disparities between entrepreneurship (especially between female entrepreneurship) in rural areas be found, and if so, what may cause crucial differences? Why and how do the females make use of the new spatial framework in a rural context and (how) do they contribute to rural development?

### **3. Methods**

The chapter is mainly based on three studies on new businesses in rural areas carried out as qualitative interviews. They are combined because of their different perspectives on similar questions, namely whether and how new spatial frameworks do affect entrepreneurship in rural areas emphasizing female entrepreneurs, because of statistical findings as mentioned beforehand. The first interview survey is a broad overview of new businesses in a specific rural area looking into the existence of entrepreneurship and which modes of entrepreneurship you might find. The second survey focuses on female entrepreneurs in a rural context and the last survey on in-movers to rural areas that have set up new businesses. The first and the third study include both males and females and therefore allow us to make comparisons related to gender. However, because of different methods used in the three studies it is not possible to take into account which influence different regional dimensions may cause. The first two studies took place in Jutland around the town of Vejle in Jutland and the last in rural areas within the southern periphery of the Sealand region; the former Storstrøm County.

The Vejle area is situated in the eastern part of Jutland and is regarded as one of the growth areas in Denmark (where study 1 and 2 took place). The municipality of Vejle covers 106.383

inhabitants and 1066,32 km<sup>2</sup>. The largest town is Vejle with 51.341 inhabitants, and apart from a few smaller towns the rest of the population is situated in the rural areas. Although the Vejle area is characterized as a growth area in Denmark, there are disparities between the most western and most eastern parts of the municipality for historical reasons. Generally the most western part can be characterized as being more rural than the eastern. Two minor rural case areas, representing east and west, were selected for the first study, whereas for the second females from rural areas in general in the municipality did take part. In the case areas, Smidstrup-Skærup and Thyregod-Vester, lived 2300 and 2500 people in 2008 and approximately; half of them in small villages and another half in the open land. However, we expected to find disparities reflecting the structural differences when looking for entrepreneurship, we rather found that entrepreneurship in the two areas were pretty similar indicating that entrepreneurship not solely is affected by local conditions (Tanvig, 2010a).

The Storstrøm County (where study 3 took place) now part of the Region of Sealand<sup>1</sup> comprises an area of 3.398 km<sup>2</sup> and has 262.781 inhabitants. The area has continuously experienced a fall in agricultural and manufacturing employment. There has been a rise in building and construction industry but the great growth rates in business services occurring in the rest of the country has not taken place here (Lundtorp et al., 2005). The area has had a marginal position for many years but within the last 10 years the number of newcomers to the area has been growing and so has their incomes and education level (Aner, 2007). Characteristically the area is gradually becoming part of the metropolitan labour market (Lundtorp et al., 2005).

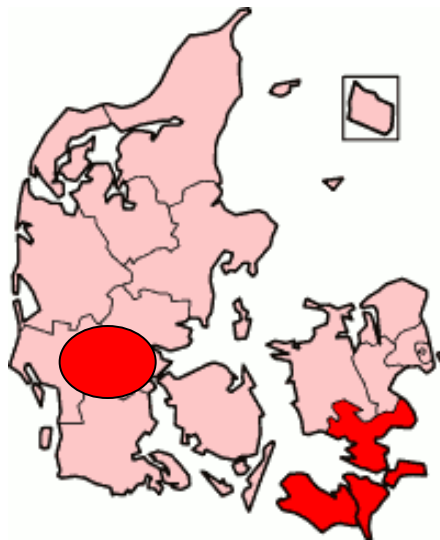


Fig. 1. Map of Denmark. The red highlighted areas are where the interview surveys took place.

<sup>1</sup> In 2007 the counties were abolished and bigger regions as well as municipalities were established as part of a structural reform.

The first survey carried out as in depth interviews counted 35 new businesses which were randomly selected, but quantitatively representative, among newly VAT registered businesses in two small communities mentioned above (Tanvig, 2010a). The second survey consisted of 40 interviews with female entrepreneurs in rural areas, around 15 from the former mentioned survey and around 25 being members of a newly established network of female entrepreneurs in rural areas (Tanvig, 2010b). Both studies thus allowed all kinds of businesses, sizes and being set up by locals as well as newcomers. Nevertheless female entrepreneurs turned out to be over-represented in the first study and in both studies self-employment and lifestyle entrepreneurship certainly dominated regardless of which kinds of businesses they carried out.

The third survey consisted of 30 in-depth interviews. To become updated 10 of these respondents were selected for follow-up telephone interviews later on. The respondents were selected through a network of micro-businesses started in a specific county on Sealand. All of them were members of this network and were in-migrants from the city to the countryside within the last 6 years. In this study the respondents also turned out to mainly be females motivated by lifestyle considerations and all being self-employed. Selecting respondents through the network of micro-businesses does not automatically give a full representative picture of rural micro-businesses in the area as most likely more hobby related activities and locally oriented micro-businesses have not joined the micro-network and there could be an overrepresentation of full-time businesses in knowledge sectors. In this study it has not, however, been the intention to provide a fully representative overview of the phenomenon of newcomer businesses. Rather the aim was to get an insight into the problems and possibilities for the newcomers in starting businesses.

In two of the studies (1 and 3) respondents were interviewed at their dwellings, and in the second study (among members of the association), respondents were also interviewed at the meetings of their association. All were semi-structured interviews and most of the interviews were recorded. The first and second study took place in 2009-2010. The third study took place in 2007 and follow-up interviews in 2008.

#### **4. Results**

In the three studies, we discovered many new businesses; many more than were officially recognized. A huge variation in sectors was represented and only a couple of new businesses were to be found within the agricultural sector. In the two studies (the first and third) which were not focused on female entrepreneurs, the tendency was clear. Most were females and their rate of entrepreneurship in the rural areas was higher than the average of female entrepreneurship for the whole country. Almost all had settled in the rural area before deciding to start up a business of their own, and their businesses were also situated in their dwellings. By doing so, from pull or push reasons, they aimed at becoming flexible, independent, achieving better quality of life and spending time in the rural areas. Most of the female entrepreneurs in the three studies were certainly self-employed and engaged in lifestyle entrepreneurship with business activities that were embedded in everyday life and adapted to their rural dwellings.

Although there were similarities in the three studies and the respective entrepreneurs, there were at the same time distinctive disparities between them. In particular the results revealed

further distinctions between the locals and the newcomers to the rural areas, but also between newcomers setting up businesses from scratch usually realizing a hobby or with experienced backgrounds; transferring their professional experiences to the rural area. The studies included both males and females, recalling that in two out of the three studies men were included. However, in the following we are focusing on the female entrepreneurship. Local male entrepreneurs usually were skilled craftsmen that had set up businesses within the older sectors, acting like 'the economic man'. In-migrating male entrepreneurs did not adapt their businesses to the regional and local markets but stayed focused on the city in contrast to the female in-migrants businesses that focused more on adapting to the regional markets in order to better combine lifestyle considerations with business.

#### 4.1 Locals

Characteristically the local females were older, possessed older qualifications and often shorter years of formal education compared to in-migrated females in the studies. They had spent many years on the labour market and many had withdrawn from demanding and maybe also uninspiring local labour markets to become independent and obtain more flexibility in their every day life. Many of them also wanted to realize a dream of setting up a business related to their hobby and work with more passion. That also became possible among others because children had left home and left free space and lower stable income needs.

Most of them started businesses within a different industry than they had worked in in the past. For instance, many had previous working experiences in teaching, health care or administration, and started businesses mainly in therapies, crafts, retailing and e-shops et al. They started from scratch having no business experience in the sector from before. Unlike the newcomers described in the following paragraphs, the locals did not articulate the rural place as an amenity or an important part of the business concept. Living in the local area was important, nevertheless, and they were active in local community life. When the rural dimension was articulated in relation to their businesses, it had to do with lower costs or was negatively portrayed like distance to customers.

