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Preface

The overarching aim of this book is to assess the dynamics of poverty in rural Bangladesh. This work reflects poverty dynamics between different social groups such non-poor, ascending poor, descending non-poor, and chronically poor households between 2004 and 2009 and highlights differences and similarities in the poverty situations between and among these groups over a 5-year time horizon.

Poverty researchers are now well aware that static poverty analysis has only limited explanatory power and may hide the processes that are important for understanding poverty dynamics. The conventional approach to poverty analysis shows how poverty varies across social sub-groups, but it does not show any changes in poverty among the same households over a period of time. The state of poverty is not static; it is dynamic, as multiple interacting forces are involved. Very few empirical studies on poverty dynamics have been done in Bangladesh. However, the study of poverty dynamics is important for framing effective poverty alleviation policies because the changes in consumption poverty are also accompanied by substantial changes in other socioeconomic factors such as literacy, gender parity in schools, health-care services, infant and child mortality, and asset holdings, among others. In order to examine poverty dynamics, information on a total of 1,212 households was collected twice, first in December 2004 and then in December 2009. This involved conducting both quantitative and qualitative surveys with the same households at two points in time. The panel data permit us to understand the ways in which individuals/households explain the changes that occurred with them between 2004 and 2009.

An effort has also been made to include the most recent analytical research findings from diverse disciplines including economics, statistics, anthropology, education, health care, and vulnerability study. More specifically, findings from logistic regression analysis, polychoric principal component analysis, kernel density function, income mobility with the help of the Markov chain model, and child nutritional status from anthropometric measures have been included in this book. Changes in several factors and mobility in income distribution, landholding, occupation, and food security status have also been examined. This volume contains valuable research materials for university-level students, development economists,

social scientists, and professional researchers. It can also be used as a reference book for poverty study and for framing policy recommendations for poverty alleviation. Arguments are presented in various forms—in simple equations, in words, and in diagrams. By raising arguments in these different ways on various aspects of poverty and poverty dynamics, it is expected that a deep understanding of the subject can be conveyed to all readers and researchers in an easy-to-understand way.

The authors benefited from the valuable comments made by Dr. Hiromi Tsuboi, a professor at Akita University; by Dr. Masamitsu Kurata of the University of Tokyo; and by other participants during the draft-report stage while it was being discussed in a seminar held 21–23 November 2011 in Tokyo. Financial support from a Grant-in-Aid for Scientific Research from the Japan Society for the Promotion of Science (project number: 22530262, project title: Global Role of Social Enterprise for Poverty Reduction: Theory and Practice; project term: 2010–2012) is gratefully acknowledged. We also would like to acknowledge with deep gratitude the financial assistance received from the Institute for Advanced Studies on Asia, the University of Tokyo, Japan, and other assistance from the Institute of Statistical Research and Training (ISRT), University of Dhaka, Bangladesh. We express our heartfelt thanks to Dr. Asaduzzaman, assistant professor; Mr. Mahsin, lecturer; and Mr. Poritosh Kumar Roy, Lecturer; of ISRT for helping in computer programming and analysis. We are grateful to those who engaged in data collection from the field in general and in particular to Mr. Muhammad Rashed of SURCH for helping in data analysis. We are also most grateful to Mr. A.F.M. Ahnaf of SURCH for his detailed review of the manuscript. Acknowledgment is also made to Mr. Md. Abdul Aziz for his laborious typing. Of course, we alone are responsible for any errors or omissions.

Finally, we will be happy indeed if this book is of help to those who are interested in research on poverty and the dynamics of poverty.

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Chapter 1
Introduction

1.1 Emergence of Poverty Dynamics as an Area of Enquiry

Development efforts of the Bangladeshi government since independence in 1971 have emphasised poverty reduction through economic growth, employment generation and the provision of social services. The UN Millennium Development Goals include halving the proportion of poor people in Bangladesh between 1990 and 2015. This necessitates reducing the proportion of poor from 56.6% in 1990/1991 to 29% by 2015. Although the commitment of the government to poverty reduction is strong, the development efforts did not meet set goals and about 40% of the country's population still lives in poverty.

After independence, initiatives were taken to measure poverty. The first round of Family Budget enquiries were conducted in 1973–1974 and termed the Household Expenditure Survey (HES). Since then, including the latest survey in 2010, the Bangladesh Bureau of Statistics (BBS) has periodically completed 15 rounds of HES. The main purposes of these surveys were to measure the level of poverty and to examine its pattern: to see how it varies according to geographic characteristics (by region, urban/rural), community characteristics (communities with and without infrastructure, schools, social institutions), and household characteristics (level of education and gender of the head of the household, and its size). This information provides a comprehensive poverty profile in Bangladesh. They also furnished information on household income, expenditure on food and non-food items, calorie intake, income and expenditure inequalities. The HES data play an important role in compilation of household as well as national accounts and the construction of consumer price index (CPI).

However, none of the surveys measured or observed the dynamics of poverty or movements of the poor and the factors explaining these movements. It is apparent that the poverty profile observed in the conventional surveys is not sufficient to combat poverty nor to frame appropriate poverty alleviation policies. This is because poverty is not static but changes with season, climate variability, idiosyncratic shocks, lifecycle changes and public policy. The conventional profile sets out the

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main facts of poverty and shows how it varies across sub-groups of society but does not explain a household's status change over a period of time, while poverty dynamics demonstrate a household's movement into and out of poverty and explain reasons for movement. Thus, the study of poverty dynamics is critically important to framing effective poverty alleviation policies and policy targeting.

The literature on poverty dynamics is now quite voluminous. The contributors on this subject come from diverse disciplines including economics, anthropology, and development studies. Scholars have directed their attention to poverty dynamics as a distinct area of enquiry only since the early 1980s. They include Attwood (1979), Bane and Ellwood (1986), Barrett et al. (2001), Bird and Shinkeya (2003) and Lawson et al. (2003). A useful overview of poverty dynamics is provided in Addison et al. (2009). The study of poverty dynamics requires panel data and the lack of panel data is the limiting factor in this type of study. Over the last few decades, the demand for panel data has increased in order to explain a household's movement in and out of poverty. Baulch and Hoddinott (2000) studied poverty dynamics in several developing countries using panel data. In Ethiopia, a number of empirical studies have been conducted into poverty dynamics including the work of Dercon and Krishnan (2000), Bigsten and Shimeles (2004), Dercon (2001) and Swanepoel (2005).

Few empirical studies of poverty dynamics have been carried out on Bangladesh. The Bangladesh Institute of Development Studies (BIDS) attempted descriptively to study the changes in the poverty situation between 1987 and 1990 using panel data but did not use statistical inference to measure poverty dynamics (Rahman and Hossain 1995). More recently, Hossain and Bayes (2009) described the changes in the poverty situation in Bangladesh between 1988–1989 and 2008. The present study on poverty dynamics was designed to observe the dynamics of poverty in rural Bangladesh using panel data collected in 2004 and 2009. The two rounds of data are directly comparable both in terms of content and timing. A standardized questionnaire was used in both rounds and the surveys were conducted in the same season.

1.2 Understanding of Poverty Dynamics

Understanding why and how some households escape from and others descend into poverty is a precondition of any attempt to formule appropriate policy measures. Looking at the same households over time gives us a better understanding of the conditions that confine people to poverty and those that allow them to move out of poverty. This information enables us to assess poverty dynamics and to assist in policy formulation.

As noted, poverty is not static but dynamic, the result of multiple interacting forces operating at levels from the intra-household to national, and even to the global level. The dynamics of poverty are the changes in well-being that households experience over time. Households may frequently move in and out of poverty due to their exposure to risk and their capability to manage and cope with risk. The downward slide in economic condition is mainly caused by exogenous factors, such

as seasonality, climate variability, household level shocks and public policy. Large shocks such as economic crises, natural disasters and violence cause the most suffering to the poor and undercut their ability to move out of poverty. These adverse covariate shocks also affect the economic conditions of the rich and they may slide down into poverty. On the other hand, greater economic openness, the rule of law, fiscal discipline, greater employment opportunities and low rates of inflation help the poor to move out of poverty.

Bangladesh is one of the world's most naturally disaster prone countries, having experienced floods, cyclone, tidal waves, river erosion and drought. The people of Bangladesh suffer natural disasters causing severe casualties and damage to property almost annually. The poor and vulnerable are most severely and disproportionately affected and that causes the poor to become even poorer. In addition to natural shocks, there are others such as the price shock of essential commodities, adverse health shocks, supply–demand shock and unemployment, which affect the poor and vulnerable most heavily. Even the non-poor or transient poor become poor or extremely poor due to these shocks and adverse changes in household structure such as an increase in dependency ratio, or death of a male income earner.

In order to examine the dynamics of poverty, a random sample of 1,282 households had been classified in the baseline survey conducted in 2004 into the following four categories of dynamic poverty group on the basis of their economic condition:

(a) Non-poor (where household income remains above the poverty line for 10 years). This group of households can provide sufficient good quality food to all family members, three meals a day, all year round and can bear all expenses of education, health care, clothing and other necessities for all family members. The houses of non-poor group are constructed with durable materials such as brick or tin.
(b) Ascending poor (where household income was below the poverty line 10 years ago but is now above poverty). This group of households is second to the non-poor in terms of food security. They can provide adequate food to all family members, three meals a day, year round and can somehow manage expenses of education, health care, clothing and other necessities but children and family members have a low level of education. The quality of houses in this group is not stable and they require renovation every 2–5 years.
(c) Descending non-poor (where household income was above the poverty line 10 years ago but has since fallen below). This group of households is third to the non-poor in terms of food security. They cannot provide adequate food to all family members in three meals a day and sometimes lack food for 2–3 months per year. This group also faces difficulty in bearing all expenses of education, health care, clothing and other necessities and children have to leave school due to financial crises. Their houses are not in stable condition and require repair every 2–5 years.
(d) Chronically poor (where household income has been below the poverty line and remained poor for a prolonged period of time, often spanning generations). This group of households is landless and suffers from severe food insecurity and cannot provide three meals a day to all family members. The chronically poor household

cannot bear expenses of education, health care, clothing and other necessities and children generally remain out of school. These houses are built from non-durable materials such as bamboo, leaves and straw and housing conditions are not hygienic and often require rebuilding every year or two. They have poor asset bases, weak social networks and higher vulnerability to poverty.

There are some operational questions regarding the duration of poverty in defining the transiently poor and chronically poor. For how long does a household have to be sliding into poverty before it can be deemed descending non-poor, and how long should be a household out of poverty to be deemed ascending poor, and finally how long should a household be in poverty to be deemed chronically poor? In the baseline household survey of 2004 on average 1–10 years was considered to be the period of change of economic status (Rahman et al. 2009). That is if any household from the non-poor group falls into poverty in 1–10 years, then that household was deemed to be descending non-poor. Similarly, if any household moved above the poverty line in 1–10 years, it was deemed to be ascending poor. The chronically poor household remains poor even in good times for a longer period of time. Sometimes the chronically poor inherit poverty and remain poor their entire lives. They are so vulnerable that even small reductions in income can have dire consequences for their livelihood. In 2009, the same households were interviewed to assess the circumstances associated with each household's trajectory over the past 5 years. Specifically, we examined major factors associated with escaping from poverty and other factors associated with descending into poverty.

1.3 The Process of Poverty Dynamics

In order to understand the process of poverty dynamics spanning over a period of time or across generations, we need to understand five dimensions of poverty, which we may call the five W questions: what, who, where, when, and why. First, we need a better understanding of what poverty is than comparative statics. There are several definitions of poverty in the contemporary literature; some equate poverty with low calorie intake, others equate poverty with low income or economic resources, some relate poverty with physical need in terms of goods and services.

Secondly, we need to define who are the poor. Poverty may result due to lack of resources, lack of education, lack of working people in the household, or changes in household composition. Thirdly, we need to know where the poverty exists geographically. Generally, poverty is found in remote areas with low economic activities, low levels of productivity and lack of employment opportunities.

Fourthly, we need to understand when people become poor. People fall into poverty during widespread natural disasters, famine, crop damage, and seasonal price hikes. Poverty may increase its intensity during periods of economic recession. Finally, we need to know why people become poor. Poverty may occur due to declined household income, lack of education, lack of assets, or lack of employment opportunities.

Thus for true understanding of poverty dynamics, we need to define the followings: what is poverty, who is poor, and determine when, where and why poverty occurs. To do so we need to move beyond income and expenditure aspects alone to cross-disciplinary, socio-economic and demographic characterisation. In recent years, there is wide acceptance of the analysis of poverty dynamics rather than static analyses which have limited explanatory power in understanding the intricacy of poverty. The analysis of poverty dynamics is therefore more effective than comparative statics in framing long-term poverty reduction policies and understanding the processes of poverty.

1.4 Emerging Issues of Poverty Dynamics

The main focus of this study is to obtain a comprehensive picture of the changes in poverty groups over a period of 5 years (2004–2009). This was conducted to understand the problems faced by the poor and identify the ways to overcome poverty and reduce vulnerability. Such an understanding would help us develop appropriate policies and programs for poverty alleviation. The changes in poverty situations occur due to interactions between emerging global phenomena and domestic phenomena. Among the global phenomena, sharp increases in the international price of energy, the high price of oil, food, and edible oil, and more recently financial crises play important roles. These phenomena have emerged as serious challenges to economic development in Bangladesh and exert upward pressure on the domestic prices of food and essential commodities. Increases in the price of food cause hardship to many, but most of all to the poor, especially those on low and fixed incomes. Due to the increase in domestic prices of essential commodities many households have experienced reductions in income and consequently poverty. Among domestic phenomena, natural disasters such as frequent cyclones, tidal bores, floods, drought and river bank erosion impacted seriously to people's livelihood.

Agriculture sector in Bangladesh has suffered low crop yields due to these natural disasters. They pose serious threats to those living in rural area and create economic shocks as well as loss of life and property. For example, the natural disasters that hit the southwestern part of Bangladesh in 2007 and 2009 and sharp increase in price of food grains in 2007 and 2008 due to high import prices and consequently supply shock combined to worsen the economic conditions of many in Bangladesh. The devastating cyclones "Sidr" in 2007 and "Aila" in 2009 swept away almost everything in their paths. Huge loss of life, houses, crops and livestock badly affected the income of households in coastal areas. Even the incomes of large landowners and wealthy farmers were seriously affected. Thus, even non-poor households in rural areas occasionally experienced food deficits and poverty. More deterioration in food and calorie intake was experienced by the chronically poor due to the abnormal price shock of food grains and other essential commodities. These created economic instability within the rural households. Evidence indicates that sharp food price increases in 2007–2008 increased poverty levels by 3% (Government

of Bangladesh 2008). On the other hand, when normalcy is restored, the price of essential commodities will stabilize, and the poor have the opportunity to overcome poverty. Thus, households may frequently move in and out of poverty due to their exposure to risk and their low capability to manage and cope with those risks.

1.5 Main Objective of the Study

The present volume attempts to examine the dynamics of poverty in rural Bangladesh between 2004 and 2009. It captures the major economic and non-economic factors that influence a household's poverty and livelihood status. Among them, household size, dependency ratio, occupation, assets and liabilities, landholding, education, social capital, child nutrition, women's empowerment, income, expenditure, livelihood strategies, crisis coping strategies are of particular importance. Comparisons of poverty status have been made among the four poverty dynamic groups and between 2004 and 2009 with the help of the Markov chain method. However, estimating the proportion of the poor in the population is beyond the scope of our study.

The main objective of this book is to examine in detail the dynamic nature of poverty of rural Bangladesh from the data obtained from repeated sample surveys conducted in 2004 and 2009 on 1,212 households. The dynamic changes were observed by using transition matrices and a mobility index as suggested by Shorrocks (1978a, b). Although the sample size and time interval for studying the dynamics of poverty were not very large, special attention was paid to consistent coverage of special issues of mobility during data collection.

1.6 Plan of the Book

The book comprises 17 chapters organized into five parts. Part I is the introduction. In Chap. 2 development policies and programmes are discussed. Two chapters of Part I are intended to describe the main paradigms of measuring the dynamics of poverty and policy framework. Analysis of various issues relating to household demographics, household characteristics, and vulnerability issues are provided in the subsequent chapters.

In Part II, the demographic characteristics of household members and physical aspects of households are discussed. Household size, dependency ratio, sex ratio and their changes between 2004 and 2009 are discussed in Chap. 3. Chapter 4 deals with the physical characteristics of households. Electricity connection, source of water, sanitation and fuel are also discussed in this chapter.

This part of the work also assesses household income and expenditure, and develops a method of defining the dynamics of poverty and inter-temporal, income mobility with the help of the Markov chain model. Intertemporal mobility of income is examined in Chap. 5. In Chap. 6 the structure of income and its changes over the

5-year period is observed with the help of the Kernel density curve. Expenditure composition and distribution are analysed in Chap. 7.

In Part III poverty and food security, the seasonality of food insecurity, food consumption, nutritional status and dietary diversity are assessed in Chap. 8. Also examined here are livelihood strategies that various poverty groups have used in different ways and their comparison between 2004 and 2009 in Chap. 9. There are striking differences in asset-holding as well as types and amounts of liabilities among different poverty groups. These are assessed and analyzed in Chap. 10.

Part IV of the work examines the human and social capital issues. Particular attention is paid to understanding and analysis of the relationships between poverty and (1) education (Chap. 11), (2) health and child nutrition (Chap. 12), (3) social capital (Chap. 13), (4) women's empowerment and mobility (Chap. 14).

In Part V, vulnerability issues and a participatory approach to understanding poverty dynamics are discussed. Chapter 15 is devoted to attaining an understanding of vulnerability to poverty by separating different households by factors including years of schooling, landholding, gender of household heads, social capital and occupation. Focus group discussions (FGDs) are summarized in Chap. 16 in order to complement the quantitative analyses presented previously, ascertaining qualitative evaluations based on direct sample opinions of people from different poverty groups. Chapter 17 synthesizes some of the major findings from our analysis based on the panel data in rural Bangladesh, and concludes the book with a brief discussion on vulnerability, coping strategies, and recommendations for the poverty reduction strategies.

Chapter 2
Development Policies and Programs for Poverty Alleviation

2.1 Introduction

Because of widespread and persistent poverty, the government of Bangladesh has placed poverty reduction at the forefront of development policies and programs. The commitment of Bangladesh to the Millennium Development Goals (MDGs), the South Asian Development Goals (SDGs) and other international agreements relevant to socio-economic development was duly considered in formulating policies and strategies for poverty alleviation. The main concern of these policies is to promote labour intensive growth and expand productive employment opportunities so that the landless poor and disadvantaged can respond to those opportunities to improve their standard of living. The development of agriculture, industry and service sectors is crucially important to economic growth. The social sector development policies which include those of education, health and family planning, women's and youth development directly and indirectly affect the human capital development and socio-economic conditions of the poor, and have positive impacts on poverty alleviation. Policies of easy access to financial service in the form of microcredit for the poor are also important for access to resources, self-employment and raising the standard of living. The safety-net programs which include food stamps, subsidised food distribution, and nutrition are important to maintenance of regular income flow, health and nutritional status of the poor during lean period. Alleviation of poverty is the prime objective of each of the development policies.

Policies for poverty alleviation may be divided into two categories: indirect policies and direct. The macroeconomic policies are designed to achieve higher economic growth besides specific objectives of poverty alleviation, but may indirectly benefit the poor. These policies may benefit all groups of the population along with poorer groups through the trickle-down process. High economic growth, for example, may benefit the poor through increased employment opportunities, more social services and infrastructure development. Increased demand for labour will raise the wage rates at all levels and hence increase their standard of living. Development of the education sector increases awareness, skill, employment opportunity, mobility

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in the labour market and higher income opportunities. Similarly, development in the health sector indirectly reduces poverty through increasing working capabilities, reducing income erosion, wastage of human resources and productivity losses due to worker's ill-health.

There are, however, some limitations to macroeconomic policies of poverty alleviation. In the absence of policies for social justice, macroeconomic development as well as high economic growth may not benefit the poorer groups. This is because the growth process often bypasses some groups of the population in the absence of equitable distribution of income. It is, therefore, important to frame policies for equitable distribution of income and to provide specific services to poorer groups along with high economic growth. In view of these limitations some microeconomic policies have been implemented which are specifically designed for poverty alleviation. These policies are target-group oriented and benefit the poor directly. For instance, policies for social services, women's and youth development and rural development fall within the purview of target-group oriented policies. There are several programs and projects for their economic development and the direct benefit of the poor. Apart from the target-group oriented policies and programs, there are several interventions under the umbrella of social safety-net programs (SSNP) in the rural areas.

Among the social safety-net programs, the Food for Work (FFW), Vulnerable Group Development (VGD), Rural Maintenance Program (RMP), and Food for Education (FFE) are important in Bangladesh. These programs extend benefit directly to the target-groups. Although these programs provide immediate help to the poor, they have some limitations and in the absence of proper strategies they may not be effective in overall poverty alleviation. Moreover, these programs are dependent on foreign aid and external financial help. However, both the government of Bangladesh and the NGOs have been playing important roles in poverty alleviation through providing microcredit for income and employment generation, reducing seasonal unemployment, increasing levels of production and generating new sources of self-employment. The policy stream for poverty alleviation is shown in Fig. 2.1.

2.2 Macroeconomic Policies and Public Expenditure for Poverty Alleviation

Policies for poverty alleviation are a part of several macroeconomic development policies. Policies for agricultural or industrial development include those for poverty alleviation, but they are not separately documented. As the result budget allocation exclusively for poverty alleviation is not clearly found and thus is not transparent. The complicated budgetary system makes it difficult to figure out precise public resource allocation for poverty alleviation. It is notable that allocation in the social sector of selected ministries such as education, social welfare, health, family planning and women's affairs includes both development and non-development expenditure. Moreover, there are some components in the development expenditure which

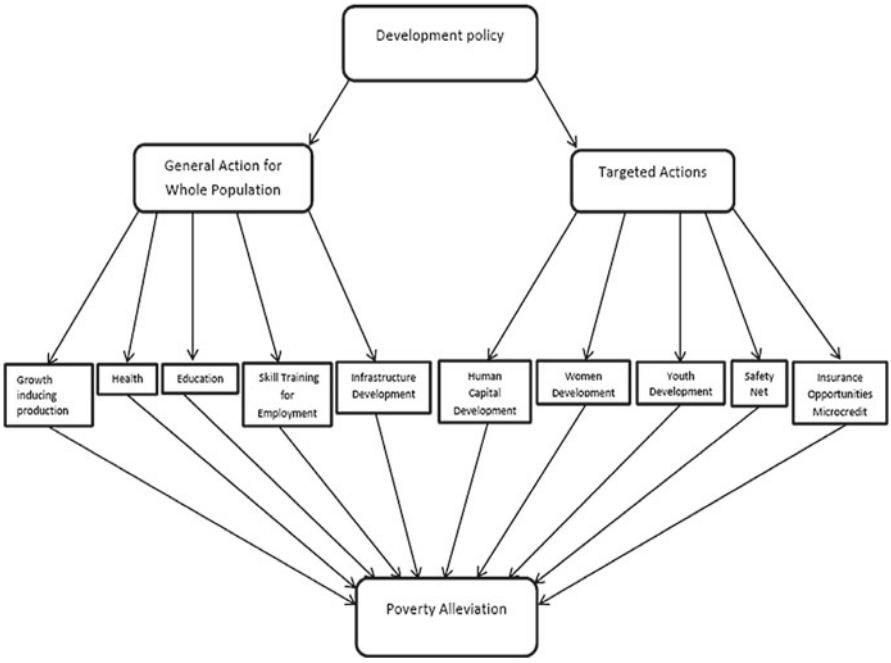

Fig. 2.1 Development policies for poverty alleviation

are actually revenue expenditure. Actual Annual Development Programs (ADP) expenditure on different sectors/subsectors which are directly as well as indirectly related to poverty alleviation programs is shown in Table 2.1.

Table 2.1 shows that the revised ADP expenditure on poverty alleviation sectors/sub-sectors increased over the period. ADP expenditure on poverty alleviation sectors as a percentage of total ADP expenditure increased from 42.39% in 2003–2004 to 52.87% in 2006–2007 and then to 53.13% in 2008–2009. Despite considerable rhetoric concerning the importance of poverty alleviation, government efforts in this area, as measured by budget share in terms of GDP, appear untraced and certainly do not reflect any sense of priority. Actual ADP expenditure on poverty alleviation as a percentage of GDP at current market price stood at 2.14% in 2003–2004, 1.93% in 2006–2007 and 1.70% in 2008–2009, indicating a gradual decline in share of expenditure on poverty alleviation. Although the recent public expenditure on poverty alleviation amounts to more than 50% of total GDP expenditure, it amounts to only 1.7% of GDP. As a result the incidence of poverty decreased only marginally for the population as a whole. The average public expenditure per person per annum was only Tk. 527.28 in 2003–2004, Tk. 659.91 in 2005–2006 and Tk. 725.88 in 2008–2009. These amounts of expenditure were meagre by any standard too little significantly to affect the colossal problem of mass poverty. Figure 2.2 shows the trend in percentage of ADP spent for poverty alleviation.

Table 2.1 Revised ADP expenditure on poverty alleviation related sectors (in million Tk.)

Economic sector	2003–2004	2004–2005	2005–2006	2006–2007	2007–2008	2008–2009
Agriculture (crops, fisheries & livestock)	6,787.9	5,870.4	10,116.9	10,500.4	12,272.4	12,352.0
Rural Development and Institutions	23,264.1	25,055.9	30,817.4	30,716.0	27,803.7	32,764.5
Industries (ready-made garments, manufacturing)	4,614.6	5,105.2	3,159.4	2,222.9	2,473.1	4,125.3
Education and Religious Affairs (primary, secondary, tertiary, vocational)	2,0651.3	19,755.9	26,925.4	27,741.7	27,721.9	31,500.5
Health, Population and Family Welfare	13,914.8	13,893.8	18,668.8	17,863.2	20,945.3	21,107.6
Social Welfare, Women Affairs and Youth Development	1,657.6	1,602.1	1,794.8	1,352.0	1,333.7	1,886.8
Labour and Employment	398.9	695.5	113.2	571.5	716.6	936.5
Total	**71,289.2**	**71,978.8**	**91,595.9**	**90,967.7**	**94,266.7**	**104,673.2**
% of total ADP expenditure	**42.39**	**38.35**	**47.04**	**52.87**	**51.18**	**53.13**
% of GDP (current market price)	**2.14**	**1.94**	**2.20**	**1.93**	**1.73**	**1.70**

Source: Bangladesh Economic Review (2009), Ministry of Finance

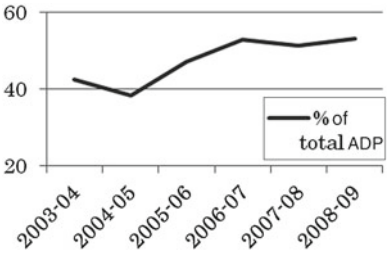

Fig. 2.2 Percentage of amount spent for poverty alleviation in ADP. *Source*: Table 2.1

2.3 Targeted Public Policies and Expenditures for Poverty Alleviation

In addition to macroeconomic policies and investment in sectors such as agriculture and industry for poverty alleviation, the government of Bangladesh has sought to reduce poverty through investment in a number of target-group oriented development

programs in such areas as social services, women's and youth development, and rural development. These programs are undertaken by the Ministry of Social Welfare, Ministry of Women Affairs, Ministry of Youth, Local Government Engineering Development (LGED), and others. The main focus of these programs is to increase income and employment opportunities of the poor through:

1. Skill development,
2. Human resource development,
3. Employment generation,
4. Socio-economic development,
5. Easy access to resources and services,
6. Credit facilities.

These programs are implemented by the selected ministries and government departments along with public expenditure described in the following sections.

2.4 Social Welfare Programs for Poverty Alleviation

In view of persistent and widespread poverty, many programs and projects have been implemented in social service sub-sectors. The Ministry of Social Welfare is working for poverty alleviation and has implemented many programs and projects such as those for human resource development and rehabilitation of the bypassed segment of the population, for example, the disabled, orphans, destitute, the poor and helpless. Attention is given to rehabilitation and development of the physically disabled, mentally retarded, visually impaired, and socially disadvantaged women, helpless orphans and the elderly poor.

A good number of programs for poverty alleviation, education, human resource development, correctional services for juvenile delinquents, training and treatment for the socially disadvantaged women, vagrants, and the destitute and the helpless are run by the Ministry of Social Welfare. Besides these programs, the Department of Social Services runs welfare and service delivery programs for poor and destitute patients and persons with disabilities (BER 2009).

2.4.1 Ministry of Women's Affairs in Poverty Alleviation

Almost half of the total population in Bangladesh are women. Socio-economic development of the country is not possible if women are kept outside the mainstream. Recognizing this problem, a large number of development programs and projects have been undertaken to increase income and employment opportunities, skill development and increase access to resources for women. Keeping the poverty alleviation aspect in view, the Ministry of Women's Affairs has

implemented programs through the Department of Women's Affairs. The most important are:

1. Skill development training,
2. Women's credit,
3. Women's entrepreneurship development,
4. Poverty alleviation programs for women,
5. Strengthening of policy leadership,
6. Assetless women development programs and advocacy of gender equity,
7. Support services (accommodation facilities, day care services, legal aid),
8. Special women's programs.

Besides these programs, several development projects have been undertaken for poverty alleviation and improving socio-economic conditions of women. These are Training in Handicraft and Agriculture for Women at Dinajpur, District Based Women Computer Training, Urban Based Marginal Women's Development, Rural Women's Development, Early Learning for Child Development, the Employment Information Centre, and Skill Development.

The Ministry of Women's Affairs has also prepared a plan of action for women's development in line with Nairobi Forward-Looking Strategies and the Jakarta Declaration (UNDP 1992).

2.4.2 Ministry of Youth and Sports in Poverty Alleviation

Youth is an important and productive segment of a nation and they can play key roles in economic development and poverty alleviation. This sector of population of 15–30 years of age, constitute more than a quarter of the population and about 36% of the total labour force. The economic prosperity of a nation requires specific policy to mobilize this group. If proper guidance and training in skill developments are provided to youth, they can play a vital role in poverty alleviation. The Department of Youth Development (DYD) has been assigned the responsibility for organizing the unemployed youth into a disciplined, skilled and productive forces. This group of population as a special social segment has, therefore, been targeted by the DYD for socio-economic development through skill development and credit support. The following important programs have been undertaken by the DYD with a view to bringing youth into the mainstream of society and to create dynamism in the country's development process.

1. Skill development training for the youth,
2. Self-employment program for unemployed youth,
3. Poverty alleviation program,
4. Youth leadership and human relations development,
5. Involvement of youth organisations in community development activities,
6. Involvement of youth in population control and welfare activities,

Table 2.2 Revised ADP expenditure on social welfare, women affairs and youth development

Year	ADP expenditure (in million Taka)[a]	% of ADP	% of GDP
2003–2004	1,657.6	0.98	0.049
2004–2005	1,602.1	0.85	0.043
2005–2006	1,794.8	0.92	0.043
2006–2007	1,352.0	0.99	0.029
2007–2008	1,333.7	0.72	0.024
2008–2009	1,886.8	0.96	0.031

[a]*Source*: Bangladesh Economic Review (2009), Ministry of Finance

7. Participation of youth in population control and welfare activities,
8. Participation of youth in national social services,
9. Youth training and self-employment,
10. Entrepreneurship development for educated unemployed youth,
11. Supply of equipment to train youth for self-employment.

The main objective of the youth training and self-employment projects is to train unemployed youth in various trades and to help establish them in self-employment. Besides these, there are technical training projects for unemployed youth. These projects include training in computer use, repair of radio, TV, electrical, house-wiring, and refrigerators. The Department of Youth Development trained more than 3,200,000 youths up to June 2009. Among these trained youths 1,790,262 have been self-employed in a variety of income generation activities. Tk. 8,454.1 million including revolving fund had by June 2009 been lent to 700,000 beneficiaries (BER 2009). Actual ADP expenditure on social welfare, women affairs and youth development is shown in Table 2.2.

It appears from Table 2.2 that less than 1% of the total ADP expenditure is spent on social welfare, women's affairs and youth development. The expenditure on these sectors as percentage of GDP is also quite insignificant. Thus government efforts in these areas as measured by their ADP budget appear indistinguishable and seem to have little priority. With this small budget allocation it is not possible to bring about any significant development in these sectors and poverty alleviation.

2.5 Social Safety-Net Programs for Poverty Alleviation

One of the important causes of the high incidence of poverty in rural Bangladesh is high prevalence of both idiosyncratic and covariate risks and shocks. Among idiosyncratic shocks, illness, death of breadwinner, theft, dacoity, loss in business have deep and wide influences. These risk factors are the evident contributory causes of low income and high incidence of poverty at the household level in rural areas. Among covariate shocks, natural disasters such as floods, droughts, cyclone are notable among the most severe, causing colossal loss of life and property. Many people

Table 2.3 List of main safety-net program with objectives

Program names	Major objectives of the program
Food for works	Employment generation for the poor, mainly during lean period through rural infrastructure creation and maintenance
Vulnerable group development	Providing training and financial help for self-employment in income generating activities
Vulnerable group feeding	Providing relief in times of natural disaster and meeting emergency needs
Gratuitous relief	Providing short-term relief to the poor and destitute for house building
Test relief	Employment generation through rural road maintenance
Old age allowance	Providing old age cash allowance to the poor men and women
Allowances to the widowed, deserted and the destitute women	Providing cash to the women in times of distress

suffer damage either physically or economically and in the process become poor and vulnerable. To protect victims of shock the social safety-net program (SSNP) has targeted those people who are temporarily affected by natural calamities and other forms of disadvantages. Safety-nets are for those who are unable to benefit from market opportunities or credit programs. The SSNP can play role in helping people when hard times do hit people. There are about 35 schemes in the SSNP package including (1) Food for Works (FFW), (2) Vulnerable Group Development (VGD), (3) Vulnerable Group Feeding (VGF), (4) Gratuitous Relief (GR), and (5) others which are old age allowance, allowance for widows and distressed women and retarded disabled persons. In short SSNP is an essential government support system for the poorer groups. The salient features of the above-mentioned programs are briefly described in Table 2.3.

The government of Bangladesh has spent huge amount of money in these programs. The majority are cash transfer programs in the form of allowances and the others are in-kind programs such as food security programs in which food grains (rice and wheat) are distributed as charity or in return doing work such as earth cutting and road maintenance. Table 2.4 shows the amount of food grains distributed in a variety of programs.

As shown in Table 2.4 there was a substantial increase in the volume of food grain distribution between 2003–2004 and 2008–2009. It has doubled in this period. The sharp increase seems mainly due to increase in those eligible, the unemployment in lean seasons and increase in coverage of beneficiaries such as the landless, the destitute, day labour, orphans, widows, the divorced and those aged 65 and above. But parts of the SSNP recipients expressed their view that SSNP had no significant effect on destitution nor did it improve the conditions of the poor. There are those who blame these programs for making the recipients lazy, devoid of motivation, and dependent on charity. They also mentioned that SSNP affects long-term protection and create little opportunity to help household assets formation. Figure 2.3 shows the trend in total public food grain distribution.

Table 2.4 Trends in public food grain distribution under social safety-net programs (1,000 MT)

Channel	2003/2004	2004/2005	2005/2006	2006/2007	2007/2008	2008/2009
FFW	202	146	233	125	154	395
TR	123	124	174	149	76	368
VGD	177	204	244	162	268	279
VGF	83	214	128	230	419	507
GR	37	72	36	32	38	43
Other	86	104	84	77	95	92
Non-monetized	708	863	899	775	1,050	1,683
Total	976	1,367	1,245	1,480	1,561	2,129

Source: Database on Food Situation, June 2009, Food Planning and Monitoring Unit, Ministry of Food and Disaster Management

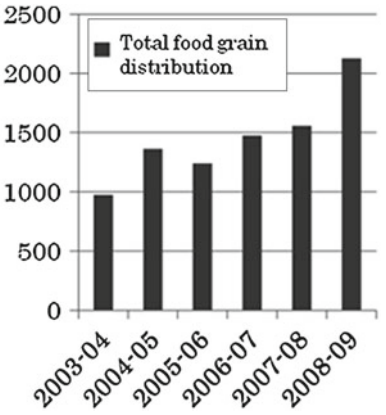

Fig. 2.3 Trend in total public food grain distribution.
Source: Table 2.4

2.6 Microcredit Program and Poverty Alleviation

The government of Bangladesh has been trying to improve economic well-being and reduce poverty through a variety of macro and micro economic programs and policies. The microcredit program is one of such ongoing anti-poverty programs at government and non-government levels throughout the country. This program is being implemented in rural areas for economic and social development through which recipients will acquire the ability (technical, financial, and attitudinal) to improve their well-being. Most beneficiaries of microcredit are rural women, the main target group.

2.6.1 Microcredit Programs of NGOs

Microcredit programs have been run throughout rural areas by different NGOs for many years and are succeeding in reaching a quarter of all poor rural households.

Table 2.5 Microcredit distributed by major NGOs (Tk. in million)

Name of NGO	2004	2005	2006	2007	2008	2009
ASA	24,039.2	33,179.2	41,316.1	53,953.4	60,841.8	61,911.9
BRAC	25,901.5	32,542.1	42,615.4	62,328.7	84,289.0	80,925.2
PROSHIKA	2,770.7	2,881.3	3,165.0	3,120.0	2,670.0	2,420.0
Society for Social Services (SSS)	847.8	1,655.2	2,607.7	3,540.6	4,326.9	5,463.6
CARITAS	604.3	1,061.8	1,182.4	1,477.8	1,402.0	1,534.6
TMSS	1,683.2	2,921.1	4,097.9	5,148.0	5,719.3	6,600.1
Shakti Foundation	1,024.0	1,504.2	1,799.7	1,761.3	2,087.4	4,125.8
BURO, Bangladesh	1,528.0	2,368.4	3,180.3	3,751.6	5,905.8	8,139.6
Swanirvar Bangladesh	607.5	759.1	913.6	963.0	967.3	1,316.5
Total	59,006.3	78,872.4	100,878.1	136,044.4	168,179.5	172,437.3

Source: Bangladesh Economic Review, Ministry of Finance, 2010

Table 2.6 Status of microcredit distribution by Grameen Bank (million Tk.)

Year	Micro-credit distributed
2004	25,901.5
2005	32,582.1
2006	42,615.4
2007	62,328.7
2008	84,289.0
2009	75,680.8

Source: Bangladesh Economic Review, Ministry of Finance, 2010

The main objective of the microcredit program is to increase economic and social empowerment of the rural poor by raising consciousness, equipping them with practical skills, supporting them with resources and infusing them with the confidence and determination that are needed to taking action to start economic activities. Several studies have been conducted to examine the effects of microcredit on poverty alleviation. The NGOs carried out such studies on those who are recipients of their microcredit and other programs. Needless to say, those studies are undertaken to highlight the coverage and recovery rate of their microcredit operations and services. But few study on poverty reduction examine the effect of microcredit programs. It is not known how many individuals have moved out of poverty as result of microcredit despite government departments', scheduled and private banks having distributed huge amounts of money to the poor in microcredit. Table 2.5 shows the amount of microcredit disbursed by the major NGOs.

Table 2.5 shows that the microcredit distributed by major NGOs has increased from Tk. 59,006.3 million in 2004 to Tk. 172,437.3 million in 2009 indicating an almost threefold increase over the period. The amount of microcredit distributed by Grameen Bank also increased from Tk. 25,901.5 million in 2004 to Tk. 75,680.8 million showing a similar increase over the period (Table 2.6).

Table 2.7 Status of microcredit distribution by the Schedule Bank (million Tk.)

Bank	2004–2005	2005–2006	2006–2007	2007–2008	2008–2009	2009–2010
Sonali Bank	4,859.0	4,566.2	4,100.2	5,570.8	6,174.4	5,139.0
Agrani Bank	1,003.4	1,820.7	2,106.0	2,904.0	3,396.6	2,848.8
Janata Bank	1,937.5	1,937.5	2,901.6	4,979.3	5,809.4	3,593.6
Bangladesh Krishi Bank	588.6	570.2	545.1	534.3	478.2	360.0
Rajshahi Krishi Unnayan Bank	307.3	292.3	149.9	177.1	180.3	88.3
Rupali Bank	152.8	160.9	110.2	169.7	168.8	142.1
Total	9,852.0	11,168.5	12,019.0	17,239.2	16,007.7	12,029.7

Source: Bangladesh Economic Review, Ministry of Finance, 2010

Besides NGOs and Grameen Bank, the Palli Karma-Sahayak Foundation (PKSF) with its Partner Organisations (POs) play significant role in poverty alleviation through microcredit activities both in urban and rural areas. At present there are eight programs of poverty alleviation. By June 2009 the PKSF had disbursed a cumulative loan of Tk. 74,844.4 million to its 257 partner organisations (POs) (BER 2009).

Table 2.7 shows that there was a substantial increase of microcredit distributed by the scheduled banks. Between 2004 and 2009 the amount of microcredit increased almost 1.22 times from Tk. 9,852.0 million to Tk. 12,029.7 million. Banks, especially the rural branches of the nationalized commercial banks, the Bangladesh Krishi Bank and the Rajshahi Krishi Unnayan Bank have played an important role in achieving increased agricultural production and in improving the rural economy as a whole. Despite the amount of microcredit distributed by the banks has increased significantly over the period, their overall contribution in credit distribution especially for poverty alleviation is not studied in terms of coverage and outreach.

2.6.2 Microcredit Programs of Administrative Ministries/Divisions

The Government has also allocated funds from non-development budget to various Ministries/Divisions/Department to implement microcredit programs for poverty alleviation. They are distributing microcredit to many sectors/subsectors to increase production of crops, fisheries and livestock. The main objectives of the microcredit programs are to enhance economic and social development through increased production and employment generation. Table 2.8 shows that the amount of microcredit distributed by ministries and government departments also increased from Tk. 59,425.5 million in 2004–2005 to 76,762.5 million in 2009–2010, though the highest amount was Tk. 108,549.0 million in 2008–2009.

Table 2.8 Status of microcredit distribution by Government Ministries and Departments (million Tk.)

Government Ministry/Department		Organization		2004–2005	2005–2006	2006–2007	2007–2008	2008–2009	2009–2010 Dec./09
1.	Ministry of Finance	i.	MoF	307.3	292.3	149.9	177.1	180.3	88.3
2.	Rural Development & Cooperative Division	i.	BRDB	6,548.6	6,837.7	8,627.3	7,960.6	6,911.9	2,704.8
		ii.	BARD	31.1	14.5	1.5	2.3	6.6	8.1
		iii.	RDA	19.4	19.9	22.6	35.7	61.9	31.2
3.	Ministry of Women and Children Affairs	i.	Dept. of Mohila	239.9	276.5	173.8	468.1	469.2	540.9
		ii.	Jatio Mohila Sangstha	52.6	35.8	29.5	19.9	–	–
4.	Ministry of Social Welfare	i.	Dept. of Social Welfare	445.9	618.6	410.2	675.4	648.3	243.8
5.	Ministry of Fisheries and Livestock	i.	Dept. of Fisheries	25.0	20.0	–	0.0	4,871.0	–
		ii.	Dept. of Livestock	188.1	54.9	–	0.0	329.7	–
6.	Ministry of Industries	i.	BSCIS	259.4	220.7	137.1	43.2	49.9	16.1
		ii.	SERWTCI	97.5	94.1	92.6	36.4	73.3	54.3
7.	Ministry of Agriculture	i.	MoA	49,567.8	54,962.1	52,925.1	85,806.6	92,844.8	71,916.3
		ii.	Cotton Development Board	2.6	2.1	2.9	3.4	3.4	4.3
		iii.	Dept. of Agril. Ext.	697.7	278.2	353.8	311.5	184.3	–
8.	Ministry of Land	i.	MoLand	87.0	101.4	55.0	87.6	43.3	27.6
9.	Local Govt. Division	i.	Local Government	33.7	60.0	163.2	319.5	931.3	–
10.	Ministry of Youth & Sports	i.	Dept. of Youth	628.7	777.7	600.2	617.5	447.2	387.3
11.	Ministry of Textile and Jute	i.	Hand Loom Board	91.6	46.8	33.1	6.0	477.0	–
		ii.	MOTJ	101.6	38.6	86.0	20.8	15.8	302.1
Total				59,425.5	64,751.9	63,863.8	96,591.6	108,549.0	76,762.5

Source: Bangladesh Economic Review (2010), Finance Division, Ministry of Finance

Table 2.9 Amount of microcredit distributed by BRDB

Year	Amount disbursed (in million Taka)
2003–2004	4,194.4
2004–2005	6,548.6
2005–2006	6,837.7
2006–2007	8,627.3
2007–2008	7,960.6
2008–2009	6,911.9

2.6.3 Bangladesh Rural Development Board (BRDB)

The BRDB is a specialised government agency operating in the field of rural development and poverty alleviation through the development of the agricultural sector. It is mandated to increase production through its two-tier cooperation model (TCCA-KSS), by organising and providing credit to the small and marginal farmers. Besides these programs, it provides training in human resource development, health provision, sanitation, family planning and mass education. The amount of microcredit distributed by the BRDB is shown in Table 2.9.

2.7 Impacts of the Development Policies and Programs

To sum up, the amount of microcredit disbursed by NGOs, banks and government ministries and departments has increased substantially over the 5 year period and these microcredits are directed at poverty alleviation. It increased from Tk. 154,185.3 million in 2003–2004 to Tk. 377,025.2 million in 2008–2009 showing a more than twofold increase. Besides microcredit provisions, the government distributed 976,000 metric tons food grains in 2003–2004 and 2,129,000 metric tons in 2008–2009 in safety-net programs. Close investigation on the performance of the microcredit programs on the rural poor reveals that microcredit distributed by the NGOs has achieved the goals of recovery of fund and outreach. The NGOs and the Grameen Bank have claimed that they have achieved commendable alleviation of poverty through the creation of income generating opportunities for the rural poor with special focus on women. But their direct contribution to increasing farm production itself is negligible compared with that of banks and Ministries/Departments. On the other hand, the contribution of banks in dispensing credit for poverty alleviation is negligible but working in achieving increased production and in developing the rural economy as a whole. Now the question left unanswered is how many poor people moved out of poverty by taking microcredit from GOs and NGOs. Another question left unanswered is whether the loan recipients repay from the benefit derived by investing microcredit in income generating activities or repay by taking another loan or selling their assets. If the latter, then the high rate of

recovery does not reflect success in poverty alleviation or socio-economic development, rather the poor will only be burdened by debt. On the other hand, many recipients of SSNP said that this is an essential support system of the government but this program has no spillover effect on poverty alleviation. There is no opportunity to save any small amount from the SSNP benefits, rather borrowing is the common strategy of their livelihood. And NGOs are the main sources of their borrowing in the form of microcredit. The poor, particularly in rural areas, have become more dependent on borrowing from the NGOs. The following chapters examine the roles, efficacy and expected outcomes of the policies and budgetary allocations for poverty alleviation over the 5 year period.

It was found from our survey that more than 65% of the chronically poor and 94% of the non-poor remained in their same respective categories in rural Bangladesh. Since our main intention is to observe the dynamics of rural poverty, it is extremely important to measure the effectiveness of development policies and programs undertaken by the government agencies and NGOs for poverty alleviation. In view of the economic growth in Bangladesh during our study period, 2004–2009, an attempt is made to factor out various causes, components and mechanisms of poverty dynamics. Besides the effects of government policies, simple economic growth or local economic factors will be critically necessary to poverty alleviation.