Their business activities were distinctively small. The local women all had a wish for further development of their businesses, but at the same time they were unresolved about their business plans and strategies. They did not make use of the formal advisory system, and did hardly know its offers. This indecision was also evident in the association that was started by a couple of local females, who sought a network of female entrepreneurs in similar situations for exchange of experience. Through advertisement they attracted other female entrepreneurs from rural areas (also locals). Many meetings took place, and inputs were also offered from external parties. Despite that, the network was about to fall apart, because, among other reasons, the females were unresolved about the direction for the network's work; whether it should be mainly social arrangements or the focus should more strategic among others by ensuring a better connection between lifestyle entrepreneurship, the location in the rural area and a successful business. The latter seemed to demand recognition of their situation, strategic thinking, and choices that they were not ready to take. A few social events kept the network alive. Although, these women definitely carried out lifestyle entrepreneurship, they did not make suggestions for development and actions that strengthened lifestyle entrepreneurship so it could become more economically viable.

*Laying the table - Shop 112.* Advice and sale/e-commerce with articles concerning table arrangements is started by a local middle-aged woman that has realised her hobby. Her children have left home and she has opened a shop by her dwelling. She has a long working day keeping the shop open also after hours to keep the customer base mostly made up of her social circle. The e-commerce is then handled on top of this. The shop is not running well economically and she is dependent on her husband's good income. She feels isolated in the business community as she has little time to participate in events. She takes part in the above mentioned association when she can and this mainly for social reasons. Her business concept and how she could achieve more time in her daily life while also improving the bottom line were talked over in the association and she was advised by an external advisor to focus the service, make the homepage more streamlined and attract new customers from outside. However, she has not taken new steps because she feels insecure how and whether she can mix the social life with making rational decisions and improving the bottom line.

## 4.2 Newcomers

The newcomers moved to the countryside because of nature and community life. Distinctive is that settlement in the area took place before starting business. For only a minor part becoming self employed or setting up the new business on a part time basis was part of the move to the countryside. A group of newcomers started out in the local labour market where another group commuted to the city labour market, before becoming self employed or setting up the part time business. The first group (newcomers 1) tended to start from scratch whereas another group, very often higher educated and experienced, tended to set up businesses within their professional fields; transferring their professional experiences to the rural area (newcomers 2).

### 4.2.1 Newcomers 1

This group started business in private services and retail, often marketed through internet and some also running e-shops. For these newcomers the business activity was not a straight continuation of their prior job employment or education but build on some competences from it combined with hobbies or interests. To many the new activities were initiated after having settled. Several had been working in e.g. public services as teachers or in the health system and their new activities were related to e.g. therapies, web sale of clothes or arts, alike the local females abovementioned. Their businesses were small as well and often combined with part time salaried jobs or social or maternity benefits. Most of the respondents were females with young families. The newcomers were especially seeking the local community in the rural area.

Compared to the locals this group of self-employed are more explicit about the use of 'the rural' as an advantage and reason for starting business, among others because of vacant building capacity and the surroundings in the new rural dwelling being attractive to customers. So they are pulled by lifestyle considerations, though, many are at the same time pushed by a difficult local labour market. Particularly, in the third study several incomers had the intention to work in the local labour market, however, often the local labour market could not assimilate them. Several of them had experienced sporadic employment or long



*Patchwork sale and courses.* A woman and her young family have recently moved to a disused farm which is localised in an area characterised by great natural beauty. An unused building in combination with the attractiveness of the place made her want to realise her hobby as a new area of business: show room, course activity, e-commerce with patchwork articles. The opening hours are structured around when the children come from school. During school hours she has salaried employment close by but the plan is to develop the business to become full-time. Her husband has salaried employment in the local area but also works to develop business activities in sale of plants from the farm. She feels somewhat isolated as a female entrepreneur but is very active in the local community

term unemployment and some had to be retrained or had to commute very far everyday to find employment that fitted their present skills. They were too well educated and the labour market in turn sought lower skills, if there were job openings at all.

*The language school.* A teacher in German and Danish also moved to a disused farm. She had found a job in the closest town teaching refugees Danish, however, the school closed and for a similar job she would have to commute long distance everyday. She decided to start teaching German tourists Danish while having a part-time job doing accounting for a local workshop. Inspired by other self-employed women in a network for micro-business she started to offer tailor-made German classes for businesses. She initially developed German courses for the local ferry employees but has now jobs around the country teaching ferry employees' part of the same company at their other routes around Denmark. Her plan is to renovate an unused stable into a course facility so she can also run overnight courses from her house and collaborate with a local hotel for accommodation so she will not have to be away from her family too much. This plan has, however, been put on hold as the local school is closing and her daughter will have to be driven far to school. She therefore strongly considers moving to a larger town instead.

Initially this group of self-employed did not have experience with private business and they generally had weak market relations in their start-up. A large part had not made use of the external advisory business services or looked up resource persons actively. However, a few of the females had been in contact with the local advisory services (municipal/regional), but they did as well experience a mismatch between their needs as self employed in new sectors and the lifestyle mode of entrepreneurship and the systems approach, which seems to be matching 'the economic man's'. They felt the advisory services did not take them seriously. These women instead joined a network of micro-businesses started by a newcomer in the area. This network is by contrast described positively. The participants feel they have gained new ideas on how to run business in new sectors in the countryside by e.g. running e-commerce, finding customers and business partners in a wider area and to diversify the customers to also include businesses or the public services instead of only private servicing.

These newcomers were very active in the local community life to create activities for them and their children. Unfortunately, in the third study several of the younger families consider moving to a larger town for the sake of their children as the local schools are closing and there are too far between playmates and leisure-time activities.

#### 4.2.2 Newcomers 2

The other group of newcomers did not opt for finding local employment after moving to the rural area but planned to commute to the city for their employment. This group of entrepreneurs are middle aged with no or grown-up children. Many were academics and working in the field of media and communication (journalists, advertising/marketing experts) or they were employed in broader business consulting (engineering, biotech). They moved to the rural area to live in an attractive dwelling close to nature, have more freedom and peace and quiet in their everyday life. However, this group soon felt that they spent too much time on congested highways commuting to the city from their new dwelling and never got time to enjoy nature and rural life. After some years they saw self-employment as the only way they could stay in their field while also having a flexible everyday life without too much commuting. They started or stepped up freelance activities beside their employment which many gradually downscaled. Their spouses usually continued commuting to the city. Common is that this group has stayed self-employed and not employed any staff as the whole idea behind self-employment was to stay free and flexible which is a quality crucial in the adaptation to a more regional business.

Compared to the former studies these females tended to 'recycle' their skills and experiences obtained from the education or labour market in the city that they left. Very often they also kept in professional contact with former business partners, colleagues and customers in the city. In other words, their start-up was founded in a large extra-local network of business contacts and sparring partners. Also they kept on drawing upon external services and support often carried put by people they knew personally.

However, with all customers and business contacts in the city, they all struggled with how to minimise the commuting and how to find customers and business contacts closer to their new dwelling. Especially the people in advertising missed the proximity to graphic designs, text writers, publishers etc. This group did grasp the situation strategically and offensive within the lines of their business strategies. In contrast to the former reported locals and newcomers that rather stood at a standstill or channelled their needs into social networking like local community activities or the local association mentioned, this group, newcomers 2, gave priority to continuously market and to stay in touch with their former colleagues and partners in the city, at the same time as building up new business relations locally and regionally.