The rest of this book is devoted to empirical as well as analytical study of the poverty dynamics found in rural Bangladesh, based on our panel data of the period 2004–2009. Dynamic aspects of poverty such as mobility in poverty status, changes in income, expenditure and asset holding, occupational mobility, and vulnerability to poverty will be analysed and discussed in the rest of the work. The results of these analyses are expected to be useful in real understanding of rural poverty dynamics in Bangladesh, and for better use of the resources for poverty alleviation.

Part II
Demography, Mobility, and Income

Chapter 3
Population, Household Characteristics and Poverty

3.1 Introduction

There are numerous characteristics that poverty might be associated with, classified by regional, sector-specific, community, household and individual. Poverty is high in isolated areas of low rainfall, floods, and other inhospitable climatic conditions. There is a variety of community level characteristics that affect poverty, among which communication and other basic infrastructure are significant. The basic infrastructure generally includes proximity to paved roads, to large markets, whether or not the community has electricity, primary schools, medical clinics, NGO office, a bank, cooperative, and development project offices. At the household and individual level characteristics such as age structure of household members, sex composition, gender of the household head, and extent of participation in the labour force matter to poverty. In this chapter we shall not discuss regional, community or sectoral characteristics but demographic characteristics of sample households will be discussed in detail. The demographic characteristics of the households may be divided into three categories; (1) household size and structure, (2) dependency ratio and sex ratio, and (3) gender of the household heads.

3.2 Household Size and Structure

3.2.1 Household Size

Large households are likely to be poor since numbers of infants, children and adults are all correlated negatively with consumption level. Thus household demographics are closely associated with household welfare and they show positive correlation between the level of poverty and household demographics. Household demographics in terms of the size of the household, dependency ratio, sex ratio and age structure of household members are often quite different for poor and non-poor households.

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Table 3.1 Average household size by economic class

	Average household size (persons)	
Economic class	2004	2009
Non-poor	5.7	5.8
Ascending poor	5.2	5.1
Descending non-poor	5.2	5.3
Chronically poor	4.5	4.6
Total	5.1	5.2

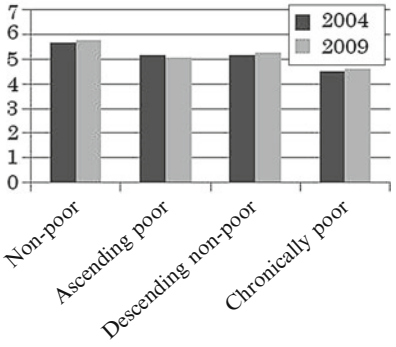

Fig. 3.1 Average household size by economic class

But in agro-based rural society the situation may not be similar. Table 3.1 shows that the non-poor tend to live in large households of an average size of 5.7 persons in 2004 and 5.8 in 2009. On the other hand, the chronically poor live in smaller households of an average size of 4.5 in 2004 and 4.6 in 2009. The average household size for descending non-poor was 5.2 in 2004 and 5.3 in 2009 and for ascending poor this figure was 5.2 in 2004 and 5.1 in 2009. The larger size of non-poor household may be due to many of these households' being joint families; while the breakdown frequently occurred among many chronically poor households.

There was no significant change in average household size between 2004 and 2009. The chronically poor households are characterized by smaller family size of 4.6 persons than the national average of 4.9 persons indicating that the average family size in other groups in the sample households is higher than the national average (BBS 2009). The cross-country studies suggest that larger households and those with a larger number of children are more likely to be poor. But this is not the case in our sample households where the average household size of non-poor is higher than that of chronically poor. Figure 3.1 shows graphically the average household size for 2004 and 2009 by economic class.

3.2.2 Household Size and Poverty

Poverty among the aged is not a natural phenomenon of biological development, but it emerges from a degradation of income sources, a lack of accumulated assets,

Table 3.2 Percentage distribution of household by age, sex and economic class

Age structure of household members in years	Non-poor		Ascending poor		Descending non-poor		Chronically poor	
	2004	2009	2004	2009	2004	2009	2004	2009
0–4	9.5	8.8	11.7	8.1	10.5	9.0	12.4	10.7
5–9	10.5	8.7	12.2	11.8	13.3	11.9	15.2	16.0
10–14	12.0	10.6	13.1	12.3	15.7	16.3	13.5	13.3
15–44	46.4	47.5	46.0	46.2	42.2	40.7	42.4	39.5
45–64	16.3	18.5	12.8	16.3	14.1	14.4	13.1	15.2
65+	5.3	5.9	4.2	5.2	4.2	7.7	3.4	5.3
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

and a rise in expenses due to illness (Schiller 2008). The age structure of household members has significant influence on household poverty. From our survey data, it is observed that the chronically poor households tend to live in younger households and 40% of household members are children aged 14 years or under who were not in labour force age group in 2009, while the non-poor live in relatively older households and 28.1% of household members are found to be children. This figure is 32.2% for ascending poor and 37.2% for descending non-poor. Of the child population 8.8% of non-poor household members, 8.1% of ascending poor household members, 9.0% of descending non-poor household members and 10.7% of chronically poor household members are infants aged 59 months or less. There is a shift of age structure between 2004 and 2009 and significant shift is observed in the proportion of elderly people over 65 years in the chronically poor and descending non-poor households (Table 3.2). Age structure is thus a good indicator of welfare status, with very poor households being least likely to have a member available for productive work (see Box 3.1).

The population profile fits well with national data obtained by population census or large scale survey (Fig. 3.2).

It is evident from the age-pyramid that the proportion of child population fell, while the working age (15–64) population rose over the 5 year period. The implication for the labour market is that it must absorb the increased labour force every year, which creates additional pressure on the market. Another weakness is that the old age population (65+) has increased, indicating higher economic burden within a household.

3.3 Dependency Ratio and Sex Ratio

The dependency ratio is defined as the ratio of the number of family members not in the labour force (members of aged 0–14 and 65+) to those household members in the labour force (members of age 15–64). Higher dependency within a household is associated with higher incidence of poverty. In general, poverty is high among households whose dependency ratio is high. One may expect that a high

Box 3.1 Household Size, Structure and Poverty: The Case of Naser Gazi

The case of 70 years old Naser Gazi of Sitalpur Village of Assashuni Upazila in the Satkhira District provides a distressed scenario of life and livelihood of a large family. Selling of manual labour was the main livelihood of Naser Gazi, but now begging is another option of his livelihood. He has no productive assets except homestead land of 10 decimal (one-tenth of an acre, i.e., about 405 m^2) and a small thatched house to live in. His family is comprised of seven members. Although the family size is large, there is no other adult male income-earner in the family. His son Abdul Gafur is mentally retarded and cannot work for the last 11 years. Gafur has one son and three daughters. The eldest daughter is married and her husband is a day labour. The next elder daughter works as maid servent in a house at Satkhira town for food and lodge only. The youngest daughter reads in grade 2 in local primary school. The son of Abdul Gafur works as a child labour in a local brick field with breakfast and lunch meal but without wage. It is notable that among the seven family members Ms. Kadbanu, the wife of Abdul Gafur (daughter-in-law of Naser Gazi) is the only adult female earning member in the family. She works as agricultural labour or day labour whichever work she gets. To maintain the big family she has to borrow money regularly from others. Community people are scared to give any loan because this poor family cannot repay back. As a result people do not help them and rather look down upon them even. Therefore, family number always suffer from food insecurity and sometimes even remain without food. Naser Gazi's grandfather and father was also asset less day labour. Naser Gazi inherited only poverty from his father and grandfather and he also could not get out of vicious circle of poverty due to large family size. Finding no other alternative options for livelihood, Naser Gazi has turned from labour to beggar. The age and sex compositions of Naser Gazi's family also pose a greatest threat to their life and livelihood. Inability to work, lack of assets and lack of material opportunities such as jobs, credit and public services undercut the ability of Naser Gazi to move out of poverty and he remains poor for the whole life.

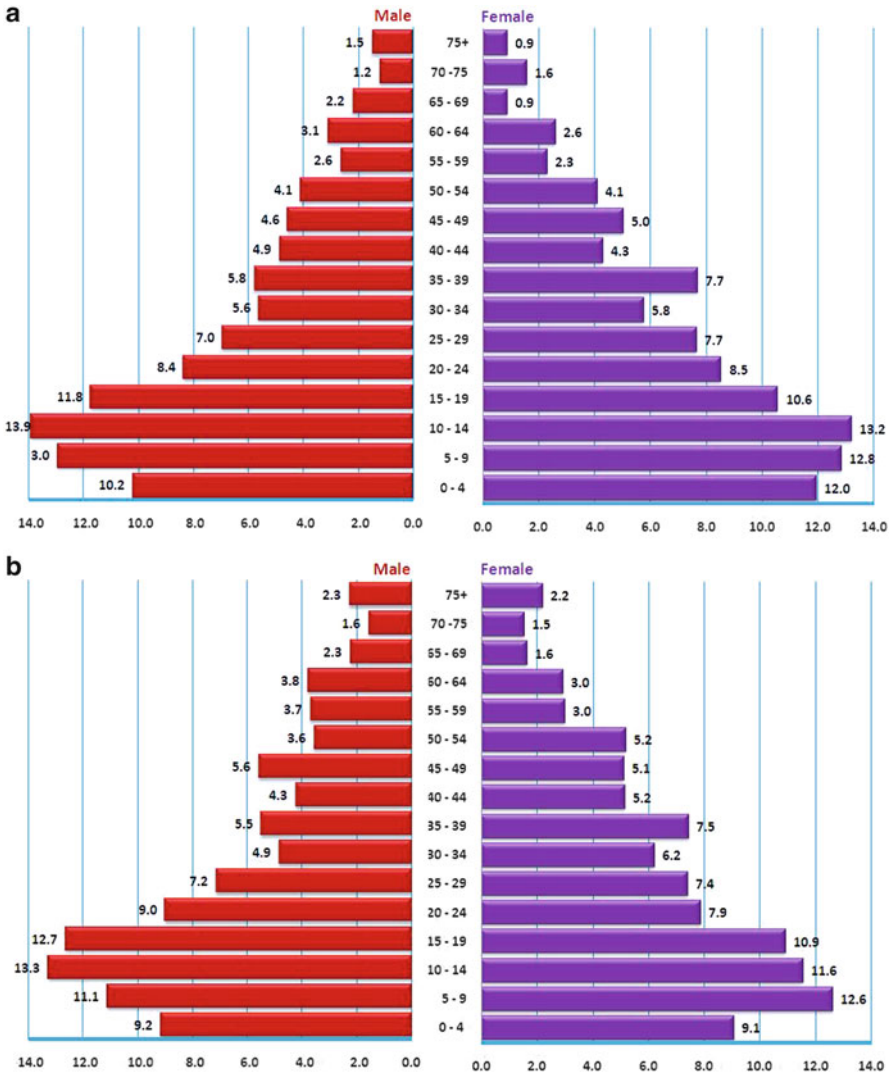

Fig. 3.2 Age–sex pyramid of sample population, 2004 (**a**), 2009 (**b**)

dependency ratio will be correlated positively with the level of household poverty. With the help of this ratio one can measure the burden on the active members in the household. The higher the level of dependency ratio, the higher the economic burden on the working members of the household.

Sex ratio is calculated as the ratio of the number of male family members to female of the household. Sex ratio also is a factor to household poverty, particularly in rural areas where employment opportunity in the labour market for female is limited. Households with larger number of female than male members are affected by both monetary and non-monetary poverty. This is because, on top of the non-availability of job for females, they have low levels of literacy and their wages are lower.

Table 3.3 Dependency ratio and sex ratio by economic class

	Dependency ratio (%)		Sex ratio (%)	
Economic class	2004	2009	2004	2009
Non-poor	59.2	51.6	110	110
Ascending poor	70.0	60.0	112	115
Descending non-poor	77.8	81.3	111	102
Chronically poor	80.6	82.9	100	93
Overall	71.6	64.5	107	106

Table 3.3 shows the dependency and sex ratios expressed in percentage term by economic class.

It is apparent from Table 3.3 that the dependency burden in non-poor and ascending poor households declined significantly between 2004 and 2009, while this burden increased in descending non-poor and chronically poor households over the same period. The highest dependency ratio is observed in chronically poor households and the lowest is found in non-poor households (59.2 in 2004 and 51.6 in 2009). A fall in dependency ratios in non-poor and ascending poor households played an important role in reducing poverty in these two groups of household. The ratio of males to females is found to be the lowest (93) in 2009 in the chronically poor household, indicating that for every 100 females there are only 93 males. The number of male members in the chronically poor household is less than the female members. The sex ratio at the national level is found to be 106, which means that for every 100 females there are 106 males (BBS 2009). The highest sex ratio is observed in ascending poor households (115) followed by non-poor households (110) in 2009. The chronically poor households with larger number of females have less access to education, resources, income generating activities and labour market, and thus it shows that it is this group of households that cannot move out of poverty. These indicators are important demographic characteristics of household as they show a possible relation between the level of poverty and the levels of dependency and sex ratios. Higher dependency ratio and lower sex ratio influence the level of poverty in rural households (Figs. 3.3 and 3.4).

3.4 Gender of the Household Head

Poverty has a clear gender dimension and one may expect differences in the poverty rate of female-headed and male-headed households. It is generally believed that the gender of the household head significantly influences households' welfare and more specifically that households headed by women are poorer than those headed by men. Thus gender of household head is a good indicator of welfare status of household. Chronically poor households are least likely to have male members available for productive work. Of the 120 female-headed households 62 or 51.7% households are chronically poor, while only 19.2% female-headed households are non-poor (Table 3.4). Thus female-headed households are more likely to be in poverty than

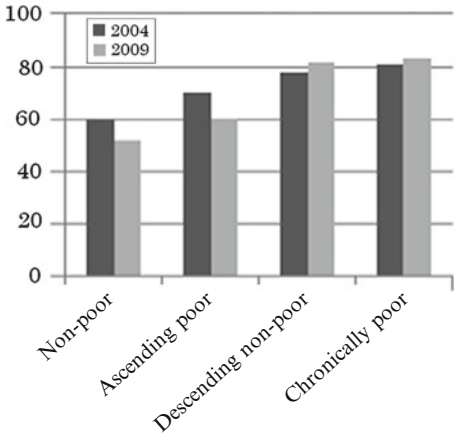

Fig. 3.3 Dependency ratio by economic class

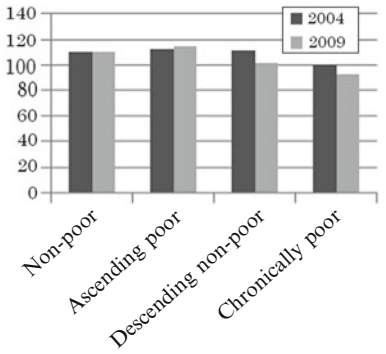

Fig. 3.4 Sex ratio by economic class

Table 3.4 Distribution of household heads by gender and economic class

Economic class	Gender of household head					
	Male		Female		Total	
	2004	2009	2004	2009	2004	2009
Non-poor	296 (95.8)	325 (93.4)	13 (4.2)	23 (6.6)	309 (100)	348 (100)
Ascending poor	204 (94.9)	347 (92.8)	11 (5.1)	27 (7.2)	215 (100)	374 (100)
Descending non-poor	203 (94.0)	135 (94.4)	13 (6.0)	8 (5.6)	216 (100)	143 (100)
Chronically poor	419 (88.8)	285 (82.1)	53 (11.2)	62 (17.9)	472 (100)	347 (100)
Total	1,122 (92.6)	1,092 (90.1)	90 (7.4)	120 (9.9)	1,212 (100)	1,212 (100)

Note: Figure in parenthesis is the percent of the corresponding row total

their male-headed counterparts. Female-headed poor households have a pattern of income earnings quite different from that of male-headed poor households. In general, the female-headed poor households have less earned income and rely on various forms of welfare such as old-age allowance, allowance for widowed, deserted and destitute women, and vulnerable group feeding (VGF).

Female-headed households increased from 7.4% in 2004 to 9.9% in 2009. Due to death of husband, divorce, separation or abandoned, women often become heads of households and they are severely affected by both monetary and non-monetary conditions. Of male-headed households 26.4% were non-poor in 2004; while the figure for 2009 was 29.8%. The respective figures for female-headed households were 14.4% for 2004 and 19.2% for 2009 indicating some improvement over the period. By contrast 37.3% of the male-headed households were chronically poor in 2004 but 26.1% in 2009. The corresponding figures for female-headed households were 58.9% and 51.7%, respectively. Though both the male-headed and female-headed households show some improvement between 2004 and 2009, the rate of improvement for female-headed households is lower than that of their male counterparts. The case of female head Begum (see Box 3.2) illustrates the causes of women's becoming head of household and describes the sufferings of her life and livelihood.

Box 3.2 Marital Dissolution and Destitution: The Case of Begum

The case of Begum, an illiterate destitute woman of Dhamur Village of Atwari Upazila in the poverty-prone northern district of Panchagarh, is an interesting one. Begum was deserted by her idle and gambler husband who earned income by selling his manual labour. Since Begum's husband was indulged in gambling and was very poor, he sold out Begum's only asset, a land of 5 decimal (about 202 m^2) which she inherited from her father. After marriage they used to live together in the house of Begum's father but after selling land Begum became assetless and her husband left her. After being deserted by her husband she went to another village and married again to another person with the hope that the second husband will look after her and provide food and shelter. But this husband also did not look after her since she had no asset to offer to him and after few months he also left Begum. Thus repeated marital dissolution in terms of divorce or separation by her husbands made Begum a destitute poor woman. She has no off-spring to look after her and cannot afford to have at least two meals a day for herself. As a livelihood she collects cow dung from the field and prepares fire cakes and sells them to maintain her. As an alternative option of livelihoods she begs one day a week (Friday, a special prayer day of Muslim community) from door to door for her survival. She also mentioned that at her distress time village people also help her by giving food, clothes and charity money. Her economic condition is so deplorable that she sometimes remains without food. Begum once got a goat from BRAC, which gave birth to two calves. But she was compelled to sell those calves to buy food and other essential commodities. She also got once 10 kg rice from Union Parishad, by selling which she bought an old cot to sleep in. She is so vulnerable that even small reduction in income due to illness or bad weather condition can have dire consequences on her life and livelihood. The economic incapability and crises of destitute women like Begum undercut the ability to move out of poverty, and the poverty remains for her whole life.

Table 3.5 Average household size by gender

Year	Male-headed household	Female-headed household
2004	5.19	3.41
2009	5.35	3.56

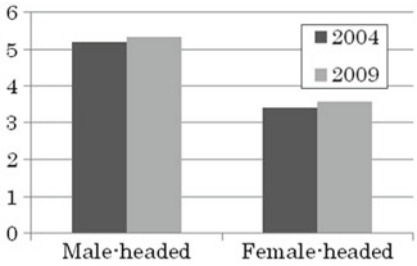

Fig. 3.5 Average household size by gender

3.4.1 Household Size and Gender of Household Head

There is a significant variation in household size between male-headed and female-headed households. Table 3.5 shows that male-headed households were larger with mean size of 5.19 persons in 2004 and 5.35 persons in 2009, while female-headed households had a mean size of 3.41 persons in 2004 and 3.56 persons in 2009. While male-headed households were larger because many of them were maintaining joint families, female-headed households were smaller because many of them were not.

Figure 3.5 also shows the difference in average household size by gender graphically.

3.4.2 Marital Status of Household Head

The distribution of marital status is markedly different between male-heads and female-heads (Table 3.6). A little more than 96% of the male-heads in 2004 and 97% in 2009 were found to be married, while only 37% of the female-heads in 2004 and 24% in 2009 were married. Frequent marital dissolution (in terms of widowhood, divorce, separation, or abandonment) among married women is the main reason for the significant difference in marital status between male and female-heads. The proportion of widowed female-heads increased from 51% in 2004 to 66% in 2009.

The socio-economic position of poor women in rural areas becomes more vulnerable when they reach old age, become widowed or separated or divorced. They have less access to resources and employment opportunities and they often fail to derive

Table 3.6 Marital status of household heads by gender

	Gender of household head					
	Male		Female		Total	
Marital status	2004	2009	2004	2009	2004	2009
Married	1,079 (96.2)	1,059 (97.0)	33 (36.7)	29 (24.2)	1,112 (91.7)	1,088 (89.8)
Unmarried	33 (2.9)	19 (1.7)	0 (0.0)	1 (0.8)	33 (2.7)	20 (1.7)
Widow/widower	10 (0.9)	14 (1.3)	46 (51.1)	79 (65.8)	56 (4.6)	93 (7.7)
Abandoned/ separated	–	–	9 (10.0)	6 (5.0)	9 (0.7)	6 (0.5)
Divorced	–	–	2 (2.2)	5 (4.2)	2 (0.2)	5 (0.4)
Total	1,122 (100)	1,092 (100)	90 (100)	120 (100)	1,212 (100)	1,212 (100)

Table 3.7 Incidence of widowhood and divorce/separated/abandoned by economic class, 2004 and 2009

Economic class	Widow/widower (%)	Divorced/separated/abandoned (%)
Non-poor	4.9	0.7
Ascending poor	5.3	0.8
Descending non-poor	7.3	0.4
Chronically poor	8.6	2.7
Total	6.2	1.2

benefit from development processes and public services. Widowed, separated or divorced female-heads were disproportionately higher in chronically poor households. As soon as a woman becomes widowed, separated, abandoned or divorced, her income drops and she becomes more dependent on welfare programs such as widow allowance, vulnerable group feeding, vulnerable group development, and old age allowances. As a result these women are not only more likely to be poor but also to stay in poverty longer. Marital dissolution in terms of widowhood or divorce has increased between 2004 and 2009 from 5% to 8%. But the proportion of abandoned or separated women reduced to some extent over the same period. The dissolution rate by reason of widowhood or divorce is much higher in chronically poor households than in other economic classes. It appears from Table 3.7 that the incidence of widowhood, divorce, separation and abandonment are much higher among chronically poor households and that the levels of these indicators vary with the variation in level of economic class: the higher the economic class, the lower the incidence of widowhood, divorce, separation and abandonment. The changing family pattern due to divorce or widowhood led to a surge in “broken” families with the mother often maintaining independent household for many years. Moreover, married life among the chronically poor women is much shorter than for others due to higher marital dissolution among them.

3.5 Poverty and Disability

A disabled person is not only unable to earn income, household expenses also tend to stay higher. If there is a disabled child in a household he/she may limit a parent's ability to work and also add additional expenses to that household. Thus disability not only reduces incomes, but also increases household expenses. In addition to economic losses due to disability, there is distinct social discrimination against the disabled.

Physically and mentally handicapped people have difficulties enough in life, often made worse off by the neglects of the society. They also face much discrimination. They have less employment opportunity in the labour market and cannot take part in the development processes. As a result, they are likely to be exposed to poverty and they stay poor for a longer period. Apart from the social problem of disability, there are many economic problems. A disabled member of the household not only fails to earn a full income, he/she also increases household expenses. A disabled child may limit a parent's ability to work and also increases the household expenses (see Box 3.3).

In our survey, hearing, visual and speech impairment, difficulty in walking, self-care difficulty were considered as the factors in disability. The physically handicapped and mentally retarded suffer from many deficiencies which limit earning opportunities and affect their livelihoods. In our 1,212 sample households, out of the total of 6,270 persons, 107 were reported to suffer difficulty and were treated as disabled. Since our sample size is not large, our estimate may not be strictly comparable with the national estimate. Despite limitation in its coverage, scope, definition and comparability, highest number (43) of disabled people is found in chronically poor households. But there is no strong link between poverty and disability. This is because the second highest number is observed to be in non-poor households followed by ascending poor. In the present context, not every type of disability is classified by degree of disability such as "some difficulty", "severe difficulty", and "fully unable". In our small survey data about 1.7% of the population was found to suffer from some kind of disability. The distribution of physically handicapped persons by economic class is shown in Table 3.8.

The proportion of physically handicapped persons is highest in chronically poor households, 2.7%, 1.5% in non-poor, 1.3% in ascending poor and 1.2% in descending non-poor households. Thus relationship between poverty and disability is not direct. In our survey the second highest proportion of disabled persons was found in

Table 3.8 Percentage distribution of physically handicapped persons by economic class, 2009

Economic class	% of Handicapped persons
Non-poor	1.5
Ascending poor	1.3
Descending non-poor	1.2
Chronically poor	2.7
Total	1.7

Box 3.3 Disability, Lack of Asset and Poverty: The Case of Mohammad Abdur Rahim

The case of 77 years old Mohammad Abdur Rahim of Kamartook Nutauhati Village under Sunamganj Sadar in Sunamganj District provides profile of distressed life of a disabled man. Mr. Mohammad Abdur Rahim is disabled due to paralysis. Abdur Rahim married first at the age of 22 years. Three sons with the first wife had died and she also died after 10 years. Then he married the second wife who gave birth to a son and after 2 years she had died. Her son now lives in Pakistan. Then Abdur Rahim married the third wife with whom he is living now. He has four daughters and one son from his present wife out of whom three daughters have been married to poor men. Abdur Rahim's father was whimsical. He sold all his lands to pay back his loans. So Abdur Rahim did not get any land from his father. He has got a piece of land from government in a portion of which he has built-up his house and the rest portion remain fallow. The walls of his house are made of mud and straw and the roof is made of tin. Abdur Rahim has taken loan of Tk. 13,000 from BRAC and ASA which he has spent for maintaining family and purchasing medicine. Abdur Rahim would earn Tk. 1,500–1,800 per month by vending vegetables. With this meagre amount of money he would somehow maintain his family and pays back loans. With the payment of Tk. 320 all his loans will be repaid. But for last 10 years he is disabled due to paralysis and cannot work. As a result, hunger and food insecurity remain the core concern of his daily life. He did not get any VGF, VGD card or old-age allowance from the state. It is sad that nobody comes forward to help out this distressed family.

non-poor households. It is thus difficult to claim that disability causes their poverty. We may further examine how many households actually fall into poverty due to disability: that is we are to examine the extent to which poverty is actually caused by disability. However, at most we can say that disability makes poverty more miserable (Schiller 2008).

Chapter 4
Housing and Household Facilities

4.1 Structure of the Main House

Household welfare depends on many factors other than income or consumption expenditures. Improvement of these is important for well-being and social prestige. These factors may also be correlated with consumption. Households with higher consumption expenditure are likely to have better housing, electricity connection, hygienic sanitation facilities and safe drinking water. The quality of physical structure of the house not only reflects the social position of its owner in the community but is also an indicator of household members' exposure to disease and sufferings. Good quality physical structure of houses may give a better picture of long-term living standards than an income snapshot because it reflects a result of accumulated asset over time and lasts longer.

In order to gain an understanding of the quality of shelter, household heads in our household survey were asked about the main materials of the walls and roofs of their main dwelling house. Information was also collected on main sources of drinking water, sanitation, lighting, electricity and cooking fuel. Table 4.1 shows the type of structure of the main dwelling house. There were significant variations in housing material structure across the economic classes of the sample households. Kutcha houses (with straw roof and mud walls) are the most common type among the chronically poor households, followed by corrugated iron (CI) sheet (with tin/tally roof and tin wall). More than 14% of the chronically poor people live in thatched house. The majority of the descending non-poor live in kutcha houses. The non-poor and ascending poor live in better houses and the majority live in houses made of CI sheet. 26.4% of the non-poor and 8.8% of the ascending poor live in semi-pucca (tin roofed and brick walled) houses. Only 5.5% of non-poor and less than 1% of the ascending poor live in pucca houses, but none of them live in a thatched house. Pucca and semi-pucca houses are constructed with more expensive and durable materials like brick and CI sheeting.

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Table 4.1 Distribution of sample households by structure of house and economic class

Structure of house	% Households by economic class									
	Non-poor		Ascending poor		Descending non-poor		Chronically poor		Total	
	2004	2009	2004	2009	2004	2009	2004	2009	2004	2009
Thatched/jhupri	–	–	–	–	0.9	1.4	2.5	14.4	1.2	4.4
Kutcha	35.0	25.0	57.4	44.8	62.5	56.0	79.9	58.8	61.6	44.4
Made of CI sheet	40.9	43.1	34.5	45.6	32.2	34.2	16.0	25.4	28.3	37.7
Semi-pucca	21.3	26.4	7.2	8.8	4.4	7.0	1.6	0.9	8.0	11.4
Pucca	2.8	5.5	0.9	0.8	–	1.4	–	0.6	0.9	2.1
Total	100	100	100	100	100	100	100	100	100	100

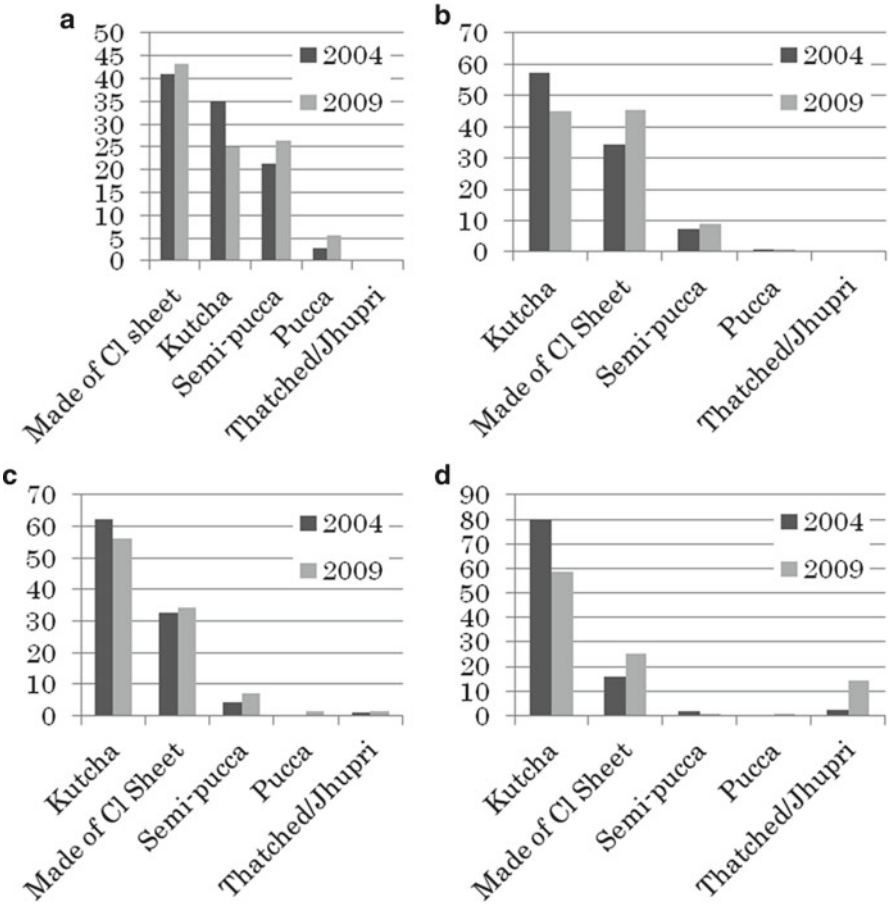

Fig. 4.1 Structure of house for non-poor (**a**), ascending poor (**b**), descending non-poor (**c**), chronically poor (**d**)

Comparison of economic classes shows that chronically poor families generally live in houses of inferior quality made of less durable materials such as bamboo, straw and leaves. A kutcha house is better than that made of bamboo, straw and leaves. These materials are not durable and quickly deteriorate during the rainy season. Some improvement in housing was observed in all economic classes between 2004 and 2009 but significant improvement is noticed only in non-poor households. Many people have upgraded their housing conditions over this 5 year period and major upgrading is observed from kutcha to CI sheet house (wall and roof are made of CI sheet) in all classes of households (Fig. 4.1).

4.2 Access to Water, Toilet Facilities and Electricity

4.2.1 Drinking Water

Drinking of contaminated water is the main cause of high incidence of water-borne diseases such as diarrhoea, pneumonia, malaria, measles and other infectious diseases in rural areas. Cross-country study suggests that contaminated drinking water causes diseases which account for nearly 10% of the total burden of disease in developing countries (World Bank 2002). It was also observed that water-borne diseases were one of the major causes of under-five mortality (Talk International 2004). In general, tap water is considered safe to drink but very few people enjoy tap water in rural area. Rural people largely depend upon tube-wells and consider this source to be safe while other water sources are considered unsafe, as per the UNICEF definition. At the household level 92% of households reported having access to drinking water from a tube-well. Other sources of drinking water were ring-wells (1.4%), river (0.5%) and ponds (0.9%). Table 4.2 shows some improvement in the source of drinking water in all classes of households except descending non-poor between 2004 and 2009. In 2009 some new sources are added such as supplied water, water purifier supplied by NGO. Although tube-well water is considered to be safe drinking water,

Table 4.2 Distribution of households by type of water sources and economic class

	% Households by type of water resources								
	Tube-well		Ring-well		River		Ponds & other sources		
Economic class	2004	2009	2004	2009	2004	2009	2004	2009	Total
Non-poor	90.9	93.1	1.9	1.9	4.7	0.6	2.5	4.3	100.0
Ascending poor	91.5	93.8	1.4	1.6	4.8	0.5	2.3	3.8	100.0
Descending non-poor	89.8	86.0	1.8	2.1	6.6	0.0	1.8	9.8	100.0
Chronically poor	89.0	91.6	3.1	1.4	5.7	0.6	2.2	5.5	100.0

Table 4.3 Distribution of households by type of toilet facility and economic class

	% Households by economic class							
	Non-poor		Ascending poor		Descending non-poor		Chronically poor	
Type of latrine	2004	2009	2004	2009	2004	2009	2004	2009
Water-sealed	13.2	37.0	4.9	13.7	4.5	15.5	0.4	9.9
Pit (hole/well)	33.1	14.2	33.6	25.5	40.8	20.4	26.1	28.9
Fixed pit	31.6	42.2	18.1	47.2	20.2	45.8	12.9	35.6
Hanging	19.6	6.1	28.8	12.3	24.2	18.3	35.8	17.5
Open-space	2.6	0.6	14.6	1.3	10.3	0.0	24.8	8.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

no information was collected in the survey as to whether tube-well water was free from arsenic nor was natural arsenic contamination tested. Therefore it is not certain that 86–93% of the households were drinking safe water. It may also be noted that many of the households with best access to tube-well also experienced a decrease in water quality due to the drop in underground water levels and presence of arsenic contamination.

4.2.2 Toilet Facilities

Access to a hygienic toilet facilities is vital to the prevention of environmental hazard in general and prevention of infectious disease in particular. Poor access is a major public health problem that causes excreta related diseases such as diarrhoea and cholera. Roughly two-fifths of the world population was without access to proper sanitation in 2000. Sanitation coverage in rural areas is very discouraging and 80% of those lacking adequate sanitation live in rural areas. Lack of sanitation is the main cause of diseases transmitted by human waste in developing countries (World Bank 2002).

Table 4.3 shows the percentage of households with access to specific types of toilet facility in 2004 and 2009. The majority of households reported having traditional pit latrines and very few reported using improved and sanitary latrines. Of the entire sample about 3% of households in 2009 reported having no toilet facility and using open spaces for excreta disposal.

Significant improvement is, however, noticed in sanitary toilet use and the highest improvement is observed among non-poor households between 2004 and 2009, followed by ascending poor and descending non-poor. The overall scenario of improvement in toilet facilities in the survey households indicates that people are becoming more health conscious. The proportion of households which used open spaces for excreta disposal also fell markedly in every economic class.

Table 4.4 Change in percentage of households with electricity connection by economic class

	% of Households	
Economic class	2004	2009
Non-poor	28.4	63.8
Ascending poor	21.8	37.4
Descending non-poor	16.4	32.9
Chronically poor	11.0	14.7

4.2.3 Access to Electricity

Electricity supply in rural areas is uncommon and insufficient throughout the country: 62% of sample households reported having no access to electricity. A similar finding (61.2%) is reported by the BBS in its Welfare Monitoring Survey (BBS 2010). Electricity in rural areas is supplied by public agencies such as the Rural Electrification Board (REB) or Power Development Board (PDB). Access to electricity is, therefore, largely dependent on availability of the facilities. Among economic classes the highest percentage of non-poor households (64%) had access to electricity for lighting in 2009, followed by ascending poor (37%) and descending non-poor households (33%). Only 15% of chronically poor households had electricity connection in their households. Thus affordability is also important factor in access to electricity. But it is notable that between 2004 and 2009 significant improvement in the access to electricity is observed in all economic classes. Table 4.4 shows that only 28% of non-poor households had electricity connection in 2004, while this figure rose to 64% in 2009. Electricity connection even in chronically poor households has increased from 11% to 15% over the 5-year period. Changes over periods graphically can be seen in Fig. 4.2.

4.3 Fuel Used for Cooking

Bushes, leaves and ping (a local shrub) are the most commonly used fuel for cooking in rural households. These are used by almost 70% of non-poor households, 79% of ascending poor, 87% of descending non-poor, and 92% of the chronically poor households. Firewood is the second most common, used by 75% of non-poor households, 63% of ascending poor, 64% of descending non-poor and 53% of chronically poor households. Cow dung, jute stick, rice/wheat straw are also commonly used as fuel for cooking. The least commonly used is coal (Table 4.5).

A combined use of these fuels is common. Some are seasonally available but firewood can be preserved for all seasons. The poor people generally use bushes/leaves and ping and collect them from public and private sources free of cost. They cannot afford to buy firewood from the market but collect it from other sources. Wood is commonly used by non-poor households.

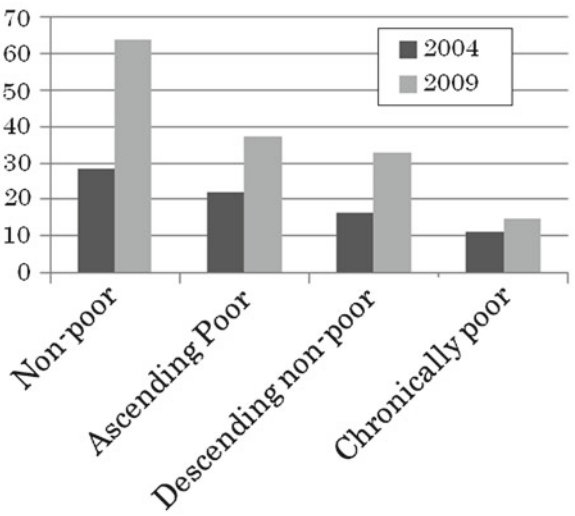

Fig. 4.2 Percentage of household having electricity connection

Table 4.5 Percentage of households by chief source of fuel and economic class, 2009

	% Household			
Type of cooking fuel	Non-poor	Ascending poor	Descending non-poor	Chronically poor
Cow dung	38.2	49.5	37.8	45.7
Firewood	75.3	63.3	64.3	52.9
Jute stick	16.1	14.7	7.0	13.0
Bushes/leaf/ping (a local shrub)	69.5	79.4	87.4	92.2
Rice/wheat straw	51.7	47.1	45.5	48.6
Coal	3.4	1.1	1.4	0.6
Others	16.4	12.8	13.3	14.2

4.4 Polychoric PCA Coefficients to Assess Housing Stock

Housing and household facilities are important components of physical capital. Household facilities also reflect social status and provide information on households' housing stock. For instance, a household lacking an electricity connection for lighting is likely to fall within lowest categories of the other types of assets. Conversely, households with an electricity connection are likely to fall within higher categories of other assets such as flash toilet, pucca house (made of brick). An econometric analysis has been conducted on housing and household facilities based on type of toilet, housing materials and lighting facilities. This analysis is made with the help of polychoric principal component analysis (PCA). The interesting interpretation of coefficients of polychoric PCA is that it rises with the increasing quality of each indicator of that category. A higher magnitude of coefficient for indicator (positive or negative) will provide more information on the household's housing

Table 4.6 Housing facilities polychoric PCA coefficients

Housing facilities		Polychoric PCA coefficient
A.	**Housing condition:**	
	(i) Thatched/jhupri	−1.1198
	(ii) Kutcha	−0.3734
	(iii) Made of CI sheet	0.2718
	(iv) Semi pucca	0.8213
	(v) Pucca	1.3344
B.	**Toilet facility:**	
	(i) Open space	−1.2078
	(ii) Hanging	−0.7255
	(iii) Pit (hole)	−0.3373
	(iv) Fixed pit	0.1245
	(v) Water sealed (sanitary)	0.7374
C.	**Lighting:**	
	(i) Traditional	−0.3001
	(ii) Electricity	0.4763

stock (Moser and Felton 2009). The coefficients estimated by the polychoric PCA techniques for housing condition, toilet facilities and electricity connection are shown in Table 4.6.

It is evident from the estimated polychoric PCA coefficient that households whose houses are thatched/jhupri (−1.1198) or kutcha (−0.3734) are less likely to own other assets and it provides very little information on ownership of other assets. On the other hand, a coefficient of households having semi-pucca (0.8213) or pucca (1.3344) constructions is highly indicative of ownership of other assets, such as electricity connection, television, land assets, and sanitary toilet facility. It is also noteworthy that households having pucca construction has a higher positive coefficient than that of households having semi-pucca construction, implying that the ownership of a pucca house conveys more information about ownership of other assets than ownership of semi-pucca and pucca houses receives a higher weighting. Similarly the estimated polychoric PCA of households that use open space toilets (−1.2078), hanging latrine (−0.7255) or pit-hole (0.3375) are likely to own few other assets and provide very little information on ownership of other assets. By contrast, the polychoric PCA coefficient for households having a water sealed/sanitary toilet facility (0.7374) is more indicative of ownership of other assets such as pucca or semi-pucca house, piped water, electricity connection. The lowest positive coefficient (0.1245) is found for households having a fixed-pit toilet facility and provides almost no information on other assets the household owns (Moser and Felton 2009). Households that use traditional lighting (−0.3001) provide very little information on ownership of other assets. Conversely, households having an electricity connection (0.4763) are likely to own other assets including land, pucca house, sanitary toilet.

Chapter 5
Inter-temporal Mobility of Poverty Status

5.1 Introduction

The main concern of this chapter is to examine the changes of household from one state of poverty state to another over the 5-year period. Poverty is not static but dynamic, the result of multiple interacting factors that operate from intra-households to the global levels. A static measure of poverty is taken from the observation of income or wealth at a particular point of time and for particular purpose. This type of measurement does not reflect the difference between individuals or relative positions of individuals or households with respect to poverty situations over period. It has been argued that "static" measures of poverty should be supplemented by "dynamic" measures of changes over time, which we shall call measures of mobility (Shorrocks 1978a). Dynamic changes can be measured by using elementary statistics such as the correlation coefficient, rank correlation coefficient. Dynamic change can also be measured by using transition matrices and other simple stochastic processes (Shorrocks 1978a).

The dynamic aspects of poverty in Bangladesh have received little systematic attention. Our intention is therefore to examine dynamics of poverty of rural Bangladesh, using panel data obtained from repeated sample surveys conducted in 2004 and 2009. For the evaluation of mobility of poverty status we calculate mobility measures based on transition between the dynamic poverty categories. These categories are chronically poor (whose household income is always below the poverty line for long period of time), descending non-poor (whose household income was above the poverty line 10 years ago but now descended into poverty), ascending poor (whose household income was below the poverty line 10 years ago but have now escaped poverty) and non-poor (whose household income has been above the poverty line). Thus the poverty groups are determined by their economic conditions. The poverty status of a household may change to any category over a period and thus the status of household is dynamic. Poverty dynamics are analysed with the help of a method as propounded by Shorrocks (1978b). Other dynamic aspects of poverty are analysed with the help of a stochastic process to construct a model to

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represent the transition which takes place in poverty status between 2004 and 2009. An attempt has also been made to estimate the limiting behaviour of transition probabilities of poverty status over the 5-year period. Test of hypothesis is then performed to examine whether the observed process is a realisation of a Markov chain of order one and finally the extent of mobility that occurred among the dynamic poverty groups including non-poor households is measured.

5.2 Methods of Mobility Measurement

There are several measures of mobility found in the literature. But it is convenient to have a scalar measure of mobility, which is useful for both comparison of societies and examining changes in mobility within the same society. Descriptive and scalar measures of mobility have been propounded by Matras (1960b) for empirical work, which was elaborated by Boudon (1973) and its review is contained in Bibby (1975). Shorrocks (1978b) also developed a useful mobility index based on a transition matrix, whose brief description is given in this section.

5.2.1 The Shorrocks Mobility Index

The information regarding mobility of households from one poverty status to another may be summarized in a mobility index as propounded by Shorrocks (1978b). The Shorrocks Mobility Index (SMI) for a transition matrix P is given by

$$\mathbf{SMI(P)} = \frac{\mathbf{n - TraceP}}{\mathbf{n - 1}}$$

where n is the number of poverty categories and the index is related to the mean exit time from status i, which is $1/(1-p_{ii})$.

The index is scaled by $n/(n-1)$ in order to have a normalized value between 0 and 1 (Nega et al. 2010). A SMI value close to zero indicates immobility; the closer to one, the higher the mobility between categories of poverty (Shorrocks 1978a).

5.2.2 Markov Chain Model

The method used in this study is designed to explain inter-temporal transformation of poverty status from 2004 to 2009 by Markov chain model. Because of natural disasters, household level shocks, economic crisis, climatic variability, price hike of essential commodities etc. the movement of a household from one poverty status to another is not regular, and it is influenced by multidirectional factors. The future

status of a household in terms of poverty cannot, therefore, be predicted with certainty but can only be done within a probabilistic framework. In the absence of several panel or two or more sets of generation data on poverty status, we have, in particular, used the first-order Markov chain model which assumes that current outcome depends only on the previous state and not on those of the further past. Important advantages of using the Markov chain model in the present case are that uncertainty in prediction can be accommodated by probability distribution in a model and it provides stochastic behaviour of the system.

Let X_T be the random variable which represents the state at time T and under the assumption that there is a finite number of states, the sequence $\{X_T\}$ is called a chain. The functional form of transition probability of Markov chain $\{X_T, T>0\}$ of order one may be defined as:

$$\text{Prob}(X_T = j / X_{T-1} = i) = P_{ij}. \tag{5.1}$$

The transition probabilities can easily be written in matrix notation by $\mathbf{P}=[P_{ij}]$ whose elements satisfy the following conditions

$$P_{ij} > 0, \quad \text{for all i, j,} \tag{5.2}$$

$$\text{and} \quad \sum_j P_{ij} = 1 \quad \text{for all i.} \tag{5.3}$$

For our present purpose the Markov chain $\{X_T\}$ is defined in terms of poverty status of a household on the assumption that the poverty status of a household in 2009 (second round survey period) depends on that in 2004 (the first round survey period). In other words, inter-temporal transition of poverty status from 2004 to 2009 constitutes a first-order Markov chain.

Let us consider a Markov chain with **state** space S $\{S=1, 2, 3, 4\}$ representing chronically poor (CP), descending non-poor (DNP), ascending poor (AP), and non-poor (NP). The category boundaries of poverty status (CP, DNP, AP and NP) have been explained in detail in Chap. 1. The choice of these categories is made keeping in conformity with other studies and nationally accepted classified groups. The possible transitions are shown in Fig. 5.1.

5.3 Limiting Behaviour of Transition Probabilities

It is interesting to investigate the limiting behaviour of the probabilities ($\mathbf{P}_i^{(T)}$) and { $\mathbf{P}_{ij}^{(T)}$ } as T tends to infinity. In the general theory of Markov chains the limiting behaviour depends on the structure of the transition probability matrix **P**, provided that this matrix **P** is regular. Satisfying this condition it makes it possible to show the probabilities all approach limits as T tends to infinity (Bartholomew 1978).

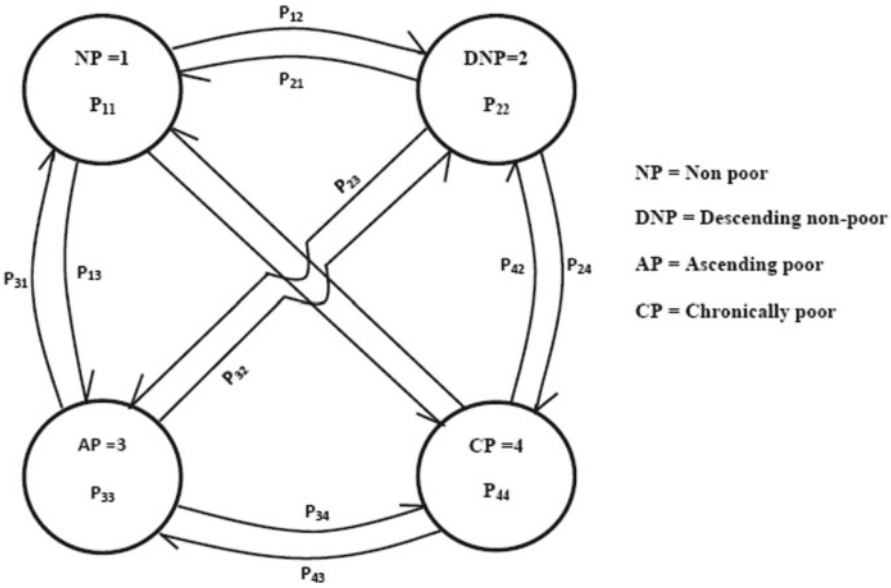

Fig. 5.1 Diagrammatic display of transitions in poverty state. *NP* non-poor, *DNP* descending non-poor, *AP* ascending poor, *CP* chronically poor

The limiting behaviour of transition probabilities has been examined as suggested by Feller (1968). Using Chapman–Kolmogorov equation we can have by recursive relation as

$$\| \mathbf{P^T} \| = \mathbf{P^{T-1}P} = \mathbf{P^T} \tag{5.4}$$

If T is large, P^T is equivalent to

$$\lim_{T \to \infty} \mathbf{P^T} = \mathbf{V} = \begin{bmatrix} \mathbf{v} \\ \mathbf{v} \\ \mathbf{v} \\ \mathbf{v} \end{bmatrix} \tag{5.5}$$

where $\mathbf{v} = (v_1, v_2, v_3, v_4)$ with $0 < v_i < 1$ and $\sum_{j-1}^{S} v_j = 1$.

Then the probability vector $\mathbf{v} = (v_1, v_2, v_3, v_4)$ satisfies the relation VP = V, which gives the desired limiting distribution of the process. In other words as $T \to \infty$, $\mathbf{P^{(T)}}$ tends to a limit v_j independent of the initial state i. This is also called predicted equilibrium.

Table 5.1 Limiting behaviour of transition probability matrix

T	p^T			
2	0.3025	0.1084	0.4487	0.1404
	0.1508	0.1780	0.4001	0.2715
	0.0715	0.1798	0.3764	0.3724
	0.0199	0.0953	0.0488	0.8360
4	0.0672	0.1211	0.1747	0.6415
	0.0625	0.1210	0.1740	0.6426
	0.0623	0.1209	0.1735	0.6433
	0.0678	0.1206	0.1718	0.6459
6	0.0620	0.1207	0.1725	0.6448
	0.0620	0.1207	0.1725	0.6448
	0.0620	0.1207	0.1725	0.6448
	0.0620	0.1207	0.1725	0.6448

5.4 Limiting Behaviour of Transition Probability Matrix P

The limiting behaviour of **P** matrix has been examined using a Kolmogorov equation and we can have it by recursive relation (5.4). In the present context the limiting behaviour of transition probability matrix is estimated and shown in Table 5.1.

Table 5.1 shows that the limiting value is $\underset{n\to\alpha}{\text{Lim}}\, P^n$ equivalent to $\mathbf{P^6}$, which implies that the Markov chain will occupy any state which is independent of the initial state and the social structure with respect to poverty status will be stable after 30 years from 2004. For $\mathbf{n=6}$ or more, no further change in transition probability is observed. It also indicates that the probability of chronically poor remaining in the same state is reduced to 0.0620 from 0.6547 in 2009. Similar interpretation may be given for other poverty status and probability of changes from one state to another will be the same after 30 years if the present development processes continue.

5.5 Mean Duration of Stay in a Particular Poverty Status

The mean duration of stay in a particular poverty category of a continuing household and the mobility of each poverty category is measured by the following methods.

Let m_i denote the number of years required up to and including moving from *i*-th state to another state. Again, let $m_i = T$, if the first (T-1) periods result in immobility and at the T-th period yield first mobility. Then m_i follows a geometric distribution and the mean of this distribution measures the mean time of stay in a state i which may be estimated by

$$\mu_i = E(m_i) = 1/(1-P_{ii}), \tag{5.6}$$

where P_{ij} is the probability that a household will remain in state i from one period to the next. If μ_i is compared with similar measure for an ideal society, we can have a measure of social mobility. Prais (1955), however, considered a perfectly mobile

society to be one whose transition probability matrix is obtained by the limiting distribution of the Markov chain. Then the standardized mean for the i-th state is

$$\mu_i^S = (1 - v_i)/(1 - P_{ii}), \quad i = 1, 2, 3, 4, \tag{5.7}$$

where v_i is obtained for the Markov chain whose transition probability matrix is shown in (5.5). An interesting interpretation of μ_i^S (5.7) is that in a mobile society its value is small and in an immobile society its value is large (Bartholomew 1978).

5.6 Test of Hypothesis

The test of hypothesis is then performed to examine whether the observed process is a realization of Markov chain of order-one and we formulate the null and alternative hypotheses as:

$$H_O : P = P^O \text{ and } H_A : P \neq P^O \tag{5.8}$$

For null hypothesis $P_{ij} = P_{ij}^0$ two test statistics can be used as suggested by Anderson and Goodman (1957) concerning Markov chain. The first test statistic to be used is

$$\chi^2 = \sum_{i=1}^{S}\sum_{j=1}^{S} n_i \cdot \frac{(\hat{P}_{ij} - P_{ij}^0)^2}{P_{ij}^0} \tag{5.9}$$

which under H_0 has chi-square distribution with $S(S-1)$ degrees of freedom, where d is the number of zero in P_{ij}^0. The second test-statistic to use is

$$-2\ell_n \wedge = 2\sum_{i=1}^{S}\sum_{j=1}^{S} n_{ij}\, \ell_n \frac{n_{ij}}{n_i P_{ij}^0}, \tag{5.10}$$

where $\wedge$ is the likelihood ratio which is also χ^2 with $S(S-1)$ degrees of freedom under H_0 (Bhat 2002).

5.7 The Transition Count Matrix by Poverty Status

Based on the theoretical framework above, we analyse the degree of mobility among the households of different poverty categories using panel data sets collected from interview in 2004 and 2009.

Table 5.2 Transition count matrix for four dynamic poverty categories 2004–2009

	2009				
2004	Chronically poor (CP)	Descending non-poor (DNP)	Ascending poor (AP)	Non-poor (NP)	Marginal total (2004)
Chronically poor (CP)	311	00	164	00	475
Descending non-poor (DNP)	32	84	76	20	212
Ascending poor (AP)	04	39	134	39	216
Non-poor (NP)	00	20	00	289	309
Marginal total (2009)	347	143	374	348	1212

The mobility of households between dynamic poverty categories [chronically poor (CP), descending non-poor (DNP), ascending poor (AP) and non-poor (NP)] using transition count matrix is shown in Table 5.2.

Comparison of marginal totals of row and column reveals that there is a distinct process and pattern of mobility among the categories of poverty. Almost one third of all households (394) changed their poverty status between 2004 and 2009, of which 76% (households above the diagonal) experienced upward mobility and 24% (households beneath the diagonal) suffered downward mobility. None of the chronically poor households could move to non-poor and descending non-poor categories, but 164 (34.5%) of chronically poor households moved to ascending poor category. This means that those 164 chronically poor households could manage three meals a day for all their family members but could not bear educational expenses for their children nor those of healthcare for their family members during the previous 5 years. But these households could not manage three meals a day for their family members 5 years before. Thirty-two households (15.1%) of the descending non-poor and four households (1.9%) of ascending poor households fell into the chronically poor category over the 5 year period. This indicates that the economic condition of these households deteriorated over the same period and that they failed to manage three meals a day for their family members, not to mention educational and health care expenses. On the other hand, none of the non-poor households slid down to chronically poor and ascending poor categories, but 20 (6%) of non-poor households descended to the descending non-poor category. It is notable that 65% of the chronically poor, 40% of the descending non-poor, 62% of the ascending poor and 94% of the non-poor households stayed in the same category between 2004 and 2009. The non-poor households are a highly immobile group as their incomes are concentrated at the top of the distribution. The chronically poor group ranks second in terms of high immobility, although the income of this group is concentrated at the bottom of the distribution. On the other hand, the highest mobility (60%) is observed in descending non-poor followed by ascending poor households.

5.8 Transition Probabilities and Markov Matrices

Changes in poverty status between 2004 and 2009 are indicated by the conditional probabilities that a household in 2009 will be a chronically poor (CP), descending non-poor (DNP), ascending poor (AP) and non-poor (NP) given that the household was a (CP), (DNP), (AP) and (NP) in 2004. The conditional probabilities are shown in Table 5.3.

The transition between poverty categories of a household over a 5-year period may be regarded as transitions of a Markov chain with the above transition probabilities. The probability of a chronically poor household's becoming non-poor between 2004 and 2009 is found to be zero. The probability of a non-poor household's becomng chronically poor and ascending poor over the same period is also zero. The transitional probability matrix from Table 5.3 may be denoted by $P=[P_{ij}]$. Clearly P is a square matrix with non-negative elements

$$\mathbf{P}=\begin{bmatrix} \mathbf{0.6547} & \mathbf{0.0000} & \mathbf{0.3453} & \mathbf{0.0000} \\ \mathbf{0.1509} & \mathbf{0.3962} & \mathbf{0.3585} & \mathbf{0.0944} \\ \mathbf{0.0185} & \mathbf{0.1806} & \mathbf{0.6250} & \mathbf{0.1759} \\ \mathbf{0.0000} & \mathbf{0.0647} & \mathbf{0.0000} & \mathbf{0.9353} \end{bmatrix} \tag{5.11}$$

The main diagonal elements of P indicate the probability that a household will remain in the same state of poverty between 2004 and 2009. For instance, given that a household was chronically poor in 2004, after 5 years (2009) the probability of that household will be chronically poor is 0.6547. After 10 years this probability is reduced to 0.3025 and after 20 years it is further reduced to 0.0672. It is also observed that after 30 years the probability of mobility from one category to other becomes stable and achieves equilibrium conditions as shown in Table 5.1.

5.9 Empirical Results and Discussion

5.9.1 Estimated Value of Shorrocks Mobility Index (SMI)

The value of the Shorrocks Mobility Index (SMI) computed from transition matrix P is

$$\mathbf{SMI(P)} = \mathbf{0.3468}.$$

Table 5.3 Conditional probabilities for four dynamic poverty categories

	Status in 2009			
Status in 2004	CP	DNP	AP	NP
CP	0.6547	0.0000	0.3453	0.0000
DNP	0.1509	0.3962	0.3585	0.0944
AP	0.0185	0.1806	0.6250	0.1759
NP	0.0000	0.0647	0.0000	0.9353

Table 5.4 Actual and equilibrium distributions of poverty status

	Actual distribution		
Poverty status	2004	2009	Predicted equilibrium distribution
Chronically poor (CP)	0.3919	0.2863	0.0620
Descending non-poor (DNP)	0.1749	0.1180	0.1207
Ascending poor (AP)	0.1782	0.3086	0.1725
Non-poor (NP)	0.2550	0.2871	0.6448

This result shows that according to the SMI the degree of mobility from one poverty status to another status between 2004 and 2009 is low in rural Bangladesh. This means progress and process of economic development failed significantly to relieve poverty in rural Bangladesh. Millions of poor people who fight losing battles to move out of poverty remain in poverty in the end. The drawbacks of this index are that it does not give an indication of the direction of mobility but indicates the extent of mobility over the period and that it is related to the mean exit time from state i, which is $1/(1-P_{ii})$ (Hofer and Webber 2001).

5.9.2 Actual and Predicted Equilibrium Distribution

In order to examine the nature of distributional pattern of households over the period, the actual and predicted equilibrium distribution of households by poverty status is computed and shown in Table 5.4.

The first two columns of Table 5.4 indicate the structure of households classified according to poverty status between the two survey periods (2004–2009). If the society were to reach equilibrium, we would expect these distributions to be the same. We would also expect them both to agree with the equilibrium distribution obtained from (5.5). The difference in distributional pattern of household between 2004 and 2009 and the predicted equilibrium distribution is quite high and it indicates a clear shift among the categories of households. This large gap implies the absence of equilibrium in terms of poverty status of households in rural society. It also indicates to some extent the inadequacy of Markov chain model (Bartholomew 1982).

The average period (μ_i) spent by a continuing household in poverty category i or the mean exit time from state i, which is calculated by $(i-P_{ii})^{-1}$. The standardized value of μ_i is estimated by $\mu_i^S = (1-v_i)/(1-P_{ii})$ and presented in Table 5.5.

The higher value of departure of μ^S from unity indicates a high degree of immobility, while zero departure implies a high degree of mobility from one category to another (Bartholomew 1978). The mean exit time for non-poor household is the highest (15.46), followed by the chronically poor household (2.89). The value of μ^S for non-poor category of households is the highest (5.49), indicating least chance of downward mobility. The value of μ^S for the chronically poor category is the second highest (2.72) implying that this category of household has also fewer chances of upward mobility. Descending non-poor and ascending poor households have higher

Table 5.5 The expected stay and measures of mobility of each category of poverty status

Household category	$\mu_i = (1 - P_{ii})^{-1}$	$(1 - V_i)^{-1}$	$\mu_i^S = (1 - V_i)/(1 - P_{ii})$
Chronically poor (CP)	2.8960	1.0661	2.7168
Descending non-poor (DNP)	1.6562	1.1373	1.4563
Ascending poor (AP)	2.6666	1.2085	2.2067
Non-poor (NP)	15.4560	2.8153	5.4899

Table 5.6 Mobility of households of different categories in between 2004 and 2009

Household category	Stayed in the same category of 2004	Upward mobility (%)	Downward mobility (%)
Chronically poor (CP)	65.5	34.5	–
Descending non-poor (DNP)	39.6	45.3	15.1
Ascending poor (AP)	62.5	17.6	19.9
Non-poor (NP)	93.5	–	6.5

chances of mobility, as indicated by the value of μ^S and these two categories of household show mobility in both directions. These findings may be substantiated by the results shown in Table 5.6

Table 5.6 shows that almost two third of the chronically poor and 94% of the non-poor categories of household remain in the same category over a 5-year period and 35% of the chronically poor moved to the ascending poor category only. It is notable that 20% or 6% of the non-poor households showed downward mobility and slipped into the descending non-poor category. The mobility of descending non-poor households is very high, followed by ascending poor households and between 2004 and 2009 only 40% of descending non-poor households stayed in the same category. This figure for ascending poor category of household was 63%. It is also observed from Table 5.2 that only few households (8% from DNP and 18% from AP) from transient poor have moved up and escaped poverty over the 5 years. But considerable mobility is shown between CP and AP and between the two transition poverty groups DNP and AP. During the same period, a large number of households has suffered downward mobility.

5.10 Statistical Inference Regarding Equality of Transition Matrices

We have the transition counts for a four state Markov chain which is shown in Table 5.2 and the transition probability is shown in Table 5.3. We can then employ two test statistics (5.9) and (5.10) to test the null hypothesis $\mathbf{H_0} : \mathbf{P_{ij}} = \mathbf{P_{ij}^0}$, (i = 1,2, …,4 and j = 1,2, …,4), where $\widehat{\mathbf{P}}_{\mathbf{ij}} = \frac{\mathbf{n_{ij}}}{\mathbf{n_i}}$ and $\mathbf{P_{ij}^0}$ is assumed to be 0.25, the

Table 5.7 Estimated value of test statistics

Test statistics	Value	Degrees of freedom (DF)	P-value
Chi-square test	110.48	12	0.000

transition from one state to another, i.e. transition is fixed (25%) in each state in the population from which sample households have been drawn. Thus the transition probability matrix $\mathbf{P^0}$ in the population is as follows:

$$\mathbf{P^0} = \begin{bmatrix} \mathbf{0.25} & \mathbf{0.25} & \mathbf{0.25} & \mathbf{0.25} \\ \mathbf{0.25} & \mathbf{0.25} & \mathbf{0.25} & \mathbf{0.25} \\ \mathbf{0.25} & \mathbf{0.25} & \mathbf{0.25} & \mathbf{0.25} \\ \mathbf{0.25} & \mathbf{0.25} & \mathbf{0.25} & \mathbf{0.25} \end{bmatrix}$$

The estimated value of test statistics (5.9) and (5.10) for testing equality of transition matrices is presented in Table 5.7.

Table 5.7 indicates that the Chi-square value of 110.48 with 12 degrees of freedom is highly significant (p-value <0.001). We therefore reject our null hypothesis $H_O : \mathbf{P_{ij}} = \mathbf{P_{ij}^O}$ and we may conclude that the observed sample process has not come from a Markov chain process of order one whose transition probability matrix is P^0. This finding further suggests that the observed process is not a realization of the process with 0.25 transition probability in each state of poverty.

5.11 Reasons for Mobility

Why did some households show upward while others show downward mobility? Why did some others stay in the same status of poverty? To answer all these critical questions we must investigate the events that drive transitions of a household from one poverty status to another.

In the current complex structure of rural society it is difficult to single out the actual cause of mobility in poverty status for the period 2004–2009. There is no regular pattern nor linear trend in mobility from one status to another. It depends upon many complex factors and different sets of reasons are associated simultaneously with upward mobility and downward mobility. However, an attempt has been made to identify the main reasons for mobility in poverty status. We shall first discuss reasons for upward mobility and then those for downward mobility over the period 2004–2009.

Table 5.8 Major reasons for upward mobility between 2004 and 2009 (percent of households[a])

Major reasons for upward mobility	Percent of cases (n = 299)
1. Increase of work opportunity	40.6
2. Increase of income from diversified sources	36.6
3. Crop diversification	18.1
4. Progress in business	12.9
5. Worked harder	6.9
6. Few dependents	3.4
7. Bought and inherited property	3.4
8. Cultivation of leased in land	2.6
9. Livestock rearing	0.9
10. Loan from NGOs	0.9
11. Help from friends and relatives	0.4

[a]These numbers do not add up to 100% because more than one reason could be given

5.11.1 Reasons for Upward Mobility

There is no single reason for escape from or descent into poverty. Both occur gradually and are cumulative, nor do they take place from 1 year to the next. Multiple linked factors are associated with upward and downward mobility. When the heads of the households who experienced upward mobility were asked to state the reasons for upward mobility, they offered several. Table 5.8 shows the major reasons for upward mobility as described by the heads of sample households that experienced upward mobility:

5.11.1.1 Work Opportunity

Opportunity for work has been the most important pathway for upward mobility (Table 5.8). Work opportunities in farm and non-farm activities increased considerably in the period under discussion. Rural-based enterprises (such as road-side stand, tea stall), petty trading (such as selling of vegetables, cereals and pulses) and the livestock trade provide opportunities to work to a large number of people. Getting work in those informal sector enterprises was cited as an important reason for upward mobility by a significant number of households (41% of all observed ascending households). Given enhanced work opportunities people can work hard and through hard work about 7% of all observed ascending households improved their economic conditions.

5.11.1.2 Diversification of Income Sources

Income diversification was the second important reason for upward mobility. A large number of households (37%) moved upward over the 5 years through business progress, obtaining jobs most often in the informal sector, and remittance

from abroad. There are several pathways involved in diversification. The first involvement is in agriculture. The second is engagement in informal business in the locality and petty trading of local products. The third is seasonal migration to cities for better source of income and employment. Securing income from diversified sources is the major reasons associated with upward mobility as described by the households that experienced upward mobility. About 13% households have improved their economic condition through gain in business. Livestock rearing is another source of income and through this one percent of all ascending households experienced upward mobility.

5.11.1.3 Crop Diversification and Crop-Related Factors

Crop diversification is another aspect of increasing income of farmers in rural areas. Crop diversification through introduction of modern technology, of HYVs (high-yield varieties) of crop, increasing use of fertilizer and irrigation have greatly improved yield. Eighteen percent of the households that experienced upward mobility over the 5 years did so through crop diversification (including vegetables, beans, potatoes, tomatoes, banana, wheat, maize). About 3% of households improved their economic condition through cultivation of crops in leased land. Increasing land under crop cultivation and diversification through improved management practices also relieves poverty.

5.11.1.4 Social Factors

Inherited property, the presence of few dependents, help from friends, relatives and NGOs are important factors in improving economic conditions and about 8% of all households who showed upward mobility thus improved their economic condition.

5.11.2 Reasons for Downward Mobility

As with upward mobility, there is no single reason for downward mobility and multiple linked factors propel most descents. In descending order of frequency, health care expenses, death of the main income earner, demographic factors such as household size, high dependency ratio, natural disasters, social factors such as dowry and land division were the main reasons for downward mobility. However, when the heads of households who experienced downward mobility were asked to identify reasons for downward mobility, they stated the following reasons, shown in Table 5.9.

Table 5.9 Major reasons for downward mobility between 2004 and 2009 (percent of households[a])

Major reasons for downward mobility	Percent of cases (n = 95)
1. Low income but high expenditure	48.6
2. High treatment cost	35.2
3. Loss of crops by natural disasters	14.9
4. Loss of money for employment abroad	11.1
5. Distress sale of land for gambling	11.2
6. High litigation cost	11.1
7. Dowry expenses for daughter's marriage	5.6
8. Death of main income earner	5.6
9. Uneconomic expenditure by unruly sons	3.7
10. Split of family	3.7

[a]These numbers do not add up to 100% because more than one reason could be given

5.11.2.1 Low Income with High Family Expenditure

Low household income is overwhelmingly the single most important reason for downward mobility of households (Table 5.9). Increases in the price of essential food raised the burden of consumption expenditure of households. For those whose income does not keep pace with the hike of prices, the real income deteriorates quickly at the time of rapid price increase.

5.11.2.2 High Cost of Treatment

The cost of health care is the second most important cause of downward mobility. The economic condition of about 24% of households has deteriorated over the 5 years period due to high cost of treatment of family members. Expenses were those associated with hospitalisation, long illness and regular or particularly high use of medication. Increase in poverty, due to health problems and their related human and financial costs, have become serious concern in rural Bangladesh.

5.11.2.3 Death of Main Income Earner

Death of the principal income earner was causing 4% of households' downward mobility. Absence of main earner and presence of dependents in the households helped to explain why some households experienced downward mobility.

5.11.2.4 Economic Factors Related to Demographics

Increase of family size without corresponding increase of income-earning members caused hardship to some of the sample households. Large family size and high dependency ratios raised family expenditure relative to income. Having large

number of dependents, strains households' limited resources. Soaring prices of essential commodities has pushed some households downward. This is mentioned by 32% of observed descending households.

5.11.2.5 Natural Disasters

Crop failure due to natural disaster resulted in reducing household income. Flood, cyclone, drought are recurrent in rural areas and contribute to downward mobility. This factor was cited by 15% of households who suffered downward mobility. Reduction and losses of crops due to natural disasters has also driven rural farm mobility, as mentioned by about 2% of observed descending households.

5.11.2.6 Social Factors

Distress sale of property because of gambling, division of family into two or more and consequently subdivision of land, loss of money saved for going abroad, dowry expenses for daughter's marriage, expenses of litigation, waste of money by unruly sons and other family members are the major social factors that associated with 45% of all descending households observed in our sample households.

Chapter 6
Distribution of Household Income

6.1 Introduction

An understanding of household income and expenditure is essential to consideration of poverty. However, income is difficult to measure as it includes monetary and non-monetary components (for instance, farm households consume parts of their own farm produce). Household income is defined as the total amount of income available for final consumption expenditure and other household expenditure that are not generally obligatory, and for saving. Wages and salary, agriculture, business, remittance, livestock, poultry, rickshaw/van pulling were taken as the major sources of income. Self-employment in household economic activities is common particularly in rural areas. In the field survey, collection of income data from such household activities is very difficult, because most of the households do not keep accounts of income earned from informal sectors. Moreover, they cannot remember the amount of income earned from all the different sources and transactions made during a 1-year reference period. Apart from recall and accounting problems, there is a tendency to conceal and less than candid about their income level, which is generally underreported for fear of income tax and other reasons. It is to some extent possible to correct these false statements by carrying out a large-scale detailed survey on economic activities. Keeping these problems in view, emphasis was given in preparing questionnaires and conducting field survey of pooled income and expenditure data from a variety of sources at the household level.

Despite limitations in measurement, household income and expenditure data have long been used for poverty analysis and for classifying household's socio-economic positions in society or measuring standard of living. It is a cardinal variable and is directly comparable with observations. We use income data in quantitative analysis and interpret them in a straightforward manner. The results such as variation of income by gender and other characteristics of income recipients are understandable. In the field survey, we wanted to capture the total amount of income received by a household, place of earning income, amount of income from different sources, and relevant economic characteristics of income recipients.

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6.2 Distribution of Household by Income Sources

The concept of household used in income and expenditure survey does not conform to the standard international concept recommended for census or surveys. Emphasis is placed in our survey on family members (related by blood or marriage) only, rather than number of people taking meals from the same kitchen facilities, such as domestic servants and lodgers. Their income is not included in the household income. Household income is the total income earned by all family members from different sources. The underlying assumption is that a household operates as an unit where all the members share equally household income and other resources. The share of household income earned from different sources is shown in Table 6.1.

Sources of income of rural households are diverse but agriculture is still the main source of income in rural Bangladesh. Agriculture generates nearly 30% of the total income in all economic classes excepting chronically poor households. Table 6.1 shows that a major share of income of non-poor (33.2%), ascending poor (23%) and descending non-poor (24.2%) comes from agricultural farming, while the major share of income of the chronically poor (45.6%) comes from selling of manual labour. Business as a source of income in 2009 ranked second for non-poor, ascending poor and descending non-poor. For chronically poor it ranked fifth in 2009 but in 2004 it ranked second. Thus the livelihoods of the chronically poor depend on selling labour in the agricultural and non-agricultural labour markets. Farming, business, and rickshaw/van pulling were secondary sources of their income. The share of income from farming between 2004 and 2009 fell to some extent for all economic classes except chronically poor households. The difference in income share on account of farming for chronically poor between 2004 and 2009 increased from roughly 10% to 12%. An opposite scenario is observed in income share from business. It is worth mentioning that the income share earned from foreign remittances for all economic classes declined over the 5 year period. These directly influence on social welfare but very few poor people have access to it. Since the poor have less access to land and remittance, they engage in other income-generating activities such as fishery and handicrafts. Income share from other sources increased for all economic classes but non-poor. The increase is pronounced for the chronically poor (12.2%) and descending non-poor (18.5%) households. Shares of income by source for different economic classes for 2004 and 2009 are shown in Figs. 6.1–6.4.

6.3 Monthly Household Income and Inequality by Economic Class

Before measuring household income, the concept of income should be clearly explained. The term “household income” refers to the flow of economic compensation received from different sources by the family members in a given time period. Most households earn income from production, service, business, selling of labour,

Table 6.1 Share of monthly household income by source and economic class

	% of total income							
	Non-poor		Ascending poor		Descending non-poor		Chronically poor	
Source of income	2004	2009	2004	2009	2004	2009	2004	2009
Agriculture (farming)	37.6	33.2	30.8	23.0	26.9	24.2	9.8	12.2
Service	18.1	17.9	14.8	9.9	10.4	5.2	4.6	5.6
Business	21.3	21.9	21.7	21.2	22.6	23.0	16.6	9.1
Livestock rearing	2.5	4.3	1.7	4.8	2.8	4.3	2.4	2.8
Poultry rearing	0.4	0.5	0.4	0.6	0.7	1.1	0.8	0.5
Daily wage labour (agri. and non-agri.)	2.6	2.7	14.8	20.7	18.8	20.6	49.8	45.6
Rickshaw/van pulling	0.0	0.3	1.2	3.2	2.9	1.4	7.6	10.7
Foreign remittance	10.4	8.8	9.0	6.8	3.0	1.8	3.1	1.4
Others[a]	17.4	10.4	5.6	9.7	11.8	18.5	5.3	12.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

[a]Others include house rent, fisheries, handicraft, and driving

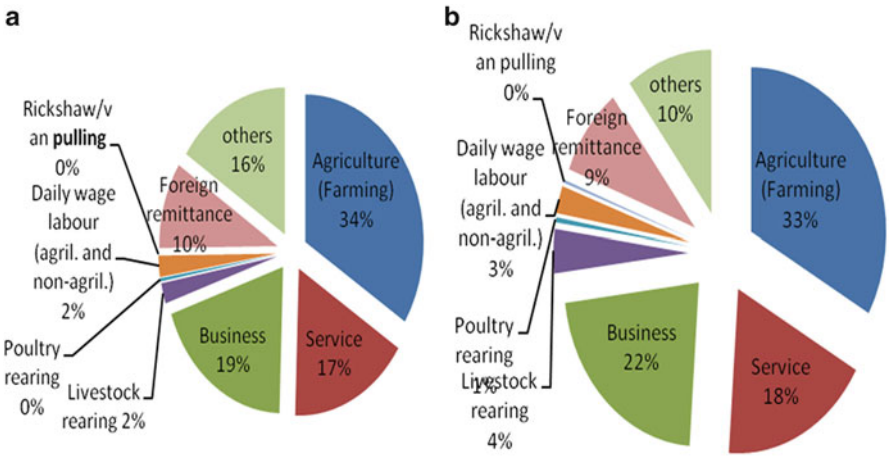

Fig. 6.1 Share of income of non-poor household by source, 2004 (**a**) and 2009 (**b**)

fisheries and livestock. Besides earning from different sources, profit, interest, rent, and capital gains are also important components of income. Income flow of receipts is distinguished from wealth, which is a stock value of assets an individual owns (Schiller 2008). There is inequality of income between and among households of different economic classes or characteristics.

One of the most common measures of inequality is the difference in income between classes. Table 6.2 shows differences in the average monthly household incomes from all sources for all economic classes. It shows that household income at

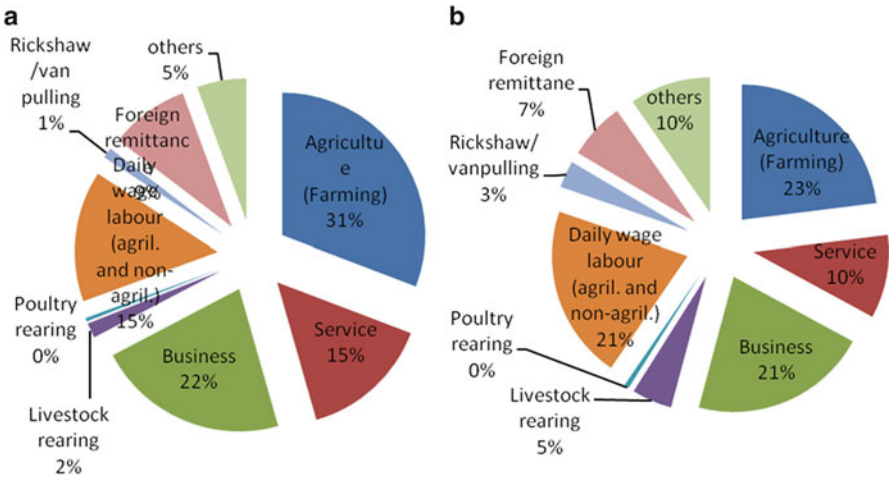

Fig. 6.2 Share of income of ascending poor household by source, 2004 (**a**) and 2009 (**b**)

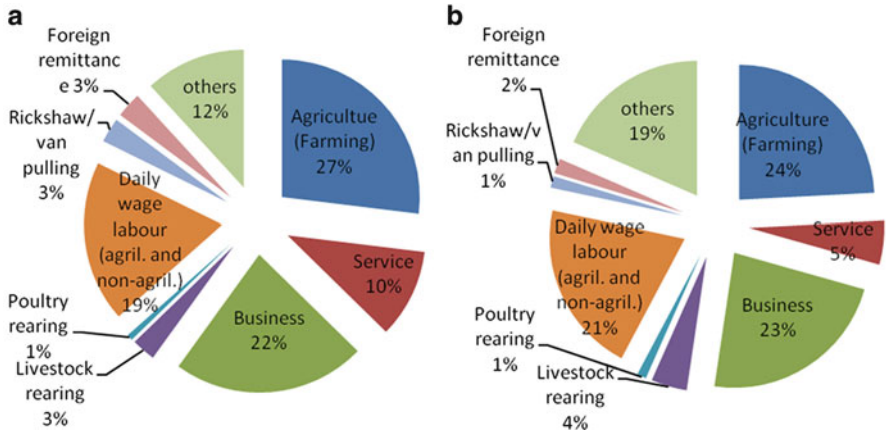

Fig. 6.3 Share of income of descending non-poor household by source, 2004 (**a**) and 2009 (**b**)

current prices for all economic classes greatly increased between 2004 and 2009. The average monthly income of non-poor households is almost four times higher than that of chronically poor households, indicating a wide disparity in monthly income between the rich and the poor. The average monthly income of descending non-poor and ascending poor households was also 62% and 48% lower than that of non-poor households. Thus there is considerable disparity in income distribution between the economic classes. Differences in productive assets, education, employment opportunities are the main causes of income differential. These differences between economic class averages are often the primary focus of inequality concern.

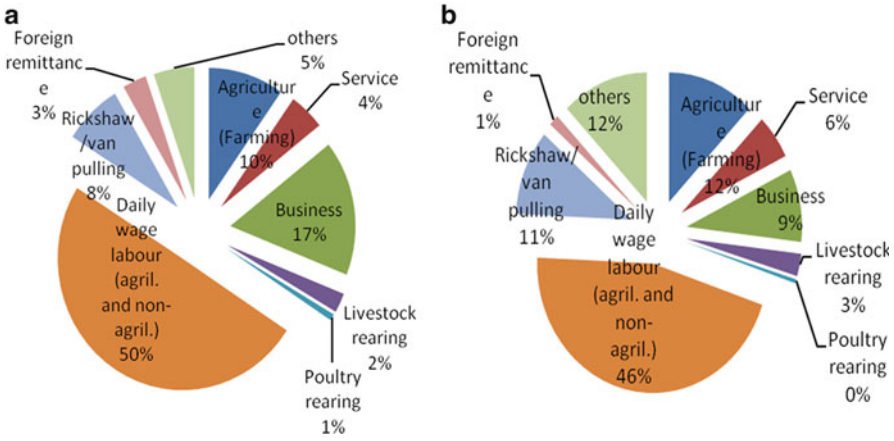

Fig. 6.4 Share of income of chronically poor household by source, 2004 (**a**) and 2009 (**b**)

Table 6.2 Average monthly household nominal income by economic class

Economic class	Average monthly nominal income (Tk.)		Real income[a] 2009	Average annual growth in real mean between 2004 and 2009	Gini index	
	2004	2009			2004	2009
Non-poor	7,097.3	13,646.2	9,456.8	6.64	0.3638	0.3190
Ascending poor	4,438.9	7,073.3	4,901.8	2.09	0.3365	0.2862
Descending non-poor	2,958.7	5,122.1	3,549.6	4.00	0.2979	0.2636
Chronically poor	1,913.8	3,582.8	2,482.8	5.95	0.2486	0.2578
Overall	3,869.5	7,731.0	5,357.6	7.69	0.4224	0.3864

[a]Nominal income of 2009 is deflated by general CPI taking 2003–2004 = 100

It also appears from Table 6.2 that the income inequality as measured by the Gini coefficient[1] fell between 2004 and 2009 in all economic classes except the chronically poor. Higher income inequality is observed among non-poor households (Gini = 0.3638 in 2004 and Gini = 0.3190 in 2009), while the lowest inequality is observed among chronically poor households (Gini = 0.2486 in 2004 and Gini = 0.2578 in 2009). A significant reduction in inequality among ascending poor households is observed. This may be due to the 164 chronically poor households' having improved their income distributional pattern over a 5-year period and joined

[1] The formula for estimating the Gini coefficient is: $\mathbf{Gini} = \frac{\mathbf{1}}{\mathbf{2n^2\bar{y}}} \sum_{\mathbf{i=1}}^{\mathbf{n}} \sum_{\mathbf{j=1}}^{\mathbf{n}} \left| \mathbf{y_i - y_j} \right|$.

the category of ascending poor, resulting an even distribution of income of this economic class. Non-poor households experienced an annual average growth rate of 6.64% in average real household income between 2004 and 2009, while the figure for ascending poor, descending non-poor and chronically poor was 2.09%, 4.0% and 5.95%, respectively. Comparison of overall income inequality of 2004 (Gini = 0.4224) with that of 2009 (Gini = 0.3864) in rural areas shows that income inequality decreased by 8.5%, illustrating changes in the distributional pattern.

6.4 Per Capita Income by Economic Class

Per capita income by economic class is shown in Table 6.3. The data indicate a large variation in average per capita income between the classes. Improvement in per capita income between 2004 and 2009 is shown by the change from Tk. 779.6 in 2004 to Tk. 1,546.9 in 2009 indicating more than two-times increase in nominal term.

The average per capita nominal income more than doubled in the 5-year period for all economic classes. The poverty line income (z)[2] was estimated at Tk. 1,207 for 2009 but it was Tk. 595 for 2004 per month per person. The poverty line income in real term was found to be Tk. 841 in 2009. It is notable that the average per capita income of non-poor and ascending poor households was higher than the poverty line income estimated both in nominal and real terms. But the average per capita income of descending non-poor and chronically poor was far below the poverty line income. Non-poor households showed an average yearly increase in real per capita income of 6.2%; while the chronically poor experienced an average annual increase in real per capita income of 5.7%. The average annual increase in real per capita income of ascending poor and descending non-poor over the study period was 3.0% and 5.6%, respectively. The overall annual increase in per capita income between 2004 and 2009 was estimated at 3.8%.

6.5 Kernel Density Curve for Per Capita Monthly Income

In this section an attempt is made to find a structural pattern in univariate data sets by Kernel density estimation without imposition of a parametric model. Kernel density estimation is a non-parametric technique for estimating the probability density function of a random variable which interprets data without prior assumptions about the functional form. It is also a fundamental data-smoothing problem where inference on the population is drawn on the basis of a finite sample data such as per capita income and per capita expenditure. If we want to display the data graphically

[2] The poverty line income (z) is estimated from the functional form of the relation between calorie intake and consumption expenditure (i.e. $Iny_i = a + bc_i + E_i$).

Table 6.3 Average per capita monthly income by economic class

Economic class	Average per capita income (Tk.) 2004	2009	Real per capita income 2009[a]	Average annual growth between 2004 and 2009 real per capita income (y_i)
Non-poor	1,314.1	2,481.9	1,719.8	6.2
Ascending poor	899.0	1,494.3	1,035.6	3.0
Descending non-poor	603.1	1,114.6	772.4	5.6
Chronically poor	456.6	846.2	586.4	5.7
Overall	779.6	1,546.9	1,072.0	3.8

[a]Nominal income of 2009 is deflated by general CPI taking 2003–2004 = 100

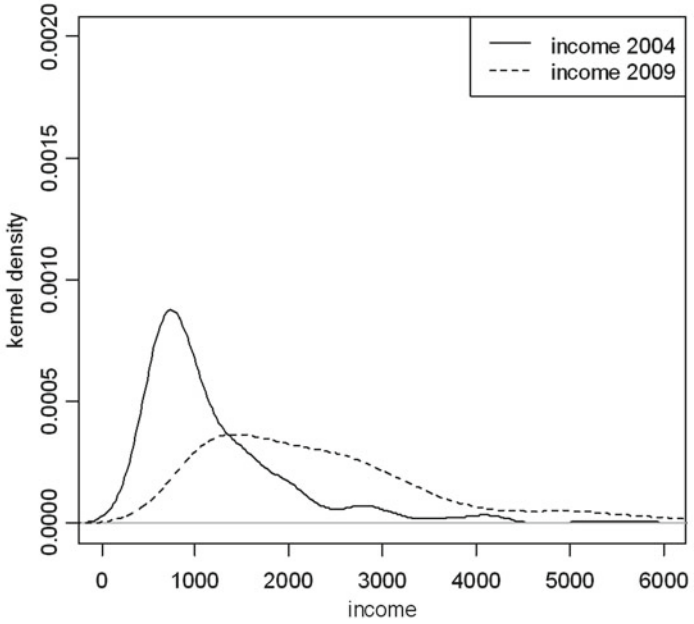

Fig. 6.5 Kernel density curve for per capita monthly income (NP)

to see their structures and their changes over a period of time, the Kernel density estimation as well as plot provide an attractive way of displaying data graphically, known as the Kernel density curve. It provides pre-estimation information about the most appropriate functional form to be adopted. It also presents the evolution over a period. Figures 6.5–6.8 show the Kernel density curves of per capita income for 2004 and 2009 and for different economic classes.

The Kernel density curve (Fig. 6.5) indicates that the per capita income of non-poor households was highly concentrated between 0 and Tk. 3,000 in 2004, while in 2009 the curve showed much flatter top and narrower tails than the curve obtained in 2004. This means that the bandwidth of per capita income was much wider in

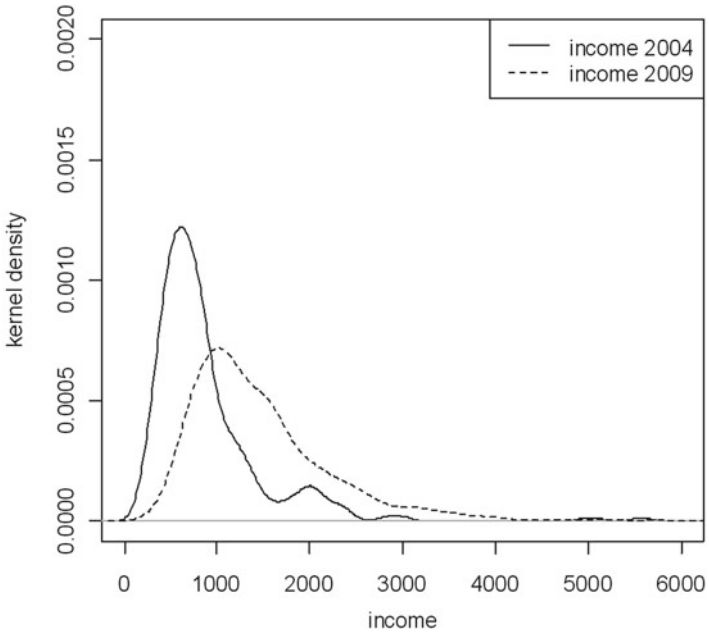

Fig. 6.6 Kernel density curve for per capita monthly income (AP)

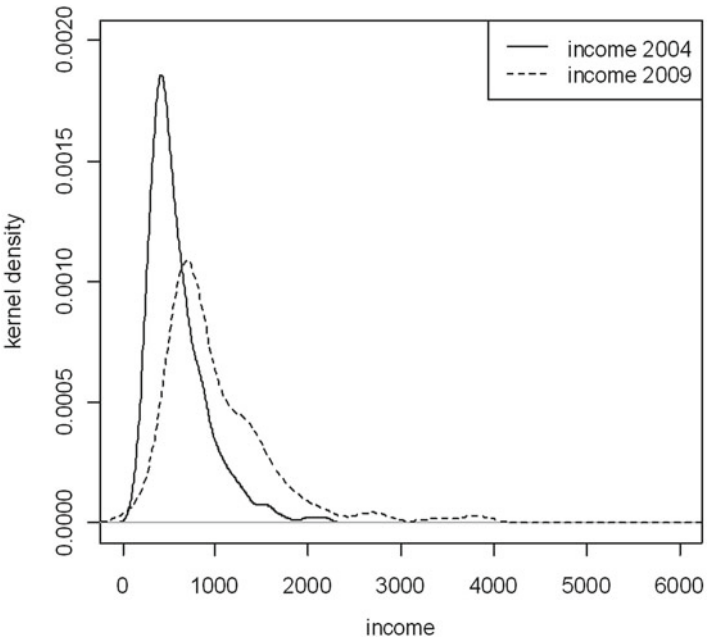

Fig. 6.7 Kernel density curve for per capita monthly income (DNP)

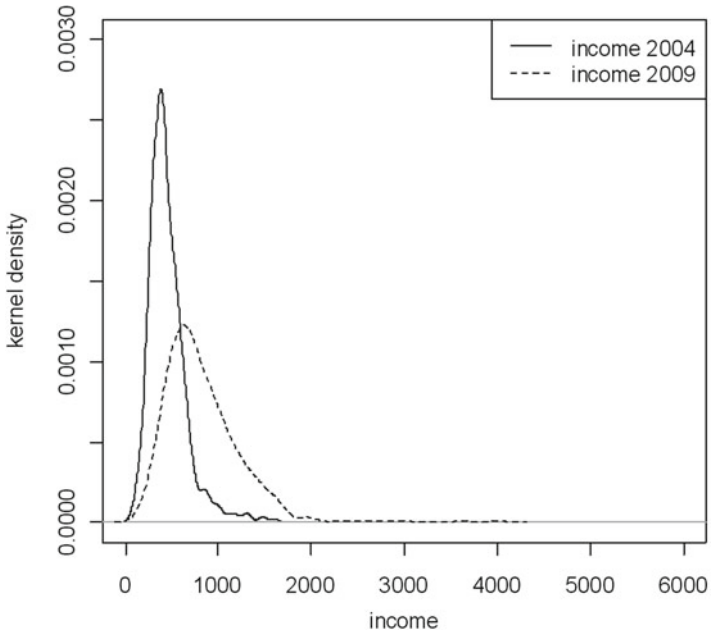

Fig. 6.8 Kernel density curve for per capita monthly income (CP)

2009 than in 2004 and the range of per capita income in 2009 varied from 0 to Tk. 5,000 indicating a distinct structural change over the 5-year period.

The Kernel density curve for ascending poor households (Fig. 6.6) shows that the per capita income in 2004 peaked at around Tk. 750 and the income is concentrated between 0 and Tk. 2,000 but the curve for 2009 had a flatter top and narrower tails. The interval in per capita income in 2009 was much wider than in 2004 and majority of the people had income around Tk. 1,500.

Figure 6.7 shows that the average per capita income of descending non-poor households varied in a small interval and ranged between 0 and Tk. 1,500 in 2004, but in 2009 the interval became wider and the Kernel density curve had a flatter top. The highest peak in 2004 was around Tk. 500, while in 2009 the highest peak was observed to be at Tk. 1,000.

The Kernel density curve for per capita income for chronically poor households (Fig. 6.8) indicates that the per capita income of most people in 2004 was concentrated around less than Tk. 500 but in 2009 it rose to Tk. 1,000. The variation in per capita income of the chronically poor was much smaller in 2004 than in 2009. Thus the curves present the changing pattern and evolution of per capita income for four economic classes over the period of 5 years. For all classes the curve in 2009 showed wider bandwidth and had flatter top and narrower tail than in 2004. The curves were also looked alike log-normal plot and we may conclude that log-normal curve fits data best.