*Tech Transfer.* A respondent formerly employed in the biotech industry in the capital city as a tech transfer consultant, became gradually self-employed after realising that commuting to the city everyday was not what she wanted. She loves her new big house in the countryside, her view and the peacefulness. She describes the process as going from high tech to low tech consultancy. She today advises the regional pharmaceutical industry mainly in marketing, building of networks, headhunting employees and in training. She also works with the regional administration in applying for EU funding and is presently a project manager for an EU regional fund project where she has also used her former relations to partners in Europe. She also works with the regional hospitals in attracting foreign doctors.

To get access to locally or regionally located business partners and customers several of the respondents in the study have set up new networks. One network is dedicated to regional

entrepreneurs within a particular sector (advertisement), another to small businesses in a particular municipality and one to micro-enterprises in general which has grown to cover the whole of Denmark. It is this network some 'newcomers 1' in private services have joined. These networks seem to support the adaptation by building links within sectors and by exchanging experiences on how to both diversify the kind of customers but also the product. Instead of a more narrow business consulting, the respondents often have also diversified their product to also fit the regional market and have been able to better connect their lifestyle motives with making money.

It is distinctive that the few males in the third study have kept doing 'city-business' focusing on the city market and not tried to adapt and find customers regionally and locally. It is the females who find commuting to the city a major difficulty and have worked to overcome this by finding regional business partners/customers and adapting the product to the regional market. Becoming self-employed has been a viable option for these knowledge workers to create their own employment while at the same time spending more time at their dwelling and in nature. Common is, however, that they do not take much part in village life and local community activities. They moved to the countryside for nature and peace and quiet. They do not contribute to reviving rural social life but their establishment of regional business networks shows important for their own business adaptation and also for the more isolated new businesses in extending their markets and developing their product.

## **5. Discussion**

### **5.1 The life style entrepreneur**

The respondents in the studies have set up new business activities in the rural areas in the shape of self-employed life style entrepreneurship. They started business activities for social or lifestyle reasons. They are motivated to set up new businesses more or less drawing upon rural assets. The self-employed activities show to be in new sectors than the usual rural businesses. The new activities are different kinds of services, therapies, handicrafts, e-shops and more knowledge based businesses that can be carried out at distance from their customers.

The studies reveal an overrepresentation of women compared to the country as a whole. Opposite the few male entrepreneurs found, the female entrepreneurs have been motivated by lifestyle and everyday considerations for starting business. Males rather tended to start ordinary workshops or stayed 'city businesses', indicating that a rural place and a more flexible everyday life do influence females as entrepreneurs in particular. These females' approaches to business can not be explained from the theories that appoint 'the economic man' as the key actor. His (the economic man) aim is to set up a firm with economic growth. 'The economic man' addresses two kinds of entrepreneurship according to theories: the local entrepreneur within old businesses operating at the local market or the managerial entrepreneur that in a rural setting very often has moved to the area because of gaining particular comparative advantages to the business (eg. as a source of input like raw materials or for cheaper labour etc.).

The females in our studies rather seem to be opportunity driven, some of them setting up businesses without professional background, but all of them encouraged from social reasons in relation to the settlement in the rural area. They may be better explained by the

‘peripheral mode of entrepreneurship’ (Anderson, 2000), although many of them are not explicitly commodifying ‘the otherness’ and ‘left over qualities’ in the rural setting, but implicitly by the convergence between living in the area and the adaptation to business.

The lifestyle entrepreneurship is both promoted by pull factors and push factors. A wish to have a more flexible everyday life and time at the rural dwelling and in nature while at the same time being pushed by a too stressful commuting job or a boring or difficult local labour market. When realizing the difficulties in integrating into the local labour market or having no time to enjoy the rural dwelling because of being stuck on congested highways, the newcomers see starting as self-employed as an option to combine lifestyle with also having a career. Self-employment is an option and, for some, the only option to combine lifestyle and everyday life with a continued professional life as an alternative to long commuting, unemployment or a hard and uninspiring job (see table 1).

	<b>Locals</b>	<b>Newcomers 1</b>	<b>Newcomers 2</b>
<b>Age</b>	Middle-aged	Mainly young families	Middle-aged
<b>Educational backgrounds</b>	Skilled and short educations	Skilled and short to medium tertiary educations	Medium and long tertiary educations
<b>Social situation</b>	Having spouses, no children living at home	Having spouses (commuting or running own businesses) and children living at home	Having spouses (commuting long distances) and no children living at home.
<b>Business characteristics</b>	Very small, starting from scratch, services, retail, therapies etc., business strategies unresolved	Small, starting from scratch, services, retail, therapies etc. Tend to draw upon comparative advantages from rurality, business strategies slightly more resolved	Following tracks from education or former occupation, more are full-time occupied with their business, more are knowledge based businesses at high level, more are aware of having business strategies
<b>The new business and the rural area</b>	A push-effect from previous employment is often important	A pull effect-from the new environment after having settled is important as well as a push-effect from previous employment	A pull-effect from the new environment after having settled is important as well as a push-effect because of long commuting distances

Table 1. The main differences between the three typologies of lifestyle entrepreneurs.

## 5.2 Finding the right combination

All the female respondents surely represent self-employment and lifestyle entrepreneurship with business activities embedded in everyday life originating in their rural dwelling. However, the studies also show that it is not easy to juggle the different motives; - to find the ‘right’ combination between running a new business, making room for lifestyle and everyday life while also making a living. The life style entrepreneurs are diverse and have

different starting points and competences for running a business, have different ideas of what rural life is and consequently contribute differently to rural development.

The two opposites are the locals realising a hobby and the newcomers recycling their tertiary educations and professional backgrounds from private business into knowledge businesses in the countryside. These groups are both middle-aged with children having left home; a situation launching a new beginning for both groups, - realising a hobby or moving to the countryside. The newcomers have a higher education, a professional background combined with business experience, a product and extra-local networks giving them a very different starting point for business development. The locals together with the newcomers starting from scratch feel invisible, not appreciated as a business entity or recognized and like 'a desert island'. They also have weak business relations to other firms. Many of these are at a standstill where developing their product and extending their market is necessary if they want to make a living from their activities. In contrast, the newcomers depending on only city relations struggle to adapt their business to also include customers closer to their dwelling in order to bring more flexibility and freedom into their everyday life.

Crucial differences between the lifestyle entrepreneurs are related to their drive and efforts in building both horizontal and vertical relations which characterises the more successful businesses; the combination of customers and networks in the city or nationally with a broader array of services matching a regional market. To run a lifestyle business that also makes a living means adapting into a business that combine networks at different scale and different services and activities. Not all the lifestyle entrepreneurs have been able to develop their product and extend networks and markets or have even tried to. It seems that lifestyle considerations can also stand in the way for business or rural development. Being active in the local community and wanting a more flexible life while also having to develop a business that can compete and make a living are activities difficult to combine. Opposite running a successful business and spending the little leisure time left enjoying peace and quiet leaves little room for taking part in the strengthening of the local community. The locals and newcomers with young families contribute to the strengthening of the local community by being active in village life. As Warren-Smith (2009) argued, it is the locals that contribute to rural development and the newcomers do not; however, this study shows that they take another important role. They extend the business networks and add new inputs to the business community in how to run new service businesses. In this way they add to rural development and get to use their higher skills in supporting rural change as Stockdale (2006) looked for.