6.6 Income Mobility Pattern and Mobility Index

There are many factors in income mobility over the periods, including age of income earners, migration, entry to labour market, and split families. Income mobility can easily be examined by ranking everyone according to relative income in a given year. Relative ranking of the same individuals can be arranged for another year and we observe how many individuals changed relative position over a period of time. Thus mechanisms of measuring income mobility are straightforward.

6.6.1 Income Mobility by Quintile

In our case the per capita income for 2004 and 2009 has been divided into quintile income states. Q_1 being the lowest 20% and Q_5 being the highest 20%, and the middles defining the per capita state as quintile (i.e., five states) of the contemporaneous income distribution in the period under consideration. There are 1,212 sample households for 2004 and 2009. The corresponding mobility matrix for five dynamic quintile groups for 2004 and 2009 is shown in Table 6.4. If there is no income mobility between the survey periods, everyone would be arrayed along the diagonal and all the matrix cells off the diagonal would be zero. This means, for example, that a person in relative rank 3 (say) in year 2004 should be at the same relative rank 3 in year 2009.

The mobility between income quintile groups over a 5 year period of a household may be regarded as transitions of a Markov chain with the following transition probability matrix P. Clearly P is a square matrix with non-negative elements (Table 6.5).

The elements P_{ij} of P matrix present the probability of moving to state j for those who started in state i, while P_{ii}-the main diagonal elements indicate the probability that a household will remain in the same state of per capita income between 2004 and 2009. Table 6.5 indicates that households at the two extreme quintiles—the bottom most (first quintile $\mathbf{Q_1}$) and the top most (fifth quintile $\mathbf{Q_5}$)—stayed within the same quintile in higher ratios as compared to the middle level quintiles. Moreover, most households moved one quintile upward or downward. More than 35% of the poorest 20% ($\mathbf{Q_1}$) and 48% of the richest 20% ($\mathbf{Q_5}$) households remained in the same per capita income category. More than 34% households showed upward (above the diagonal) in income mobility, while 33.7% of households showed downward (beneath the diagonal) in income mobility indicating very little net outflow of per capita income from lower to higher income category.

From the information contained in transition probability matrix $p = [p_{ij}]$, Shorrocks mobility index (SMI) as discussed in Chap. 5 can be computed to assess the degree of income mobility (Shorrocks 1978a, b). The transition matrix $[\mathbf{p_{ij}}]$ results in an SMI of 0.678, indicating relatively high mobility between 2004 and 2009 since it is closer to 1, the upper limit of the SMI, than the other way around.

Table 6.4 Mobility count matrix for quintiles of per capita income between 2004 and 2009

	2009				
Quintile 2004	Q_1	Q_2	Q_3	Q_4	Q_5
Q_1	85	62	59	22	15
Q_2	68	64	54	42	14
Q_3	44	60	57	46	35
Q_4	29	36	49	70	65
Q_5	16	21	24	61	114

Table 6.5 Transition probability matrix for five dynamic quintile group

$$P=\begin{bmatrix} 0.3498 & 0.2551 & 0.2428 & 0.0905 & 0.0617 \\ 0.2810 & 0.2645 & 0.2231 & 0.1736 & 0.0579 \\ 0.1818 & 0.2479 & 0.2355 & 0.1901 & 0.1446 \\ 0.1165 & 0.1446 & 0.1968 & 0.2811 & 0.2610 \\ 0.0678 & 0.0890 & 0.1017 & 0.2585 & 0.4831 \end{bmatrix}$$

6.6.2 Changes in Income Share by Decile Groups

The share of aggregate household income received by each decile group is shown in Table 6.6. The table indicates that the income share of the poorest 10% of households decreased from 2.4% in 2004 to 2.2% in 2009. The income share of top 10% also decreased from 34.2% in 2004 to 30.1% in 2009. Although the income shares of two extreme deciles declined, the shares of income of decile 2 through decile 8 all showed increase in the study periods, which resulted in a decrease in income inequality as measured by Gini coefficient. The most noteworthy feature of income distribution is that the share of income of the bottom 50% of households is less than that of the top 10% of households. It can be seem that the average household income of the top decile was several times higher (seven to eight times) than the average of the bottom 50%. And the gap diminished during the period. Viewing the process of distributional change, it is clear that the process of stratification strengthens the position of all but the two extreme decile groups in 2009.

6.7 Gender and Income Distribution

Due to the social structural system and differences in individual attributes, female-headed households have much lower income than their male counterparts. Generally, female-headed households have consistently low assets, low employment opportunity, low education and hence low income. Besides social structural difference and unequal income opportunity, family roles and responsibilities constrain the female participation in the labour market. Traditional values imposed on women are problematic particularly

Table 6.6 Share of household income by decile group for 2004 and 2009

	Share of household income (%)	
Deciles group	2004	2009
Bottom 10%	2.4	2.2
11–20%	3.7	3.8
21–30%	4.5	4.8
31–40%	5.4	5.7
41–50%	6.3	6.7
51–60%	7.3	7.9
61–70%	9.4	9.8
71–80%	11.2	12.1
81–90%	15.5	16.9
Top 10%	34.2	30.1
Gini coefficient	0.4224	0.3864
Share of bottom 50% household	22.3	23.2

in the rural areas where people are more conservative and try to maintain traditional values (Larson 1978; Willits et al. 1973). Traditional values mean that women remain in the home and take care of their husbands and children. The second important responsibility of women is thought to be to prepare meals for their husbands and children, but they will eat food last and least. As a result women cannot take part fully in income-generating activities outside home. The average income for 2004 and 2009 by gender is shown in Table 6.7.

Table 6.7 shows that the average monthly income of male-headed households was 1.4 times higher in 2004 and 1.6 times higher in 2009 than that of female-headed households. Thus income differentials between male-headed and female-headed households widened over the 5-year period. This is because the female-headed households had entirely different patterns of income from those of male-headed households. In general, the female-headed households have far less earned income and there are marked contrasts in labour force activity between male and female. The graph below illustrates the average monthly income by gender (Fig. 6.9).

The average monthly income data by gender and economic class indicate that the economic characteristics of female-headed households differ between economic classes (Table 6.8).

It is observed that the average monthly income of female-headed households was much lower than that of their male counterparts for all economic classes except that of ascending poor class in 2004. From the demographic composition of household by gender it was found that a larger proportion of households headed by females was in the chronically poor class and these groups of households are likely to have fewer adult male members to do productive work, which resulted in lower income opportunities. It is interesting to note that income inequality as measured by Gini coefficient has increased to some extent over the 5-year period for both male-headed and female-headed households. But the income inequality of female-headed

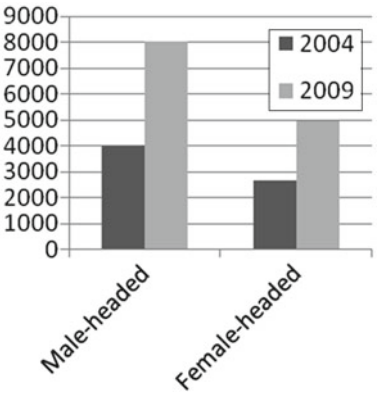

Fig. 6.9 Average monthly income by gender

Table 6.7 Average household income by gender of household head

	Average monthly income (Taka)		
Gender of household head	2004	2009	Real income 2009[a]
Male	3,969.6	8,037.1	5,569.7
Female	2,621.5	4,945.6	3,427.3
Overall	3,869.5	7,731.0	5,357.6

[a]Nominal income of 2009 is deflated by general CPI taking 2003–2004 = 100

Table 6.8 Average household income by gender and economic class

	Average household income			
	Male-headed household		Female-headed household	
Economic class	2004	2009	2004	2009
Non-poor	7,100.3	13,932.8	7,030.5	9,596.7
Ascending poor	4,428.2	7,092.0	4,636.7	6,832.2
Descending non-poor	3,027.2	5,135.7	1,889.2	4,893.4
Chronically poor	1,991.3	3,839.0	1,301.4	2,405.2
Overall	3,969.6	8,037.1	2,621.5	4,945.6
Gini coefficient	0.3894	0.4322	0.3687	0.4187

households is lower than that of their male counterparts, implying that the amount of loss of social welfare among male-headed households is higher than that of female-headed households.

Chapter 7
Distribution of Household Expenditure

7.1 Household Consumption Expenditure: Food and Non-Food

In this chapter we use consumption expenditure data to measure household welfare. These data are preferred to income data for traditional reasons—less measurement error, greater accuracy and less seasonality effect. However, income and consumption expenditure are highly correlated and consumption expenditure is a good indicator of welfare status. The structure of household consumption expenditure can be used to characterize households by describing the level of food and non-food expenditure. The measurement will give some indication of the probable impact of price variation on household purchasing power. It is expected that expenditure, especially on food, is the most significant part of spending by the poor and it varies widely with the variations of economic and socio-demographic conditions.

7.2 Expenditure on Food Items

Household consumption expenditure data are simply an estimate of the relative weight of different types of food items consumed multiplied by their price incurred in the past 3 days. The number of people in a household was determined using the household register section of the questionnaire. The number of people who were present at meal times for 3 days recall period was also recorded. But this method did not provide an opportunity to account for food wasted or fed to animals. The household food expenditure for 3 days recall period was converted into total monthly expenditure. The average household monthly expenditure was estimated separately for ten food items and is shown in Table 7.1 by economic class.

Table 7.1 reveals that the highest proportion of expenditure was incurred for cereals (35% for non-poor, 44% for ascending poor, 48% for descending non-poor and 52% for chronically poor households) followed by meat, poultry, egg and fish, and vegetables. Spices, including salt are also important items for all types of households.

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Table 7.1 Average monthly household expenditure on food items by economic class, 2004 and 2009

	Average household expenditure (Tk.)							
	Non-poor		Ascending poor		Descending non-poor		Chronically poor	
Food item	2004	2009	2004	2009	2004	2009	2004	2009
Cereals	1,311.9	2,399.6	1,124.0	1,895.4	1,063.5	1,941.2	879.1	1,606.4
Vegetables	286.3	666.5	217.8	506.6	193.6	480.3	146.9	379.1
Leafy vegetables	60.6	95.9	50.6	75.3	49.8	80.6	38.1	66.3
Pulses	57.5	158.5	39.3	73.8	30.5	71.0	18.3	40.2
Edible oil	146.7	266.1	99.6	171.8	97.7	167.1	69.1	127.7
Meat, poultry, egg & fish	750.1	1,830.6	423.6	812.3	303.2	657.3	170.2	374.8
Milk and milk products	117.6	234.8	56.7	93.5	38.7	32.0	15.3	49.8
Sugar/gur	48.7	163.4	28.0	64.0	19.7	66.9	11.7	45.3
Fruits	75.8	234.1	24.2	66.3	14.5	34.1	6.6	24.8
Condiments & spices	216.3	542.2	150.4	379.5	155.0	348.0	106.6	272.4
Others	138.9	266.2	79.7	190.4	83.9	202.7	58.2	167.4
Overall	3,211.4	6,857.7	2,293.8	4,328.9	2,049.9	4,081.2	1,520.1	3,154.3

The second highest item of expenditure was meat, poultry, egg and fish for all categories of households except the chronically poor (2009). The second highest item of expenditure for chronically poor households was vegetables (12% in 2009). A similar expenditure pattern was also observed in 2004.

7.3 Kernel Density Curve for Different Food Items

It appears from the Kernel density curve for different food items that expenditure on rice was clustered around 0–400 taka per month in 2004, while in 2009 the curve shows much flatter top and narrower tails. This means that the variation of expenditure on rice was much wider in 2009 and the range of expenditure per month varied from 0 to 650 taka. There was a little variation in expenditure pattern in other commodities. These are shown in Fig. 7.1, (a) rice, (b) pulse, (c) oil, (d) vegetables, (e) leafy vegetables, (f) meat, (g) egg, (h) milk, (i) fish and (j) fruits.

7.4 Expenditure on Non-Food Items

Household monthly expenditure on different non-food items (excluding durable goods) was estimated for 2004 and 2009 and is shown in Table 7.2. The estimates were made separately for different economic classes. The highest proportion of total

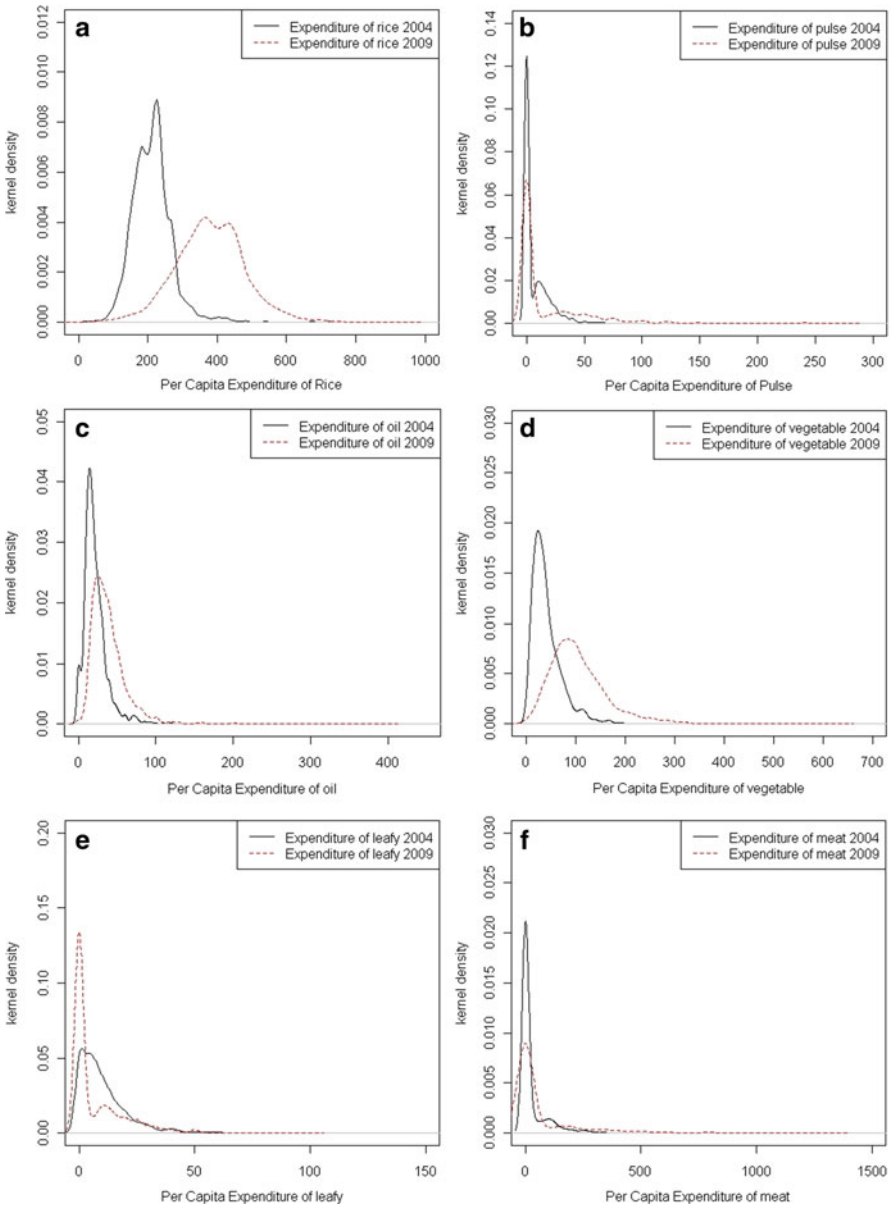

Fig. 7.1 Kernel density curve of expenditure of rice (**a**), pulse (**b**), oil (**c**), vegetables (**d**), leafy vegetables (**e**), meat (**f**), egg (**g**), milk (**h**), fish (**i**), and fruit (**j**) in 2004 and 2009

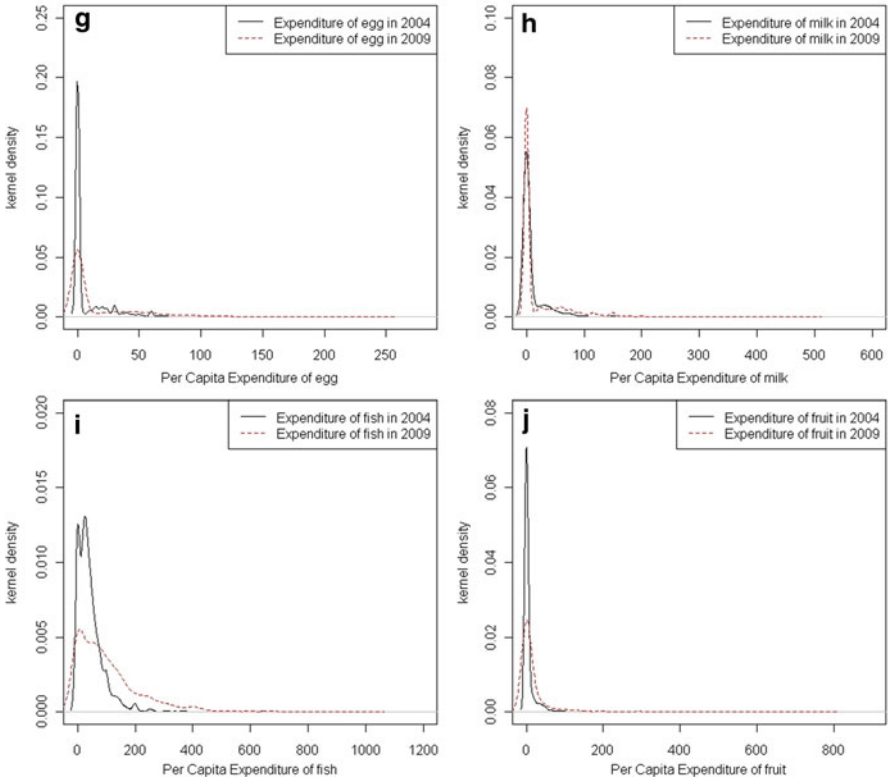

Fig. 7.1 (continued)

Table 7.2 Average monthly household expenditure on non-food items by economic class, 2004 and 2009

	Economic class							
	Non-poor		Ascending poor		Descending non-poor		Chronically poor	
Food item	2004	2009	2004	2009	2004	2009	2004	2009
Education	223.5	814.6	89.4	278.3	102.1	364.2	27.8	91.6
Health	413.2	579.3	184.3	256.3	284.2	426.3	136.1	294.7
Fuel	146.8	288.6	99.1	201.6	72.8	180.6	47.1	124.8
Transport/ communication	123.5	223.5	69.3	114.6	47.2	81.1	30.0	61.4
Clothing and cosmetics	357.4	613.6	246.8	339.6	228.1	303.9	141.1	205.6
House construction/ repairing	286.1	426.9	242.3	239.3	58.0	144.0	46.5	82.6
Litigation/land registration	31.1	52.7	8.2	21.4	7.7	7.0	0.2	4.6
Others	408.5	1,092.1	221.6	484.6	137.5	341.4	47.1	218.6
Overall	1,990.0	4,091.3	1,161.0	1,935.7	937.6	1,848.5	475.8	1,083.6

non-food expenditure was spent on medical care by the descending non-poor (22%) and the chronically poor (27%) in 2009, while the figure for 2004 was 30% and 29%, respectively. The proportion of spending on medical care by non-poor was 14% in 2009 and 21% in 2004. This figure for ascending poor was 13% and 16%, respectively. The highest proportion of expenditure was incurred on education by non-poor (20%) and descending non-poor (20%) but the chronically poor spent the lowest proportion (only 9%) on education. Clothing and other items (cosmetics, footwear etc.) ranked third and fourth, respectively, while the lowest expenditure was observed for land registration and litigation.

The average per capita monthly expenditure on food and non-food items and their distribution by economic class is presented in Table 7.3. It appears from the table that non-poor households spent about 62% on food items, while ascending poor spent 68%, descending non-poor 68% and chronically poor about 76% of the total expenditure in 2004. The figures for 2009 were 63%, 68%, 66% and 74%, respectively. The rest amount was spent on non-food items. It may be seen from the same table that expenditure on food increases with the decrease of income, while the inverse expenditure pattern was observed for non-food items. For instance, chronically poor households spent about 74% of the total expenditure on food, 26% on non-food items. Conversely, non-poor households spent about 63% on food and 37% on non-food items. The findings on household expenditure by economic class follow the Engel's law which states that as income rises, the proportion of income spent on food decreases (Lange 1978).

7.5 Kernel Density Curve for Per Capita Monthly Expenditure

The Kernel density curves of per capita monthly expenditure of non-poor households present wide variations in concentration area between 2004 and 2009. Per capita monthly expenditure peaked at around Tk. 1,000 in 2004 but in 2009 this figure was Tk. 1,500. The curve in 2009 had a much flatter top and narrower tail than that for 2004 (Fig. 7.2), which means bandwidth of expenditure in 2009 was much wider.

For ascending poor households, the peak was around Tk. 500 in 2004, while for 2009 it was Tk. 1,000 and the curve for 2009 had a flatter top and narrower tail than the Kernel density curve for 2004 (Fig. 7.3) indicating a wide variation in per capita expenditure pattern over the study period.

The Kernel density curve (Fig. 7.4) for per capita monthly expenditure of descending non-poor households also showed wide variation in expenditure pattern in 2009 compared with 2004. Concentration of expenditure in 2004 was between 0 and Tk. 1,000, while the concentration in 2009 had a wide range and was between 0 and Tk. 2,500 and the curve had a flatter top and narrower tail than that for 2004.

The Kernel density curve (Fig. 7.5) for the chronically poor showed that per capita monthly expenditure was concentrated between 0 to Tk. 750 and the peak was around Tk. 400, while in 2009 the peak shifted to Tk. 800 and had a flatter top

Table 7.3 Per capita monthly food and non-food expenditure by economic class for 2004 and 2009

	Food expenditure		Non-food expenditure		Total	
Economic class	2004	2009	2004	2009	2004	2009
Non-poor	589.7 (62.1)	1,221.7 (62.6)	360.4 (37.9)	729.9 (37.4)	950.1 (100)	1,951.6 (100)
Ascending poor	468.5 (68.1)	890.3 (68.4)	219.3 (31.9)	410.7 (31.6)	687.8 (100)	1,301.0 (100)
Descending non-poor	412.2 (68.4)	802.7 (66.1)	190.9 (31.7)	411.4 (33.9)	603.1 (100)	1,214.1 (100)
Chronically poor	362.1 (75.7)	732.1 (73.6)	116.0 (24.3)	262.5 (26.4)	478.1 (100)	994.6 (100)

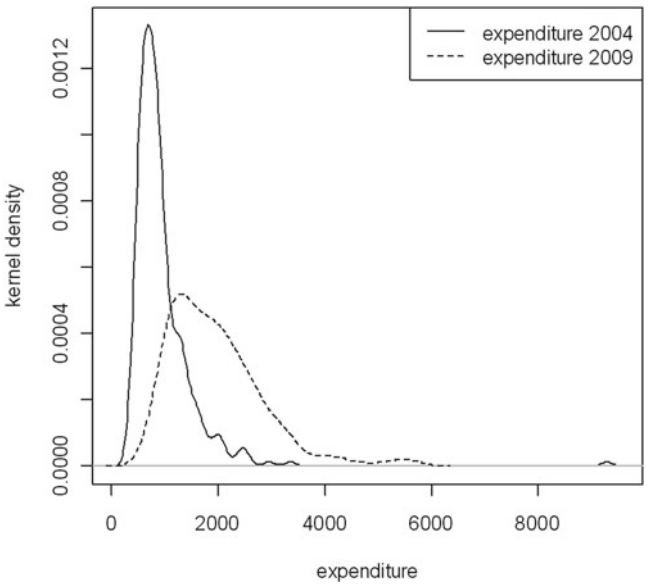

Fig. 7.2 Kernel density curve of per capita monthly expenditure of non-poor households

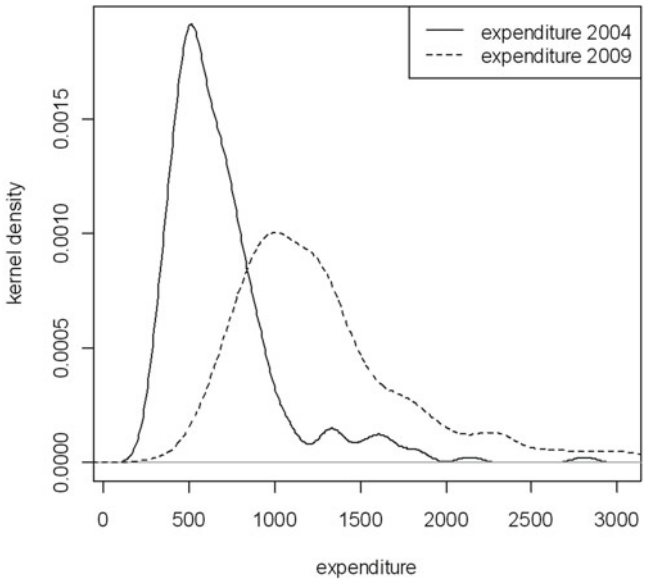

Fig. 7.3 Kernel density curve of per capita monthly expenditure of ascending poor households

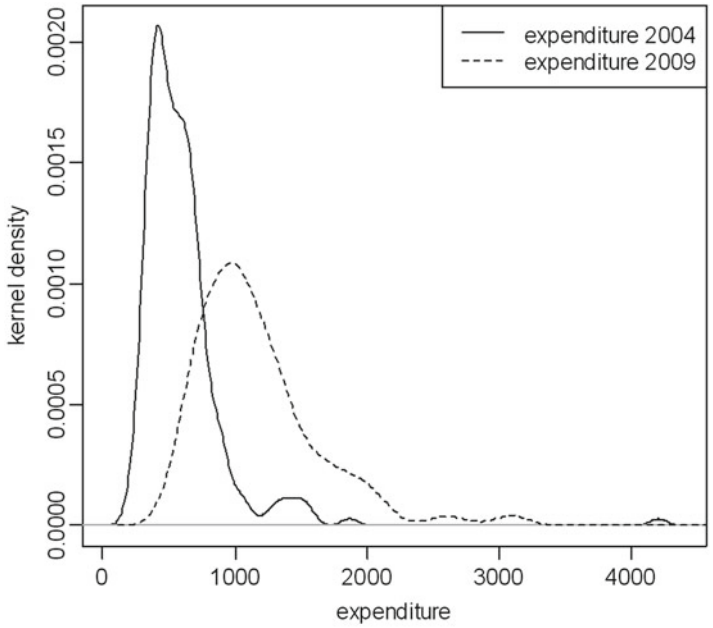

Fig. 7.4 Kernel density curve of per capita monthly expenditure of descending non-poor households

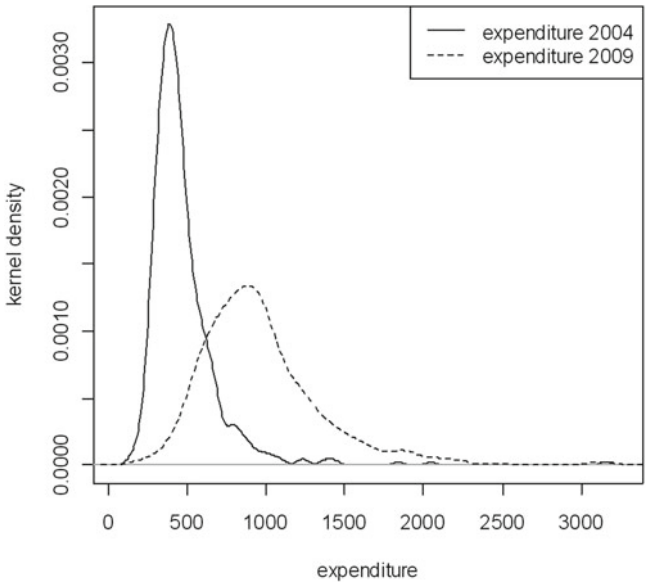

Fig. 7.5 Kernel density curve of per capita monthly expenditure of chronically poor households

Table 7.4 Percentage share of expenditure by decile groups for 2004 and 2009

	Percentage share of collective expenditure of household	
Decile group	2004	2009
Bottom 10%	3.2	3.1
11–20%	4.6	4.9
21–30%	5.6	5.9
31–40%	6.5	6.8
41–50%	7.5	7.8
51–60%	8.6	8.8
61–70%	10.1	10.3
71–80%	11.8	12.0
81–90%	15.1	15.0
Top 10%	27.1	25.3
Gini coefficient	0.2921	0.2893
Share of bottom 50% households	27.4	28.5

with narrower tail. From the Kernel plot we can easily see changes in per capita expenditure pattern between 2004 and 2009 and a wide range of variation in expenditure pattern was observed in 2009 for all economic classes.

7.6 Changes in Share of Expenditure by Decile Group

Table 7.4 shows that share of household expenditure in 2009 had a slight increase over that of 2004 in each decile except the bottom and the top 10% of the households. It is worth mentioning that the poorest 10% of the households spent only 3% of the total expenditure, whereas the richest 10% spent more than one quarter of the total expenditure. The share of expenditure of the bottom 50% was about 27 of the total expenditure in 2004, while the figure in 2009 was 28.5%, indicating an increase of 1% point. The most striking feature of expenditure pattern is that in 2004 the share of expenditure of the bottom 50% of the household was 27.4%, while the top 10% of households spent 27.1% of total expenditure. The figures for 2009 were 28.5% and 25.3%, respectively. The Gini coefficient indicates a slight decrease from 0.2921 in 2004 to 0.2893 in 2009. Inequality in household expenditure is much lower than that of household income. This means that household expenditure is more evenly distributed than the household income.

7.7 Gap Between Income and Expenditure

Nominal average monthly household income and expenditure by economic class in Table 7.5 indicates that monthly expenditure for descending non-poor and chronically poor households were higher than their monthly income, but for non-poor and ascending poor households the monthly income was higher than their monthly

Table 7.5 Gap between average monthly household income and consumption expenditure between 2004 and 2009

	Average monthly income/household (Tk.)		Average monthly consumption expenditure/ household (Tk.)		Difference (%)	
Economic class	2004	2009	2004	2009	$\frac{\textbf{Col.(2)} - \textbf{Col.(4)}}{\textbf{Col.(2)}} \times \textbf{100}$	$\frac{\textbf{Col.(3)} - \textbf{Col.(5)}}{\textbf{Col.(3)}} \times \textbf{100}$
1	2	3	4	5	6	7
Non-poor	7,097.3	13,646.2	5,201.4	10,949.0	26.7	19.8
Ascending poor	4,438.9	7,073.3	3,454.7	6,269.6	22.2	11.4
Descending non-poor	2,958.7	5,122.1	2,987.5	5,959.6	−1.0	−16.4
Chronically poor	1,913.8	3,582.8	1,995.9	4,238.2	−4.3	−18.3
Overall	3,869.5	7,731.0	3,248.7	6,946.2	16.0	10.1

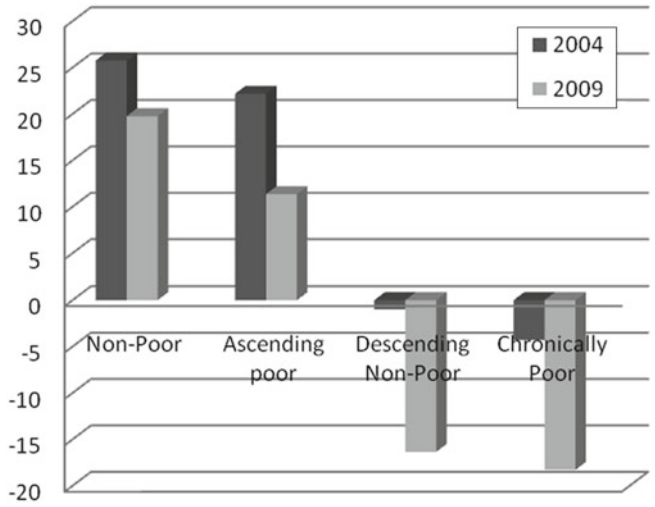

Fig. 7.6 Gap between average monthly household income and consumption expenditure in 2004 and 2009

expenditure. When we compare the gaps between income and expenditure for 2004 and 2009, a wider gap is observed in 2009 mainly due to increase in price of essential goods in 2007 and 2008. Monthly expenditure for descending non-poor households was found to be 1.0% and 16% larger than their income in 2004 and 2009, respectively. The figures for chronically poor are 4% and 18%. Figure 7.6 shows the gaps between income and expenditure in percentage differences in nominal values by economic class indicated in column (6) and (7) of Table 7.5.

Real per capita monthly income and expenditure presented in Table 7.6 shows a similar result. But per capita expenditure for descending non-poor households in 2009 was around 9% higher than their income. The figure for the chronically poor was 18%. It is worth mentioning that although the per capita income in 2009 is almost double that of 2004 for all economic classes, the gap between real income and expenditure in 2009 for descending non-poor and chronically poor is much greater than that observed in 2004. The gap was 0.02% for descending non-poor and 5% for chronically poor in 2004, while this gap was 9%, 18%, respectively, in 2009. Figure 7.7 shows those gaps between income and expenditure in percentage differences in real value by economic class indicated in column (6) and (7) of Table 7.6.

It is notable that the nominal monthly income and consumption expenditure of a household almost doubled over the 5-year period, for all decile groups. As prices vary over time, no fixed expenditure groups will be comparable over time and it would represent different groups in different time periods. But comparisons between the same decile groups, like the bottom 10% or top 10% is more significant for many purposes and the above conceptual difficulties may be avoided. The decile groups may be treated as ten economic strata. The monthly expenditure by decile group is provided in

Table 7.6 Gap between real per capita income and expenditure/month by economic class for 2004 and 2009

	Average monthly per capita income (Tk.)		Average monthly per capita expenditure (Tk.)		Difference (%)	
Economic class	2004	2009	2004	2009	$\frac{\text{Col.}(2)-\text{Col.}(4)}{\text{Col.}(2)}\times 100$	$\frac{\text{Col.}(3)-\text{Col.}(5)}{\text{Col.}(3)}\times 100$
1	2	3	4	5	6	7
Non-poor	1,314.1	1,720.0	950.0	1,353.4	27.7	21.3
Ascending poor	899.0	1,035.6	687.8	901.6	23.5	12.9
Descending non-poor	603.1	772.4	603.2	841.3	−0.0	−8.9
Chronically poor	456.6	586.4	478.4	689.3	−4.7	−17.5
Overall	779.6	1,072.0	657.9	963.4	15.6	10.1

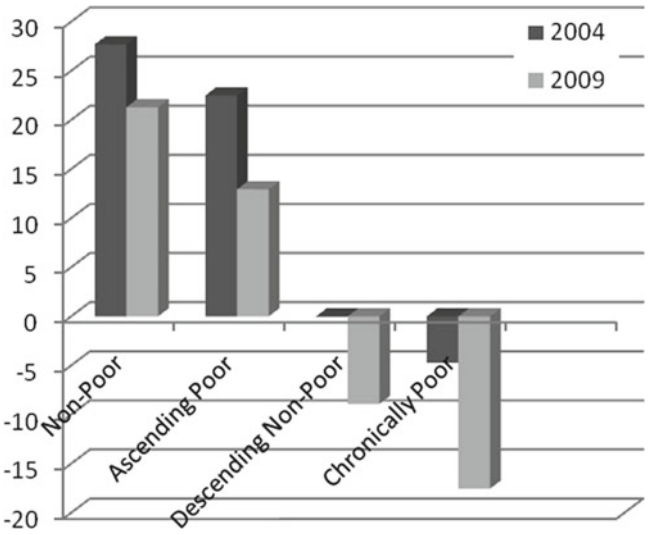

Fig. 7.7 Gap between real per capita income and monthly expenditure in 2004 and 2009

Table 7.7 which indicates that expenditure from first to fifth deciles was found to be higher than their respective income and it was 3% higher for households in fifth decile and 24% higher for households in first decile in 2009. This figure for 2004 was 0.9% and 11%, respectively. The high rise in food prices particularly that of rice might have added to the adverse impact on the consumption budget of the poor since they spend greater proportion of their budget on rice. It is notable that the average income level of the majority of the descending non-poor and chronically poor households falls within the poorest 50% decile groups. This means that the increase in income of the poor was not accompanied by an increase in consumption expenditure due to increase of food prices between 2004 and 2009. The percentages in column (6) and column (7) in the above table can also be interpreted as savings-to-income ratios. They rise, as expected, as income rises, because richer households save more than poorer households not only in absolute terms but also in terms of percentage of income. These findings also point to a high degree of consistency between data on household income and expenditure obtained through repeated surveys in 2004 and 2009.

7.8 Consumption Behaviour: Analysis Based on Engel Ratio and Engel Elasticity

7.8.1 The Engel Ratio

Household surveys conducted in 2004 and 2009 provide information on household consumption on food and non-food items, which vary widely between economic classes. The primary objective of the consumption behaviour analysis is to examine

Table 7.7 Gap between average monthly household income and household expenditure by decile group for 2004 and 2009

	Average monthly income/ household (Tk.)		Average monthly expenditure/ household (Tk.)		Difference (%)	
Decile group	2004	2009	2004	2009	$\frac{\text{Col.}(2)-\text{Col.}(4)}{\text{Col.}(2)}\times 100$	$\frac{\text{Col.}(3)-\text{Col.}(5)}{\text{Col.}(3)}\times 100$
1	2	3	4	5	6	7
Bottom 10%	940.6	1,719.0	1,045.4	2,136.2	−11.1	−24.3
11–20%	1,422.7	2,988.4	1,489.2	3,414.7	−4.7	−14.3
21–30%	1,774.8	3,658.8	1,806.5	4,110.3	−1.8	−12.3
31–40%	2,081.4	4,365.5	2,101.8	4,713.6	−1.0	−8.0
41–50%	2,414.6	5,220.2	2,437.2	5,396.0	−0.9	−3.4
51–60%	2,851.3	6,147.3	2,788.2	6,132.7	2.2	0.2
61–70%	3,520.8	7,500.9	3,247.3	7,134.5	7.8	4.9
71–80%	4,475.6	9,389.0	3,854.2	8,371.2	13.9	10.8
81–90%	6,021.3	12,663.4	4,916.2	10,445.2	18.4	17.5
Top 10%	13,260.7	24,099.3	8,810.1	17,624.9	33.6	26.9

the relationship between expenditure on individual items and the total income/total expenditure in order to understand how household consumption expenditure on various items is influenced by changes in total income/total expenditure. There are two simple measures which help in identifying the nature of items consumed by households. One is the Engel ratio which indicates the relative importance a household attaches to individual items of consumption. In other words, the Engel ratio for items signifies their relative importance in the consumer's budget. The other measure is known as Engel elasticity which indicates the sensitivity of items of expenditure to changes in total income/total consumption expenditure. The Engel ratio may be defined symbolically as:

$$\mathbf{E_r} = \frac{\mathbf{E_i}}{\mathbf{E}}, \tag{7.1}$$

where $\mathbf{E_i}$ is the expenditure of the ith item of consumption and $\mathbf{E}$ is the total income/total expenditure. The Engel ratio is thus a proportion of the total expenditure on an item or a group of items and it is used to describe consumption patterns of households differing in standards of living. The estimated value of Engel ratio for ten food items and eight non-food items is presented in Table 7.8.

Table 7.8 shows the food consumption behaviour of sample households of four economic classes in 2004 and 2009. The table shows how the Engel ratio changes by items with different economic class over the 5-year period. It is observed that the relative importance of cereal (rice) consumption is the highest for all economic class. The budget share of expenditure on cereal by non-poor households was around 41% in 2004 and 35% in 2009. But this share increases with decrease in income. For instance, chronically poor households spent about 58% of their total food expenditure in 2004 and 52% in 2009 on cereals. This figure was 49% in 2004 and 44% in 2009 for ascending poor and 52% and 48%, respectively, for descending non-poor households. The second highest was meat, poultry, eggs and fish, its relative importance decreasing with decrease in income. Although these items are the main source of protein, poor households cannot afford these. Non-poor household expenditure on this food item was nearly 23–27% of their total food expenditure, while the chronically poor spent only 11–12% of their total budget between 2004 and 2009. Conversely, the Engel ratio for vegetables for descending non-poor and chronically poor households is relatively higher than that for non-poor and ascending poor households, indicating that the poorer households attach greater importance to vegetables than the richer households. They have no choice than to consume vegetables. The lowest importance is attached by the descending non-poor and chronically poor households to consumption of fruits but it increases with increase of income. The Engel ratio for sugar/gur is also very low for all economic classes. Very little change in food consumption behaviour is observed between 2004 and 2009 but the Engel ratio for cereals indicates a fall over the 5-year period for all economic classes.

Table 7.8 Estimated Engel ratio for monthly food consumption by food items and economic class, 2004 and 2009

	Engel ratio for food item							
	Non-poor		Ascending poor		Descending non-poor		Chronically poor	
Food item	2004	2009	2004	2009	2004	2009	2004	2009
Cereals	0.409	0.352	0.490	0.442	0.519	0.482	0.578	0.516
Vegetables	0.106	0.105	0.117	0.125	0.118	0.127	0.122	0.130
Pulses	0.018	0.025	0.017	0.017	0.015	0.018	0.012	0.013
Edible oil	0.046	0.039	0.043	0.040	0.048	0.041	0.045	0.041
Meat, poultry, eggs & fish	0.234	0.269	0.185	0.189	0.148	0.163	0.112	0.120
Milk and milk products	0.037	0.034	0.025	0.022	0.019	0.008	0.010	0.016
Sugar/gur	0.015	0.024	0.012	0.016	0.010	0.017	0.008	0.016
Fruits	0.024	0.034	0.011	0.015	0.007	0.008	0.004	0.008
Condiments & spices	0.080	0.080	0.066	0.088	0.076	0.086	0.070	0.087
Others[a]	0.039	0.039	0.035	0.044	0.041	0.050	0.038	0.054

[a]others include bid, cigarette, betel leaf and betel nuts and other food items

7.8.2 *Engel Ratio for Non-Food Items*

The Engel ratio for eight non-food items has been estimated separately for 2004 and 2009 and shown in Table 7.9. This table reveals that the Engel ratio for health care in chronically poor and descending non-poor households is higher than in non-poor and ascending poor households. Clothing is another important non-food item on which the descending non-poor and chronically poor households spend larger proportion of their total expenditure of non-food items.

Like the non-poor, the descending non-poor spend more on education but chronically poor spend less. The relative importance on house construction/repairs was relatively higher in non-poor and ascending poor households than in descending non-poor and chronically poor households. Least was spent by all economic classes for litigation and land registration. The Engel ratio is also higher for other non-food items, including cosmetics, footwear, soap, hair cutting. In rural areas fuel for cooking is usually collected free of cost from own, public forest/bush and from someone else's sources. As a result the estimated value of Engel ratio on fuel is low for all economic classes. Among non-food items, major expenditure was incurred for health care, clothing and education, with varying importance by economic classes.

7.9 The Engel Elasticity

Engel elasticity of an item measures the degree of responsiveness of consumption expenditure of the item to the changes in income/total expenditure. There are a number of two-parameter models which are used in Engel curve analysis to estimate Engel elasticity and to explain consumer expenditure patterns for individual items or groups (Prais and Houthakker 1955). Among the models, log-linear or double-log form was found to be suitable for estimation of Engel elasticity straight away from the estimated parameters. The log-linear form is as:

$$\ell_n E_i = a + b_i \ell_n E + \varepsilon_i \tag{7.2}$$

where E_i is the per capita expenditure on the commodity, E is the per capita income/expenditure, b_i is the Engel elasticity of the i-th item which remain constant at all levels of the expenditure curve, a in Eq. (7.2) is any constant term and ε_i is a random disturbance term. Given the above functional form, only those households were taken into consideration that actually bought and consumed the commodity. The Engel elasticity of the i-th item of consumption may be defined as:

$$\beta_i = \frac{d\ell_n E_i}{d\ell_n E}, i = 1,2\ldots m \tag{7.3}$$

Table 7.9 Engel ratio non-food items by economic class, 2004 and 2009

	Engel ratio for non-food item							
	Non-poor		Ascending poor		Descending non-poor		Chronically poor	
Non-food item	2004	2009	2004	2009	2004	2009	2004	2009
Education	0.112	0.199	0.077	0.144	0.109	0.197	0.058	0.084
Health care	0.208	0.142	0.159	0.132	0.303	0.231	0.286	0.272
Fuel for cooking	0.074	0.071	0.085	0.104	0.078	0.098	0.099	0.115
Transport/ communication	0.062	0.055	0.060	0.059	0.080	0.044	0.063	0.057
Clothing	0.180	0.150	0.213	0.175	0.243	0.164	0.297	0.190
Litigation/land registration	0.016	0.014	0.007	0.012	0.008	0.009	0.000	0.006
House construction/repairing	0.144	0.104	0.209	0.124	0.062	0.078	0.098	0.076
Other non-food items[a]	0.205	0.266	0.191	0.249	0.147	0.180	0.099	0.200

[a]other non-food items include cosmetics, soap, hair cutting, footwear

7.9.1 Engel Elasticity for Food Items

On the above formula the Engel elasticities of ten food items have been estimated and are presented in Table 7.10. It has already been mentioned that the Engel elasticity of an item measures the responsiveness of expenditure of the item to the changes in total income/total expenditure. In this sense, meat, poultry, eggs and fish are highly responsive to every rise in total income/total expenditure. The value of elasticity of such item is not greater than one and thus it is a necessary item. Income elasticity varies with variation of economic class. A 10% increase in total income/total expenditure would lead to an 8.7% increase in demand for meat, poultry, eggs and fish in non-poor households, an 8.3% increase in ascending poor, a 7.6% increase in descending non-poor and a 9.4% increase in chronically poor households in 2009. It is also observed that Engel elasticities of all other food items are less than one, implying that demand for food items under consideration is in-elastic but varies between 2004 and 2009 and with economic class. The elasticity of milk and milk products is higher for descending non-poor and chronically poor. And in response to a 10% increase in total income/total expenditure, expenditure on milk and milk products will increase by 9.9% for descending non-poor and 9.4% for chronically poor. The lowest elasticity is observed for vegetables for all economic classes. Income elasticities of different food items apart from vegetables are higher in chronically poor households.

7.9.2 Engel Elasticity for Non-Food Items

Like elasticity for food items, income elasticities of seven selected non-food items have been estimated to assess responsiveness of expenditure of a particular item to changes in total income/total expenditure. The income elasticities for education, health care, fuel, transport/communication, clothing, and house-construction/repairing, and other non-food items are estimated separately for non-poor, ascending poor, descending non-poor and chronically poor households and presented in Table 7.11. It shows that expenditures on education and health care are highly responsive to changes in total income/total expenditure. The Engel elasticities of clothing and house construction/repairing are found to be higher in the case of chronically poor households than other economic classes. Like food items, all non-food items are found to be inelastic. But the consumption expenditure of non-food items is in general more in-elastic than that of food items.

To sum up, non-poor households have average incomes four times higher than those of chronically poor households, yet their expenditures is only three times that of chronically poor households. The monthly household income of the descending non-poor and chronically poor was found to be lower than their household monthly consumption expenditure. A similar pattern was also observed for per capita income and expenditure. When income is compared with expenditure in different decile

Table 7.10 Estimated Engel elasticity for food items by economic class, 2004 and 2009

	Engel ratio for food item							
	Non-poor		Ascending poor		Descending non-poor		Chronically poor	
Food item	2004	2009	2004	2009	2004	2009	2004	2009
Cereals	0.584	0.393	0.581	0.536	0.666	0.444	0.705	0.681
Vegetables & leafy vegetable	0.234	0.294	0.382	0.379	0.329	0.329	0.435	0.252
Pulses	0.396	0.375	0.439	0.318	0.475	0.632	0.479	0.628
Edible oil	0.456	0.585	0.535	0.576	0.667	0.554	0.702	0.591
Meat, poultry, eggs & fish	0.839	0.871	0.624	0.834	0.714	0.761	0.559	0.936
Milk and milk products	0.553	0.442	0.428	0.518	0.765	0.990	0.983	0.935
Sugar/gur	0.532	0.456	0.164	0.518	0.318	0.715	0.582	0.658
Fruits	0.621	0.472	0.314	0.447	0.501	0.321	0.390	0.648
Condiments & spices	0.550	0.552	0.669	0.842	0.432	0.213	0.695	0.807
Others[a]	0.554	0.280	0.342	0.625	0.389	0.419	0.616	0.846

[a]others include bidi, cigarette, betel leaf and betel nuts and other materials

Table 7.11 Estimated Engel elasticity for non-food items by economic class, 2004 and 2009

	Engel elasticity for non-food item (η_i)							
	Non-poor		Ascending poor		Descending non-poor		Chronically poor	
Non-food item	2004	2009	2004	2009	2004	2009	2004	2009
Education	0.390	0.621	0.429	0.491	0.572	0.441	0.288	0.455
Health care	0.545	0.494	0.407	0.336	0.579	0.456	0.505	0.313
Fuel	0.147	0.332	0.186	0.267	0.292	0.226	0.255	0.370
Transport/communication	0.425	0.496	0.481	0.368	0.287	0.339	0.500	0.439
Clothing	0.215	0.677	0.407	0.301	0.285	0.561	0.361	0.538
House construction/ repairing	0.488	0.717	0.563	0.722	0.700	0.362	0.730	0.631
Other non-food items[a]	0.533	0.679	0.553	0.707	0.573	0.629	0.621	0.202

[a]other non-food items include cosmetics, soap, hair cutting, footwear etc.

groups, it was found that expenditure was higher than income of the poorest 50% of households (up to fifth deciles). This situation was observed both in 2004 and 2009. The increase in food prices over the 5-year period added the adverse effect on expenditure of the poor households due to the large share of food in their consumption basket. Chronically poor households spent about 75% of their total consumption expenditure on food, while the figure for non-poor households was 62% in 2009. The Engel elasticities for food and non-food items indicate that expenditure on non-food items is more in-elastic than that for food items. The Engel ratio indicates the importance of cereals; particularly rice is the highest for all economic classes.

Part III
Food and Livelihood

Chapter 8
Poverty and Food Security

8.1 What Is Food Security

Different organisations, authors and researchers have defined food security differently. In general, the food security refers to availability and affordability of food. An individual or a household is said to be secure in food when they have access to sufficient and quality food at all times: have physical and economic access to enough safe and nutritious food to meet their dietary needs. The UN Food and Agricultural Organisation (FAO) defined food-security as having physical, social and economic access to sufficient, safe and nutritious food to meet dietary needs, while the United States Department of Agriculture (USDA) defined food security of a household as all household members having access at all times to enough food for an active and healthy life, which means that every individual should have entitlement to food at all times. Thus entitlement and safety are intrinsic elements of food security. More specifically, it includes three important elements: ready availability of nutritionally adequate and safe food; affordability of socially acceptable food; and thirdly the utilization of food. In wider terms, the food need to be prepared in such a way as to help people grow and develop normally.

8.2 Food Insecurity

Food insecurity means lack of access to sufficient quality food for all members of the household at all the times. Poverty is the main reason for food insecurity since poor people may have difficulty in obtaining adequate, safe and nutritious food. Natural calamities such as flood and cyclone, which influence domestic production and abnormal increase in food prices in the international market adversely affect food security of the poor. On the other hand, poor farmers having very small farms use less effective farming techniques and are unable to afford fertilizers. All these factors limit food production and food security of small farmers.

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Table 8.1 Changes in distribution of households by problem in meeting three meals/day, 2004–2009

	% of Households			
	Could provide three meals/day		Could not provide three meals/day	
Economic class	2004	2009	2004	2009
Non-poor	100.0	100.0	–	–
Ascending poor	88.8	95.7	11.2	4.3
Descending non-poor	46.8	42.0	53.2	58.0
Chronically poor	8.7	15.0	91.3	85.0

There are several kinds of consequence of food insecurity ranging from social, economic to demographic ones. Without sufficient food, people will have ill health and shorter life expectancy, difficulty in selling labour and less education. Poor farm households are unable to afford fertilizer to use modern farming techniques and consequently cannot grow enough food for themselves. Without sufficient food and nutrition the body will be weak and lack strength to be used for food production. Besides social and economic consequences, a poor hungry mother will give birth to an underweight baby. Likewise the young children who suffer from under nutrition due to food insecurity are likely to be shorter and physically and intellectually less developed.

8.3 Perception of Food Security

Perception of food security varies from one society to another and within the same society from one income group to another. Perception also varies between urban and rural areas. The common perception of rural people is whether three meals a day are provided. If household fails to have three meals for all household members then it is said to suffer food insecurity. Due to poverty many people take only two meals a day and some only one during lean periods (pre-harvesting periods). In our surveys the respondents were asked to state their food security status. Their responses are shown in Table 8.1.

Table 8.1 shows that there was some improvement in food security status between 2004 and 2009 for all economic classes except the descending non-poor. In 2004, 47% of descending non-poor households could provide three meals a day to all household members, but this figure dropped to 42% in 2009. Fig. 8.1 shows the proportion of households that could provide three meals a day.

8.4 Duration of Food Insecurity

Usually poor households suffer from the problems of food insecurity since they cannot afford food all the time due to high prices and low income. When the respondents were asked to state the duration of food insecurity, they stated their

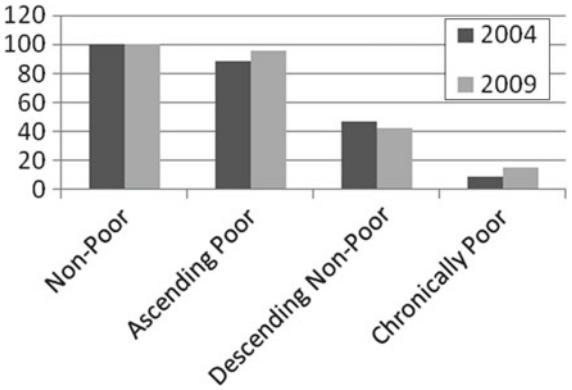

Fig. 8.1 Proportion of households that could provide three meals/day

Table 8.2 Changes in distribution of household according to duration of food insecurity by economic class

Duration of food insecurity (in months)	% of Households suffer from food insecurity					
	Ascending poor		Descending non-poor		Chronically poor	
	2004	2009	2004	2009	2004	2009
1–2 months	8.4	2.9	36.1	35.0	48.7	42.8
3–4 months	2.3	1.1	15.7	13.3	37.3	19.9
5–6 months	0.5	0.0	0.9	6.3	4.4	6.1
7–12 months	0.0	0.3	0.5	3.5	0.8	16.2

problems in satisfying their adequate food requirements in the previous 12 months as shown in Table 8.2.

Table 8.2 shows some reduction in the food insecurity situation between 2004 and 2009 in the three economic classes. But compared with 2004, the proportion of households suffering food insecurity for 7–12 months had increased for descending non-poor and chronically poor households. More than 16% of the chronically poor households suffered food insecurity for 7–12 months in 2009. Thus severe food insecurity is concentrated in chronically poor households. Fig. 8.2 shows the percentage of households suffering from the problem of food insecurity.

8.5 Food Insecurity and Dietary Adjustment

One of the direct consequences of poverty is food insecurity and low food intake. Facing food insecurity, poor people adjust the frequency of meals and remain "half-fed" and consequently they are subjected to serious consequences of nutritional deficiency. Many households who suffered from food insecurity followed a diet-adjustment strategy during a food crisis. The households that had to follow a diet adjustment strategy during a food crisis were 16 out of 374 ascending poor (4%), 82 out of 143 descending non-poor (57%), and 294 out of 347 chronically poor households (85%).

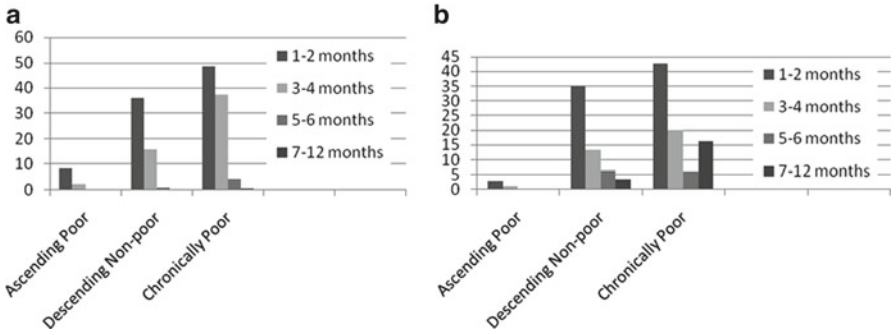

Fig. 8.2 Percentage of households suffering food insecurity in 2004 (**a**) and 2009(**b**)

Table 8.3 Changes in distributi on of households adjusted frequency of meals by economic class

Diet adjustment strategy	% of Households who adjusted meals in a day					
	Ascending poor		Descending non-poor		Chronically poor	
	2004	2009	2004	2009	2004	2009
One meal a day	–	–	3.5	1.2	4.0	10.5
Two meals a day	69.6	81.3	84.3	87.8	89.1	84.7
Three meals a day	30.4	18.7	12.2	11.0	7.0	4.8
Total	100.0	100.0	100.0	100.0	100.0	100.0

Severity of diet adjustment is very high among chronically poor households and more than 10% of the chronically poor households who suffered from food insecurity ate even one meal a day in 2009, while this figure in 2004 was only 4% (Table 8.3). However, the majority of the households (81% ascending poor, 88% descending non-poor and 85% chronically poor households) ate two meals a day and very few of them could manage three meals a day. Thus large-scale deprivation of food was absorbed among the chronically poor and descending non-poor households and consequently these households suffered nutritional deficiency. Fig. 8.3 depicts the deprivation of required food per day.

8.6 Seasonality in Food Insecurity

Seasonality in food insecurity refers to deprivation of adequate food for all members of a household in a particular period or season. A lean period is a difficult time for the poor because it is the pre-harvest season. As a result, some households cannot afford food at all times mainly because of high price of food grains and low employment opportunity and thus low income. This usually happens in the pre-harvest period when employment opportunity is minimum and prices of rice and wheat are higher than after the harvesting season. Thus it is difficult for poor

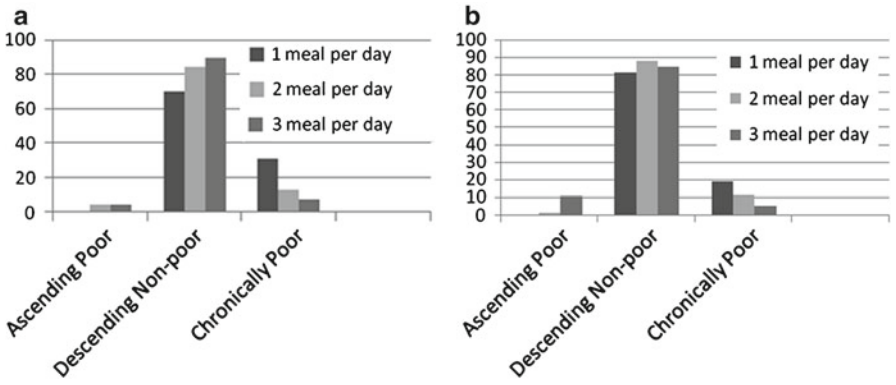

Fig. 8.3 Diet adjustment for food insecurity, 2004 (**a**) and 2009 (**b**)

households to provide their members adequate food every month. In rural Bangladesh the price of food grains falls after the harvesting season and rises during sowing periods. The variations in food security largely depend on variations in availability and prices of food grains. Rural households suffer the problem of food insecurity for 4 months from Bhadra to Augrahayan or roughly mid-August to November. This is because these months are considered to be as lean as like the pre-harvest period and consequently they are difficult months for the poor. The respondents also opined that Kartik (mid-October to mid-November) is the most difficult month for them in respect of food security. The month Kartik is traditionally called Mora Kartik (less employment opportunity, high price of food and scarcity of food) and thought to be one of the adverse lean seasons just before the "aman rice" harvest season. The month of Choitra (mid-March to mid-April) is another difficult period for the poor. This period just before the "Boro rice" harvest season is also thought to be lean.

Table 8.4 shows the percentage distribution of households according to respondents' opinion regarding food insecurity by month and economic class for 2004 and 2009. It appears from Table 8.4 that about 50% of the ascending poor, 57% of descending non-poor and 49% of chronically poor households opined that the month of Kartik (mid-October to mid-November) is their difficult month and they suffered from intense food insecurity. They also responded that Choitra (mid-March to mid-April) is another difficult month for them. Fig. 8.4 shows the percentage of households that cannot provide adequate food by month and shows several noticeable differences in food insecurity between the months. The highest peak of food insecurity is observed in the month of Kartik. The sample households also suffered intense food insecurity in the month of Choitra. These households have the lowest food insecurity after harvest period of Aman (mid-December to mid-March) and Boro rice (mid-May to mid-June). Comparison of economic classes shows seasonal variations in food insecurity are more or less similar. Fig. 8.4 illustrates the seasonal variations in percentage of households that could not provide adequate food by month in 2004, while Fig. 8.5 shows the variations

Table 8.4 Changes in percentage distribution of households according to food insecurity by month and economic class

	Ascending poor		Descending non-poor		Chronically poor		Overall total	
	2004	2009	2004	2009	2004	2009	2004	2009
1. Baishakh (mid-April to mid-May)	0.0	0.8	14.9	21.7	14.2	18.7	13.7	19.8
2. Jaishtha (mid-May to mid-June)	0.0	0.0	4.4	3.6	7.4	4.1	6.5	3.8
3. Ashar (mid-June to mid-July)	20.8	12.5	22.8	16.9	31.2	17.7	29.0	17.3
4. Sraban (mid-July to mid-August)	16.7	20.0	18.4	13.3	25.3	16.7	23.6	15.2
5. Bhadra (mid-August to mid-September)	8.3	12.5	12.3	8.4	13.5	15.0	13.0	13.5
6. Aswin (mid-September to mid-October)	29.2	31.3	25.4	31.3	31.2	34.7	29.9	33.8
7. Kartik (mid-October to mid-November)	58.3	50.0	47.4	57.0	56.3	49.3	54.6	51.3
8. Agrahayan (mid-November to mid-December)	4.2	12.3	1.5	6.0	9.5	7.1	9.5	6.6
9. Poush (mid-December to mid-January)	8.3	6.3	16.7	6.0	7.2	7.1	9.2	6.9
10. Magh (mid-January to mid-February)	12.5	6.3	10.5	6.0	6.0	7.8	7.2	7.4
11. Falgun (mid-February to mid-March)	25.0	31.3	12.3	28.9	22.3	27.6	20.4	27.9
12. Choitra (mid-March to mid-April)	33.3	68.8	36.0	57.8	43.5	49.3	41.5	51.8

for 2009. The figures show that the highest percentage of household could not provide adequate food to their household members in the month of Kartik (mid-October to mid-November) followed by the month of Choitra (mid-March to mid-April). Fig. 8.6 shows changes of percentage distribution of food insecurity of overall totals comparing 2004 and 2009.

8.7 Dynamics of Food Security

8.7.1 Short-Term Mobility in Food Security Status Between 2004 and 2009

We can now examine the information obtained from the panel data on food security to see the mobility in food security status over a 5 year period. In the surveys the respondents were asked to state whether they had food deficit or surplus in the previous 12 months using a four-point scale, ranging from “always deficit” through “sometimes deficit” and “break-even” to “always surplus”. In the present context, the term “state”

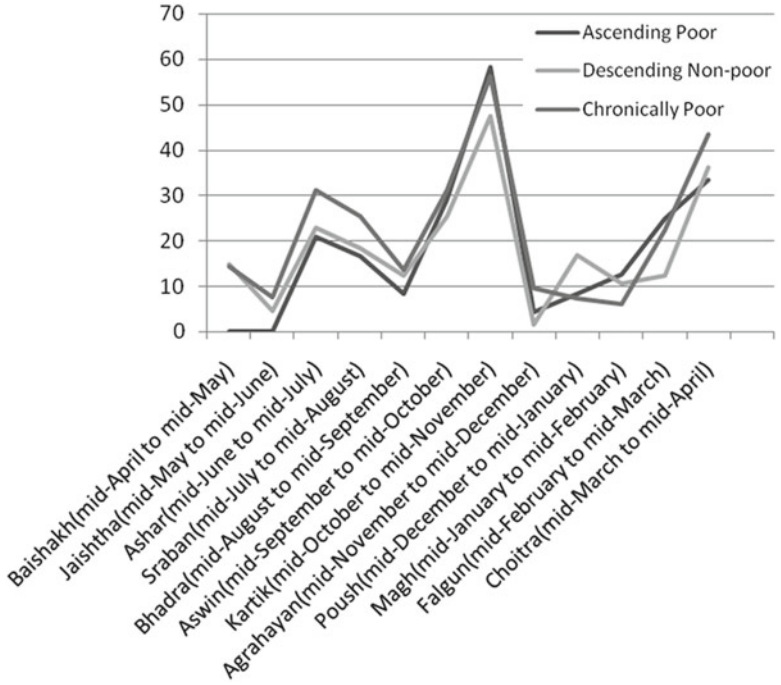

Fig. 8.4 Seasonality in food insecurity in 2004

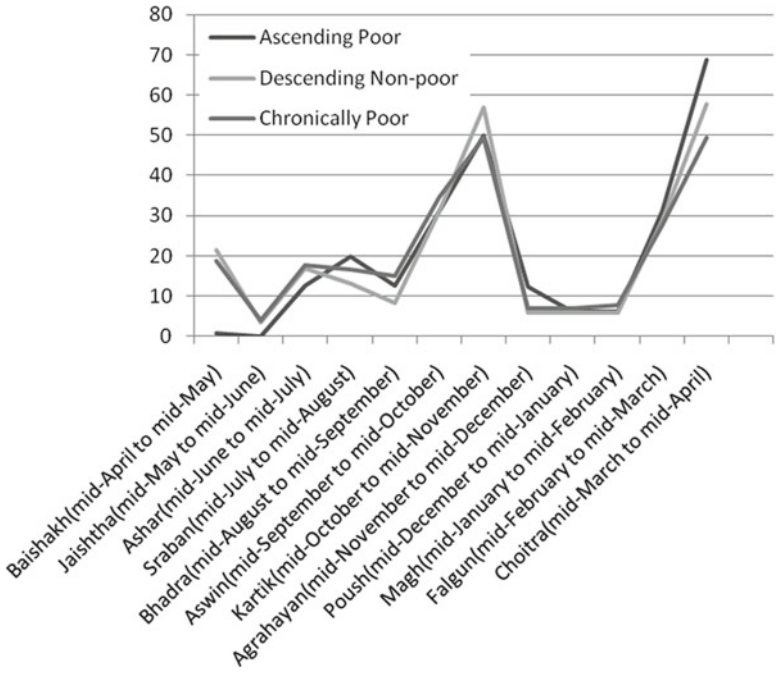

Fig. 8.5 Seasonality in food insecurity in 2009

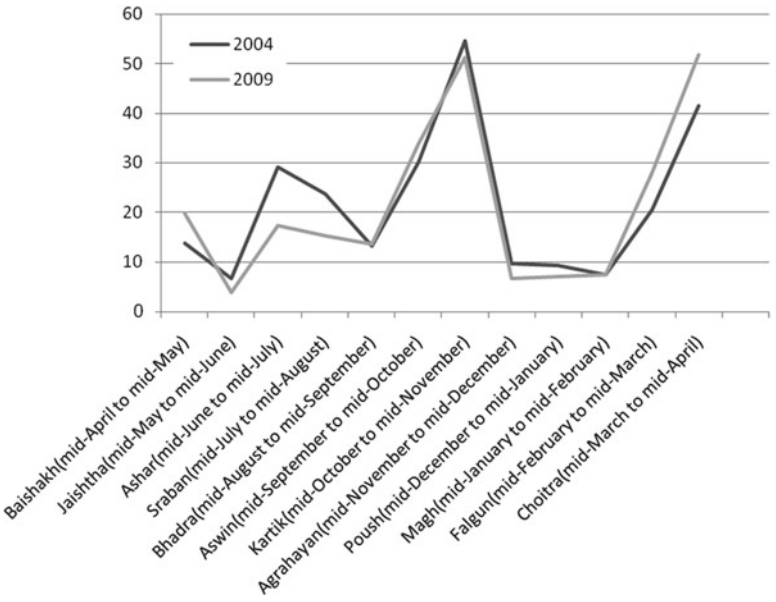

Fig. 8.6 Seasonality in food insecurity, 2004 and 2009

Table 8.5 Transition count matrix according to food security status

Food security status in 2004	Food security status in 2009				Marginal total
	Always deficit	Sometimes deficit	Breakeven	Always surplus	
Always deficit	78	122	91	35	326
Sometimes deficit	40	93	95	64	292
Breakeven	11	54	111	100	276
Always surplus	5	14	68	231	318
Marginal total	134	283	365	430	1,212

with above four levels is used to describe the food security status of a household. A household suffering food deficit throughout the previous 12 months is termed state 1, a household which experienced sometimes deficit is termed state 2, a household which experienced neither deficit not surplus is termed state 3, and a household who had always surplus food is termed state 4.

For the present context, the Markov chain (X_T) is defined in terms of food security status of a household under the assumption that the food security status of a household in 2009 (second round survey period) depends on the food security status of the household in 2004 (the first round survey period). Thus the inter-temporal transition of households in terms of food security status from 2004 to 2009 constitutes a first-order Markov chain.

Let us consider a Markov chain with State space S {S = 1,2,3 and 4} representing always deficit, sometimes deficit, breakeven, and always surplus. The mobility of households of the dynamic states between 2004 and 2009 is shown in transition count matrix above (Table 8.5).

The transition count matrix reveals that there is a distinct mobility in food security status over the 5-year period. More than 57% of all households changed their position between 2004 and 2009 with respect to food security status. Households which experienced upward mobility in food security status (those above the diagonal) constitute 41.8%, while 15.8% showed downward mobility (households beneath the diagonal). The percentage of households that stayed in the same food security status between 2004 and 2009 are almost 24% households of status 1 (always deficit), 32% of status 2 (sometimes deficit), 40% of status 3 (breakeven), and 73% of status 4 (always surplus). The highest mobility occurred among those in the always deficit category, while the lowest mobility was observed among those in the always surplus category.

8.7.2 Shorrocks Mobility Index

Shorrocks (1978b) suggested one method for analysing mobility based on the transition matrix as we have examined in Chap. 5 for income mobility. This method of analysing the mobility of food security status is to define n = 4 states (always deficit, sometimes deficit, breakeven and always surplus) in years 2004 and 2009 of the survey periods and observe at the corresponding transition matrix P. The elements $\mathbf{p_{ij}}$ represent the probability of transferring to state **j** for those starting in state **i**. The transition probability matrix **(P)** is obtained from the transition count matrix which is shown below:

$$\mathbf{p} = \begin{vmatrix} \mathbf{0.2393} & \mathbf{0.3742} & \mathbf{0.2791} & \mathbf{0.1074} \\ \mathbf{0.1370} & \mathbf{0.3185} & \mathbf{0.3253} & \mathbf{0.2192} \\ \mathbf{0.0399} & \mathbf{0.1957} & \mathbf{0.4022} & \mathbf{0.3623} \\ \mathbf{0.0157} & \mathbf{0.0440} & \mathbf{0.2138} & \mathbf{0.7264} \end{vmatrix}$$

From the transition matrix P, the Shorrocks Mobility Index SMI (P) is obtained by

$$\text{SMI } (\mathbf{P}) = \frac{\mathbf{n} - \mathbf{trace}(\mathbf{P})}{\mathbf{n} - \mathbf{1}}$$

where n is the number of states or categories of food security status.

The index is normalized to take a value between 0 and 1 by dividing SMI (P) by n/(n−1). The value of index close to 1 indicates higher mobility while the index equal to zero means immobility (Shorrocks 1978a, b). The transition probability matrix P results in an SMI (P) = 0.423, indicating relatively low mobility in food security status between 2004 and 2009.

Chapter 9
Livelihood Strategies and Poverty

9.1 Introduction

The concept of livelihood strategy has been discussed, defined and interpreted differently in the literature by different authors and researchers, since a large number of people continues to have a low level of living despite considerable economic growth or development in the developing countries. Some researchers have defined "livelihood strategy" as means of support or sustenance of life. Others have described it as means of securing the necessities of life. In the present context livelihood strategy is used as a choice of the main occupation of an individual through which he/she earns income for his/her livelihood. Generally, the main occupation of the household head that provides the main source of income of the household is considered to be the main livelihood strategy. Many household heads have more than one occupation. Therefore the occupation which provides the highest share of the total income is considered to be the primary occupation, while the occupation which provides the second highest share of income is regarded as secondary occupation. The primary occupation of the household head is often productive and cash-earning livelihood activities. But the occupation of household head varies with the variation in the economic condition of the household. For instance, agriculture and business are common livelihood activities in non-poor households. This is because these activities need more material resources that are not available to poor households. Again performance of jobs in the government and non-government offices and earning international remittance require education and professional skills that are more likely to be possessed by non-poor households because of monetary investment in education and acquiring skills. On the other hand, agricultural labour, non-agricultural labour, petty business, rickshaw/van pulling are more common livelihood activities among poorer households. None of these activities requires substantial material resources, but they all involve wage labour possessed by poor households as well.

Livelihood strategies of the majority of the rural people of Bangladesh are mainly based on agriculture, agricultural wage labour, daily wage labour and petty

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business. But these livelihood activities are severely affected by natural calamities such as repeated flood, drought, high-level crop and livestock disease. Thus rural people who are involved in these livelihood activities suffer more from food insecurity and vulnerability.

9.2 Occupational Types and Poverty

Types of occupation of household heads and household members play an important role in maintaining the standard of living. The incidence of poverty varies with variation in occupational type and it is highest among labour household since the earnings of daily labourers are the lowest. Moreover, daily wage labourers generally come from the landless households and very few of them have any asset base, social network, education or skill. As a result this group of households often suffers from severe food insecurity and vulnerability. By contrast salaried employment either in government or non-government organisations is characterised by high education and skills, and high income-earning opportunities. The incidence of poverty in salaried group of households is lower. Table 9.1 shows the incidence of poverty in rural areas according to type of occupation.

It appears from Table 9.1 that the lowest incidence of poverty is observed among administrative and management workers (1.2% for lower poverty line, 1.6% for upper poverty line), while the highest incidence of poverty is seen among the service workers (31% for lower poverty line and 49% for upper poverty line). The second highest poverty is found among the households whose heads are engaged in production, transport and related work followed by agriculture, forestry and fisheries. The proportions of the poor in these households are higher than the overall proportion (21% for lower poverty line and 35% for upper poverty line).

9.3 Livelihood Strategies in Rural Bangladesh

Livelihood strategies in rural Bangladesh are diversified. Among them agriculture-based income sources are still dominant. This sector is most important in terms of employment generation and income earning opportunities. Livelihood strategies vary with the variation in economic condition of the household. For instance, more than a half of non-poor male household heads were engaged in farming, while only 15% of the chronically poor male household heads were engaged in farming both in 2004 and 2009. About 44% in 2004 and 41% in 2009 of the heads of ascending poor households were engaged in farming. This figure for descending non-poor household head was 43% in 2004 and 33% in 2009, indicating a decreasing trend over the period. The daily wage sector is the main livelihood strategy of chronically poor households and it accounted for 46% (37 in agriculture and 9 in non-agriculture) in 2004 and 45% (19 in agriculture and 26 in non-agriculture) in 2009 and there was a

Table 9.1 Incidence of poverty by main occupation of household head, 2010

Occupation of head	% of Population below poverty line	
	Lower poverty line	Upper poverty line
Professional, technical and related worker	15.0	24.8
Administrative & management worker	1.2	1.8
Clerical, related works and govt. executive	15.5	23.5
Sales worker	14.6	27.1
Service worker	30.9	49.1
Agriculture, forestry and fisheries	22.5	36.8
Production, transport and related workers	28.9	47.9
Head not working	15.7	28.1
Total	21.1	35.2

Source: Preliminary Report on Household Income & Expenditure Survey-2010, Bangladesh Bureau of Statistics (BBS), Statistics Division, Ministry of Planning, June 2011

great shift of livelihood strategy of chronically poor households from agricultural to non-agriculture labour between 2004 and 2009. That is, 9% of chronically poor household heads were engaged in non-agriculture labour in 2004, while this figure increased to 26% in 2009. This may be due to the fact that the demand for agricultural labour does not remain constant and its having seasonal fluctuations. During off-seasons demand for agricultural labour goes down and often workdays are missed due to lack of work. As a result they look for alternative sources of income and sell their labour to work as non-agricultural labours. A similar increasing trend in the engagement of non-agricultural labour is also observed for ascending poor and descending non-poor households.

Business as livelihood strategy was found among 14% of non-poor household heads in 2009 while this figure was 8% for ascending poor, 6% for descending non-poor and only 1% for chronically poor households. But petty business, rickshaw pulling, non-agricultural labour and other skilled occupations (as in carpentry, hair-dressing, masonry, tailoring etc.) were more important livelihood strategies for descending non-poor and chronically poor households (Table 9.2). Non-agricultural labour as the main alternative occupation for the poor is in construction, road building, and brick kilns, for example.

More than 60% of female non-poor household heads perform household work and nearly one-fifth of them were engaged in agricultural production activities. But a significant proportion of female heads of chronically poor households worked as agricultural and non-agricultural labour. According to our panel data, the female-headed households are concentrated in the chronically poor group (52%). Heads of these households have less or no education than others and thus have fewer skills for high income-generating activities. The majority of them (37%) are engaged in other unspecified work for their livelihood but nearly one-third of them are engaged in household and housework. Although the majority of them are landless, about 3% of them were engaged in crop farming. A similar scenario was also observed for female heads of descending non-poor households. Salaried jobs are less risky as livelihoods and variation in earnings is much higher than that of daily wage

Table 9.2 Changes in primary occupation of male household head by economic class, 2004 and 2009

	% of Male household head by occupation and economic class							
	Non-poor		Ascending poor		Descending non-poor		Chronically poor	
	2004	2009	2004	2009	2004	2009	2004	2009
Primary occupation	n=296	n=325	n=204	n=347	n=203	n=135	n=419	n=285
Agriculture (crop)	50.7	51.1	44.1	40.6	43.3	33.3	15.8	15.1
Livestock/poultry/fishery	1.0	3.1	2.5	2.0	1.0	3.7	0.5	0.4
Service/NGO worker	17.6	7.7	9.3	3.2	2.4	2.2	1.7	1.4
Business	11.8	13.5	7.8	8.1	3.4	5.9	0.3	1.1
Petty business	5.1	2.2	11.3	8.1	15.3	11.1	9.5	7.7
Agriculture labour	1.0	0.3	3.4	5.2	10.8	7.4	36.8	19.3
Non-agriculture labour	1.0	1.2	7.4	12.1	5.9	11.1	9.3	25.6
Professional (carpenter, barber, tailor etc.)	–	0.3	1.0	4.9	2.5	2.2	9.3	12.3
Rickshaw/van-pulling	4.4	2.2	10.3	7.5	4.9	5.2	6.3	5.3
Others	7.4	18.2	3.0	8.4	1.0	14.7	7.2	12.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

earnings. But very few of female heads were engaged in salaried jobs since they have less or no education, which is essential for salaried jobs (Table 9.3).

Secondary sources for the majority of non-poor households often involve farming, petty business and other occupations. Secondary occupation of ascending poor, descending non-poor and chronically poor are also in farming but large proportions of them depend on wage labour in agriculture and non-agriculture. For a secondary source of income these groups of households are also involved in other occupations (Table 9.4).

9.4 Livelihood Strategies of Out-of-School Children

More than 81% of boys and girls aged 6–14 years attended school in 2004 while this figure rose to 85% for boys and 91% for girls in 2009, indicating a significant increase in school attendance rates over the 5-year period. The proportions of children at work have declined over the period. Putting boys and girls together, 8% of non-poor children, 10% of ascending poor, 12% of descending non-poor and 19% children from chronically poor households were out-of-school and joined the labour market in 2004. This figure for 2009 was 2%, 5%, 6% and 7%, respectively, showing a significant reduction in child labour over the 5-year period (Table 9.5).

The children, particularly female, who neither attended school nor joined the labour market engaged in household chores. It appears from Table 9.5 that poverty is strongly associated with child labour in rural Bangladesh since a higher proportion of children from descending non-poor and chronically poor households joined the labour market than did non-poor and ascending poor households. The distribution of child who works in the labour market is shown by economic class and sex in Table 9.6. It is evident from Table 9.6 that the majority of children who are at work in non-poor and ascending poor households are engaged in their own agricultural crop cultivation activities. On the other hand, the majority of the children from descending non-poor and chronically poor households work in agricultural labour, non-agricultural labour and some other classified positions and all these activities involve wage labour. The knowledge required of child labour to perform activities is often limited and lower in status and wages. Very few girls from non-poor and ascending poor households work in the field or other activities but the majority of the girls from chronically poor households work as house maids or in other unclassified work.

9.5 Occupational Mobility of the Household Heads

Livelihoods of the household members largely depended on the occupational status of household head. This is believed to be a key factor in poverty. It is also observed that agricultural and non-agricultural wage labourers are the poorest occupational

Table 9.3 Changes in primary occupation of female household head by economic class, 2004 and 2009

	% of Female household head by occupation and economic class							
	Non-poor		Ascending poor		Descending non-poor		Chronically poor	
	2004	2009	2004	2009	2004	2009	2004	2009
Primary occupation	n=13	n=23	n=11	n=27	n=13	n=8	n=53	n=62
Agriculture (crop)	23.1	17.4	–	7.4	–	37.5	3.8	3.2
Livestock/poultry/fishery	7.7	4.3	–	–	–	–	–	–
Service/NGO worker	–	4.3	9.1	–	–	–	–	1.6
Business	–	–	–	–	–	–	1.9	–
Petty business	7.7	–	–	–	–	–	9.4	3.2
Agriculture labour	–	–	–	–	15.1	12.5	13.2	4.8
Non-agriculture labour	–	–	9.1	14.8	23.1	–	30.2	17.7
Professional (carpenter, barber, tailor etc.)	–	–	–	–	–	–	–	–
Rickshaw/van-pulling	–	–	–	–	–	–	–	–
Housewife/housework	61.5	65.2	72.7	55.6	53.8	50.0	30.2	32.3
Others	–	8.7	9.1	22.2	7.7	–	11.3	37.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 9.4 Changes in secondary occupation of male household head by economic class, 2004 and 2009

	% of Male household head by occupation and economic class							
	Non-poor		Ascending poor		Descending non-poor		Chronically poor	
	2004	2009	2004	2009	2004	2009	2004	2009
Secondary occupation	n = 87	n = 147	n = 84	n = 184	n = 63	n = 69	n = 148	n = 160
Agriculture (crop)	44.8	46.2	29.8	46.2	38.1	43.5	25.7	31.9
Livestock/poultry/fishery	4.6	6.2	–	1.6	–	2.9	–	1.9
Service/NGO worker	2.3	2.1	1.2	2.2	–	–	–	1.3
Business	6.9	9.7	2.4	2.7	–	2.9	–	0.6
Petty business	17.2	9.7	14.3	6.5	3.2	5.8	6.1	3.8
Agriculture labour	5.7	4.8	29.8	13.6	36.5	13.0	38.5	21.9
Non-agriculture labour	2.3	2.1	6.0	19.0	9.5	18.8	12.2	26.3
Professional (carpenter, barber, tailor etc.)	5.7	0.7	6.0	1.1	3.2	2.9	6.8	3.8
Rickshaw/van-pulling	–	–	2.4	1.1	–	1.4	2.7	3.8
Housewife/housework	1.1	0.7	1.2	–	–	–	–	–
Others	8.0	18.0	7.2	5.9	9.5	8.6	6.9	4.4
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 9.5 Changes in status of children aged 5–14 years by economic class and sex, 2004–2009 (% in each class, by sex and year)

	No. of children attending school				No. of children at work				No. of children neither at school nor at work			
	Boys		Girls		Boys		Girls		Boys		Girls	
Economic class	2004	2009	2004	2009	2004	2009	2004	2009	2004	2009	2004	2009
Non-poor	153 (88.9)	163 (92.1)	171 (91.0)	169 (94.4)	13 (7.3)	7 (4.0)	15 (8.0)	1 (0.6)	9 (5.4)	7 (4.0)	2 (1.4)	9 (5.0)
Ascending poor	127 (87.6)	182 (85.4)	98 (86.0)	182 (91.9)	12 (8.3)	16 (7.5)	15 (13.2)	3 (1.5)	6 (4.1)	15 (7.0)	1 (0.9)	13 (6.6)
Descending non-poor	138 (82.1)	94 (86.2)	119 (86.2)	79 (89.8)	21 (12.5)	11 (10.1)	17 (12.3)	0 (0.0)	9 (5.4)	4 (3.7)	2 (1.4)	9 (10.2)
Chronically poor	211 (74.3)	168 (79.2)	184 (70.2)	178 (86.4)	37 (13.0)	25 (11.8)	67 (25.6)	4 (1.9)	36 (12.7)	19 (9.0)	11 (4.2)	24 (11.7)

Table 9.6 Changes in activities of children aged 5–14 years by economic class and sex, 2004–2009

	Non-poor				Ascending poor				Descending non-poor				Chronically poor			
	Boys		Girls		Boys		Girls		Boys		Girls		Boys		Girls	
Occupation	2004	2009	2004	2009	2004	2009	2004	2009	2004	2009	2004	2009	2004	2009	2004	2009
Agriculture (crop)	8 (61.5)	2 (28.6)	–	–	4 (33.3)	2 (12.5)	–	–	3 (14.3)	2 (18.2)	1 (5.9)	–	4 (10.8)	1 (4.0)	–	–
Wage labour (agri./non-agri.)	1 (7.7)	1 (14.3)	–	–	1 (8.3)	6 (37.5)	–	–	6 (28.6)	5 (45.5)	–	–	8 (21.6)	10 (40.0)	–	–
Service	1 (7.7)	–	1 (6.7)	–	–	1 (6.3)	1 (6.7)	3 (100.0)	2 (9.5)	1 (9.1)	–	–	1 (2.7)	2 (8.0)	3 (4.5)	–
Petty business	–	1 (14.3)	–	–	1 (8.3)	2 (12.5)	–	–	3 (14.3)	2 (18.3)	–	–	–	1 (4.0)	–	2 (50.0)
Rickshaw/van puller	–	–	–	–	2 (16.7)	–	–	–	–	–	–	–	3 (8.1)	2 (8.0)	–	–
Professional (barber, carpenter, tailor)	1 (7.7)	–	–	–	1 (8.3)	3 (18.8)	–	–	1 (4.8)	–	3 (17.6)	–	6 (16.2)	5 (20.6)	6 (9.6)	–
House work	–	–	13 (86.6)	–	–	–	12 (80.0)	–	–	–	13 (76.3)	–	–	–	53 (99.1)	2 (50.0)
Others	2 (15.4)	2 (28.6)	1 (6.7)	1 (100.0)	3 (25.0)	2 (12.5)	2 (13.3)	–	6 (28.6)	1 (9.1)	–	–	15 (40.5)	4 (16.0)	5 (7.5)	–
Total	13 (100)	7 (100)	15 (100)	1 (100)	12 (100)	16 (100)	15 (100)	3 (100)	21 (100)	11 (100)	17 (100)	–	37 (100)	25 (100)	67 (100)	4 (100)

Table 9.7 Transition count matrix according to occupational status, 2004–2009

	2009				
Occupational status of household head 2004	1	2	3	4	5
1. Agriculture	298	1	21	46	46
2. Service (govt./non-govt.)	15	37	6	14	32
3. Business/petty business	35	1	96	20	24
4. Wage labour (agri./non-agri)	43	1	21	107	30
5. Others (skilled occupation[a])	39	5	13	50	211

[a]Skilled occupation includes barber, cobbler, mason, tailor and others

Table 9.8 Transition probability matrix

$$P = \begin{bmatrix} 0.7233 & 0.0024 & 0.0510 & 0.1117 & 0.1117 \\ 0.1442 & 0.3558 & 0.0577 & 0.1346 & 0.3077 \\ 0.1989 & 0.0057 & 0.5455 & 0.1136 & 0.1364 \\ 0.2129 & 0.0050 & 0.1040 & 0.5297 & 0.1485 \\ 0.1226 & 0.0157 & 0.0409 & 0.1573 & 0.6635 \end{bmatrix}$$

group (HIES 2005). In rural Bangladesh agriculture (crop farming, livestocks and poultry) has continued to be the single major source of income and primary source of livelihood of the majority of rural people. From the panel data on households, it is observed that about 34% of household heads were engaged in agriculture in 2004, the proportion is 35% in 2009. The proportion of household heads engaged in wage labour (agriculture/non-agriculture) increased from 17% to 20%, while the proportion of heads engaged in service declined from 9% to 4% over the same period. Slight occupational shifts were observed among the heads who were engaged in business and other skilled occupations. The transition count matrix according to occupational status of household head is shown in Table 9.7.

In order to measure the overall degree of occupational mobility the transition probability matrix $\mathbf{P} = [\mathbf{p}_{ij}]$ obtained from the transition count matrix is calculated in Table 9.8. Clearly P is a square matrix with non-negative elements.

The main diagonal elements $\mathbf{P}_{ij}$ of P is the probability that a household head will remain in the same occupation between 2004 and 2009. Table 9.8 reveals that 72% of household heads who were engaged in agriculture in 2004 continued to be so in 2009. But 5% of them engaged in business, 11% of them became wage labour, and another 11% engaged in other occupations. Agriculture is the most stable occupation in rural areas. The main occupational mobility to agriculture was from wage labour (21%), business (20%), service (14%) and other occupations to agriculture (12%) over the 5-year period.

The Shorrocks mobility index (SMI) is estimated from $P=[p_{ij}]$ matrix and it is found to be 0.436, indicating that the degree of mobility is relatively low in occupational status over the 5 year period. In the absence of rural industrialization and other economic activities, opportunity in occupational change is limited for rural people. Due to sectoral differences in the labour market there are important barriers in the labour market among various socio-economic groups such as non-poor versus poor, men versus women, rural versus urban, educated versus uneducated and these differences are the chief obstacles to integration and mobility in the labour market. In this way, segmentation of labour markets limit the mobility of workers through socio-economic groups for employment.

Chapter 10
Changes in Access to Assets

10.1 Introduction

Over the last several decades economists have generally used income to measure wealth, welfare and other indicators of well-being. But income data have some limitations in both accuracy and measurement, especially in non-market activities, where people are generally engaged in economic transactions outside the market. Incomes earned from the informal sector and self-employment are highly variable since income may be seasonal or temporary. Thus taking a snapshot of income at one point of time may give a less reliable measure of monthly or annual income. Problems of sampling bias, under-reporting of income and difficulties of assessing income from self-employment inside or outside household are also raised. This means that income data which are often unreliable or inaccurate do not provide a real picture of the well-being of people. In order to overcome these problems many economists have used expenditure and consumption data to measure well-being (Chen and Ravallion 2000; Ellis 2000). Although expenditure solves some of the problems faced in using income data such as seasonal variation, yet expenditure data are not completely free from measurement errors such as problems of measuring the value of bartered goods and measuring consumption expenditure on home products. However, despite having expenditure data with less error, the economists generally use income data to measure well-being.

More recently some economists have suggested possession of durable assets as proxies to measure wealth and thus household welfare. Such proxies are easier to observe than to estimate income. This is because there is often less likelihood of recall or measurement problems of assets and they have been accumulated over time and last longer. As a result assets may provide a better picture of long-term standard of living than an income snapshot and expenditure data (Moser and Felton 2009). There are two main types of household asset: tangible and intangible asset. The former includes land, livestock, agricultural equipment, machinery, household appliances and other durable goods; the latter human and social capital. These assets represent the household's inventory of wealth and

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affect its income flow. Moreover, possession of these assets by the poor, if any, affect their prospects for escaping poverty because these assets can be enabling factors for poor people to take advantage of opportunity for higher income. Despite its importance, asset is also difficult to estimate in a precise and efficient way. The main difficulty is to determine the depreciation of assets since the lifespan of any given asset is not fixed but variable. It is easier to measure monetary value of tangible or physical assets such as land, houses, and household durable goods. To measure household's intangible assets in monetary value is different and nearly impossible since it is difficult to assign prices to intangible assets such as human and social capital. Thus measurement of asset value in monetary terms is also not free from all problems and difficulties. But expanding the assets of poor people can strengthen their economic positions and control over their lives and livelihoods.

10.2 Methods of Measurement of Assets

There are several methods and techniques for measurement of assets in the literature, among which three important methods have been illustrated by Moser and Felton (2009) in their research work. These methods are:

1) Current values
2) Unit values, and
3) Principal component analysis (PCA).

By method 1 one can estimate asset value in monetary term of the household's wealth by multiplying the quantity of assets possessed by their current market price. In other words it is the sum of current values of assets as assessed by the household itself.

Symbolically, $\mathbf{A_{h,t}} = \sum_{i=1}^{k} \mathbf{q_t^i p_t^i}$

where, $\mathbf{A_{h,t}}$ = assets value at time t of the *h*-th household

$\mathbf{q_t^i}$ = quantity of *i*-th asset at time t

$\mathbf{p_t^i}$ = price of *i*-th asset at time t

n = household number
k = item number, and

$\sum_{h=1}^{n} \mathbf{A_{h,t}}$ is the total monetary value of the households assets. This method has several limitations which have been explained by Moser and Felton (2009). For instance, prices of goods, seasonal variation in prices and consumer price indices are unavailable and unreliable, particularly in developing countries like Bangladesh. Despite being somewhat problematic, method 1 is traditionally used by economists because it is easy to measure and is widely understood by the public.

Table 10.1 Average value of all assets by economic class (Taka)

	Value of assets at nominal price		Real value of assets[a]
Economic class	2004	2009	2009
Non-poor	529,398.15	1,443,510.63	1,002,438.00
Ascending poor	156,512.88	430,080.3	298,666.92
Descending non-poor	189,519.47	427,934.11	297,176.65
Chronically poor	37,026.96	139,093.97	96,593.00
Total	207,812.92	637,561.63	442,709.46

[a]The value of assets at current market price is deflated by CPI with 2003–2004 = 100

10.3 Method 1: Household Assets at Current Market Price

Household assets are classified into two categories: household productive assets and household durable assets. The former includes land, livestock, poultry and fisheries; the latter wristwatch, clock, radio, television, bicycle, motorcycle, jewelry, fan, furniture, trees, equipments and utensils. The total monetary value of all kinds of asset has been estimated at current market price by economic class and is shown in Table 10.1.

It appears from Table 10.1 that there is a significant variation in asset values between economic classes. Non-poor households had the highest asset value, while the chronically poor households had the lowest asset value in both survey years. Ascending poor and descending non-poor households rank second and third in this respect. In the 5-year period there has been an exorbitant price hike of land and other productive assets which resulted in significantly higher total value of assets for all economic classes. It increased almost threefold in nominal price but twofold in real terms. The average value of assets for non-poor households is more than ten times higher than that of chronically poor in real term indicating a distinct variation in asset ownership between poor and non-poor households.