It is the newcomers that more explicitly express the rural as a factor in their business. It is important for them when moving to the countryside and it is a major factor why they start business (vacant stables, the possibility to spend more time in the rural area) and it is also a major reason for changing their business activities and going far in adapting (looking up regional customers and setting up regional business networks). The locals might not speak of the 'rural' but also emphasise the importance of their local area and community. But the local (rural) area also means different things to different people. For the locals and newcomers 1 community life is important where the rural means nature and peace and quiet for the middle-aged incomers. They do not contribute to the rural development in the sense of strengthening the local community but they 'hold down the extra-local relations' adding to the 'economic capital' (according to Heilbrunn, 2010) opposite the locals and

	<b>Locals</b>	<b>Newcomers 1</b>	<b>Newcomers 2</b>
<b>Local social networks</b>	Participation was demonstrated and important	Participation was demonstrated and important	Participation seemed low
<b>Local business networks</b>	Participation seemed low	Participation was medium. Was there more business oriented networks available in the area as in the third study, they more willingly than the locals participated.	Participation was demonstrated
<b>Extra-local business networks and other professional relationships</b>	Participation seemed low	Participation medium (see the above)	Participation seemed high

Table 2. The participation in different networks.

newcomers 1 that mainly work in the sphere of strengthening the social capital. The contribution into strengthening the local community and the social capital showed very important as several newcomers with young families considered leaving the rural area altogether as the local community disintegrated due to school closings. So both contributions; the social and economic are important. At the moment very few entrepreneurs practice both.

### 5.3 Rurality and ‘new rural space’

The self-employed activities carried out by women show to be in many new and very often more service based industries of which some are knowledge-intensive sectors compared to the usual rural businesses. Many of the female entrepreneurs go far to adapt their businesses by diversifying activities and combining them with some salaried employment and freelance. Their contribution to the transformation of rural areas is important, although usually overlooked, because they do not appear and can be measured like a conventional enterprise. Despite being self employed, - theories suggest that these lifestyle entrepreneurs strategically could take part in the transition of the rural areas by combining and recombining place/space through local/extra-local exchange in their businesses.

Both relations to ‘place’ and ‘space’ can be found among the female entrepreneurs, although none of the groups did practice the ‘right’ combination following the lines from theory strategically, at least when studied. Many have not positioned themselves in an ideal combination of ‘space’ represented by extra-local networks, and ‘place’ either represented by local, horizontal networks or taking advantage of local capitals such as e.g. local amenities. All three groups do not attract and transform as much extra local business ‘energy’ to the local community, and thereby new business life, as they could. To the locals as well to newcomers 1 it seems relevant to extend the business horizon locally and also to get extra local relations. But to the locals it at the same time seems relevant more explicate to draw upon rural assets in their business and bring them forward to the market. To newcomers 2 it seems relevant to work upon building up local social networks to become embedded and spread the ripples.

Taking advantage of the new economic space by combining local comparative advantages and building up both local and extra-local networks lead to rural revitalization according to theory. Many female entrepreneurs, both locals and incomers, have taken the first steps, but they should be stimulated or assisted to go further. Some of them needs to improve both 'place' and 'space' relations, others either 'space' or 'place' relations, very often by building new networks, demonstration of local assets and best practices. Most of them will keep on being self-employed but with an improved bottom line, some may increase employment, most important to all and the 'new rural space' is the fact that many more may be treading the same path, if knowledge about the opportunity and a supportive framework is being established.

Our studies demonstrate that the formal advisory system do not acknowledge these new lifestyle entrepreneur. By ignoring lifestyle motives or the social-dimensions behind female entrepreneurship, they miss out on a new kind of business development that could have important impacts on rural revitalisation. The lifestyle entrepreneurs must organize their own new networks to find a supportive environment. Following the lines from the theories abovementioned, the gaps whether exemplified by weak local ties or weak extra-local relations surely could need support and hereby have a greater impact. Exchanging knowledge and taking part in networks with other similar businesses shows necessary for being able to juggle the different motives and develop a viable combination of lifestyle and economic considerations as the formal advisory system does not yet see a potential in these.

These studies also show new dynamics in the rural landscape as questioning the very concept of rurality. Apparently there is a fusion between what otherwise has been analyzed as two separate 'worlds' the rural and urban, so that the concepts 'peri-urbanity' or 'rurbanity' can also make sense in this context. They describe urban physical expansion and assimilation of the rural, our studies suggest, however, a marked difference and a border: the rural component is decisive for the settlement of the new entrepreneurs, and the balance between 'place' and 'space' in their business concepts is crucial to them and the rural areas. If the balance will be moved primarily to be 'space'-driven, like agglomerative economies would tend to, danger of draining and disregard of local resources would happen, and weaken the attractiveness and thus the possibility of establishing the new business arising from the new forms of entrepreneurship. The balance on this knife edge is critical to success for the 'new rural space'.

## **6. Conclusion**

In the chapter new modes of rural entrepreneurship has been explored. Results show that it is women that mainly take advantage of and respond to rural amenities and living as a motivation to start business in the rural area. Their new activities can vary between full-time business to a combination of several services and also salaried employment. Therefore their activities very often are not measured as real business in the shape of a genuine firm like the 'economic man's' and can not always be found in the general statistics. Despite of that all these new activities do hold a great potential to rural development.

The female respondents all represent self-employment and lifestyle entrepreneurship with business activities embedded in everyday life originating in their rural dwelling. They are opportunity driven, some of them setting up businesses without professional business background, but they are all encouraged by everyday life and lifestyle considerations. The female respondents take advantage of the new rurality by combining lifestyle considerations

with new sectors to or new ways of handling business in the rural areas. The self-employed activities carried out by women show to be in many new and very often more service based industries of which some are knowledge-intensive sectors compared to the usual rural businesses. The business activities are in e.g. media, health and therapy and business services. Many of the female entrepreneurs go far to adapt their businesses by diversifying activities and combining them with some salaried employment and freelance.

It is the newcomers that explicitly express the rural as a factor in their business. It is important for them when moving to the countryside and it is a major factor why they start business and in the way they adapt their business. The newcomers also have a higher educational, business experience and extra-local networks giving them a very different starting point for business development. The locals together with the newcomers starting from scratch feel invisible, not appreciated as a business entity or recognized and like 'a desert island'. They also have weak business relations to other firms. Many of these are at a standstill where developing their product and extending their market is necessary if they want to make a living from their activities. In contrast, the newcomers depending on only city relations in their start-up struggle to adapt their business to also include customers closer to their dwelling in order to bring more flexibility and freedom into their everyday life. The newcomers tend to pave the way for new sectors or solutions like setting up business networks rather than locals. Thus, the life style entrepreneurs are diverse and have different starting points and competences for running a business. The different positions in the global/local interplay are determined by competences and the ability to use both local and external resources, which are heavily, influenced whether you are a local or a newcomer to the area.

The lifestyle entrepreneurs also have different ideas of what rural life is and consequently contribute differently to rural development. The locals and the more locally oriented newcomers are active in the rural community and play an important role in strengthening the social capital of the local community. In contrast the more externally oriented newcomers extend business networks and add to the economic capital. However, none have positioned themselves in an 'ideal' combination taking advantage of local capitals, being active in the local community while also 'holding down' extra-local relations by establishing business networks also to outside the local area. The theories state that taking advantage of the new economic space by combining local comparative advantages and building up both local and extra-local networks will lead to rural revitalization. Many female entrepreneurs, both locals and incomers, have taken the first steps, but they should be stimulated or assisted to go further. At the moment, the business advisory in the rural areas have not yet 'noticed' this new kind of rural business. In the case area where newcomers have established business networks, these have shown very useful for both locals and newcomers in adapting the businesses and improving the bottom line. However, in areas where such networks are not present, the lifestyle entrepreneurs are left on their own. By ignoring this new rural business, they miss out on a new kind of business development that could have important impacts on rural revitalisation.

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# A Chronicle of the Timber Industry in East Arnhem Land, Australia

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## 1. Introduction

The north eastern part of the Northern Territory (NT) is East Arnhem Land. This expanse of Australia is the homeland of the Indigenous Yolngu clans whose forbears occupied the land some 50,000 years ago. These people survived in a nomadic lifestyle of hunter gatherers on their traditional land (Altman, 2002; 2003). Historical records show that from the 17<sup>th</sup> Century Indigenous Yolngu traded with seafarers from China, the Celebes, Japan, the Netherlands and even sailors navigating the great southern land (Berndt & Berndt, 1999; Worsely, 1955). Over 300 years later within the first quarter of the 20<sup>th</sup> Century, the Methodist Church began to develop the coastal region of East Arnhem Land, and thus, began the congregation of Indigenous communities (Trudgen, 2000). Living in this inhospitable land obliged the non Indigenous settlers to use available material to establish structures and facilities vital to sustain a string of mission stations. A primary resource was cypress pine (*callitris intratropica*) which was resistant to termites, the indefatigable predators of other timbers, and this was the beginning of merchandising the timber industry in East Arnhem Land.