10.3.1 Assess to Land Assets

Land is an important productive asset and it is also an important determinant of social status in rural society. Land takes the leading role in income generation and gaining opportunities in rural areas, and thus ownership of land assets directly affects the welfare of a household. But rampant population growth resulted in an increasing pressure on available land. The average land holding size by economic class is shown in Table 10.2.

There is no significant change in the pattern of average landholding size over the 5-year period and chronically poor households have land assets (0.20 acre in 2004 and 0.28 acres in 2009) smaller than all other classes. As a result the level of

Table 10.2 Average landholding size by economic class (in acres)

Economic class	2004	2009	% Change in average landholding size over 2004
Non-poor	3.23	3.30	+2.17
Ascending poor	1.03	1.04	+0.97
Descending non-poor	1.13	1.03	−8.85
Chronically poor	0.20	0.28	+40.0

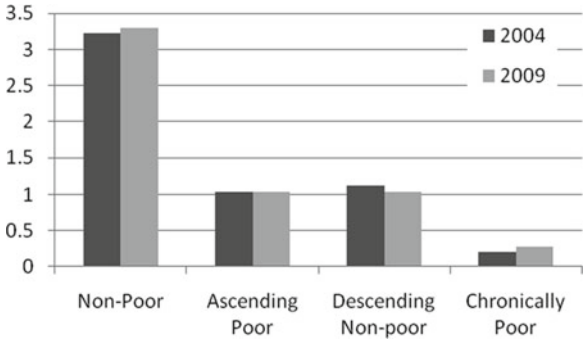

Fig. 10.1 Average landholding size by economic class, 2004 and 2009

living of the chronically poor households with insufficient land to feed their family members should depend on wage labour. Figure 10.1 shows the average landholding size for 2004 and 2009.

10.3.2 Distribution of Land Asset

The landholding distribution exhibits a very uneven character, which presupposes high inequality in landholding distribution, even higher than income inequality. The distribution of our sample households by landholding size and economic class for 2004 and 2009 is shown in Table 10.3.

It appears from Table 10.3 that the characteristics of land ownership distribution vary greatly and are very unequal across the economic classes. The proportion of landlessness has decreased for non-poor and descending non-poor households while it has increased greatly for ascending poor and chronically poor households over the 5 years. It is also observed that about 26% and 38% households of chronically poor had no access to land assets in 2004 and 2009, respectively. Inequality in land ownership as measured by the Gini coefficient is very high for all economic classes and is highest among chronically poor households. However, between 2004 and 2009 the inequality was found to decline to some extent among non-poor and descending non-poor, while the opposite case was observed among ascending poor and chronically poor households.

Table 10.3 Distribution of households by landholding size and economic class for 2004 and 2009

Landholding size in acres	% of Households							
	Non-poor		Ascending poor		Descending non-poor		Chronically poor	
	2004	2009	2004	2009	2004	2009	2004	2009
Landless	3.8	1.7	8.4	13.6	6.6	4.2	26.3	38.3
0.05–0.49	12.5	9.5	41.8	38.8	40.5	44.1	62.6	47.6
0.50–0.99	9.4	14.7	14.2	16.3	18.1	17.5	6.8	8.4
1.00–1.49	12.5	10.1	11.6	12.3	11.0	11.9	2.8	2.6
1.50–2.49	19.7	19.0	11.1	9.6	11.5	15.4	1.4	0.9
2.50–5.49	26.9	28.2	11.6	5.3	9.7	3.5	0.59	2.3
5.50–7.49	6.6	7.2	0.99	3.2	0.88	2.8	–	–
7.50+	8.8	9.5	0.44	0.8	1.76	0.7	–	–
Gini index	0.5181	0.4871	0.6001	0.6449	0.6037	0.5737	0.6130	0.6828

Table 10.4 Value of land asset by economic class between 2004 and 2009 (Taka)

Economic class	Value of land asset (in current price)		Real value of land assets[a] for 2009
	2004	2009	
Non-poor	484,802.22	1,291,993.70	897,217.85
Ascending poor	139,985.11	382,671.90	265,744.40
Descending non-poor	177,654.72	396,829.70	275,576.20
Chronically poor	28,654.38	125,695.80	87,288.80

[a]The value at current market price is deflated by CPI with 2003/2004 as base

10.3.3 Value of Land Assets

The value of land asset depends upon the pattern of land ownership distribution across the economic classes. As the landholding size of non-poor households is the highest, the value of land asset at current market price is obviously the highest for non-poor. By contrast, the value of land asset is the lowest for chronically poor households since their landholding size is the lowest (Table 10.4).

It appears that about 90% of the total asset value comes from landed property. The market price of landed property has increased by two- to threefold over the 5-year period and this asset has no depreciation cost like other households durable assets. As a result, comparison of the asset value of 2009 with that of 2004 shows large difference in this period. If we convert the asset value from nominal to real term (deflated by CPI), the land asset value in 2009 remains nearly two times higher than in 2004. It should be noted that the possession of land asset by chronically poor households was ten times lower that of non-poor households, although the gap became smaller from 17 times of 2004. Ascending poor and descending non-poor households possess about 3.3 times lower assets than non-poor households. One would like to recall here that the increase in asset values of non-poor households was mainly due to higher landholding size. Although the landholding size did not increase significantly, the value of land asset shows a striking increase mainly due to exorbitant price hike of land asset during the period under study.

10.3.4 Access to Other Productive and Household Durable Assets

Apart from land asset, there are other productive and household durable assets such as livestock, poultry, trees, tools and equipment and other luxury items which are good indicator of household wealth. Among the main luxury items are, wrist watch, radio, television, bicycle, motorcycle, jewelry and furniture. Tools and equipment include equipments and those transport related to agricultural production. Possession of durable assets by a household is also a good indicator of household welfare. Numbers or values of several household items may be used as proxies to other economic variables such as income and expenditure which are subjected to various measurement errors. We can collect information on durable assets by asking simple questions such as "Do you own a TV set?" In this way we can measure socioeconomic status (SES) of a household with less measurement and reporting error. In this section reported numbers of durable assets and their current market values are calculated. In the next section the most popular method, the principal component analysis is used to assign coefficients to those observed variables and to sum them up to get an asset index. In this way we can obtain a univariate measure of welfare. The percentage of households having a particular asset is shown in Table 10.5.

Table 10.5 reveals a distinct variation across economic class in possession of durable assets by a household. The proportion of households having different durable assets is the highest for non-poor, while it is the lowest for chronically poor households. A cot/bed(chawki) is essential for sleeping and the highest percentage of households owned this item followed by gold jewelry, chair/table, wrist watch/clock. Weight of gold jewelry was not considered during survey, but irrespective of weight and size, ornaments made of gold are considered as gold jewelry. As a result the proportion of households having gold jewelry becomes higher than any other household item. But over the 5 years period this proportion of households that owned gold jewelry decreased from 96.3% in 2004 to 74.4% in 2009 for non-poor households. A more significant decrease in the proportion of households owning gold jewelry was observed in other economic classes. It is notable that the mobile phone became an important item to all categories of household between 2004 and 2009 as shown in the big increases in the proportion of households owning one. A mobile phone was owned by 82% of the sample non-poor households, 55% of ascending poor, 36% of descending non-poor and 17% of the chronically poor households in 2009. These figures in 2004 were 1.6%, 0.8%, 1.8%, and 0.9%, respectively. The lowest level of assets is possessed by chronically poor households, followed by descending non-poor and ascending poor. Possession of low levels of assets keeps chronically poor in poverty for longer and limits them from improving their socioeconomic condition. Lack of access to assets resulted in several forms of deprivation including deprivation in education, health, and capability development. The value of other productive assets including household durable assets at current market price is also calculated and presented in Table 10.6.

Table 10.5 Percentage of households having a durable asset by economic class

	% of Household							
	Non-poor		Ascending poor		Descending non-poor		Chronically poor	
Household item	2004	2009	2004	2009	2004	2009	2004	2009
Wristwatch/clock	78.4	76.6	59.6	50.5	46.3	44.1	23.5	19.9
Radio/cassette player	37.1	21.3	24.9	11.8	6.2	7.7	0.1	5.5
Black & white/color television	30.6	46.3	12.0	20.3	6.2	11.9	2.5	2.6
Bicycle	35.6	49.7	21.8	30.2	18.5	26.6	8.6	13.0
Motorcycle	7.2	13.2	0.8	1.1	–	–	–	–
Gold jewelry	96.3	74.4	91.1	40.6	86.3	25.9	37.3	8.4
Silver ornament	46.3	27.9	49.3	22.7	40.5	15.4	36.7	14.1
Electric fan	23.1	42.8	9.3	20.6	6.6	16.8	3.3	3.2
Cot/bed	96.3	98.6	90.2	94.4	90.3	94.4	74.7	76.9
Chair/table	88.7	92.5	67.1	73.3	60.4	63.6	32.5	39.2
Almirah	44.1	46.0	20.8	17.4	17.2	16.1	5.3	4.9
Wardrobe	39.2	13.2	23.1	4.3	17.6	2.1	9.2	0.3
Meat safe	31.9	30.7	15.1	11.8	10.1	4.9	3.7	1.4
Bench	20.6	31.3	13.3	19.8	13.2	21.7	6.3	9.8
Mobile phone	1.6	82.2	0.8	54.5	1.8	35.7	0.9	16.7

Table 10.6 Values of durable assets including other productive assets by economic class

	Value of assets (Tk.)	
Economic class	2004	2009
Non-poor	62,776.01	151,516.89
Ascending poor	23,604.05	47,408.48
Descending non-poor	27,725.97	31,104.46
Chronically poor	8,323.12	13,398.14

The values of household durable assets show a marked variation across the economic classes. Asset value of non-poor households is more than ten times higher than that of chronically poor households in 2009, though it was eight times in 2004. Over the 5 year period asset values rose 2.4 times for non-poor, just a little more than twofold for ascending poor, roughly 12% more for the descending non-poor, and 61% higher for the chronically poor between 2004 and 2009. Chronically poor households have the lowest value of assets. It is interesting to note that about 90% of the total assets came from land asset and the rest came from other sources.

Table 10.7 Asset index by unit and by economic class

	Unit of household assets	
Economic class	2004	2009
Non-poor	99	76
Ascending poor	41	34
Descending non-poor	43	46
Chronically poor	22	15

10.4 Method 2: Assets by Unit

By method 2, a household wealth index is obtained by a simple sum of total number of assets owned by the household, which is equivalent to assigning value 1 for each item. This method is simple but has a great limitation of giving equal weight (one) to ownership of each asset. Assigning equivalent worth to owning a tractor and a plough does not give information except the number of units of assets (Moser and Felton 2009). The unit numbers of assets apart from land, based on this method for each class of household are shown in Table 10.7.

Table 10.7 reveals a marked inter-class differentials in the unit of asset holding. The asset index by this method for non-poor household is almost five times higher than that for chronically poor household. The ascending poor household's assets are almost half of those possessed by the non-poor household. Assets possessed by descending non-poor also shows a significantly lower unit than that of non-poor but three times that of chronically poor households in 2009. The asset index by unit in 2004 was higher than that of 2009. Over the 5-year period either some of the assets were sold, used or abandoned by households.

10.5 Method 3: Principal Component Analysis (PCA)

In view of the problems discussed above other non-monetary indicators of household welfare such as the assets based index have been developed by several researchers and academics as an alternative tool for measuring household's wealth and welfare (Filmer and Pritchet 1998; Morris et al. 2000). The PCA is one of the methods. It was developed in the early twentieth century (Pearson 1901; Hotelling 1933) in psychometrics and multivariate statistical analysis. But more recently development economists have used this method to assess asset index. The asset index using PCA which was presented by Filmer and Pritchett in 1998. They used PCA to aggregate several binary asset ownership variables into a single dimension. The coefficients obtained by PCA have a fairly interesting interpretation. Moreover, this method assigns more accurate weight than simple summation done in method 2. The coefficient of PCA on account of any one variable is related to how much information it gives about other latent

Table 10.8 Asset index using PCA by economic class, 2004 and 2009

Economic class	Asset index: the mean of factor score	
	2004	2009
Non-poor	6.0693	7.6879
Ascending poor	1.4762	0.0118
Descending non-poor	−0.2721	−1.8915
Chronically poor	−4.5343	−6.9433

(unobservable) variables. The positive coefficient means that the ownership of one type of asset is highly indicative of the ownership of other assets. If the coefficient of ownership of an asset is close to zero, then it indicates that ownership of that variable will not provide information about ownership of any other assets. If the coefficient receives negative value for ownership of an asset, then it will indicate that household is likely to own few other assets. Higher and lower coefficients indicate that ownership of that asset provides more or less information about the other type of asset (Moser and Felton 2009).

The PCA can determine weight as a factor score for each asset variable. Derived from PCA, scoring factors of the first principal component were used to construct the asset index of each household. The asset index computed by PCA is defined as the sum of the factor score of each asset variable which is dichotomous (zero or one). After computing the asset index for each of the sample households of 2004 and 2009 by PCA, the asset index is classified according to the four economic classes. The mean value of asset index for each economic class is found to differ distinctly (Table 10.8).

The difference in asset index between descending non-poor and chronically poor for 2004 was found to be 4.2622 and for 2009 it was 5.0518. But the difference between non-poor and chronically poor was 10.6036 in 2004 and 14.6312 in 2009. The asset indices for descending non-poor and chronically poor are negative, implying that a household in these two groups is likely to own few other assets. Conversely, the high positive index for non-poor is highly indicative of ownership of other asset. Over the 5-year period the average values of asset index for all economic classes except for non-poor households dropped. This indicates that there are wider variations in the asset base across the economic classes in 2009 than in 2004 (Fig. 10.2).

10.6 Household Asset by Decile Group

A simple measure of asset inequality is the difference of asset index between the richest 10% of the population and the poorest 10%. This measure, however, ignores information about the asset index of other decile groups. Though the household asset analysis can be more useful when it is used in conjunction with household

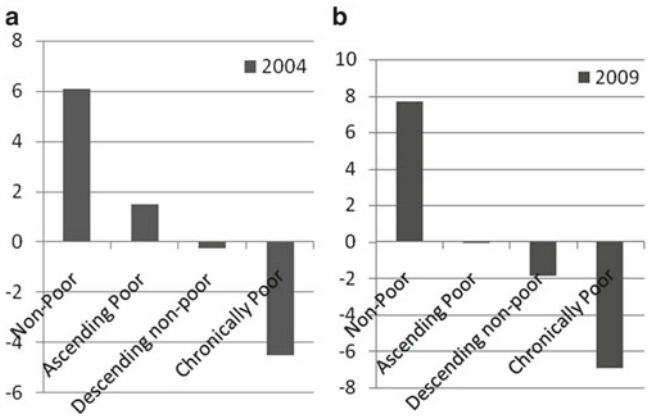

Fig. 10.2 Asset index by economic class, 2004 (**a**) and 2009 (**b**)

Table 10.9 Average asset index for 2004 and 2009 by decile group

Decile group	2004	2009
Bottom 10%	−10.0443	−11.2236
11–20%	−7.1793	−8.1594
21–30%	−5.1590	−5.8068
31–40%	−3.4378	−3.6834
41–50%	−1.7558	−1.9166
51–60%	0.1743	0.0481
61–70%	1.9984	2.3149
71–80%	4.0051	4.8945
81–90%	7.1606	8.1026
Top 10%	14.3445	15.3952

income data, the average value of the household asset index has also been calculated for each income decile group and presented in Table 10.9.

The difference in asset index between the bottom 10% (decile 1) and the top 10% of income distribution (decile 10) was found to be 24.3888 in 2004, while this figure for 2009 was 26.6188. The difference in income share between these two extreme decile groups was observed to be 31.8% for 2004 and 27.9% for 2009, indicating some reduction in income share gap between the two groups (see Table 6.6 in Chap. 6). There is a strong link between household asset index and household annual income. The correlation coefficient between these two indicators was found to be 0.4440 for 2004 and 0.6595 for 2009. The bar plots (Fig. 10.3) display the level of asset index by decile group for 2004 and 2009.

Although the PCA is a valuable approach for modeling and is superior to methods 1 and 2 for measuring asset value, it has also several drawbacks. It reduces dimensions of variables by transforming the original set of variables into a smaller set of linear combinations that account for most of the variations of the original set of variables

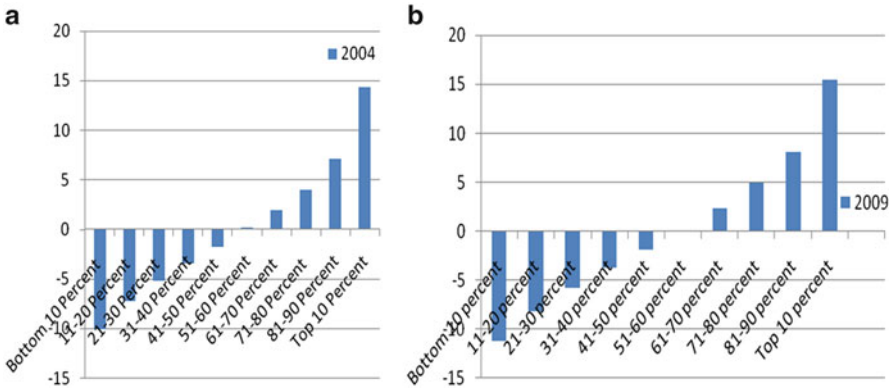

Fig. 10.3 The level of asset index by decile group, 2004 (**a**) and 2009 (**b**)

(Ram 1982). The PCA was originally developed for the multivariate normal distribution and sample from it. It works best for variables that are continuous and distributed at least approximately normal (Kolenikov and Angeles 2004). The violation of the important normality assumption underlying the PCA occurs in our work where the variables are discrete and most often they are binary i.e. a variable that can take only one of two values (zero or one), depending upon the ownership of various asset items or not. In view of these problems Kolenikov and Angeles (2004) suggest an alternative technique known as polychoric principle components analysis (PPCA). This approach is propounded by Pearson (1901) and further development was done by Pearson and Pearson (1922) and Olsson (1979). A number of research works and studies on polychoric PCA have been done and its use are found now in the literature, like Filmer and Prichet (1998, 2001), and more recently, Kolenikov and Angeles (2004) and Moser and Felton (2009). Kolenikov and Angels described this technique as an improved version of regular PCA and is designed specifically for categorical variables. Moreover, the polychoric PCA has a number of advantages over regular PCA. The major advantage is the higher accuracy of its estimated coefficients than the regular PCA coefficients.

Moser and Felton (2009) described the following advantages of polychoric PCA over regular PCA. The main advantage is that we can use ordinal data without any violation of assumption. But use of ordinal data in regular PCA is a violation of normality assumptions. Polychoric PCA ensures that the coefficients of an ordinal variable follow the order of its value. Another important advantage of polychoric PCA is that it gives the coefficients of both owning and not owning an asset. This phenomenon is important because sometimes not owning a particular asset conveys more information than owning it. For instance, if almost every household own homestead except a few poorest households, then the coefficient of owning homestead land will be around zero. It does not help distinguish household wealth among those who own it. On the other hand, not owning homestead land will be negatively correlated to ownership of other assets such as electricity connection, piped water, sanitary latrine, and others.

10.7 Empirical Analysis for Constructing Asset Index by Polychoric PCA

In our household survey in 2004 and 2009, several information were collected on different dimensions. But all information were not used in construction of asset index by polychoric PCA. Only the physical characteristics of house and household consumer durable assets were used. The physical characteristics of the house include physical structure and housing materials, type of toilet, sources of drinking water, sources of lighting. Housing structure was divided into five categories: (1) soil/bamboo/straw—wall and roof, (2) soil/bamboo/straw—wall and tin roof, (3) tin/wood wall and tin/tally roof, (4) semi-pucca (brick wall and tin roof), and (5) pucca (brick wall and concrete roof). Toilet facility was classified into five categories: (1) bush/open place, (2) hanging, (3) pit (hole/well), (4) fixed pit, (5) and sanitary latrine (water sealed). Sources of drinking water were classified into four categories: (1) river/pond, (2) ring well, (3) tube-well, and (4) supplied water. Sources of lighting were categorised as: (1) lighting by traditional sources (lantern/lamp) and (2) electricity. These variables are ordered in terms of quality and ordinal in nature. With ordinal nature of data polychoric PCA is the most suitable technique for analysing asset index. The estimated polychoric PCA coefficient is presented in Table 10.10.

It is interesting to note that the estimated coefficients increase with the increasing quality of each asset (Table 10.10). Greater coefficients (negative or positive) imply that the variables provide more information on the household's housing characteristics. The highest negative coefficient (−0.9096) is observed on having no fixed toilet facility and use bush/open space for excretion. The second highest negative coefficient (−0.8585) was found on having thatched house (soil/bamboo/straw—wall and roof). This means that a household having no fixed place for excreta disposal or that a household made of soil/bamboo/straw (most temporary housing materials) is likely to fall into the lowest category of other types of assets. On the contrary, the highest positive coefficient (1.0134) is observed on having pucca house. This group of household is likely to fall into the highest category of other types of assets such as electricity connection and other valuable assets as well. This can be observed in the following table (Table 10.11).

It appears from the above table that people who live in thatched house and use open space for excretion fall into the lowest category of owning other assets. On the other hand, people who possess pucca house also owned other household assets. Thus wealthy households with pucca structure of dwelling unit (the highest level within structure of main dwelling house) are more likely to own other valuable items such as wrist watch/clock, television, bicycle, motorcycle, mobile phone, electricity connection, and electric fan than poor ones.

The lowest coefficients (positive and negative) were obtained on account of different sources of drinking water and these variable will not provide more information about other assets of the household. This is because 92% households take water from tube-well for drinking purpose and not all of these tube-wells were owned by

Table 10.10 Polychoric PCA coefficients for housing physical characteristics

Asset	Coefficient	% of Household
A. Housing structure:		
Soil/bamboo/straw wall and roof	–0.8585	7.18
Soil/bamboo/straw wall and tin roof	–0.2862	41.54
Tin/wood wall and tin/tally roof	0.2072	37.74
Semi-pucca (brick wall and tin roof)	0.6243	11.40
Pucca (brick wall and concrete roof)	1.0134	2.15
B. Sources of drinking water:		
River/pond	–0.0126	3.55
Ring well	–0.0098	1.40
Tube-well	0.0001	92.07
Supplied water	0.0123	2.98
C. Toilet facility:		
Bush/open place	–0.9096	2.91
Hanging	–0.5464	12.71
Pit (hole/well)	–0.2545	22.59
Fixed pit	0.0924	42.28
Sanitary latrine	0.5534	19.52
D. Lighting facility:		
Traditional (lantern/lamp)	–0.3001	62.05
Electricity	0.4762	37.95

Table 10.11 Percentage distribution of household possessing certain assets (%)

	Category of household		
Consumer durable assets	Thatched house polychoric PCA coefficient (–0.8585)	Pucca house polyphoric PCA coefficient (1.0134)	Household use open space coefficient (–0.9096)
Wrist watch/clock	28.7	84.6	11.4
Radio/cassette	5.7	30.8	–
Television	2.3	61.5	5.7
Bicycle	23.0	65.4	8.6
Motorcycle	–	19.2	2.6
Mobile phone	17.2	96.2	14.3
Electricity connection	17.2	80.8	–
Electric fan	3.4	73.1	2.9

them. These are provided by the government or NGOs free of cost and only a few households use other sources. These sources were not owned by the households except supplied water which was owned by only 3% of the people and its coefficient is 0.0123 (coefficient is close to zero). Thus this type of assets contains very few information about other assets the household own.

The polychoric PCA is also useful for constructing an asset index from a longitudinal data. It also provides the value of coefficient for not owning an asset. In the present context, analysis has been done for 2004 and 2009 separately but not by

Table 10.12 Polychoric PCA coefficient for different types of assets

	Coefficient	
Asset	2004	2009
A. Animal assets:		
Cow: no	–0.448	–0.514
Cow: yes	0.498	0.542
Buffalo: no	–0.014	–0.011
Buffalo: yes	1.467	1.603
Goat/pig: no	–0.229	–0.205
Goat/pig: yes	0.782	0.599
Hen/cock: no	–0.725	–0618
Hen/cock: yes	0.243	0.243
Duck: no	–0.420	–0.392
Duck: yes	0.687	0.656
Pigeon: no	–0.017	–0.097
Pigeon: yes	1.133	1.017
B. Tree asset:		
Big tree: no	–0.516	–0.330
Big tree: yes	0.331	0.465
Fruit tree: no	–0.447	–0.439
Fruit tree: yes	0.331	0.273
Wood tree: no	–0.343	–0.441
Wood tree: yes	0.458	0.472
Bamboo bush: no	–0.319	–0.385
Bamboo bush: yes	0.464	0.383
C. Agricultural equipment:		
Equipment: no	–0.096	–0.167
Equipment: yes	1.190	1.021
D. Income generating equipment:		
Tube-well: no	–0348	–0320
Tube-well: yes	0.410	0.289
Plough or spade: no	–0.727	–0.700
Plough or spade: yes	0.276	0.293
E. Electric items:		
Electric items: no	–0.437	–0.379
Electric items: yes	0.395	0.314
F. Vehicles:		
Vehicles: no	–0.167	–0.201
Vehicles: yes	0.619	0.425
G. Mobile phone:		
Mobile phone: no	–0.001	–0.331
Mobile phone: yes	0.044	0.338
H. Ornament:		
Ornament: no	–0.578	–0.301
Ornament: yes	–0.074	0.316
I. Fan:		
Fan: no	–0.088	–0.153
Fan: yes	0.777	0.557
J. Furniture:		
Furniture: no	–0.798	–0.820
Furniture: yes	0.089	0.054

aggregating the data across two time periods. This is important because, values of many items are changed over time. For instance, before 20 years owning of a radio was a sign of wealth, but now it is a sign of poverty, as TV is now easily available with low price. The estimated value of coefficient for owning and not owning of 19 assets of different types such as animal assets, tree asset, agricultural equipment, income generating equipment, electric items, vehicle, ornament, electric fan, and furniture is presented in Table 10.12.

Table 10.12 demonstrates that among animal assets, the polychoric PCA coefficient on account of buffalo ranks the highest since buffalo is owned by the fewest households (only eight households). This is followed by pigeon, goat, duck and cow. Among tree asset, wood tree and bamboo bush show higher value of coefficients. Among other assets vehicle (bicycle and motorcycle) and electric fan have relatively higher coefficients. Although we have calculated coefficient for each item in each year, no significant change in value of coefficient is observed over the 5 year period except mobile phone. The polychoric PCA coefficient for mobile phone in 2004 was 0.044 which has increased to 0.338 in 2009 and it is now a sign of wealth. In 2004, its price was higher and it was not easily available. It was also beyond the ability of many people but its price has declined now in the market and many people have easy access to it. Households owning no ornament and furniture receive high negative coefficients (−0.578 for ornament and −0.798 for furniture) indicate that a household is likely to own few other assets. Conversely, households owning electric fan and vehicles (bicycle and motorcycle) receive relatively higher positive coefficients (0.777 for fan and 0.619 for vehicles) are highly indicative to ownership of other assets.

Part IV
Human & Social Capital, Health, and Women Empowerment

Chapter 11
Poverty and Human Capital: Literacy and Education

11.1 Introduction

Basic education and literacy are important dimensions of human capital and essential for mobility and income earning opportunities of the poor. The lack of education will limit the ability to seek better paying employment or to secure alternative sources of income that can effectively reduce poverty and vulnerability of the family. The role of education in human capital development is vitally important. Education prepares people to participate in the development of their selves and of society at large. Educated people are more productive and can enjoy a better life through increased employment opportunities and skill development. But illiteracy remains one of the major social problems in Bangladesh. Although considerable progress has been achieved during the last decades, literacy rates remain low, particularly among females. According to Welfare Monitoring Survey conducted by the Bangladesh Bureau of Statistics (BBS) in 2009, 58.9% males and 50.6% females aged 7 years and above were counted as literate (BBS 2009). Given the size of the population, the number of the illiterate people is still very high.

There are various reasons for low rate of literacy. Generally speaking, the main constraint on enrolment is the inability of parents, due to poverty, to afford to send their children to school. Despite nominal free schools, attendance at those schools involves both actual expense and opportunity costs as parents must forego children's contribution to the household economy. Children are of critical importance to the welfare of poorer households, either because they can earn income directly or they can join in productive activities to supplement income of the households. The help of girls is particularly needed in the home and for other domestic chores. Religion and other prejudice are obstacles to enrolment of girls. Thus almost 50% of the total population remains illiterate and they are least likely to get jobs and earn income for their livelihoods. With lesser education and skills their ability to earn other income and secure jobs are restricted. Consequently they are apt to live in poverty. Hence, the need for human capital development to alleviate poverty. This chapter explores the state of education in rural areas through a number of

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Table 11.1 Trends in resource allocation for education

	Resource allocation		Per capita allocation	
Year	% of ADP	% of GDP at current market price	in Taka	in US $
2004–2005	13.70	2.44	144.20	2.35
2005–2006	13.83	2.49	193.98	2.89
2006–2007	15.48	2.54	197.31	2.86
2007–2008	15.56	2.58	201.70	2.94
2008–2009	15.99	2.64	218.45	3.18

Source: Bangladesh Economic Review, 2009, Ministry of Finance

indicators such as resource allocation for education, average year of schooling, educational attainment, gender disparity and private expenditure on education.

11.2 Resource Allocation for Education

Although the actual resource allocation on education as a percentage of annual development program (ADP) shows an increasing trend, the allocation is very low compared to the needs of a large number of the population. In order to alleviate poverty, human capital development is necessary but the public investment in education ranging from 14% to 16% of annual development program (ADP) is not adequate to the need of the country (Table 11.1). In terms of GDP it ranged from 2% to 3% between 2004–2005 and 2008–2009. This figure remains very low even in relation to other South Asian countries. Although the share of resource allocation for education stood at 14–16% of ADP, the per capita spending was Tk. 144.2 in 2004–2005 to Tk. 218.5 in 2008–2009, which is around only 2–3 US dollar per year. It appears that despite considerable rhetoric concerning the importance of education, government efforts, as measured by the per capita resource allocation and budget share, are certainly far from reflecting any sense of great priority. Figure 11.1 shows the trends in resources allocation in education.

11.3 Literacy and Education

11.3.1 Average Years of Schooling

The average years of schooling of a household is defined as the ratio of total years of schooling completed by the household members of age 7 years and above to the total number of household members of age 7 years and above. The average years of schooling varies widely with the economic classes. The average years of schooling

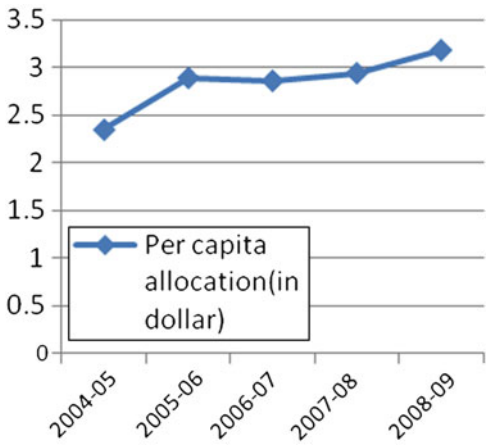

Fig. 11.1 Trends in resources allocation for education

Table 11.2 Changes in average years of schooling (age seven and above) of household by sex and economic class, 2004 and 2009

	Average years of schooling				Gini coefficient in years of schooling	
	Male		Female			
Economic class	2004	2009	2004	2009	2004	2009
Non-poor	6.4	7.0	4.6	5.3	0.4383	0.3829
Ascending poor	3.9	3.9	3.0	3.1	0.5647	0.5279
Descending non-poor	3.8	4.1	3.3	3.4	0.5252	0.5127
Chronically poor	2.3	2.6	1.8	2.1	0.6574	0.6222

of non-poor households was found to be 7.0 for males and 5.3 for females in 2009, while this figure for chronically poor households was only 2.6 years and 2.1 years, respectively, indicating a wide difference between rich and poor households (Table 11.2). Significant differences in average years of schooling are observed between males and female members of households and between economic classes. The lowest years of schooling is observed in chronically poor households and with this their ability to acquire jobs becomes restricted. Although considerable resources have already been spent on education, the rural poor have achieved very little in improving their knowledge and skill. It is assumed that the targeted programs on education, such as the female stipend program, food-for-education program for poor children might be an effective approach to improving the educational status of the poor, but in reality poor and female members could not derive benefit from these programs. Since chronically poor households have the lowest average years of schooling, they are least likely to have skill and get jobs. Even if they do get jobs, their salaries are lower than those of educated manpower. With less skill and education, their mobility in the labour market is restricted and thus their income opportunities are limited. Changes in average years of schooling between 2004 and 2009 are shown in Table 11.2.

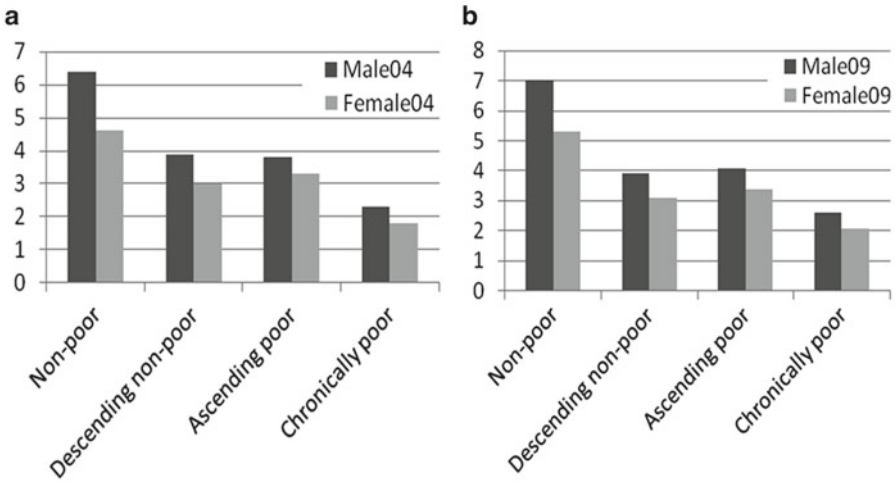

Fig. 11.2 Changes in average years of schooling of household members by sex and economic class, 2004 (**a**) and 2009 (**b**)

11.3.2 Gender Disparities in Average Years of Schooling

Wide disparities in average years of schooling are observed between males and females in Table 11.2. Although there is a sign of some improvement in this respect over the 5-year period, the average years of schooling of females even in non-poor households was much lower than their male counterparts'. The average for males was 6.4 years in 2004 and 7.0 years in 2009 in non-poor households, while the figure for females was 4.6 years and 5.3 years, respectively. The average years of schooling in chronically poor households are the lowest among all the economic classes in both 2004 and 2009. Lower level of education, particularly in females, limits the ability to seek better paying labour opportunities or to find alternative sources of income that can effectively reduce their poverty. Figure 11.2 shows the changes in average years of schooling among economic classes for males and females of age 7 years and above between 2004 and 2009.

11.3.3 Age-Specific Gender Disparities in Years of Schooling

It is interesting to note that disparity in average years of schooling increases with the increase of age and the highest gender disparity is observed in those aged 55 years and above, while the disparity is found to be lower in those aged 6–24 years (Table 11.3). This means illiteracy was a more acute social problem during the 1960s and 1970s when elderly females had the lowest years of schooling. There were various reasons for the low rate, and the constraints were different for males

Table 11.3 Changes in average years of schooling by age and sex, 2004 and 2009

	Average years of schooling			
	2004		2009	
Age group	Male	Female	Male	Female
6–14	2.53	2.75	2.88	2.76
15–24	6.06	5.98	6.67	6.70
25–34	5.14	2.96	6.31	4.82
35–44	3.88	2.06	4.47	2.22
45–54	3.69	1.31	3.59	1.84
55–64	3.36	0.71	3.96	1.28
65+	2.31	0.28	2.61	0.41

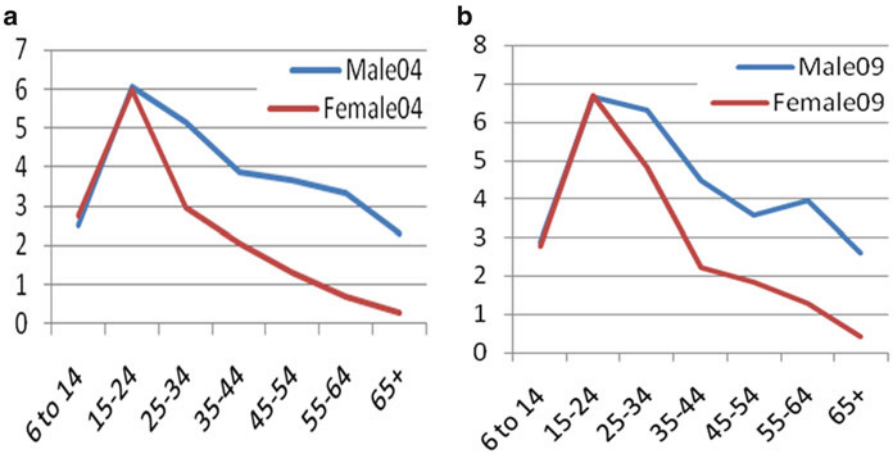

Fig. 11.3 Gender disparity in average years of schooling by age group, 2004 (**a**) and 2009 (**b**)

and females. During the 1960s and 1970s women particularly were culturally disadvantaged due to religious and other prejudices. Education was not considered a specially prized matrimonial attribute. But matrimonial strategies have been changing and now more emphasis is put on education for brides. Moreover, some attractive employment opportunities have been opened to educated women in various GO and NGO programmes. Considerable progress has been achieved with respect to education during the last decades in both of programmes. Thus age and sex are intrinsic elements in the differential pattern of average years of schooling. The elderly female population had the lowest years of schooling (0.28 years in 2004 and 0.41 years in 2009), while the figure for elderly males was 2.31 years in 2004 and 2.61 years in 2009. Figure 11.3 shows the wide gender gap between elderly males and females for 2004 and 2009, respectively.

11.4 Educational Attainment

Some positive changes are observed in educational attainment of household members aged 7 and above between 2004 and 2009. The illiteracy rate has been reduced to some extent over the 5-year period in all economic classes. The proportion of household members who completed primary education has also been increased during the study period. But very little change is observed in educational attainment of higher levels (SSC and above) in all economic classes except non-poor. It is interesting to note that there is a positive significant change in non-formal education over the 5-year period (Table 11.4).

Household income and other background may affect educational attainment if students from the low-income households (say, chronically poor) possess fewer resources and thus less able to afford education of their children. The children of these households also need to spend more time in non-academic work to supplement their family income, thereby detracting from their studies and lowering their level of educational attainment. These statements are found strong empirical support in our analysis.

11.5 Education and Welfare

Higher educational attainment contributes to higher welfare in several ways. Education levels of household members have positive association with per capita income and consumption. Educational levels of household heads have also the highest effect on per capita income and consumption. These relations are supported by our panel survey data. Conversely, people with lower educational attainment are likely to have lower income and consequently lower consumption expenditure.

Table 11.4 Changes in educational attainment of household members of age seven and above, 2004 and 2009

Educational attainment	% of Household members by economic class							
	Non-poor		Ascending poor		Descending non-poor		Chronically poor	
	2004	2009	2004	2009	2004	2009	2004	2009
Illiterate	14.8	9.9	25.6	17.8	22.3	17.1	38.5	28.5
Primary (1–5 grade)	29.1	30.6	35.0	40.3	40.4	39.9	36.3	38.8
Secondary (6–9 grade)	27.5	28.1	20.1	19.6	20.6	21.5	10.4	13.4
S.S.C.	10.6	11.3	4.2	3.5	4.0	3.5	0.6	1.0
H.S.C.	2.7	7.7	1.1	1.7	0.8	1.4	0.3	0.2
Degree/masters	6.8	5.6	1.6	0.6	0.9	0.2	0.1	0.2
Non-formal education	8.6	6.9	12.5	16.5	10.9	14.4	13.9	20.3

Table 11.5 Per capita income and consumption expenditure by education level of household head, 2004 and 2009 (Taka)

	Per capita income		Per capita expenditure	
Educational attainment of household head	2004	2009	2004	2009
Illiterate	598.6	1,174.0	551.3	1,129.5
Primary (1–5 grade)	779.9	1,462.9	687.4	1,318.6
Secondary (6–9 grade)	983.6	1,832.6	758.7	1,650.7
Secondary school certificate (S.S.C.)	1,137.8	2,576.9	822.3	2,174.0
Higher secondary certificate (H.S.C.)	1,548.5	3,329.4	1,063.8	2,430.7
Degree/masters degree	1,748.5	2,547.6	1,050.7	2,057.1
Non-formal education	609.9	1,308.9	585.3	1,207.3
Correlation coefficient between average years of schooling and per capita income and expenditure	0.290[a]	0.313[a]	0.253[a]	0.349[a]

[a]Estimated correlation coefficient is significant at 0.001 level

Those with lower educational attainment are also apt to be unemployed far more often than those with higher educational attainment. The earning gap between greater and lesser levels of education of the household heads appears to be widening. For instance, the per capita income of household heads having the level of education, higher secondary certificate (HSC) in 2009 was about 2.84 times higher than that of illiterate household heads. A similar income gap was observed in 2004. Thus the least educated will have the least amount of human capital to bring to the labour market and will receive the least income. Poverty can thus partially be explained by a failure to receive education (Table 11.5).

Although the correlation coefficient between average years of schooling and per capita income of household (0.290 for 2004 and 0.313 for 2009) is not high, they are significant at the 0.001% level. A similar result is also obtained for the correlation between average year of schooling and per capita expenditure of household (0.253 for 2004 and 0.349 for 2009). Thus simple correlation between educational attainment and income is strong and consistent. It can be said that the correlations between educational attainment and both income and expenditure became stronger in 2009 than in 2004.

11.6 Gender Disparities in Access to Education

Although the average years of schooling for females was much lower than their male counterparts', the enrolment ratio shows the opposite scenario. In all economic classes enrolment ratios for females aged 6–10 years and 11–15 years were much higher than those for males of the same age groups. However, enrolment ratio does not tell the whole story about the progress of enrolment. Rather, attendance ratio is important in assessing efficiency of system and progress of education. The food for education program at the primary level and female stipend program at the secondary

Table 11.6 Changes in enrolment ratio in primary and secondary levels by gender and economic class, 2004 and 2009

	Primary level (6–10 years of age)				Secondary level (11–15 years of age)			
	2004		2009		2004		2009	
Economic class	Male	Female	Male	Female	Male	Female	Male	Female
Non-poor	91.5	96.2	96.1	99.0	72.1	79.4	87.0	87.6
Ascending poor	89.5	88.2	90.5	93.8	74.4	79.7	73.0	82.2
Descending non-poor	86.7	95.6	98.0	97.7	65.6	74.7	74.6	79.2
Chronically poor	80.2	75.8	88.9	91.5	52.4	53.0	60.7	73.7

level might have had positive influence on female enrolment ratios. But among the economic classes children in the chronically poor households have the lowest access to both primary and secondary schools. About 92% of male and 96% female children of non-poor households enrolled in primary school in 2004, while these figures for chronically poor children were 80% and 76%. Similar variations were also observed for 2009. Although uneven access to school was found, significant improvement in enrolment ratio was observed in 2009 (Table 11.6). Despite the free primary school education in rural areas, about 20% of male children and 25% of female children aged 6–10 years (school-aged children) of chronically poor households were out of school, while these figures for 2009 was 11% and 8% indicating a significant improvement. Such improvement was also observed for enrolment ratio in secondary school. In 2004 almost half of secondary-school aged children (11–15 years) of chronically poor households did not attend in secondary school, but over the 5-year period tremendous improvement is observed. The enrolment ratio of females is much higher than that of male children. This improvement might be due to the effect of the female-stipend program at the secondary level. The main obstacle to enrolment of poor male children in secondary schools is the inability of parents to send their children to school. This is because school attendance of males involves both actual expenses and opportunity cost as parents must forego children's contribution to the household economy, which is of critical importance to the welfare of poor households. As a result about 39% of secondary-school aged (11–15 years) chronically poor male children were out of school in 2009. This figure was 13% for non-poor male children, 27% for ascending poor and 25% for descending non-poor children.

It seems from Table 11.6 that the enrolment ratios among boys aged 6–10 years and 11–15 years and among girls of the same ages suggest that of the more recent cohort, the boys of those age groups may be getting less interest and benefits than their girl counterparts.

11.7 Private Expenditure on Education

For human capital development there are two main components of expenditure; public and private. The former includes salaries of teachers, building construction, teaching and laboratory equipments. Besides public expenditure there is

Table 11.7 Average expenditure on education and its changes, 2004 and 2009

	Average expenditure on education/month (in Tk.)		
Economic class	2004	2009	% Increase over 2004
Non-poor	223.51	814.60	264.46
Ascending poor	89.45	278.28	211.10
Descending non-poor	102.14	364.24	256.61
Chronically poor	27.78	91.60	229.73

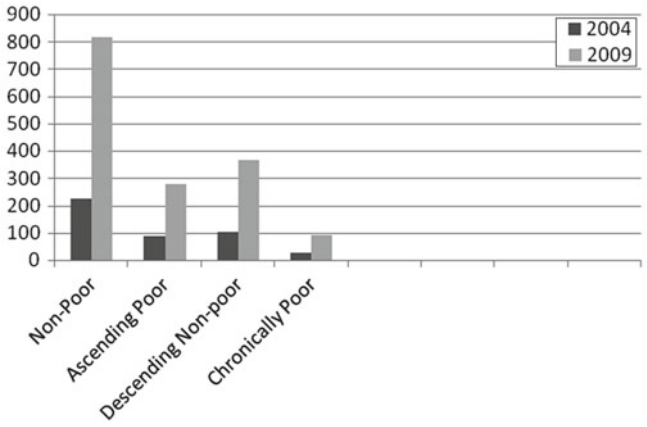

Fig. 11.4 Changes of educational expenses by economic class, 2004 (**a**) and 2009 (**b**)

some private expenditure incurred by the parents on account of purchase of books, school uniform, tuition fees, stationery and private tutors. Over the 5-year period, private expenditure for all categories of household has greatly increased (Table 11.7).

The average expenditure per month on education is the highest for non-poor households, while it is the lowest for chronically poor households. Non-poor households spent Tk. 814.60 per month on education of children; ascending poor spent Tk. 278.28; descending non-poor Tk. 364.24 and chronically poor spent only Tk. 91.60. Non-poor households had spent almost nine times more than the chronically poor. Like food expenditure, educational expenses have increased tremendously, which may be barriers to education to poor households. Figure 11.4 shows the changes in educational expenses between 2004 and 2009 by economic class.

There is a positive relationship between per capita income and average years of schooling. It appears from Fig. 11.5 that income increases with the increase in average years of schooling.

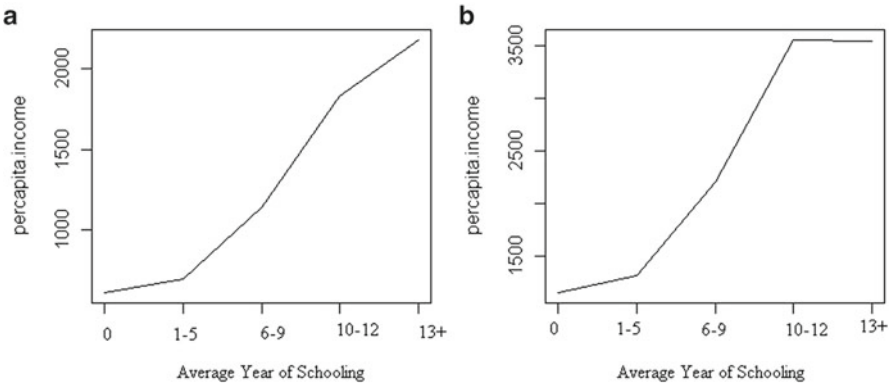

Fig. 11.5 Per capita income and average years of schooling, 2004 (**a**) and 2009 (**b**)

Table 11.8 Incidence of poverty in rural areas by education level, 2010

	% of People below poverty line	
Education level	Lower poverty line	Upper poverty line
No education	27.2	43.5
Completed class I–IV	18.4	38.1
Completed class V–IX	13.8	24.3
Completed SSC +	6.1	11.2

Source: Preliminary Report on Household Income and Expenditure Survey, 2010, BBS, Statistics Division, Ministry of Planning

11.8 Poverty and Education

Poverty is negatively related to level of education and skill. All types of outcome of education, such as employment opportunities, wages and incomes are related to poverty. In fact poor people tend to have lower levels of education, while rich people have higher level of education. Poor people work in low-paid activities and earn low income. Thus education has an impact on quality of life. The relationship between poverty and education level can be seen in Table 11.8.

It is evident from Table 11.8 that the higher is educational status and level the lower incidence of poverty. Whichever poverty line is considered the incidence of poverty is the highest among those having no education, while it is the lowest among those with educational level SSC and above. The incidence of poverty using the upper poverty line is 44% for people having no education, 38% for grade I–IV, 24% for grade V–IX and 11% for education level SSC and above. This figure for the lower poverty line is 27%, 18%, 14% and 6%. Thus poverty varies inversely with the level of education. Thus a sharp increase in education level has played an important role in increasing per capita income and reducing poverty.

Chapter 12
Poverty, Health and Child Nutrition

12.1 Introduction

Improvement in health and nutrition is important for human development both at individual and social levels. It complements socio-economic development of any community or country. It is considered that health and nutritional development are the outcome of economic development, and in turn improved health and nutritional status lead to economic development by creating a healthy work force.

Malnutrition makes people prone to disease, slow in economic activity and thus increases the incidence of poverty. It is said that poverty is the main cause of ill health and nutritional status in Bangladesh. Malnutrition is widespread among infants and children particularly in rural areas. Different household studies and surveys on health issues have indicated that one person out of seven has suffered from disease. Morbidity is higher among males than females and it is inversely correlated with economic class.

Viral fever, diarrhoeal diseases including cholera and dysentery, gastro-intestinal, lung, respiratory, skin diseases and rheumatism are the most common account for most morbidity. Evidently, improvement of the health and nutritional status will lead to higher income, higher economic growth and gradual reduction of poverty and human development. Again sufficient and improved health service facilities are essential to the improvement of health and nutritional situation of Bangladesh. Therefore, sustainable improvement of health and nutritional status should be ensured particularly for poor and vulnerable groups including women, children and old people with the ultimate goal of their economic and social development.

Though Bangladesh has made significant progress in reducing the outcome of some of the health and nutritional indicators such as infant and child mortality, maternal mortality and under-five mortality rates and life expectancy has increased steadily, the current situations are still among the highest in the world. The health situation in rural areas is worse than that in urban areas. An important factor affecting the rural health situation is the absence of good health facilities and a preventive health system. As a result, there is little choice for rural people but to seek help from

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Table 12.1 Trends in budget allocation in annual development plan (ADP) in health, population and welfare sectors

Year	Allocation on health as		Per capita allocation in US $
	% of Total ADP	% of GDP (current price)	
2004–2005	7.40	0.37	1.65
2005–2006	9.59	0.45	2.01
2006–2007	10.41	0.38	1.34
2007–2008	11.35	0.38	2.14
2008–2009	10.71	0.34	2.13

Source: Bangladesh Economic Review (2010), Ministry of Finance

the nearest and cheapest health services provided by poor quality medical staff with poor quality medical facilities. Moreover, poor rural people have little access to relatively good quality health services available in the cities and towns since high cost is involved in getting these good health services.

12.2 Resource Allocations for Health, Population and Welfare Sectors

Although the Bangladesh government has been trying to improve the situation of general health and child nutrition through implementation of basic national health programs such as family planning, immunization, child health care, reproductive health services, progress is still far from the millennium development goals (MDGs) set for the country. The resource allocation for health, population and welfare sector must be increased in order to address the challenge of improving health and reducing malnutrition. But the resource allocation in this sector is altogether inadequate for the vast population as measured by the share of development budget shown in Table 12.1.

The ADP allocation in the health sector in 2004–2005 was 7.4% of the total annual development budget, which was raised to 10.7% in 2008–2009. Although a certain improvement was observed in budget allocation from 2004–2005 to 2008–2009, the share of allocation measured as a percentage of GDP was reduced over the period, from 0.45% in 2005–2006 to 0.34% in 2008–2009. The per capita allocation in the health sector was only US$ 1.65 in 2004–2005 and US$ 2.13 in 2008–2009. It should be noted that the United States spent roughly US$ 1.9 trillion on health maintenance and care in 2005, which was US$ 6000 per person per year (Schiller 2008). Thus, despite the rhetoric of the government on health and nutrition, efforts in this area as measured by the share of development budget, appear undistinguished and far from reflecting any sense of great concern or priority.

Besides the indicators discussed above, the following five health and nutritional indicators are widely used in analyzing a household's standard of living:

1. Morbidity status by age, sex and economic status
2. Availability of health care services and basic health care for maternal health and 3 years birth delivery care

Table 12.2 Percentage of household members suffered from illness by economic class

	No. of members affected by illness		% of Members suffered from illness	
Economic class	2004	2009	2004	2009
Non-poor	512	460	29.0	22.8
Ascending poor	338	485	30.2	25.5
Descending non-poor	351	223	31.2	29.5
Chronically poor	711	461	36.3	28.9
Total	1,912	1,629	31.2	26.0

3. Nutritional status of children measured by anthropometric indicators such as weight-for-age, height-for-age and weight-for-height
4. Work days lost and income erosion due to illness, and
5. The use of these services by poor and non-poor households.

12.3 Morbidity Prevalence and Its Profile

The head of the household was asked whether any of its members was ill during the preceding 3 months of the survey and if so, then asked to describe the symptoms or name diseases. Reported symptoms or diseases were verified by a local physician and classified according to category of illness. But this approach for disease identification has some limitations. For instance, anaemia prevalence, particularly among children under five and pregnant mothers is quite high in rural Bangladesh, but it is difficult to identify without pathological test. In our study there was large-scale underreporting. Reported symptoms in many cases may not be correct to identify the disease. In the present context we have classified diseases in 15 categories or types.

12.3.1 Morbidity by Economic Class

Morbidity reflects the health status of a population or a community. Prevalence of illness in the last 3 months preceding the survey period was estimated to measure morbidity. The panel data indicate higher degrees of morbidity in both of the survey years. Of the 6,133 and 6,270 sample population in 2004 and 2009, about 31.2% in 2004 and 26.0% of household members in 2009 suffered from various illnesses during the 3 months preceding the survey, indicating 5.2% point decline in overall morbidity rate over the study periods.

Table 12.2 shows that the percentages of members of household who suffered from illness are lowest in the non-poor in both survey years. Inadequate and imbalanced food intake makes people prone to disease and increase the likelihood of morbidity and thus mortality. Malnutrition and living in unhygienic conditions also expose people to a range of diseases. Ill-health and poverty are circular. One produces

the other. Ill-health keeps poor people poor for longer periods, while poverty breeds illness as indicated by the high incidence of illness among the chronically poor household members in both 2004 and 2009.

It is notable that each and every economic class experienced declines in percentage from 2004 to 2009. Among the economic classes, the largest decline in the illness percentage point (i.e., the relative improvement in general health condition) is seen in the chronically poor, at 7.4 points. On the other hand, it is the descending non-poor class that has experienced the smallest decline in the illness percentage, i.e., only a 1.7 point drop. Thus prevalence of illness appeared to be associated with economic class.

12.3.2 Morbidity by Type of Disease and Economic Class

Table 12.3 shows that the incidence of general viral-fever with headache was significantly high in all economic classes in both 2004 and 2009, followed by injuries/arthritis/joint pains (6.2% in 2004 and 7.7% in 2009), cough with cold (6.4% in 2004 and 7.1% in 2009), stomach ache (5.9% in 2004 and 5.1% in 2009), respiratory problem (7.8% in 2004 and 4.3% in 2009), diarrhoea (6.5% in 2004 and 3.5% in 2009), influenza/typhoid/malaria (4.7% in 2004 and 3.1% in 2009) and skin diseases (4.3% in 2004 and 3.4% in 2009). Out of 15 diseases, the morbidity rate of 8 diseases has increased, while the incidence of the other 7 diseases has dropped over the 5-year period. However, there is no significant variation in prevalence of disease across economic classes but variation is observed in the type of diseases.

12.3.3 Morbidity by Age

Age and illness are found to be closely related. The youngest (<5 years) and the oldest (60+ years) are more likely to suffer illness. Table 12.4 illustrates the relationship between age and morbidity. These two extreme groups were significantly more likely to be sick than other age groups (5–14 years and 15–60 years). Morbidity estimates by age group were lower among the adolescents than any other age group. The prevalence of diarrhoea, dysentery, cough with cold and pneumonia/respiratory problem appeared to be high among the youngest (<5 years) and the oldest (60+ years) population, followed by the 5–14 years population. Heart disease, blood pressure and respiratory problems were found to be more pronounced among the oldest (60+ years) population. Illness, as types of disease, is thus appeared to have some relationship with age, the youngest and the oldest of population are more likely to be sick than the other age groups. There was a tangible difference in prevalence rate between 2004 and 2009 except for viral fever, pneumonia/respiratory problem, diarrhoea and cough cold. However, aging itself causes higher morbidity and household health expenses.

Table 12.3 Changes of prevalence of morbidity for 15 symptoms/disease by economic class

		% of Individuals suffering from illness									
		Non-poor		Ascending poor		Descending non-poor		Chronically poor		Total	
Disease		2004	2009	2004	2009	2004	2009	2004	2009	2004	2009
1.	Viral fever with cold/headache	29.1	35.9	35.5	41.4	34.2	37.4	36.1	37.9	33.8	38.3
2.	Cough with cold	7.0	7.5	5.6	7.5	6.3	7.2	6.3	6.1	6.4	7.1
3.	Respiratory problem	6.6	3.7	7.7	4.5	9.7	5.4	7.9	3.9	7.8	4.3
4.	Stomach ache	7.0	3.7	4.7	6.2	4.8	5.0	6.0	5.2	5.9	5.1
5.	Rheumatism/rheumatic fever/gout	3.9	3.5	4.1	4.7	3.7	5.0	2.5	3.9	3.4	4.2
6.	Dysentery	2.9	3.3	3.8	1.0	2.6	2.7	3.1	1.7	3.1	2.1
7.	Diarrhoea	5.7	2.6	7.4	2.7	6.3	4.5	6.8	4.8	6.5	3.5
8.	Skin disease	3.9	4.2	3.6	2.9	3.4	3.6	5.3	3.1	4.3	3.4
9.	Influenza/typhoid/malaria	4.3	3.1	5.3	2.3	5.7	3.6	4.2	3.7	4.7	3.1
10.	Injury/arthritis/wrist pain	7.0	8.8	5.0	6.6	7.7	7.7	5.3	7.8	6.2	7.7
11.	Heart disease/blood pressure	2.3	4.1	0.9	2.6	1.1	3.2	1.7	2.8	1.6	3.8
12.	Gynecological problem	1.2	0.9	0.6	0.2	0.3	0.5	1.0	0.7	0.8	0.6
13.	Eye/ear/teeth problem	2.7	3.1	2.1	3.9	1.1	3.2	2.1	3.7	2.1	3.5
14.	Anaemia	0.8	0.9	1.8	1.6	1.1	0.5	0.8	2.4	1.0	1.5
15.	Others (cholera, pox, measles, tetanus)	12.6	15.4	11.5	11.8	10.8	12.0	12.2	10.7	11.9	12.4
Total		100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 12.4 Morbidity by type of disease and age group

Type of disease	Age group (in yrs.)							
	0–4		5–14		15–60		61 & above	
	2004	2009	2004	2009	2004	2009	2004	2009
1. Viral fever with headache	29.7	50.0	40.6	54.6	34.9	33.4	16.5	26.7
2. Cough cold	13.4	11.2	7.7	9.3	3.3	5.9	6.8	5.7
3. Pneumonia respiratory problem	17.9	7.3	6.6	3.3	4.3	3.2	9.8	8.0
4. Stomach ache	1.3	0.0	3.6	1.1	8.3	6.9	6.8	6.8
5. Rheumatic fever/rheumatism	0.0	0.0	1.3	0.7	4.5	5.5	10.5	7.4
6. Dysentery	4.0	5.8	2.3	0.4	3.0	1.9	3.8	1.7
7. Diarrhoea	13.9	11.7	5.4	0.0	4.5	2.7	3.8	4.0
8. Skin disease	5.6	2.9	7.4	5.6	3.0	2.9	1.5	3.4
9. Influenza/typhoid	4.3	2.4	6.4	5.9	4.5	2.8	2.3	1.1
10. Injury/arthritis/joint pain	0.8	0.0	2.8	2.6	8.3	10.6	15.8	8.5
11. Heart disease/blood pressure	0.0	0.0	0.5	0.0	2.5	4.7	3.0	9.1
12. Gynecological problem	0.0	0.0	0.3	0.0	1.4	0.9	0.0	0.0
13. Eye/ear/teeth problem	1.1	2.9	2.0	3.7	2.4	3.8	3.0	2.3
14. Anaemia	0.5	0.0	0.8	1.1	13.3	2.1	1.5	0.6
15. Others (cholera, pox, measles, etc.)	7.5	5.8	12.5	11.5	13.8	12.8	15.0	14.8
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 12.5 Prevalence of morbidity for 15 symptoms/disease by gender

	Male		Female		Total	
Disease	2004	2009	2004	2009	2004	2009
1. Viral fever/headache	31.7	40.3	36.7	36.4	33.8	38.3
2. Cough with cold	6.2	7.7	6.5	6.5	6.4	7.1
3. Respiratory problem	9.0	4.5	6.8	4.0	7.8	4.8
4. Stomach ache	5.8	5.9	5.9	4.2	5.9	5.1
5. Rheumatism/rheumatic fever/ gout	2.5	2.7	4.2	5.7	3.4	4.2
6. Dysentery	3.1	2.5	3.1	1.7	3.1	2.1
7. Diarrhoea	6.6	3.9	6.4	3.1	6.5	3.5
8. Skin disease	5.3	3.4	3.4	3.3	4.3	3.4
9. Influenza/typhoid/malaria	4.9	2.5	4.5	3.7	4.7	3.1
10. Injury/arthritis/wrist pain	6.6	6.5	5.8	8.9	6.2	7.7
11. Heart disease/blood pressure	1.4	2.9	1.8	4.6	1.6	3.8
12. Gynecological problem	0.0	0.0	1.6	1.1	0.8	0.6
13. Eye/ear/teeth problem	1.9	3.8	2.3	3.7	2.1	3.5
14. Anaemia	0.5	0.5	1.5	2.5	1.0	1.5
15. Others (cholera, pox, measles, tetanus)	14.6	13.3	10.4	10.5	12.4	11.9
Total	100.0	100.0	100.0	100.0	100.0	100.0

12.3.4 Morbidity and Gender

Table 12.5 shows that morbidity due to fever, headache, cough with cold, rheumatic fever and anaemia was higher among females in the study population than their male counterparts. Males are more likely to be affected by diseases other than these. The prevalence of aneamia, as expected, is higher among females than males although the sex difference in sickness was not statistically significant. No tangible difference in morbidity was found with respect to gender.

12.4 Duration of Illness

Duration of suffering from illness is considered an important indicator of health status and economic losses due to illness. Table 12.6 shows that about 40–50% of household members exposed to illness suffered for 1–7 days, 20–25% suffered for 8–15 days, 3–4% for 16–21 days, 5–9% for 22–30 days, 2–4% for 31–60 days, and 14–24% of household members suffered for more than 2 months. Duration of illness generally depends on the type, nature and intensity of the disease. Comparing the two points of time of our survey, it is noted that the percentages of people who suffered from illness for less than a week have gone down and that of people who suffered illness longer than 2 months have gone up, regardless of classes. This may

Table 12.6 Percentage distribution of members who suffered illness by duration and economic class

	Non-poor		Ascending poor		Descending non-poor		Chronically poor	
Duration in days	2004	2009	2004	2009	2004	2009	2004	2009
1–7	46.1	43.3	50.9	44.3	49.9	44.4	49.1	39.9
8–15	21.7	18.7	22.8	20.8	24.2	19.7	23.9	25.4
16–21	4.1	3.3	4.4	4.1	2.6	4.0	3.9	3.9
22–30	7.4	5.9	6.5	8.7	7.7	8.1	5.3	8.7
31–60	2.7	4.8	1.2	3.9	2.6	1.8	4.2	4.8
60+	18.0	24.1	14.2	18.1	13.1	22.0	13.5	17.4
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 12.7 Average income erosion due to illness by economic class

	% of People who lost income		Average income erosion (Tk.)	
Economic class	2004	2009	2004	2009
Non-poor	5.1	7.6	956.2	2,872.3
Ascending poor	5.6	16.3	790.5	1,331.9
Descending non-poor	8.0	15.2	553.2	1,052.9
Chronically poor	10.5	20.4	381.3	1,085.1

be, examining Tables 12.3–12.5, due to the increased incidence of sickness related to heart disease and blood pressure of people, particularly in those aged 61 and above, and females in all economic classes.

12.5 Workdays Lost and Income Erosion Due to Illness

Income erosion due to illness is considered an important indicator to measure the effect of illness on the household economy. This indicator is important particularly for the extremely poor, since the number of workdays lost is directly related to their income and livelihoods. Economic consequences of loss of workdays due to illness are distinct. While 5% and 8% of non-poor household members who were exposed to illness lost their income due to illness in 2004 and 2009, respectively, 11% in 2004 and 20% in 2009 of household members of chronically poor lost their income due to illness (Table 12.7). Income erosion due to illness keeps poor people poor for longer periods and this breeds the greatest threat to their lives and livelihoods. The average burden of income loss was Tk. 956 for non-poor, Tk. 790 for ascending poor, Tk. 553 for descending non-poor and Tk. 381 for chronically poor in 2004. This figure for 2009 was Tk. 2,872, Tk. 1,332, Tk. 1,053 and Tk. 1,085, respectively, indicating a more than two to three times higher income erosion occurred in 2009 than in 2004. This partially explains the downward movement along the poverty spiral during 2004–2009. Thus income erosion due to illness is detrimental to a

family's economic security. Income erosion due to illness has crept up threefold for the non-poor and the chronically poor in 2009, while that for the ascending poor and the descending non-poor are less than twice of 2004. A sick person not only fails to earn income but also household expenses increase due to his or her medicare.

In Box 12.1, Mr. Kartik Chandra Shil describes the curse of sudden illness of an earning member of a poor family.

Box 12.1 Sudden Incidence of Illness and Vulnerability: The Case of Kartik Chandra Shill

The case of Mr. Kartik Chandra Shil of Paschim Kaligram Kukua Village under Kalkini Upazila of Madaripur District speaks of the curse of sudden illness of earning member of a poor family. Mr. Kartik Chandra Shill is the eldest son of a poor barber. Due to poverty he had to accept unwillingly the profession of a barber in his boyhood to assist his father. After the death of his father, Kartik started a barber shop independently at Pathuripara bazar. Kartik married at Kaligram. Three years after his marriage his wife gave birth to a daughter, and 4 years later, he sold his paternal land to his younger brother. Kartik purchased a piece of land adjacent to his father-in-law's house and constructed a house there with loan money from Grameen Bank, Asha and from his own savings. With the income of his barber shop Kartik was living happily with his small family. All of a sudden misfortune fell upon Kartik's family when appendicitis of his wife needed to be operated upon on urgent basis while she was pregnant for 7 months. For operation

and treatment of his wife Kartik took out a loan of Tk. 120,000 from a money lender with exorbitant interest rate. His wife was operated upon successfully at hospital but the child in her womb did not survive. Illness of Kartik's wife has affected the economic stability of the entire household and pushed the household into extreme poverty. In the mean time the money lender and NGOs began to press hard on Kartik to pay back the loan money with interest. Being undone he sold off his barber shop and a piece of land and paid back the loan of the money lender. By working in another barber shop he has been maintaining his family and paying back the loans of the money lender and NGOs with much difficulty. Now Kartik's life is very vulnerable to any kind of risk. High interest rate of loan pushes Kartik into vicious circle of tyranny and exploitation of money lenders. Hunger as well as food insecurity remains the major concern of his daily life.

12.6 Private Health Expenditure

The private health care expenditure has two main components: expenditure for hospital services and for medicine, pathological and other tests and transportation. Table 12.8 indicates that the cost of both hospital and medicine including tests and transportation more than doubled during the 5-year period. The cost estimate shows wide variation across economic classes. The highest cost was incurred by non-poor households, and the lowest by chronically poor households. That the lowest cost was incurred by the poor could be due to, despite being sick, their not taking medicine or consulting doctors since they could not afford to. On the other hand, non-poor households are economically better off and they can afford better treatment, costly medicine, private hospital/clinic and a specialist. As a result, expenditure for non-poor households on account of hospital, medicine, tests and transportation was much higher than in other economic classes.

12.7 Maternal and Child Healthcare

12.7.1 Antenatal Care

Antenatal care (ANC) during pregnancy is an important step in preventing any adverse pregnancy outcome. It also indicates the status of treatment received by pregnant women. Regular visits to a good doctor for check up and first visit on time are essential to reduce the risks of any complications for mother and child during delivery. For most effective delivery and to maintain good health during pregnancy, it is recommended that ANC visits should be made monthly for the first 7 months, fortnightly in the eighth month and then weekly until the birth takes place. But in rural areas very few pregnant women follow the routine check up. The panel data indicate that a significant proportion of pregnant women did not receive ANC from any source. It appears from Table 12.9 that the proportion of mothers who took ANC and who gave birth in the 3 years preceding the survey improved over the 5-year period.

Table 12.8 Average private health expenditure on treatment in the 3 months preceding the survey by economic class

	Average expenditure (Tk.)			
	Hospital		Medicine, test and transport	
Economic class	2004	2009	2004	2009
Non-poor	6,647.3	2,600.0	1,115.8	1,908.6
Ascending poor	786.0	2,250.3	412.6	961.4
Descending non-poor	1,275.0	1,024.0	513.9	1,532.8
Chronically poor	386.4	1,875.7	227.4	830.9

Table 12.9 Percentage distribution of mothers who took ANC in the 3 years preceding survey by source of ANC and economic class

	% of Pregnant women who received ANC by source of providers							
	Public health providers		Private health service providers		Satellite clinic		None	
Economic class	2004	2009	2004	2009	2004	2009	2004	2009
Non-poor	23.0	41.1	14.6	29.8	5.5	3.7	56.9	25.4
Ascending poor	15.9	34.2	20.7	15.8	7.3	7.9	56.1	42.2
Descending non-poor	14.7	31.3	16.9	14.6	9.6	6.3	58.8	47.8
Chronically poor	17.6	24.2	15.9	13.7	7.6	5.3	58.9	56.8

Table 12.10 Percentage of mothers who received postnatal care by economic class

	% of Mother who received PNC		% of Mother who did not receive PNC	
Economic class	2004	2009	2004	2009
Non-poor	26.2	40.5	73.8	59.5
Ascending poor	17.9	32.8	82.1	66.2
Descending non-poor	19.2	44.5	80.8	55.6
Chronically poor	12.1	31.8	87.9	68.2

12.7.2 Postnatal Care

Postnatal care (PNC) is important to improve health care of the mother and protect the health of new born baby. Very few good facilities are available for PNC in rural Bangladesh. Although the use of PNC increased between 2004 and 2009, yet more than 60% mothers did not receive PNC during and after delivery in the 3 years preceding the survey dates (Table 12.10). The proportion of mothers who received PNC increased to about twofold in 2009 compared to 2004. The highest proportion of mothers who received PNC was found among descending non-poor (45%), followed by non-poor (41%), ascending poor (33%), while the lowest proportion was observed among the chronically poor households (32%). Like ANC, there should be routine check-ups for PNC also. But most mothers in rural areas do not go to doctors until and unless the complication arises. Another reason is that there are no mother and child specialists in rural areas. These are available in district hospitals/clinics but are not easily accessible to the poor. Figure 12.1 gives the percentage of mothers in the four economic classes who received postnatal care between 2004 and 2009.

12.7.3 Delivery Seeking Behaviour

Trained birth attendants who deal with delivery cases can improve the maternal health and safe delivery of babies. But the number of skilled birth attendants in rural

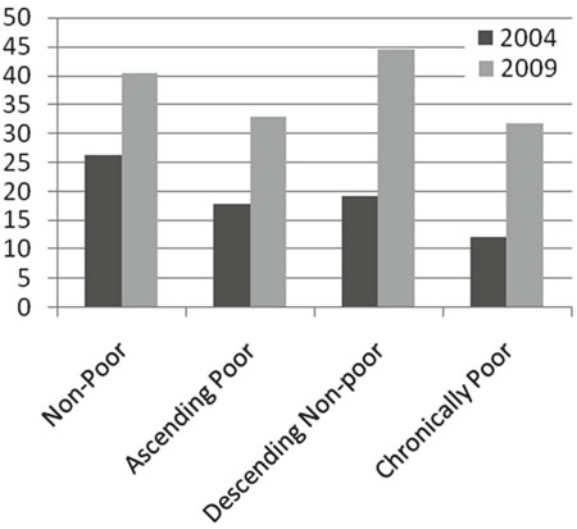

Fig. 12.1 Percentage of mothers who received postnatal care, 2004 and 2009

Bangladesh is quite inadequate for taking delivery care and ensuring safe delivery. Place of delivery is another dimension of delivery care. The personnel who take part in conducting delivery and the place where delivery is taking place are important in reducing the risk of complication and infection that might cause death or illness of mother and new born baby. During data collection in 2004 and 2009 the women were asked to give information about the place and type of delivery attendant during delivery of babies who were born in the 3 years preceding the survey. The respondents provided the following information.

12.7.4 Place of Delivery

The panel data show that nearly 85% of deliveries took place at home in 2009, while this figure was 95% in 2004, registering some improvement in delivery places (Table 12.11). Significant improvement was observed among non-poor households where about only 59% deliveries took place at home in 2009 as against 90% in 2004. This figure was 89% for ascending poor, 86% for descending non-poor and 96% for chronically poor households in 2009 as against 92%, 93% and 99%, respectively in 2004. Thus home as a place of delivery is still quite common in rural areas for poor households. There is a marked difference in the proportion of births occurring at health facilities at different levels by economic classes. The likelihood of deliveries at health facilities is higher for women in non-poor households and it is lower for women in chronically poor households. About 18% of the women of non-poor households, 11% of ascending poor, 8% of descending non-poor and only 3% of chronically poor households used a family welfare centre, upazila health com-

Table 12.11 Percentage of deliveries in the 3 years preceding the survey by place of delivery and economic class

	Place of last delivery						
	Home		FWC/UHC/DH/ medical college hospital		Private/NGO health centre/ clinic		
Economic class	2004	2009	2004	2009	2004	2009	Total
Non-poor	90.4	69.3	6.7	18.4	2.9	12.3	100.0
Ascending poor	92.3	89.2	6.4	10.8	1.3	0.0	100.0
Descending non-poor	93.2	86.1	5.5	8.3	1.4	5.6	100.0
Chronically poor	99.3	95.5	0.7	3.4	0.0	1.1	100.0
Total	94.6	83.5	4.2	11.2	1.2	5.3	100.0

Table 12.12 Percentage of births in the 3 years preceding the survey by type of assistance and economic class

	% of Birth attendant									
	Relative/ neighbour		Traditional birth attendant (dai)		Trained birth attendant		Doctor		Total	
Economic class	2004	2009	2004	2009	2004	2009	2004	2009	2004	2009
Non-poor	50.5	30.7	31.1	37.7	13.6	10.5	4.8	21.1	100.0	100.0
Ascending poor	57.0	45.8	27.7	39.8	10.3	3.6	5.0	10.8	100.0	100.0
Descending non-poor	58.3	27.8	31.5	52.8	6.5	5.6	3.7	13.8	100.0	100.0
Chronically poor	73.5	43.2	21.8	51.1	2.0	0.0	2.7	5.7	100.0	100.0

plex, or district hospitals/medical college hospitals as a place of delivery. Only a few used NGO and private health centres as a place of delivery. Little breakthrough took place except among non-poor rural households with respect to the place of delivery. It is evident that most deliveries occurred in unhygienic conditions, resulting in a high incidence of infant mortality. Institutional deliveries particularly in rural areas for poor women are almost absent but delivery at home is the common feature among rural women.

12.7.5 Delivery Attendants

Before taking up discussion of delivery attendants it would be appropriate to recapitulate on the place of delivery for different economic classes. This is because place of delivery and delivery attendants are associated. For instance, deliveries at home are more likely to be attended by unskilled and non-medical personnel. Table 12.12 shows that about 51% of the total deliveries among non-poor were

assisted by relatives/neighbours, 31% by traditional birth attendant (dai), 14% by trained birth attendant and 5% by doctors in 2004, while this figure for 2009 was found to be 31%, 38%, 11% and 21%, respectively. It is notable that about 74% of the total births of chronically poor households was attended by a relative/neighbour in 2004. In all economic classes there has taken place a clear improvement in quality of birth assistance between 2004 and 2009. But there are significant disparities between economic classes. Deliveries in chronically poor households take place at high risk to both mother and baby and only 6% of the total births were attended by a qualified doctor though this figure was less than 3% in 2004. However, traditional birth attendants still persist to play a key role in assisting delivery in rural Bangladesh.

12.8 Anthropometric Measures of Child Nutrition

Nutritional status depends on many factors but largely depends upon balanced and sufficient dietary intake. Poor food intake has gravely affects the nutritional status of children. The prevalence of child malnutrition is widespread in rural Bangladesh, adversely affecting the growth of children, body structure and health. The long-term adverse effect of malnutrition is the reduction of intellectual ability, learning ability, mental and cognitive development. It also affects educational attainment and performance, indirectly preventing the poor from working for long periods and earning higher income. Lack of physical and cognitive development leads to anthropometric failure. To measure anthropometric failure the following information for children aged 6–59 months was collected in 2004 and 2009.

1. Age in months
2. Weight in kilograms; and
3. Height in centimeters.

These data were used to calculate different anthropometric indices for measuring nutritional status of children and to interpret the nutritional status in relation to standard reference data for childhood weight, height and age. The standard references for children's anthropometry was suggested in the 1975 National Centre for Health Statistics (NCHS), USA and for comparison the following three widely-used anthropometric indices have been estimated:

1. Weight-for-age (underweight)
2. Weight-for-height (wasted); and
3. Height-for-age (stunted).

The first index is a measure of the child's weight in relation to his age, which is influenced by the combined effects of weight-for-height and height-for-age. The second index explains body mass in relation to body length. It also explains how thin or fat a child is in relation to his height and it is the effect of inadequate food intake. The third index indicates how tall or short a child is in relation to his age and it also shows linear growth retardation.

Table 12.13 Prevalence of underweight children (weight-for-age) by economic class

	% of Underweight children aged 6–59 months			
	Moderates underweight (≤ −2SD)		Severely underweight (< −3SD)	
Economic class	2004	2009	2004	2009
Non-poor	21.4	21.4	4.2	2.4
Ascending poor	30.9	25.8	9.3	7.8
Descending non-poor	21.3	19.6	10.1	8.9
Chronically poor	30.6	29.0	11.2	12.2
Overall	26.9	24.7	9.0	7.7

Table 12.14 Prevalence of wasted (weight-for-height) children by economic class

	% of Wasted children of age 6–59 months			
	Moderates wasted (≤ −2SD)		Severely wasted (< −3SD)	
Economic class	2004	2009	2004	2009
Non-poor	3.4	2.4	0.0	2.4
Ascending poor	5.2	8.8	1.0	1.8
Descending non-poor	1.1	7.1	1.1	1.8
Chronically poor	6.4	9.2	1.0	0.8
Overall	4.6	6.8	0.8	1.6

In order to measure the nutritional status of children by economic class, the Z score (or standard deviation score) has been estimated for each sample child from the mean value of the reference population. The Z-score < −2SD and < −3SD of the NCHS reference have been used as a cut-off point to describe the level of nutritional status of the children (i.e. < −2SD is considered as modern outcome of malnutrition). Table 12.13 shows the prevalence of underweight of sample children for 2004 and 2009. On average, about 25% of the 441 sample children were moderately underweight (< −2SD) in 2009, while this figure was 27% for 2004 indicating some improvement over the 5-year period. Chronically poor households have the highest prevalence of underweight (31% in 2004 and 29% in 2009). Severe underweight (< −3SD) children (11% in 2004 and 12% in 2009) was also observed among chronically poor households, while severity was lowest among non-poor households. An inverse relationship is observed between economic class and level of malnutrition.

The prevalence of wasted which measures the body mass in relation to body length of under-five children is presented in Table 12.14 for 2004 and 2009. It reveals that more children in chronically poor (6.4% in 2004 and 9.2% in 2009) households are moderately wasted than in other economic classes and the lowest prevalence is observed among children of non-poor households. But the prevalence of wasted among the children in 2009 has deteriorated compared to 2004. This means that children in 2009 were more affected by shortage of food than in 2004. Very few children were found to be severely wasted in all economic classes.

Table 12.15 Prevalence of stunted children (height-for-age) by economic class

	% of Stunted children of age 6–59 months			
	Moderately stunted (≤ −2SD)		Severely stunted (< −3SD)	
Economic class	2004	2009	2004	2009
Non-poor	23.1	21.0	17.1	21.0
Ascending poor	41.8	34.3	19.4	11.2
Descending non-poor	39.5	33.3	29.4	13.0
Chronically poor	33.8	28.9	29.4	23.4
Overall	33.5	28.8	22.9	14.2

Table 12.15 shows that about 29% of children in 2009 and 34% in 2004 were moderately stunted, while the severely stunted children were 14% in 2009 and 23% in 2004, indicating a significant reduction in the prevalence of stunted children over the study period. Also there were wide differences in the prevalence of malnutrition across the economic classes.

The anthropometric measures provide a vivid benchmark picture of the poor economic conditions, consequent to illness, poor health condition and malnutrition under which the chronically poor households manage to live their lives. Malnutrition is severe, widespread but apparently decreasing. If malnutrition could be eliminated, morbidity and mortality would be greatly improved. But, in addition to an inadequate food intake, there are risks involved with other matters such as unsanitary living conditions, unsafe drinking water, and unhygienic toilet facilities. Thus poverty makes people more prone to malnutrition and disease.

To sum up: although a considerable resources have been allocated and spent in the health sector, very little achievement in reducing morbidity, mortality and improving the health status of the poor is observed. The morbidity rate, work days lost due to illness, income erosion, proportion of delivery at home are still higher among poor households.

Chapter 13
Social Capital and Shocks Coping Strategies

13.1 Introduction

A variety of concepts and definitions of social capital are found in the contemporary literature. Some authors define social capital as an intangible asset which is non-physical and being difficult to measure in monetary terms. Others have mentioned that social capital is generated through membership of social networks at different levels, ranging from the individual or household to the local political system. But these definitions do not have a clear and undisputed meaning and they are not free from criticism and disagreement for ideological reasons (Dolfsman and Dannreuther 2003; Foley and Edwards 1997). Some authors argued that definition may vary between disciplines, level and subject of investigation. It also varies with the variation of relations and structure of relations among actors. Social capital has multidimensional aspects ranging from sociological to economic. But common to most definitions of social capital is that they focus on social relations that have productive benefits. In other words, we can say that social capital is the fruit of social relations and benefits derived from the cooperation between individuals and groups. Just like physical and human capital, social capital increases productivity. A plough (physical capital) and university education (human capital) can increase productivity both individually and collectively. Similarly, social networks, relations and contacts (social capital) can also increase the productivity of individuals and groups. Since social capital is an intangible asset, it is very difficult to measure its scale and thus benefit directly. But we can realize the benefit positively from social networks, relationships and participations (Dasgupta 1999). Social capital is important for the well-being of the poor since they are repeatedly affected by natural calamities and it is useful for them to cope with problems of different dimensions, such as health services, food insecurity and access to public services. But in rural Bangladesh there is dearth of social organisations, social networks, cohesion and trust among people that can work as a safety net for rural people particularly for the poor.

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Table 13.1 Percentage of households having relational capital with politically influential rich relatives by economic class

	% of households having rich/ influential relatives	
Economic class	2004	2009
Non-poor	60.8	55.3
Ascending poor	28.4	26.5
Descending non-poor	45.8	40.6
Chronically poor	17.6	20.9
Total	36.6	34.9

Thus social capital is particularly important to economic and social development of the rural poor at individual and collective levels. The NGOs in rural areas play an important role in forming institutional social capital among the poor. Institutional capital is more structured and regulated (Ostrom 1990; Coleman 1988).

13.2 Relational and Institutional Capital in Rural Areas

Relational social capital refers to social networks with neighbours, rich and influential people and political leaders who come forward to help people when they face problems. This type of social capital is more amorphous and less governed by the rules and regulations, but generally this type of network is prevalent in rural areas and it is more important to the livelihoods of the rural poor. The survey findings indicate that non-poor households are most actively involved with local institutions.

The following sections give a profile of social networks by economic class. When heads of households were asked whether any adult member had relations with rich and politically influential persons, 36.6% of the sample household heads affirmed that they had in 2004 (Table 13.1). In 2009, the percentage fell a little to 34.9.

It is observed that about 61% of non-poor households had rich politically influential relatives in 2004. This figure reduced to 55% in 2009 and the reduction is observed for all economic classes except the chronically poor. The reduction may be due to changes of political party in power and dissolution of marriage or death of relatives. About 28% in 2004 and 27% in 2009 of ascending poor households had relational capital with rich and influential relatives, while the figure for descending non-poor was 46% and 41%, respectively. The chronically poor had the lowest social capital (18% in 2004 and 21% in 2009). The economic status of a household is a good indicator of social capital and very poor households are least likely to have rich and influential relatives. The difference in social capital between non-poor and chronically poor households is highly significant ($P<0.01$) suggesting that non-poor households have high relational capital compared with chronically poor households.

13.3 Membership in Local Institution

Household heads from the higher economic class (non-poor) consistently had the highest rates of membership in local institutions. This includes membership of school, madrasha, market, mosque and irrigation management committees. Table 13.2 shows that 45% of non-poor household heads, 25% of the ascending poor, 23% of descending non-poor and 12% of chronically poor household heads were members of local institutions in 2004. This figure for 2009 was 37%, 13%, 13% and 7%, respectively, indicating a significant reduction of membership rates in local committees over the five-year period. It is notable that chronically poor household heads have the lowest local institutional network and the difference between the two extreme economic classes is significant ($P < 0.01$). Membership is closely and positively correlated with the level of economic class. The highest rate of membership is among non-poor household heads, while the lowest rate is observed among chronically poor household heads in both years.

13.4 Membership of Adult Household Members by Economic Class

Membership of local institutions provides opportunities to make institutional social networks. The most commonly accessed local institutions are political party, Union Parishad, Bank, Grameen Bank, BRAC, NGOs, Muktijoddha Committee, VGD/VGF, social event committee, and local club/association. Membership of these local institutions is important because they provide access to social networks for material, non-material goods or services and public welfare benefits. Generally, membership is positively correlated with the level of economic class. The level of membership by economic class is shown in Table 13.3. It is evident from Table 13.3 that association of adult members of non-poor households with a political party is most dominant (16% in 2004 and 10% in 2009), while the least association is observed in adult members of chronically poor households (0.8% in 2004 and 0% in 2009). This implies that the poor have little voice and political power in society, which affects their opportunities in getting public welfare benefits, such as VGD, FGD, old-age

Table 13.2 Membership of household heads in local institution by economic class

	% Membership	
Economic class	2004	2009
Non-poor	45.0	36.5
Ascending poor	24.7	12.8
Descending non-poor	23.1	13.3
Chronically poor	11.7	7.2
Total	24.5	18.1

Table 13.3 Changes in percentage distribution of adult household members affiliated with different institutions

	Non-poor		Ascending poor		Descending non-poor		Chronically poor	
Type of affiliation	2004	2009	2004	2009	2004	2009	2004	2009
Membership of political party	15.5	10.3	3.3	1.9	5.6	2.9	0.8	0.0
UP chairmanship/membership	2.6	3.5	1.4	0.5	0.9	1.4	0.4	0.3
Membership of Grameen Bank group society	15.5	21.5	10.2	12.9	12.0	15.7	4.7	7.0
Membership of BRAC group society	2.3	9.4	7.4	14.5	5.1	14.3	4.7	11.6
Membership of school/Madrasha/ bazaar committee/others	36.9	–	17.7	–	16.2	–	1.3	–
Membership of different GO/ NGO group society	13.6	17.9	15.3	26.8	13.9	24.3	15.0	20.1
Participation in different social events	62.8	80.0	52.6	–	55.6	1.4	36.0	33.0
Membership of VGD/VGF/RMP group	3.6	3.5	5.6	11.8	7.9	15.0	5.6	22.3
Close relation with Union Parishad	9.1	10.3	2.8	1.9	2.3	0.7	0.6	0.3
Other professional society company	0.6	1.2	3.3	2.2	2.8	1.4	2.1	0.9
Gram Sarkar	4.9	4.7	2.8	–	1.9	2.1	0.4	0.9

pension and relief. It is notable that the highest percentage (16% in 2004 and 10% in 2009) of members from non-poor households are affiliated with political institutions such as Union Parishad and Gram Sarkar through which they can derive political power and economic benefits. A higher proportion of them are also involved in the committees of school, madrasha and bazaar (rural market) and their participation in local social events is also higher than in other groups. On the other hand, very few members of chronically poor households have political affiliation and they are less involved with local level political institutions such as political party, Union Parishad and Gram Sarkar. Thus the poor are deprived of these opportunities and economic benefits. But over the five-year period membership of the Grameen Bank (GB), BRAC and other NGO groups has increased among poor household members.

Generally, membership of local institutions is positively correlated with economic class and the rich exercise local power and derive economic and welfare benefits from these institutions. By contrast, poor people are deprived of these opportunities and they are forced to involve themselves with NGOs or private moneylenders because of the relative lack of political institutional affiliation.

The rich are simultaneously involved with multiple institutions and thus have a greater chance of achieving material and non-material benefits from several institutions. Table 13.4 shows the diversity of affiliation with local institutions.

Table 13.4 Diversity in involvement with local institution by economic class

Diversity of involvement	% of household head involved by economic class							
	Non-poor		Ascending poor		Descending non-poor		Chronically poor	
	2004	2009	2004	2009	2004	2009	2004	2009
No involvement with institutions	16.2	42.2	22.8	45.7	24.1	42.7	44.3	51.0
1 institution	30.7	30.5	40.5	35.3	38.9	37.1	37.3	31.4
2 institutions	26.9	15.8	25.6	13.6	24.5	14.7	14.4	14.1
3 institutions	16.2	7.2	6.5	3.7	10.2	4.9	3.6	3.5
4 institutions	7.4	2.6	3.7	0.5	1.4	0.7	0.4	–
5 institutions	1.9	1.4	0.9	–	0.5	–	–	–
6 institutions	0.6	0.3	–	–	0.5	–	–	–
Total	100	100	100	100	100	100	100	100

It is evident from Table 13.4 that the proportions of household members who were not involved with any local-level political institution were higher in 2009 than 2004 for each and all economic classes. While almost 10% of members of the non-poor households were involved with more than three local-level institutions in 2004, this figure for 2009 was 4.3%. There is no member of the chronically poor who was involved with more than three institutions. Among those who were involved, the majority, 31% were involved with 1 institution: similarly with ascending poor and descending non-poor households. Thus non-poor household heads have the greater opportunity to be involved with multiple local institutions and thus they have greater institutional capital, whereas the poor household heads have lower instructional capital and hence have less opportunity to gain economic and social benefits. On the other hand, non-poor households gain political and economic power from multiple local-level institutions since these are the key elements in gaining social and economic power.

13.5 Shocks and Coping Strategies

A shock may be defined as an event that has negative consequences for the lives and livelihood of people. They can be natural, economic, social and political. Shocks are attributable to one or more factors operating simultaneously. Among natural shocks, flood, drought, cyclone, storm, tidal waves, earthquake, accident, crop pest/disease and livestock disease may have great impacts. Illness, food shortage, loss of livestock/poultry, market fluctuations, and dowry are the major economic shocks. Whatever the type of shock, it has severe and quite often long term effects on the household economy. From the overall economic perspectives a shock due to natural disaster results in great loss of physical infrastructure, human life and destruction of production and income-generating activities. Repeated shocks grievously damage the country's economy, decrease food security and increase risk and vulnerability of people.

Shocks may be classified into two broad categories: (1) covariate and (2) idiosyncratic, depending on the level at which they occur, i.e., at community or country level or at individual or household level. The severity of covariate shocks is wider. Covariate shock occurs mainly due to natural disasters and epidemics. The whole community or country is affected by covariate shocks. For instance, the unprecedented floods of 1998 in Bangladesh disrupted the whole economy of the country. Besides causing deaths and casualties of thousands of people, the floods damaged crops, roads, bridges and culverts. The suffering and wide economic disruption caused by the unprecedented Eastern Japan Great Earthquake and Tsunami in 2011 may be cited as an example of covariate shock.

13.5.1 Covariate Shocks and Vulnerability

In both years the survey was conducted during December and January and there was no severe natural calamity such as cyclone, high tidal surge or wave during those periods. However, each household head was asked to state whether they had experienced any covariate shocks in the previous 12 months. If household heads reported that they had experienced shock, they were again asked to mention three important covariate shocks that affected their lives and well-being. In response to that question most of them identified crop disease/pest, river erosion and flood as the most common and significant covariate shocks in rural Bangladesh. Crop disease/pest is the most common covariate shock. When crops are lost farmers fall deeply in debt and become vulnerable to poverty. Loss of land and houses by river erosion are also important covariate shocks and many households, particularly near the banks of rivers, are badly affected and it becomes impossible to recover or reverse the loss.

Flood as a covariate shock was also experienced by some of the sample households. The effects of flood were manifold. It led to crop failure, loss of production, death of animals, destruction of roads, bridges and culverts, which resulted in great economic loss that can again trigger distress sales of land and assets to buy food for survival.

13.5.2 Idiosyncratic Shocks and Vulnerability

Idiosyncratic shocks impose serious hardship on an individual or a particular household who experiences this type of shock. It causes limited destruction of physical infrastructure. In 2004, 55.4% of sample non-poor households, 48.3% of ascending poor, 54.6% of descending non-poor, and 55.9% of chronically poor households reported at least one idiosyncratic shock, while this figure in 2009 was found to be 49.4%, 42.0%, 63.0% and 37.0%, respectively. Among idiosyncratic shocks, death of main income-earner, income erosion due to illness, death of livestock, dacoity/theft, large medical expense due to illness, money extortion, land-related litigation

Table 13.5 Idiosyncratic shocks experienced by households by economic class, 2004 and 2009

	Non-poor		Ascending poor		Descending non-poor		Chronically poor	
	2004	2009	2004	2009	2004	2009	2004	2009
Death of main income-earner	–	–	0.4	–	0.9	–	0.2	–
Income erosion due to illness	4.7	2.0	3.6	2.9	7.5	3.5	10.5	2.9
Death of livestock	5.3	4.0	8.4	6.7	7.0	14.0	5.5	6.7
Dacoity/theft	4.1	3.7	0.4	5.4	3.1	6.3	0.6	2.7
Large medical expense due to illness	32.5	24.4	30.6	17.1	27.3	27.3	34.1	17.1
Money extortion	4.1	3.4	1.8	1.6	2.6	3.5	0.9	1.6
Land-related litigation expenses	2.5	7.5	1.3	3.2	2.2	4.9	0.8	3.1
Others	2.2	4.4	1.8	5.1	4.0	3.5	3.3	2.9
Total response %	55.4	49.4	48.3	42.0	54.6	63.0	55.9	37.0

expenses are inquired in our survey. These shocks erode income earnings and saving, and create a sudden demand for resources in order to recover losses. Large medical expenses were reported most frequently (Table 13.5). The effect of illness can be severe if more than one household member suffers acute disease.