Within this chapter a number of places of interest are mentioned. Seldom are all of them to be found in a standard atlas as many are in the category of an outstation. While some of these isolated centres may have populations of 100 or more people others may have less than a handful of houses that at any time can be vacant as the people move from one to another location for cultural festivals, funerals or ceremonies. One location, which is likely to be found on a standard map, is the town of Nhulunbuy that acquires the name from the sacred Mt Nhulun, and by that translates from the local mother tongue language from where I come (i.e., I come from Nhulun). The town site of Nhulunbuy, which skirts Mt Nhulun, has some 4000 people, mostly non Indigenous. A majority of these people work in jobs associated with the mining operations as the refinery (12 km from the town) is one of the biggest in the southern hemisphere with a capacity of 3.8 million tonnes of alumina per annum. Nhulunbuy is on the Gove Peninsula and the region is home to about 8000 Indigenous Yolngu who live mainly at Yirrkala (about 800 people) and on outstations and hamlets as all the land is classified as native titled. Those places which are nominated in the following pages are identified in Figure 1.

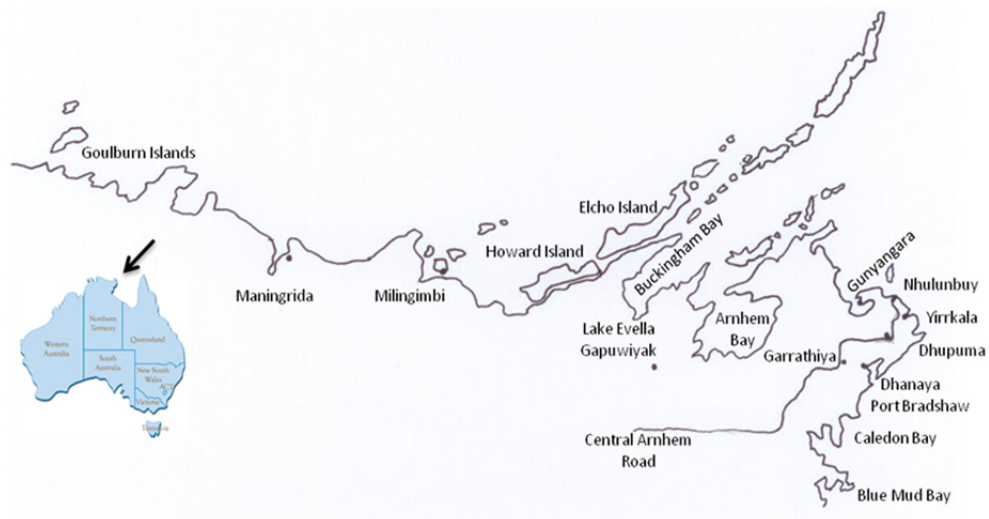


Fig. 1. East Arnhem Land and Places of Interest

## 2. The beginning of the NT timber industry

Despite the tyrannies of isolation, climatic inhospitability, and the ravenous appetite of white ants that consumed the construction timbers shipped in by luggers, other church missions were established. In 1922, a mission was started on Elcho Island by the Reverend J. C. Jennison. But when the Napha Petroleum Company began drilling within sight of the mission buildings, and with an expectation that the extensive operations would attract a large settlement of white people, the mission was relocated to Milingimbi in 1924. Later, in 1935 a mainland Methodist Church Mission was established at Yirrkala. The creation of these church missions provided the underpinning for sourcing durable construction timber, and consequently, milling facilities were built as there was a local flora that resisted white ant attack (Shepherdson, 1981).

The commercial milling of timber in the East Arnhem Land of the NT of Australia has roots in the activities of the Methodist Church Missionaries. During 1911 when the Commonwealth Government of Australia assumed responsibility for the administration of the NT this action included the welfare of the Aboriginal people (Anderson, 2007; Smith, 2006). In the following year, an interdenominational Committee of churches, with an explicit interest in Australian Aboriginal Missions, was formed in Melbourne. This organisation negotiated with the Australian Government for the right to establish missions in the NT. In 1913, on suggestion of the Committee, the Methodist Overseas Missions Board commissioned the Reverend James Watson to examine the proposal of establishing a church mission for Aboriginals in the largely unexplored Arnhem Land of the NT. Subsequently, in 1915 the Reverend Watson made two land and sea forays as far as the Goulburn Islands that were at the western boundary of Arnhem Land. After considerable deliberation the Methodist Foreign Mission Society commissioned the Reverend Watson to establish the first Aboriginal Church Mission on South Goulburn Island in 1916.

## 2.1 Influence of the Reverend Shepherdson

A central figure in the timber milling operations that commenced in 1928 was the Reverend Harold Urquhart Shepherdson. Harold, a qualified engineer, born in Bunbury, Western Australia, was married to Ella (who was born in Edinburgh, Scotland in 1913) in October 1927. The couple often met at the Methodist Church at Payneham (a suburb of Adelaide), and when engaged decided to do missionary work. Harold was encouraged by the church authorities to work in a timber mill on a country property, while Ella completed a six month nursing course. More fascinating is that the Christian Endeavour Society in Adelaide initiated a collection to purchase a saw mill for a mission in the NT, and when Harold and Ella Shepherdson arrived at the remote Methodist Milingimbi Mission on the 28<sup>th</sup> April 1928 the mill had preceded them.

Although Milingimbi Island was devoid of stands of suitable milling trees, there was a plentiful supply on nearby Howard Island and the previously explored Elcho Island. The Reverend Shepherdson built a log whim (4 foot diameter wheels), which was shipped to the islands, where it was used by Aboriginal ten men teams. Logs of 15 foot length up to 20 inches in diameter were dragged to the shores of Howard and Elcho Islands, and these masses of wood were then transported to Milingimbi Island by luggers (approximately 50 foot in length). There Shepherdson assembled the 5 foot diameter blade mill, which was belt driven and powered by an internal combustion engine, to mill the logs to structural strength boards and planks. Later the power source was a steel wheel tractor that was scavenged at Elcho Island from the defunct oil company that went into liquidation in 1931. The timber, which was cypress pine and highly resistant to white ant attack (due to its high oil content), was used to build a second house (for the Shepherdsons), a workshop (25 feet x 14 feet), and auxiliary buildings. In addition, milled timber of various sized sections was stored in racks from which it was drawn, bound in bundles with steel straps, and shipped to other locations.

Hostilities between the Indigenous people and seafarers triggered an extension of the mission stations. Historical records show that from the 17<sup>th</sup> Century the Indigenous Yolngu people of Arnhem Land had traded with the Macassans, who came in praus / prows from the Celebes, to a lesser extent the Chinese, and later with the Japanese who exploited the Australian northern waters. These seafarers came for trepang (sea cucumber), pearl shell, turtle shell and timber, which was traded for tobacco, axes, steel for spear heads and cloth material (Cawte, 1996; Ivory, 1999). However, when the Japanese sailors mistreated Indigenous women at Caledon Bay in 1933 five were killed by the Yolngu. This action spurred the Methodist Church to establish a further mission in the region and in 1935 the Reverend Wilbur Chaseling and his wife arrived at Yirrkala to establish the third mission station in the NT. A year later in November 1936 a lugger loaded with timber milled at Milingimbi arrived at Yirrkala where the Reverend Shepherdson and two Aboriginal carpenters constructed the first of two mission timber structures. One was a corrugated covered shed (50 feet x 30 feet) that was used for storage. The second building was a house for the Chaselings. This dwelling was on six foot piles, with a floor plan of 50 feet x 40 feet, and the roof was corrugated iron. Mr Phil Herdman, the Nhulunbuy historian, told the first author that despite these two buildings being in sound structural condition they were demolished in 2000/2001. The time was confirmed to the first author by a number of long term residents of Yirrkala, who stated delays to the demolition were due for the need to

conduct an exorcism of a poltergeist from an Indigenous death in the house that occurred after the Methodist Mission Reverend vacated in the early 1980s.

Further expansion of church missions in the NT was curtailed by the onset of the Great Depression. Despite Elcho Island having land more suitable for cultivation, a more sustainable water supply, better anchorage and plentiful stands of milling trees (as well as the Napha Petroleum Company vacating the island in 1931) the Methodist Overseas Mission Board was unsympathetic to the relocation of the Milingimbi mission. It was not until 1942, at the height of the Second World War, when the Australian military decided to establish spitfire and beaufort squadrons on a new aerodrome on Milingimbi Island (within three km of the mission), that the threat of being bombed emphasised a need to move the mission to Elcho Island. On Monday 3<sup>rd</sup> August 1942 the loaded 56 foot lugger *Larrpan*, with the tractor in tow on a pontoon, departed for Elcho Island.

Establishing the Methodist Church Mission on Elcho Island for the second time did immediately intensify timber milling. Whereas the milling was conducted in the open at Milingimbi extensive facilities were built at the Elcho mission to protect the operation and the large stacks of commercial timber. Continuous milling was sustainable as the forest was accessible and a regular supply of felled logs to the mill site was maintained with the use of a steel wheeled tractor. Trained Aboriginal men milled the cypress pine logs to a range of cross section beams, planks and purlins that were used to build a number of church mission buildings on Elcho Island. These structures included a hospital, a church and a large house for the Reverend Shepherdson. Once the immediate needs of the mission were met commercial timber was available for other regional construction projects. Later, the Reverend built a medium size boat for the transport of personnel and goods to other centres. In 1964 a new hospital was constructed at Milingimbi and the continual drawing on the natural resources encouraged Mr Russell-Beasley to commence a reforestation programme, but the incessant demand for milled cypress pine had peaked. During the 1960s political social forces and technological advancements reduced the relevance and influence of the church missions, and eroded the importance of cypress pine as a domestic building material in East Arnhem Land of the NT.

In 1969 the Methodist Church established the last mission on the mainland in East Arnhem Land. Often referred to as an Elcho Island outback venture the settlement was referred to as Lake Evella or Gapuwiyak, and was under the management of Mr. and Mrs. Geoff Davey. The mission was on the edge of a body of fresh water some  $\frac{3}{4}$  mile long and  $\frac{1}{2}$  mile wide. This lake had been sighted by the Reverend Shepherdson when he and the Reverend T. T. Web flew over the water in a Miles Hawk on their way from Milingimbi to Yirrkala in 1935. Consequently, the lake was named after their wives; Eve and Ella. A mill was established at Gapuwiyak to cut commercial timber from the surrounding bush, but most of the buildings were constructed with contemporary materials (e.g., bricks, concrete, steel, fibro) or practices that incorporated chemical protection from the white ants, so milling became an abstraction. However, in 1981 to 1983 when the second author was managing a barge service to the nearby coast of Lake Evella via the Buckingham River for a short time an industry flourished with 8 inch diameter poles of cypress pine. These small sized logs were bundled and transported to Kuri Bay in Western Australia for the Paspaley Pearling Company as the timber was resistant to attacks from sea organisms. The cessation of this trade brought to the close the commercialisation of timber milling of cypress pine in East Arnhem Land. This

industry had been founded by a handful of white men and women, who in the words of Maisie McKenzie (1976, forward), were described as "...people who cared so much about the "wild savages of the north" they were prepared to risk their lives in serving them."

### 3. The contemporary era of NT timber milling

Commercial milling of timber in East Arnhem Land reemerged in the late 1990s with features substantially different to the industry that had been fostered by the missionaries. Driven by a primary motive of dogma the missionaries acquired a secondary pragmatic desire to obtain building materials that would survive the avaricious appetite of the white ants. In 1998, when the Gumatj clan of the Indigenous Yolngu inaugurated their milling operations, the primary objective was to obtain flat timber boards for platforms of windmills, decks of bridges or verandahs, while their latent motive was to undertake the activity on their land for which they have holistic spiritual allegiance (e.g., *dreamtime*). A salient contrast between the two milling systems is the missionaries cut softwood logs (cypress pine), whereas the Gumatj people are predominantly milling the savannah forest hardwood of the NT stringy bark (*eucalyptus tetradonta*). Technological development has strongly influenced the operational differences in the two distinct periods of timber milling. In the time of the missionaries a large diameter circular saw was housed in a robust timber bench, which made the apparatus relatively immovable. Today, the Gumatj use a Lucas mill, which has a much smaller diameter circular saw that is compactly coupled to a combustion engine to alleviate belt drives. Moreover, the equipment is moveable as it can be disassembled in less than half an hour, transported on a flat tray truck, and reassembled at a new site in the forest in about 20 minutes. Figure 2 shows a team of Yolngu men of the Gumatj clan milling a log in the savannah forest. Commonalities of both systems were the training and the initial supervision of the Indigenous people was done by non Indigenous (ngapaki) personnel, and both arrangements generated high quality milled structural timber for building construction with an opportunity for furniture manufacturing, and other unique more artistic and utilitarian products.

#### 3.1 The Gumatj Corporation initiative

The motivation for timber milling by the Indigenous Gumatj family has been instrumental. Initially the milling of hardwood logs was for specific components (i.e., decks, platforms, floors) of traditional log structures on their cattle station, and when the task was completed the milling equipment was warehoused. The region of milling was on the east side of the red dirt track Central Arnhem Road and west of Dhanaya about 10 km northeast of the Garrathiya (land of the cycads) cattle station homestead. However, in 2008 the milling of timber was reinvigorated. Revitalisation of the industry was driven by the notion to utilise the abundant natural resources, including the latent strengths of the cattle station, in a long term strategy to reduce the socio economic disadvantages experienced by the Gumatj clan.

Indigenous Australians experience severe socio economic disparities compared to other Australians. In East Arnhem Land this minority group often resides in remote geographically dispersed communities where there are seldom mainline jobs. Often these Indigenous people are low skilled in terms of civilised societal jobs, they lack relevant industrial work experience albeit some of them may be intermittently employed in a



Fig. 2. A Team of Yolngu Men Operating a Lucas Mill

community development employment project scheme, and thus, are likely to be wedded to welfare. Poor employment prospects are consistently linked with the lowest income, the least educated and most unhealthy living conditions. In turn these patterns are associated with a multitude of social indicators such as material poverty, unhygienic housing, inadequate nutrition and unhealthy lifestyles, substance abuse (alcohol, tobacco, recreational drugs, petrol sniffing), higher incarceration rates, lower life expectancy, and epidemic rates of lifestyle diseases (diabetes, cardiovascular, coronary heart). Many of these fundamental differences with the non Indigenous population are experienced by Yolngu people as lesser life opportunities and weaker wellbeing.

Alleviating the level of social and economic disadvantage of the Gumatj family lay in a heightened timber industry. The head of the Gumatj clan and the second author held the view if the capacity of the farm could be developed cattle could be field killed in a hygienic portable abattoir. Then the cryovaced chilled meat could be sold to nearby Indigenous communities, but a majority of the product would be brought to Gunyangara where Indigenous ladies would prepare wholesome meals (in existing high quality kitchens) for sale to local Indigenous people. This ambitious plan was predicated by a sustainable meat supply, which required additional head of cattle, and thus, more holding yards. In late 2008 a D6 bulldozer was purchased that would be predominantly used for clearing of fence lines in the virgin savannah forest. A rectangular 7km x 3km paddock, with internal zigzag fencing for easier mustering, would be required on the west side of the Central Arnhem Road adjacent to the existing current Garrathiya cattle station. But before the fencing project



could commence extra workers would be required, and thus, additional accommodation had to be built.

### 3.2 Accommodation construction

The first new accommodation was a structure that combined traditional and contemporary building techniques. All the vertical columns were debarked logs that were positioned in concrete footings, while the girts and purlins were milled structural members. Field supervision of the Indigenous men who felled the trees, milled the logs and built the facility was provided by the Jack Thompson Foundation. Built in 2008/2009 the accommodation unit had three separate buildings that were connected with concrete footways. At one end there was an ablution block (5 metres x 4<sup>1</sup>/<sub>2</sub> metres) containing three toilet cubicles and three showers, and at the other end there was a large kitchen (6 metres x 4 metres). Between these two units there was a large dormitory (9 metres x 8 metres) that has a central passageway with three rooms each side. As each room had adequate floor space two beds could be put in each to give a capacity for 12 people. Within the kitchen was a number of open work benches that had timber slab tops and shelves (50mm thick) held in a milled timber framework. The floors were concrete for ease of cleaning, while the roof and external walls were olive green steel cladding. Private contractors were engaged to fit all electrical wiring, ceiling fans, power outlets and the plumbing. Figure 3 shows the external arrangement while Figure 4 reveals the internal construction technique.

In 2009 a second accommodation dwelling, architecturally designed to Western standards was built. This structure (14.6 metres x 15 metres), commonly referred to as the Garrathiya



Fig. 3. The Garrathiya Dormitory and Outbuildings during Construction



Fig. 4. The Kitchen Unit Showing Construction of Traditional Log Columns and Milled Timber Girts

five room bunk house, is illustrated in Figure 5. The leader of the Gumatj clan, Mr Galarrwuy Yunupingu AM, who had been Chairman of the prestigious Northern Land Council for over two decades, was able to use his extensive industrial and business network to acquire the assistance of three leading Tasmanian Corporations; University of Tasmania, Forestry Tasmania, and Fairbrother Builders. The architectural School of the University of Tasmania designed a timber structure of standard section structural timber with minimal employment of other construction materials. For instance, steel galvanised footings (for white ant protection), and plywood bracing gussets (to reduce the need for steel brackets) were the main off site structural non local timber components used in the building. Forestry Tasmania provided the initial supervision of two Lucas mill teams (six Yolngu men) and training in sustainable timber harvesting and management (four Indigenous men). Fairbrother Builders, a specialist company in building and construction, provided non Indigenous personnel (two men) to supervise the 18 Gumatj workers who built the bunk house. The 20 tonnes of timber used to build the bunk house was produced by another team of 10 Yolngu men who felled the trees and milled the logs.

Collaborative arrangements between the Indigenous stakeholders underpinned a number of successful endeavours. For example, the booklet (A3 size) of architectural plans and lists of sectional sizes of the timber members were more meaningful to the Fairbrother Builders supervisors, yet the Indigenous team working in the savannah forest was able to meet the continual demands for milled timber at the bunk house building site. Intense oral coordination between the construction group and the milling team ensured the timber



Fig. 5. The Garrathiya Five Room Bunkhouse

decking was transported to Gunyangara where it was dressed (by a third team), and then conveyed to the building site without delaying the erection progress. The design of the bunk house incorporated roof bracing to cyclonic wind standards, and to further accommodate the tropical climate other features included an overhanging roof to create shade on both side verandahs. Despite there being an absence of a time line chart to gauge the rate of progress the bunk house was built to an exceptionally high standard in a relatively short period (Pearson & Helms, 2010a). Both authors were at the site on the morning of the 25<sup>th</sup> April 2009 when the first footing was set in concrete, and again on the morning of 7<sup>th</sup> August 2009 when the dwelling was officially opened. This ceremony was attended by reporters of local and national newspapers, government officials, politicians (Territory and Federal), representatives of the project partners (Mr Jack Thompson; Mr Bob Gordon, Managing Director of Forestry Tasmania; University of Tasmania; Fairbrother Builders), Mr Galarrwuy Yunipingu, and a contingent of Yolngu men, who through their collaborative efforts had built the bunk house. Not only was it a magnificent achievement, but this was the first contemporary architectural designed timber dwelling that had been built by the Gumatj clan members on their ancestral land.

The second architecturally designed timber dwelling built by the men of the Gumatj clan was a four bedroom house. This structure was constructed on the shores of Port Bradshaw at the outstation community of Dhanaya. Already existing at this place were five other houses that had been built by private contractors several years earlier using contemporary building materials of steel sheeting, fibro, steel and aluminium framework and plywood.



When occupied these original houses drew energy from a diesel powered generator. The new house, which had a floor plan of 18.9 metres x 12.5 metres, and an external garage, was predominantly built with hard wood timber that had been selectively harvested by a team of Gumatj clan men, from their traditional land about 10 km west of Dhanaya (Pearson & Helms, 2010b). Figure 6 shows the house during construction.



Fig. 6. The Dhanaya House during Construction

Construction of the house commenced in the latter half of 2009. After completing the bunk house the Indigenous men exercised their reward in the form of a hunting and fishing trip to the Daly River, and shortly after returning to the Gove Peninsula began to be involved with the house construction venture. Two supervisors from Fairbrother Builders resided in one of the Dhanaya houses for the duration of the project, while one supervisor from Tasmanian Timber was required less often as the Indigenous men had become proficient in felling trees and could now competently operate the Lucas mills and the associated equipment.

The building was essentially completed by mid 2010, but occupancy was delayed. A new diesel generator and the installation of underground electrical conduit could not be commenced until after June. Traditionally, East Arnhem Land is inaccessible during the 'wet' season (November to April). Thus, contractual plumbing and electrical work could not be completed until after the roads and tracks to Dhanaya became useable. Figure 7 shows the generator housing with the house in the background, and Figure 8 is a view of the now occupied house.



Fig. 7. The Generator Housing in the Foreground and the Dhanaya House



Fig. 8. The Completed Dhanaya House

It is widely acknowledged that Aboriginal housing in Australia is deplorable. Inadequate maintenance and overcrowding of Aboriginal houses, especially in remote communities, demonstrates the prolonged failure of successive Australian governments to improve the unhygienic living conditions of Aborigines. To break this impasse the vision of Galarrwuy Yunupingu was that the Gumatj men would build houses for their clan. But the reality was the time for building the Dhanaya house was about nine months, and many houses were required. Hence, an alternative practical strategy was to buy seven kit homes and have the Indigenous men assist the contractors by adding timber verandahs. Four of the houses were built at Gunyangara, and three others were erected in Nhulunbuy. Two of the three town houses are being rented and the third was sold to give the project a cost neutral outcome. However, the homes, which were designed in Tasmania for southern climates, have not been entirely satisfactory for the extreme weather conditions in East Arnhem Land. For instance, door and window frames shrink and expand in the 'dry' and 'wet' seasons, and window/door openings do not allow sufficient airflow, while the ceilings are too low for cooling fans. Consequently, the contractors have been invited to address a list of 'defects' and tender a revised design. Shown in Figure 9 are Gumatj men building an outdoor verandah from timber milled by their colleagues.



Fig. 9. Gumatj Men Constructing a Verandah on a Kit Home at Gunyangara



### 3.3 Furniture manufacture

The number, different sizes, and geographical dispersion of Indigenous communities create enormous difficulties in supplying suitable furniture. Large distances between outland centres, and limited access to retail outlets compound transportation costs, while low incomes of Indigenous people limit purchasing power and the selection range. Furthermore, plastic, chip board, or plywood furniture lacks durability in overcrowded houses where there is a greater usage and wear and tear than is normal in non Indigenous homes. A novel technique to convince Yolngu members, who had never before made contemporary European furniture, was to begin at the high quality end of the spectrum. With guidance from a non Indigenous cabinet maker five large board room tables were made (Pearson & Helms, 2011). Valued at \$3.5K each (3 metres long and 1 metre wide) they were sold locally. Figure 10 shows one of the tables. Currently, in a shed at Gunyangara, which contains a few industrial wood working machines, some Gumatj men are designing and making household furniture from eucalyptus tetrodonta. Outside the shed, under cover, are several tonnes of different sized milled timber being air dried. One important project is to make 50 single beds, and then to engage the Health Department personnel to teach the Indigenous ladies how to regularly sterilise the beds and mattresses. The overall goal is to prevent further outbreaks of scabies in the community.



Fig. 10. The Boardroom Table

### 3.4 Building strategic capabilities

The Gumatj clan is on the cusp of expanding their timber industry. On 8<sup>th</sup> June 2011 the Prime Minister Julia Gillard visited Nhulunbuy, and later in the day went to Yirrkala to ratify the new 42 year mining lease. The occasion was a historic agreement between the

international mining company Rio Tinto Alcan and the Traditional Land Owners, who are the Yolngu clans of the Gumatj, Rirrantjingu, and the Gälpu. Over 1000 people attended Yirrkala to witness the ceremonial signing of the Gove Traditional Owners Agreement, which will provide over \$700 million in royalties and associated financial contributions during the period the bauxite ore is mined. And while the lease provides many direct attractive financial features it is also connected with an ambitious timber milling programme.

Challenging the conventional method of land clearing prior to mining operations taps into a plentiful timber resource. Since the mining operations on the Gove Peninsula commenced in the mid 1960s historical established protocol has been observed. First, the Indigenous ladies collect seeds from the savannah forest; second, the flora and overburden is bulldozed and the vegetation is burned; and last, after the ore body is depleted the ground is levelled and reforested from the stored seed bank. In a progressive move the Gumatj clan wants to change these methods. They are seeking approval from the Territory Government to annex sections of the lease, from which useable timber will be harvested, before the vegetation is cleared and burned. Legitimacy for this inaugural initiative is the mining lease is only for material under the surface. However, the extensive Minerals Royalty Act of the NT (as in force from 1 July 2008) prescribes regulations preventing timber activities preceding site clearing and overburden removal. Currently, the issue is being addressed in negotiations between the Territory Chief Minister and the second author.

The location of the mining lease provides two attractive features for the next development of the Gumatj milling operations. First, as the new lease of some 10 km length is south of the Gove airport, is parallel to and east of the Central Arnhem Road it is sufficiently distant from the social distractions of Nhulunbuy and Yirrkala. Second, close to the southern extremity of the lease are the sites of the now nonexistent Indigenous transitional Dhupuma College, and the European Launching Development Operations (ELDO). What does remain from these facilities are bitumen roads and reasonably large flat tracts of concrete on which buildings could be erected and serviced. The hardstand will provide foundation for dormitories to accommodate Indigenous Yolngu, and structures in which they can operate new milling equipment.

Milling structural grade hard wood timber has been the main stay of the Gumatj operations, but other entrepreneurial avenues have been investigated. Expectedly, the two Lucas mills can be used to mill larger diameter logs for structural timber. In addition, the Gumatj have purchased a Mahoe mill (A\$45K), which is now housed at Gunyangara. This mill is both more efficient in cutting logs and affords greater accuracy, which will give products for furniture, floorboards, and sizing of planks and boards for the general market. Smaller diameter logs will be used to manufacture hardwood veneers. During 2010 a number of logs were sent to Queensland and the successful peeling trials has encouraged the Gumatj family to install a peeling machine at the Dhupuma / ELDO site as there is an extensive global market for hardwood veneer. And other parts of the trees are marketable. For example, bark, sawdust, and chips are sought by the horticulture industry or can be used as a fuel supply. The availability of relatively small drying kilns will provide a better seasoning outcome than the current undercover air drying of timber being prepared for furniture manufacture. Overall, the opportunity exists for a wide range of jobs for Indigenous people, who in the past (in the absence of mainstream work) have been wedded to welfare.



#### 4. Conclusion

The timber industry of East Arnhem Land grew out of necessity. Historical records attest to large fleets of paus / pows from Macassar travelled from the Celebes / Sulawesi from the 17<sup>th</sup> century to trade with the Indigenous Yolngu for coastal sea products in exchange for tobacco, alcoholic beverages and iron tools. And there is suggestion the Chinese preceded the traders when in search for trepan (beche-de-mer) for their stimulating and aphrodisiac properties. There is every likelihood that some of these masses of ships, like Captain James Cook in 1770, would founder on the treacherous Australian reefs. Consequently, some sailors would require repairs to their ship worm infested timber boats. As such, it is conceivable that the rendering of the vessel seaworthy for the home bound trip spawned the timber industry in East Arnhem Land.

More definable accounts of visitors to East Arnhem Land are formed in ship logs. One of the earliest sailors to encounter East Arnhem Land was the Dutch explorer William Jansz, who traversed the northern region in 1605 in the *Duyfken*. Some years later in 1623 when two ships commanded by Jan Carstenszoon were blown from the tip of Cape York Peninsula across the Gulf of Carpentaria the land they discovered in the Gove Peninsula was called Arnhem after the name of the ship captained by Willem Joosten van Colster. Both authors have copies of maps that were available to the seafarers of that time, which demonstrate little of the coastline had been accurately plotted. In 1803, when circumnavigating Australia in the HM sloop *Investigator* Captain Matthew Flinders was in the region of Melville and Arnhem Bays. His log accounts in great detail interactions with the Macassans and the Yolngu people who had been able to inhabit the off shore islands because they had been shown by the traders how to make dugout canoes. More specific is the considerable detail of how the trepang was prepared for transport back to the marketplace. And the Yolngu acknowledge in their Madayin the death of an Aboriginal in a skirmish with one of Flinder's crew at Blue Mud Bay. Although the trepang trade was extensive in 1906 the South Australian Government (then responsible for the NT) revoked licenses for trepang fishing. Thus, the fledgling timber activity was terminated.

When the missionaries came to East Arnhem Land to civilise the Yolngu a pragmatic timber industry evolved and flourished for over 40 years. Underpinning a fundamentally different customary hunter gatherer economy of the Indigenous people was a need for building materials that would withstand the insatiable appetite of termites, the milling skills of the Reverend Shepherdson, and the technical equipment for harvesting the trees. Pivotal changes during the 1960s in the governing arrangements were legislative and constitutional reforms to remove a number of colonial structural barriers that had denied Indigenous people citizenship rights of freedom to vote, to work, and to move away from the coastal missions and government settlements. Consequently, in the 1970s there was an exodus of Indigenous people back to small communities (outstations) on their traditional ancestral lands with which they held strong spiritual and religious connections. Further erosion of the mission contribution to the timber industry lay in the gradual administration of the schools by the NT Ministry of Education and the absorption of the hospitals by the Department of Health. Last, the availability of a range of attractive desirable building materials resistant to white ants made the milling of cypress pine irrelevant.

A need to provide platforms on traditional log structures motivated the Gumatj clan to commence timber milling. The prohibitive cost of barging sawn timber to Nhulunbuy

compared to the availability of suitable hardwood trees on their traditional land led to the emergence of an enterprise generating economic, social and ecological benefits. These boundaries are being stretched within a vision of extending the timber milling activities to embrace a significant shift in Aboriginal aspirations to facilitate a sustainable future for the clan.

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