Large medical expenses were the most commonly reported idiosyncratic shock experienced by the sample households across economic classes. Nearly 33% of non-poor households, 31% of ascending poor, 27% of descending non-poor and 34% of chronically poor households reported large medical expenses in 2004, while this figure was 24%, 17%, 27% and 17%, respectively, in 2009. These indicate significant reduction in medical shocks over the five-year period excepting the descending non-poor.

Other shocks include dowry, eviction from house and land, loss in business, oppression by the husband, house gutted by fire. 2.2% of non-poor households, 1.8% of ascending poor, 4.0% of descending non-poor, and 3.3% of chronically poor households experienced these other types of shock in 2004. In 2009 this figure was 4.4%, 5.1%, 3.5% and 2.9%, respectively. Any type of shock results in income/savings erosion and accentuates vulnerability and poverty.

13.6 Loss Due to Shocks

Efficient and reliable estimate of economic loss due to shock/crisis experienced by a household is difficult in absence of sound and scientific method of measurement. When household heads were asked to provide information on their economic loss in terms of money by shock/crisis, they reported from memory or from rough calculation because it is difficult to provide exact values. For instance, to ascertain an accurate estimate of income loss due to crop pest/disease is difficult since its estimate varies with the variation of intensity of occurrence in one area to another, one

Table 13.6 Average loss per household due to shocks by economic class, 2004 and 2009

	Average loss (Taka)	
Economic class	2004	2009
Non-poor	16,792.6	21,400.3
Ascending poor	5,749.5	6,619.7
Descending non-poor	9,915.6	2,129.3
Chronically poor	2,973.6	5,562.0

farm to another and even from one household to another. Keeping these problems in mind, the average economic loss is estimated on the report provided by household heads as shown in Table 13.6.

The average loss of non-poor households due to shock was almost five times higher than that of chronically poor households in 2004 and it was four times higher in 2009. The loss was also significantly higher for descending non-poor households than for ascending poor and chronically poor households in 2004. This is because non-poor households own more agricultural land than others, and loss was incurred mainly from crop damage due to flood, crop pest and disease. Conversely, chronically poor households possessed least land and ran least risk of shocks due to flood, but for them income erosion due to illness was large in 2004, though it diminished over the period. And illness of a working household member is the most commonly reported idiosyncratic shock experienced by the sample households. 27.3% of descending non-poor households reported that they had large medical expenses due to illness and illness was the main cause of their vulnerability. Commonly used coping strategies in households whose members suffered illness were spending savings, selling land and other durable assets, loans with interest, selling livestock, mortgaging household durable assets, loans from friends and relatives. Thus repeated shocks and illness of adult members of a household lead to increased vulnerability and a decrease in food security at individual, household, community and national level.

13.7 Adopted Coping Strategies

Coping strategy is defined as the ways and means by which an individual or a household is protected from negative effects on livelihood due to shocks. In wider terms, it is the ways by which an individual or a household adjusts livelihood strategies in response to a shock. Coping strategies may range from adjusting food habits to shifting to poorer quality food. They may also involve the use of savings or sale of assets. When normal strategies are insufficient to cope the crisis, a household uses distress strategies such as selling of productive assets (female livestock, and advance selling of labour and crops) or adjusting the number of meals. The type of coping strategy to be adopted by a household largely depends upon the type of crisis and resources a household has at its disposal. In addition, adoption of a coping strategy

depends on many other factors such as the economic status of the household, the extent and nature of the crisis. Many households cannot cope with a crisis because of lack of resources. Use of savings is the most common of all strategies. Borrowing from a moneylender is the second most common coping strategy for all types of household, followed by a loan from friends/relatives and loan from a bank/NGO. Besides these, distress sales of productive assets such as land, livestock and advance sale of crop are also adopted as crisis coping strategy in responding to a shock. Other strategies include adjusting meals, sale of labour in advance. There is a variation between economic classes in adopting coping strategies. Household heads that had experienced any shock were asked to report five important strategies that they undertook during shocks. Their reported strategies are shown in Table 13.7.

It is evident from Table 13.7 that response to shock varies with the variation of economic class. The most immediate strategy of chronically poor households is borrowing from moneylenders at high interest, while use of savings is the main coping strategy of non-poor households. Figures 13.1 and 13.2 illustrate the percentage of households by economic class that adopted various coping strategies in 2004 and 2009.

13.8 Safety Net Benefits for Coping Strategy

Bangladesh is highly vulnerable to shocks due to frequent natural disasters and economic crisis. The majority of the population particularly in rural areas, is either poor or at the risk of falling into poverty due to lack of assets and crisis coping capacities in the face of illness, flood, cyclone and other crises. Rural people suffer most from natural disasters and are prone to become vulnerable to poverty. Thus safety-net programs are important and critical to poverty reduction and sustaining the food security. Safety-net programs are generally targeted to groups at risk such as widows, the disabled, blind, the aged, poor children and vulnerable women. Households having no adult income earning member or no land and having no productive asset to support the family are entitled to benefits from the safety-net programs. There are broadly two types of safety-net program. One is cash transfer and the other is food-based program. According to HIES 2010, about 30% of rural households received at least one type of benefit from safety-net programs during the 12 months preceding the survey. This figure in 2005 was 13%, indicating that the coverage of programs greatly increased over a five-year period. There were 11 safety-net programs in 2005, but the programs were widened and included 30 programs in 2010 (HEIS 2010). These programs are also extended to those households who experienced shocks and crises and these programs are used as coping strategies. In the 2009 household survey the household heads were asked to state whether they received any benefit from safety-net programs between 2005 and 2009 and many of them affirmed that they had thus received benefits from the program. Table 13.8 summarizes the distribution of households that received benefits from any safety-net program.

Table 13.7 Coping strategies adopted in 2004 and 2009 by economic class

	% of household adopted strategies							
	Non-poor		Ascending poor		Descending non-poor		Chronically poor	
Coping strategy	2004	2009	2004	2009	2004	2009	2004	2009
Could not cope	50 (15.3)	31 (14.1)	44 (22.7)	44 (24.2)	48 (23.8)	41 (32.8)	75 (21.0)	47 (24.6)
Use of savings	199 (60.9)	122 (55.5)	93 (47.9)	73 (40.1)	67 (33.2)	25 (20.0)	149 (41.7)	40 (20.9)
Sale of land	6 (1.8)	19 (8.6)	3 (1.3)	10 (5.5)	10 (5.0)	13 (10.4)	10 (2.8)	11 (5.8)
Loan from money-lender	42 (12.8)	44 (20.0)	27 (13.9)	44 (24.2)	43 (21.3)	34 (27.2)	67 (18.8)	74 (38.7)
Loan from friend and relative	9 (2.8)	19 (8.6)	8 (4.1)	9 (4.9)	22 (10.9)	13 (10.4)	32 (9.0)	24 (12.6)
Sale of livestock	2 (0.6)	5 (2.3)	6 (3.1)	5 (2.7)	2 (1.0)	3 (2.4)	8 (2.2)	8 (4.2)
Loan from Bank/NGO	12 (3.7)	7 (3.2)	7 (3.6)	10 (5.5)	11 (5.4)	4 (3.2)	15 (4.2)	3 (1.6)
Sale of crop in advance	10 (3.1)	1 (0.5)	10 (5.2)	1 (0.5)	5 (2.5)	0 (0.0)	2 (0.6)	1 (0.5)
Others	12 (3.7)	14 (6.4)	6 (3.1)	10 (5.5)	14 (6.9)	16 (12.8)	19 (5.3)	14 (7.3)
Column total	327 (30.3)	220 (30.7)	194 (18.0)	182 (25.3)	202 (18.7)	125 (17.4)	357 (33.0)	191 (26.6)

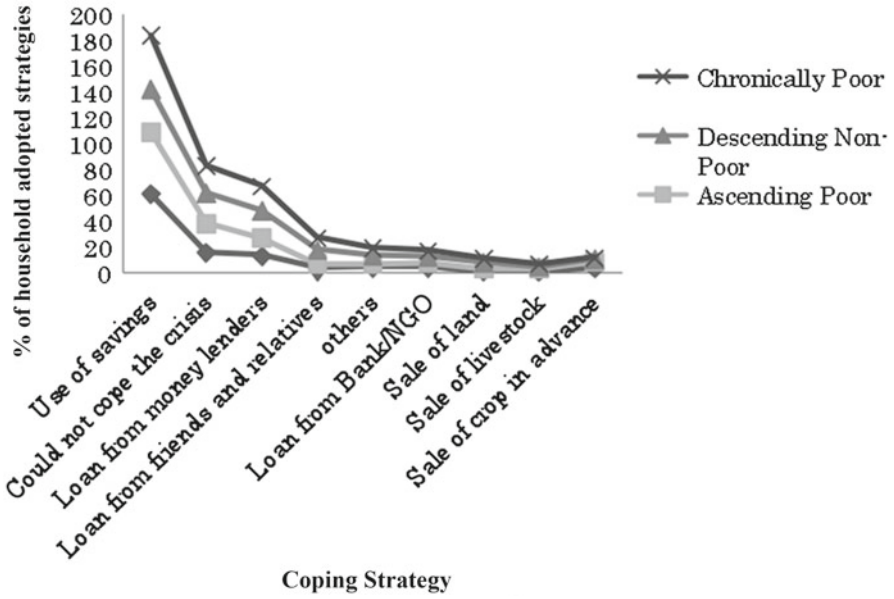

Fig. 13.1 Coping Strategies Adopted in 2004 by Economic Class

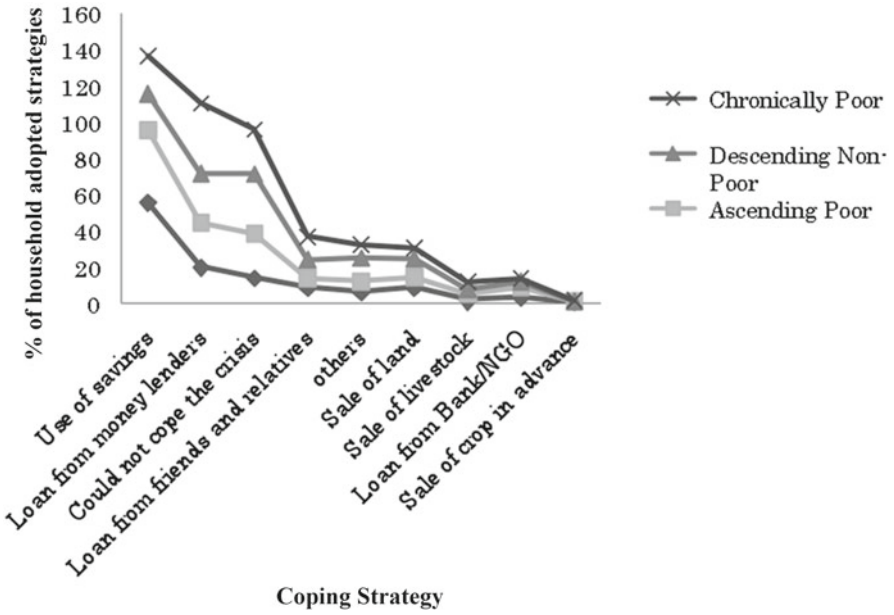

Fig. 13.2 Coping Strategies Adopted in 2009 by Economic Class

Table 13.8 Percentage of households who received benefits from safety-net programs between 2004 and 2009 by economic class

	Non-poor	Ascending poor	Descending non-poor	Chronically poor
Food for work (FFW)	0.6	1.6	2.8	3.8
Old age allowance	2.6	6.1	6.3	12.4
Vulnerable group development (VGD)	4.0	4.0	3.5	11.6
Vulnerable group feeding (VGF)	9.8	10.7	10.5	13.6
Test relief	0.6	20.3	21.7	32.9
Allowance for destitute women	6.6	2.7	1.4	4.9
Primary education stipend	6.0	11.2	9.8	13.9
Secondary education female stipend	0.3	2.9	9.1	4.3
Benefit under 100 day work	–	2.4	3.5	5.5
Maternity allowance	0.3	0.3	–	0.3
Livestock program	1.4	0.6	0.7	0.3
Disaster risk reduction	2.3	4.3	2.8	1.7
Economic risk reduction	0.9	0.8	0.7	0.3
Muktijhoddha allowance	0.6	0.3	2.8	0.3

It appears from Table 13.8 that there was a misclassification in targeting of the safety-net programs. For instance, non-poor households are not entitled to get benefit from food for work (FFW), VGD, VGF, test relief, allowance for destitute women, disaster and economic risk reduction programs, but they received benefits from those programs. This may happen if non-poor households have strong social capital with high-ranking officials or if they have social networks with politicians. The highest proportion of destitute women from chronically poor households received benefit (4.9%). Chronically poor households also received the highest proportion of benefits on account of food for work, old age allowance, VGD, VGF, test relief and primary education enrolment. It is worth mentioning that the role of safety-net programs in coping with disaster risk and economic risk is not significant and very few households received benefits for coping with the effect of shocks and crises.

To sum up, social capital plays an important role in deriving benefits from safety-net programs and other facilities: social networks likewise in taking coping strategy. The chronically poor have the fewest social networks with politically influential and rich relatives. Lack of access to low interest rates places burdens on poor households. These households usually take out a loan at high interest rates from money-lenders and NGOs to cope with a crisis rather than for investment purposes. Distress sale of household durable assets is the second most important coping strategy of poor households. Given the poor state of social capital and assets, interventions should focus on human capital that increases the coping capabilities of the poor. Intervention aimed at small stock intensification, such as livestock and poultry can also help poor households to cope with their crisis.

Chapter 14
Women's Empowerment and Mobility

14.1 Introduction

Although women's empowerment was widely discussed for long, it gained increasing recognition and widespread usage in world over only after 1990s by the United Nations. It became an essential part of the declarations for action in the 1990 World Conference on Education for All, the 1992 United Nations Conference on Environment and Development, the 1993 Human Rights Conference, the 1994 International Conference on Population and Development, the 1995 World Summit for Social Development, and the 1995 Fourth World Conference on Women. Women's empowerment also called gender empowerment became a significant topic of discussion in the 1990s in the UN bodies and various conferences. The role of women's empowerment was recognised as an essential element for the development process. The programmes of action from these conferences stressed the empowerment and autonomy of women and also stressed on the improvement of political, social, economic and health status of women's. Recognising the necessity of women's empowerment, the International Conference on Population and Development calls upon the organs of the United Nations for effective supports to the implementation of the programmes of action in each country and stressed on the following five components of women's empowerment (UNPOPIN):

1. Women's sense of self-worth
2. Right to have access to opportunities and resources
3. Right to have and to determine choices
4. Right to have the power to control their own lives, both within and outside home, and
5. Right to have ability to influence the direction of social change in right direction.

In general terms, women's empowerment refers to increasing spiritual, political, social and economic strength of women and to developing confidence in their own capacities. It covers a wide range of meanings from psychological and economical to human rights. Poor and illiterate women have been in the grip of their husbands

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in both sexuality and economic life. Women who are disadvantaged due to prevailing custom and social norms especially have no control over their bodies, sex, choice of marriage partners and decision-making process. This group of women, particularly in rural area, has been harassed and exploited by their husbands and others.

14.2 Measurement of Women's Empowerment

There is no single and scientific method for measuring women's empowerment due to lack of widespread technical expertise in this area. Other problem arises from the fact that measuring degree of women's empowerment is impeded by the lack of accurate and sound statistical information on women: their reproductive health, socio-economic implications of changing gender roles and gender disparity in earned income. However, measuring the gender empowerment can be attempted through the Gender Empowerment Measure (GEM) as suggested by UNDP (United Nations Development Programme). This measure shows women's participation in a given nation, both politically and economically. GEM is calculated by taking women's share in parliament seats, share of legislators, share of high-ranking officials and managers and female professional and technical workers. There are other measures such as Gender Parity Index (GPI) and the Gender-related Development Index (GDI). All these indices take into account mainly the importance of women's participation in socio-economic development. These indices do not tell us clearly about women's empowerment itself. However, calculation of GEM, GPI and GDI is beyond the scope of current study. In the present study we will examine the women's rights in different aspects of life ranging from economic, social, to cultural side of decision-making. We are interested in knowing whether rural women have:

- Control over resources such as land and other assets
- Control over the decision making process, and
- Barriers on movement in or outside home or community.

Lack of control over those factors denies women's human rights and limits their full participation in economic development and society. Status of women in the society is assessed by their control power over productive assets, valuable assets such as house, ornament, education and employment.

The prestige on the other hand is assessed in terms of their employment in government offices and involvement in politics. There are 300 seats in parliament but 45 seats are reserved for women and these women are selected by the political parties in Bangladesh. How the female employment in government offices and corporate bodies can be seen for 2009 in Table 14.1, which shows the number and the percentage of female employment within government offices. It shows female and total employment in ministries/divisions, departments/directorates, and autonomous bodies/corporations in Bangladesh government classifies by class I

Table 14.1 Class-wise number of female officers and employees, 2009 [number (%)]

Class		Ministry/division (secretariat)	Departments/ directorates	Autonomous bodies/ corporations	Total
Class I	(F)	400 (18.6)	8,746 (17.9)	4,449 (9.9)	13,595 (14.2)
	(T)	2,146	48,845	44,968	95,959
Class II	(F)	279 (14.4)	3,445 (16.6)	2,338 (9.1)	6,062 (12.5)
	(T)	1,931	20,811	25,745	48,487
Class III	(F)	342 (14.8)	175,963 (28.8)	6,070 (6.9)	182,383 (26.1)
	(T)	2,318	609,927	87,765	700,010
Class IV	(F)	289 (12.5)	18,633 (13.5)	2,682 (4.2)	21,604 (10.6)
	(T)	2,316	137,822	63,411	203,549
Grand total	(F)	1,310 (15.0)	206,789 (25.3)	15,545 (7.0)	223,644 (21.3)
	(T)	8,711	817,405	221,889	1,048,005

Source: Statistical Pocketbook of Bangladesh, 2010. Tables 4.16 and 4.17

through class IV. Although female employment in the government offices has been promoted, it is still only at 21% of the total. Within the autonomous bodies and government corporations the female employment entails only at 7%. In terms of classes of employment, the percentage of female employment is the highest in the class III at 26%, and the lowest in class IV at 10.6%. Class I and class II are ranked just in-between these two classes. Class-wise number of female officers and employees is shown in Table 14.1.

Women's employment is fundamental to mobility and independence of women, which in turn promote self-esteem and leadership of women in the society. As can be seen from Table 14.1, it is evident that very few female labour force was employed in 2009. Among the total officers, female percentage is 14.2 in class I (high-ranked officials). It is 12.5% in class II (second-grade officers), 26.1% in class III (office assistants), and 10.6% in class IV (office attendants), indicating very minimal mobilization and empowerment of women in Bangladesh.

On the other hand, feminization of agriculture in Bangladesh is evident from Table 14.2. While male employment has been moving toward non-agriculture from 1999–2000 to 2005–2006 based on the data from Labour Force Survey, the female employment has shifted to more agriculture during the same period. Looking at the data for both sex, however, it is apparent that the percentage distributions between agriculture and non-agriculture for both sex and male show similar figures, apart from the female figures. This is because the female employment among the total employment occupies smaller shares compared to the male employment.

According to community/village survey conducted by the BBS, it has been shown that women's representation in union parishads/councils has significantly increased. Fourteen percent of chairperson and 47% of members are women as against only 5% and 18% in 2005, respectively. There was no woman UP secretary in 2005, while 16% of the UP secretaries are now women.

Table 14.2 Employment in broad economic sectors by sex

		Total	Agriculture	Non-agriculture
1999–2000	Both sex	100	51.3	48.7
	Male	100	52.2	47.8
	Female	100	47.7	52.3
2002–2003	Both sex	100	51.7	48.3
	Male	100	49.8	50.2
	Female	100	58.6	41.4
2005–2006	Both sex	100	48.1	51.9
	Male	100	41.8	58.2
	Female	100	68.1	31.9

Source: Statistical Pocketbook of Bangladesh, 2010. Table 4.10

14.3 Women's Mobility and Empowerment

One of the important dimensions of women's empowerment is women's mobility outside home and participation in social activities. The physical mobility of women outside home for income generating activities or other purposes indicates their capacity in achieving certain objectives and are considered to be more empowered than those who are unable to achieve the same objective. Mobility was assessed by variables such as women's participation in jobs, visit to different offices and market. In rural Bangladesh movement of young married or unmarried Muslim women is generally restricted and thus have low mobility. Women, in addition to being needed at home, are culturally disadvantaged by religious and other prejudice. They were not expected to use their education to find a job and their education was not a prized matrimonial attribute. However, matrimonial strategies have been gradually changing and put now more emphasis on education for brides and some avenues for women's employment have been opened to educated women in government and non-government programs. Although social barriers on women's mobility have been reduced slightly, women's involvementt in outside home is still considered as non-prestigious for the household particularly in rural area. Within the home, household chores are mainly carried out by women, including washing, cleaning, cooking and other domestic activities. In the present study, the mobility of women refers to the mobility of wives of household heads and female heads. The panel survey data indicate a limited mobility of women and only 218 women in 2004 and 216 women in 2009 were involved in income-generating activities (IGAs) outside the home (Table 14.3). Women's mobility is limited since their socio-economic status in rural Bangladesh is significantly low. The burden of poverty is biased towards women, given their low literacy rates, poor nutrition, lack of income opportunities due to low education level and gender disparities. However, 66% in 2004 and 53% of the total wives/women heads who moved outside home for income generating activities (IGAs) were from chronically poor households. This figure was 13% for non-poor, 25% for ascending poor, and 9% for descending non-poor

Table 14.3 Mobility of women outside the home for income-generating activities by economic class, 2004 and 2009

	Mobility of women outside home (%)	
Economic class	2004	2009
Non-poor	24 (11.0)	28 (13.0)
Ascending poor	23 (10.6)	54 (25.0)
Descending non-poor	27 (12.4)	19 (8.8)
Chronically poor	144 (66.1)	115 (53.2)
Total	218 (100.0)	216 (100.0)

households in 2009. In 2004, this figure was 11%, 11%, 12%, respectively. Highest percentages of households with headed by women was found in chronically poor households. The correlation between a higher prevalence of female-headed households and higher prevalence of women in income generating activities may indicate that the wives/women heads of chronically poor are more likely to participate in income generating activities outside home, either by choice or by circumstances. Thus female-headed poor families have entirely different patterns of income and rely mostly on various forms of welfare.

14.4 Women's Participation in Outside Home Activities

In rural area, particularly poor women are involved in multiple activities and engaged themselves in whatever activities available to them. However, only main and most frequent type of activity has been reported in this section. The nature of work a woman will do largely depends upon the economic status as well as human capital of the woman. Woman from non-poor households also work outside the home but their work is not non-prestigious and not related with the sale of labour. Those who work outside the home are mainly engaged in teaching, petty business and small trade, for example. They also participate in agricultural work but within the homestead area. Conversely, majority of the women from chronically poor households are engaged in low-paying and non-prestigious jobs such as selling of labour, housemaid and agricultural work. Certain proportion of chronically poor women go outside home regularly for fetching water and collecting cooking fuel.

Women from ascending poor and descending non-poor also participate in a variety of income generating activities outside home. Agricultural work, selling labour, housemaid, services under NGOs and petty business were the main activities for women from ascending poor households. Women from descending non-poor households were actively engaged in agricultural work, selling labour, housemaid, and services for NGOs. Strict comparisons of results with regard to engagement of wives/female heads outside home are difficult due to conceptual difference in data collection in 2004 and 2009. Due to conceptual changes there is

significant differences in proportion of wives of household heads/female heads in participation in different income earning activities. Participation of women in different income generating activities is shown in Table 14.4.

14.5 Household Head's Wives/Female Heads Who Bought Necessary Commodities Within Last One Year

In both surveys, wives of household heads and female heads were asked to inform whether they bought anything within last year with their own earned money. In response to this question, 409 (or 34%) wives/female heads in 2004 and 374 (or 32%) in 2009 replied in the affirmative. The highest proportion of wives/female heads of chronically poor (41%) bought commodities for their families, while lowest proportion of wives/female heads of non-poor (28%) bought necessary commodities for their families. This figure for ascending poor and descending non-poor was 30% and 31%, respectively, in 2004. Almost similar figures were reported in 2009 by the wives/female heads of non-poor (25%), ascending poor (29%), descending non-poor (28%), and chronically poor (42%) households (Table 14.5).

14.6 Expenditure Pattern of Earning Women by Economic Class

In order to examine the women's empowerment in terms of expenditure, wives of household heads and female heads were asked in the panel surveys to state whether they bought anything in the past one year with their earned income. The expenditure pattern varies with the variation of economic class. When they were asked to mention the name of item(s) which they bought in the past year, their answers were recorded in Table 14.6. It is notable that 70% of wives/female heads from chronically poor households spent their earnings on food items (necessary goods), while 61% of the wives of non-poor spent on cosmetics (luxury items). Although 55% of the wives/female heads spent on cosmetics, the items concerned are limited to coconut oil, soap, hair bands and clips. Books and stationery are also important items of spending for children, followed by utensil for household use and clothes. But in 2009, 88% of wives/female heads of chronically poor households spent on food items, while the figure for ascending poor, descending non-poor and non-poor households was 68%, 69% and 48%, respectively. It is also notable that less proportion of household spent on cosmetics in 2009 than in 2004 but increased proportion of household spend on food items in 2009 compared to 2004. Similar expenditure pattern is observed for other items between 2004 and 2009.

Table 14.4 Percentage of income earning activity outside of home by household head's wife/female heads

	Non-poor		Descending non-poor		Ascending poor		Chronically poor		Total	
Type of activity	2004	2009	2004	2009	2004	2009	2004	2009	2004	2009
Agricultural work	19.2 (05)	10.7 (03)	11.5 (03)	28.6 (06)	32.0 (08)	30.6 (19)	9.8 (18)	22.8 (34)	13.1 (34)	23.8 (62)
Sale of labour	3.8 (01)	7.1 (02)	15.4 (04)	28.6 (06)	20.0 (05)	21.0 (13)	36.6 (67)	33.6 (50)	29.6 (77)	27.3 (71)
Business/small trade	26.9 (07)	3.6 (01)	0.0 (00)	14.3 (03)	12.0 (03)	11.3 (07)	5.5 (10)	2.0 (03)	7.7 (20)	5.4 (14)
Job in NGO/garment or weaving	3.8 (01)	35.7 (10)	23.1 (06)	4.8 (01)	16.0 (04)	21.0 (13)	6.0 (11)	6.0 (09)	8.5 (22)	12.7 (33)
Teaching/tuition	26.9 (07)	39.3 (11)	7.7 (02)	9.5 (02)	0.0 (00)	3.2 (02)	0.5 (01)	0.7 (01)	3.8 (10)	6.2 (16)
House maid	0.0 (00)	0.0 (00)	26.9 (07)	4.8 (01)	4.0 (01)	4.8 (03)	31.7 (58)	25.5 (38)	25.4 (66)	16.2 (42)
Others	19.2 (05)	3.6 (01)	15.4 (04)	9.5 (02)	16.0 (04)	8.1 (05)	9.8 (18)	9.4 (14)	11.9 (31)	8.5 (22)
Respondent number	26	28	26	21	25	62	183	149	260	260

Table 14.5 Percentage distribution of wives of household heads/female heads who bought commodities by economic class, 2004 and 2009

Economic class	2004	2009
Non-poor	27.5	25.4
Ascending poor	29.8	28.9
Descending non-poor	30.6	28.3
Chronically poor	41.1	42.2

Table 14.6 Commodities purchased by type with own earnings of wives of household heads and female heads by economic class

	Non-poor		Ascending poor		Descending non-poor		Chronically poor	
Type of commodity	2004 n=85	2009 n=86	2004 n=64	2009 n=109	2004 n=66	2009 n=39	2004 n=194	2009 n=144
Food items	22.4	47.7	35.9	67.6	48.5	69.2	69.6	87.5
Cloth/dress	21.2	30.2	34.4	41.9	21.2	33.3	30.4	33.3
Book/stationery for children	38.8	40.7	31.3	42.9	36.4	41.0	35.1	40.3
Cosmetics	61.2	37.2	50.0	34.3	51.5	33.3	54.6	22.9
Gold/silver ornaments	7.1	8.1	–	6.7	1.5	–	2.6	1.4
Utensils	30.6	32.6	34.4	37.1	21.2	25.6	34.0	32.6
Livestock/poultry	4.7	7.0	4.7	4.8	3.0	2.6	0.5	4.2
Others	32.9	37.2	39.1	52.4	50.0	53.8	67.5	67.4

14.7 Women's Participation in Local Institutions

According to our panel data, a high percentage (36% in 2004 and 35% in 2009) of chronically poor women were associated with local institutions while the lowest association (19% in 2004 and 12% in 2009) was observed in descending non-poor household. (Table 14.7) The figure for non-poor households was 27% in 2004 and 22% in 2009, and for ascending poor women it was 19% in 2004 and 31% in 2009. A large proportion of wives and female heads of chronically poor households participate in local institutions for economic gain and they participate not by choice but by circumstances. Majority of them became members of NGOs, Grameen Bank's society and VGD/VGF/old age) allowance programs (Table 14.8). Few proportion of wives/female heads of chronically poor households get chance to become member of political party, union parishad and school/madrasha/mosque management committee. Conversely, relatively large proportion of wives of households/female heads of non-poor households became members of these prestigious organisations. Association in these organisations determines an individual's whole range of relationships—economic, social, political—with others in the society. It increases one's social status and leads one's role in the development processes. Opportunities of wives of households/female heads of ascending poor

Table 14.7 Participation of wives of household heads/female household heads in local institutions by economic class (%)

Economic class	2004	2009
Non-poor	26.9	21.7
Ascending poor	18.8	31.3
Descending non-poor	18.8	11.9
Chronically poor	35.5	35.1

Table 14.8 Women's involvement in local institution by type and by economic class

	Non-poor		Ascending poor		Descending non-Poor		Chronically poor	
Local institution	2004	2009	2004	2009	2004	2009	2004	2009
Member of political party	5.2	2.4	–	0.8	–	4.3	0.6	–
Member of union parishad	3.7	4.8	1.1	–	–	–	0.6	–
Member in school/madrasha/mosque management committee	8.9	10.7	5.3	3.3	3.2	–	0.6	–
Member in Grameen Bank (GB) society	3.7	26.2	12.8	30.6	8.5	32.6	10.7	22.8
Member in NGO	28.1	65.5	34.0	71.1	35.1	73.9	41.0	69.1
Member in VGD/VGF/old age allowance	0.7	6.0	2.1	12.4	3.2	6.5	9.6	25.7
Member of other society	3.0	2.4	1.1	0.0	3.3	0.0	2.2	1.5

and descending non-poor households to become members of these institutions were lower than those of non-poor households but higher than those of chronically poor. Thus, poverty adversely suppresses the rise of women's standing in the society and their participation in local institutions which in turn determine her social status and well-being.

14.8 Control over Productive Resource

Control over resources by woman is an important indicator to assess importance and empowerment of women in the family. The social status, prestige and empowerment of women are assessed in terms of their control over productive resources. Control over different assets assessed by women was determined by the respondent's own perception of ownership of assets. Respondent is believed to have control if they fully own the assets from different sources. Among the assets, land, ornament, utensils, livestock, transport, furniture are important. These items are considered more valuable and important for their families. Table 14.9 for 2004 and Table 14.10 for 2009 indicate that very few wives of

Table 14.9 Perceived control over different household assets by the wives and female households by economic class, 2004

Type of assets or items	Has ownership																			
	Non-poor (n=309)				Descending non-poor (n=216)				Ascending poor (n=215)				Chronically poor (n=472)				Total (n=1,212)			
	By inheri-dence	By pur-chase	By gift/ other way	No owner-ship	By inheri-dence	By pur-chase	By gift/ other way	No owner-ship	By inheri-dence	By pur-chase	By gift/ other way	No owner-ship	By inheri-dence	By pur-chase	By gift/ other way	No owner-ship	By inheri-dence	By pur-chase	By gift/ other way	No own-ership
Agricultural land	2.6	0.6	4.2	92.6	0.0	0.5	1.0	98.6	0.5	0.5	1.4	97.7	1.1	0.0	0.6	98.3	1.2	0.3	1.8	96.8
Pond	0.6	0.0	0.0	99.4	0.0	0.0	0.5	99.5	0.0	0.0	0.0	100.0	0.2	0.0	0.0	99.8	0.2	0.0	0.1	99.7
Tree	5.8	0.0	0.0	94.2	6.5	0.0	0.0	93.5	3.3	0.0	0.0	96.7	2.3	0.2	0.6	96.8	4.1	0.1	0.2	95.5
House	2.6	0.0	2.3	95.1	3.2	0.0	1.4	95.4	0.5	0.0	0.5	99.1	4.0	1.1	2.3	92.6	2.9	0.4	1.8	94.9
Cow/buffalo	6.1	1.6	3.2	89.0	4.6	1.4	2.8	91.2	3.3	0.9	2.8	93.0	2.8	0.8	0.8	95.6	4.0	1.2	2.2	92.7
Goat/sheep	1.9	4.2	2.9	90.9	1.4	2.3	3.2	93.1	0.5	5.6	0.9	93.0	1.3	2.3	2.1	94.3	1.3	3.4	2.3	93.0
Poultry	12.9	26.9	24.9	35.3	13.9	19.4	22.7	44.0	10.7	29.8	22.3	37.2	8.5	24.2	16.3	51.1	11.0	25.0	20.7	43.3
Ornaments	15.9	8.1	63.7	12.3	12.0	6.5	57.9	23.6	14.9	9.8	58.6	16.7	10.2	8.7	50.6	30.5	12.8	8.3	56.6	22.2

Note: "By other way" refers to "arrangement by NGO" or "owner of land by lease out" or "owned by sharing with others"

Table 14.10 Perceived control over different household assets by the wives and female households by economic class, 2009

Type of assets or items	Has ownership																			
	Non-poor (n = 339)				Descending non-poor (n = 138)				Ascending poor (n = 363)				Chronically poor (n = 340)				Total (n = 1,180)			
	By inheri-dence	By pur-chase	By gift/ other way	No owner-ship	By inheri-dence	By pur-chase	By gift/ other way	No owner-ship	By inheri-dence	By pur-chase	By gift/ other way	No owner-ship	By inheri-dence	By pur-chase	By gift/ other way	No owner-ship	By inheri-dence	By pur-chase	By gift/ other way	No own-ership
Agricultural land	8.6	4.7	10.0	76.7	4.3	0.0	5.1	90.6	1.7	1.7	1.9	94.8	4.4	0.0	2.1	93.5	4.7	1.9	4.7	88.7
Pond	1.5	0.0	0.3	98.2	0.0	0.0	0.0	100.0	0.0	0.0	0.0	100.0	0.9	0.0	0.3	98.8	0.7	0.0	0.2	99.2
Tree	1.2	0.0	0.3	98.5	0.0	0.0	0.0	100.0	0.0	0.0	0.0	100.0	0.9	0.0	0.3	98.8	0.6	0.0	0.2	99.2
House	2.4	0.6	2.4	94.7	0.0	0.0	2.9	97.1	1.4	0.8	1.1	96.7	7.4	1.5	2.6	88.5	3.2	0.8	2.1	93.8
Cow/buffalo	1.8	3.2	1.8	93.2	0.7	2.9	0.0	96.4	0.6	1.9	3.6	93.9	0.9	1.5	1.5	96.2	1.0	2.3	2.0	94.7
Goat/sheep	0.6	5.3	2.1	92.0	0.0	6.5	2.2	91.3	0.0	5.5	1.9	92.6	0.9	3.8	0.6	94.7	0.4	5.1	1.2	92.9
Poultry	2.1	32.7	5.0	60.2	0.7	36.2	2.9	60.1	0.0	33.3	5.5	61.2	2.1	27.6	6.8	63.5	1.3	31.9	5.5	61.4
Ornaments	10.6	4.4	31.3	53.7	2.9	3.6	13.0	80.4	3.0	5.5	16.5	74.9	1.8	2.6	6.2	89.4	4.8	4.2	17.4	73.6

Note: "By other way" refers to "arrangement by NGO" or "owner of land by lease out"

household heads/female heads have control over the assets. However, a higher proportion of wives/female heads have control over poultry, livestock and ornaments—the items they exclusively took care or used. There are significant differences in percentage of asset ownership between 2004 and 2009. Over the five-year period higher proportion of wives/female heads owned assets compared to 2004, indicating increased women's empowerment in terms of asset ownership. The asset ownership pattern varies with the variation of economic class. It is notable that the asset items which increased ownership by women in this period are agricultural land and house.

Higher proportion of wives/female heads of non-poor households owned assets, while relatively smaller proportion of wives/female heads of chronically poor households owned assets since this group of households possessed lowest quantity of valuable assets. Thus, absence of asset ownership gives women in chronically poor households lower status in their overall empowerment.

14.9 Decision Making Power in Selling Commodities

Taking care of poultry and livestock is the primary responsibility of women particularly in a poor rural family. Sale of assets is important as it brings cash in the family, and if the sale proceeds are not properly utilized it would be a loss to the family. Thus joint decision in selling assets at right time and price, and proper utilization of money is important for the family welfare. In this section attempt is made to assess whether women took part in a major decision related to sale of assets such as land, poultry, livestock, ornament, and others. Tables 14.11 and 14.12 for 2004 and 2009 show the situation of women's right in making decisions to sell various items of assets they owned. It is notable that relatively small proportion of wives has right to sell ornaments alone. Although women exclusively used ornaments, a large proportion of them believed that they have no exclusive rights to sell ornaments. This may be due to the fact that majority of wives become owner of ornaments by gift either from their husbands or from their parents. As a result they were not allowed to sell alone. In many cases where joint decisions were taken to sell different items, wives were informed about decision before finalization. Poverty, illiteracy and lack of assets and means of livelihood mingled with social and cultural norms make women dependent on men and create obstacle against women's empowerment.

To sum up, women in rural Bangladesh are not much empowered since they have less access to education, opportunities and resources. Lack of education and assets are the main constraints to women's empowerment. Appropriate policies are needed to increase participation of women in social institutions, to improve women's representation in decision-making process and to provide special assistance for women's productive activities and opportunities. Moreover, social barriers that result from discrimination between gender, ethnicity, cultural and social status should be

Table 14.11 Perceived right to sell household assets by the wives and female households by economic class, 2004

	Has right to sell									
	Non-poor		Descending non-poor		Ascending poor		Chronically poor		Total	
Type of assets or items	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Agricultural land	78.3 (18)	21.7 (05)	100 (03)	0.0 (00)	100.0 (05)	0.0 (00)	75.0 (06)	25.0 (11)	82.1 (32)	17.9 (07)
Pond	50.0 (01)	50.0 (01)	0.0 (00)	100.0 (01)	0.0 (00)	0.0 (00)	100.0 (01)	25.0 (01)	50.0 (02)	50.0 (02)
Tree	55.6 (10)	44.4 (08)	64.3 (09)	35.7 (05)	71.4 (05)	28.6 (02)	80.0 (12)	20.0 (03)	66.7 (36)	33.3 (18)
House	80.0 (12)	20.0 (03)	70.0 (07)	30.0 (03)	100 (02)	0.0 (00)	71.4 (25)	28.6 (10)	74.2 (46)	25.8 (16)
Cow/buffalo	35.3 (12)	64.7 (22)	21.1 (04)	78.9 (15)	46.7 (07)	53.8 (08)	42.9 (09)	57.1 (12)	36.0 (32)	64.0 (57)
Goat/sheep	57.1 (16)	42.9 (12)	46.7 (07)	53.3 (08)	60.0 (09)	40.0 (06)	33.3 (09)	66.7 (18)	48.2 (41)	51.8 (44)
Poultry	69.5 (123)	30.5 (148)	57.9 (59)	42.1 (106)	65.2 (65)	34.8 (113)	63.2 (100)	36.8 (225)	64.5 (347)	35.5 (592)
Ornaments	45.4 (139)	54.6 (61)	35.8 (70)	64.2 (51)	63.5 (88)	63.5 (47)	30.8 (144)	69.2 (84)	37.0 (441)	63.0 (243)

Note: "Yes" refers to "yes alone" and "No" refers to "yes with others" and "no" together

Table 14.12 Perceived right to sell household assets by the wives and female households by economic class, 2009

	Has right to sell									
	Non-poor		Descending non-poor		Ascending poor		Chronically poor		Total	
Type of assets or items	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Agricultural land	41.8 (33)	58.2 (46)	76.9 (10)	23.1 (03)	78.9 (15)	21.1 (04)	50.0 (11)	50.0 (11)	51.9 (69)	48.1 (64)
Pond	66.7 (04)	33.3 (02)	0.0 (00)	0.0 (00)	0.0 (00)	0.0 (00)	75.0 (03)	25.0 (01)	70.0 (07)	30.0 (03)
Tree	100.0 (05)	0.0 (00)	0.0 (00)	0.0 (00)	0.0 (00)	0.0 (00)	75.0 (03)	25.0 (01)	88.9 (08)	11.1 (01)
House	61.1 (11)	38.9 (07)	75.0 (03)	25.0 (01)	66.7 (08)	33.3 (04)	74.4 (29)	25.6 (10)	69.9 (51)	30.1 (22)
Cow/buffalo	39.1 (09)	60.9 (14)	40.0 (02)	60.0 (03)	18.2 (04)	81.8 (18)	69.2 (09)	30.8 (04)	38.1 (24)	61.9 (39)
Goat/sheep	48.1 (13)	51.9 (14)	25.0 (03)	75.0 (09)	29.6 (08)	70.4 (19)	55.6 (10)	44.4 (08)	40.5 (34)	59.5 (50)
Poultry	63.7 (86)	36.3 (49)	72.7 (40)	27.3 (15)	55.3 (78)	44.7 (63)	68.5 (85)	31.5 (39)	63.5 (289)	36.5 (166)
Ornaments	23.6 (37)	76.4 (120)	22.2 (06)	77.8 (21)	22.0 (20)	78.0 (71)	47.2 (17)	52.8 (19)	25.7 (80)	74.3 (231)

Note: "Yes" refers to "yes alone" and "No" refers to "yes with others" and "no" together

removed for women's empowerment. However, from our 2004 and 2009 surveys women's empowerment measured in terms of physical mobility, asset ownership and participation in decision-making process has improved to some extent due to implementation of several development programs for women by the government and NGOs in rural Bangladesh.

Part V
Vulnerability and Poverty

Chapter 15
Vulnerability to Poverty: Conceptual Framework and Measurement

15.1 Introduction

Vulnerability to poverty at individual or household level may be defined as a probability that an individual or a household will be poor in the near future due to the consequences of different covariate and idiosyncratic shocks. In short, a household is vulnerable to poverty if it is likely to be poor in the near future. Morduch (1994) regarded households as vulnerable when their expected welfare status is above the poverty line but they are stochastically under the poverty line. Kurosaki (2002) regarded household as vulnerable to consumption risk if it has to reduce drastically its consumption level when the household is hit by a negative income shock. Vulnerability is also considered synonymous to transient or stochastic poverty. In non-technical language the term "vulnerability" may be termed as "defenselessness, insecurity, and exposure to risk, shocks and stress". Vulnerability can be manifested in various aspects of life. It relates to poverty through the distress sale of productive assets; to physical weakness because more time and energy have to be substituted to earn more money to manage contingencies and to overcome powerlessness by depending on patrons and by being exploited by the powerful (Chamber 1989).

Natural disasters and economic shocks and level of living are inextricably linked with one another. The adverse impacts of natural disasters and shocks affect the life and living as well as socio-economic conditions of the people. As a result, between one year and the next many people may become vulnerable to poverty. This means that people who are not poor this year may have probability of being poor in the next year or near future.

Vulnerability can be placed into three levels depending on its severity. People may be highly vulnerable if they have high chance of being poor in the next year, moderately vulnerable if they have medium level chance to be poor and people are less vulnerable if they have low chance to be poor in the next year or near future.

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Fig. 15.1 The poor fishermen going for fishing for his livelihood

It is difficult to quantify vulnerability but its intensity depends largely on the severity of economic shocks such as the Asian financial crisis of 1997 and the world wide economic depression in 2007–2008. The devastating cyclone "TSUNAMI" of 2005 in Indonesia, "SIDR" of 2007 and "AILA" of 2008 in Bangladesh swept away almost every thing in their paths and made the people vulnerable to poverty in those areas. Large human toll and livestocks, houses and crops were badly affected. The economic conditions of people had also been deteriorated and thus people became vulnerable to poverty. The earthquake of Haiti has made people vulnerable to poverty. These events appear to have negative long-term consequences on economic growth, socio-economic developments, poverty and vulnerability. As a result, there is a chance that even a non-poor household might be put to descend into poverty in the near future.

Bangladesh is one of the most natural disaster prone countries in the world. Floods, cyclone, tidal waves, river erosion and drought are common and regular phenomena of Bangladesh. These events affect a large number of people particularly in rural areas. Due to these events income and employment become uncertain for the poor. Even the rich become vulnerable to poverty due to the natural disasters or shocks. The following figures show how a poor fisherman becomes vulnerable by being victim of storm while he was catching fish in the sea (Figs. 15.1–15.3).

In estimating a household's vulnerability, the poverty line income and a number of observable household characteristics such as household size, dependency ratio, sex ratio, per capita landholding, average years of schooling, per capita consumption expenditure are taken into consideration.

Fig. 15.2 The poor fishermen fall in cyclonic storm

Fig. 15.3 The poor fishermen now in vulnerable position

15.2 Why Vulnerability Measurement

An assessment of household's vulnerability to poverty is important to identify who is likely to be poor in near future, how they are likely to be poor and why they are vulnerable to poverty. Measurement of vulnerability has both instrumental and intrinsic value. Instrumental value of vulnerability is reflected with the fact that when households face

shocks, their incomes erode quickly. So in absence of any social protection against such shocks, which is very common in most of developing countries like Bangladesh, poor households are obliged to mortgage or sell capital assets and these events entail debts on households at a high interest rate and they can have wretched effects. Strategies to cope with shock also entangle poor households into the vicious circle of poverty. On the other hand, the intrinsic value of vulnerability measurement lies in the fact that household should hold adequate resources to meet not only the present need but also the need for future welfare expenditure (Kasirye 2007).

Tudawe (2002) showed that a high degree of economic instability and vulnerability due to natural shocks contribute to the poor remaining poor for a longer period. Okidi and Mugambe (2002) examined that vulnerability is not just a cause of poverty but also a symptom of poverty. The exposure of vulnerability due to shocks is observed to be constituent factor of poverty among many.

Measurement of poverty concentrates on those who are currently poor. It is mainly because of the fact that poverty can be measured only ex post. But it is essential to identify those who are expected to be poor ex ante (that is, in the future). Dercon (2001) defines vulnerability as "ex ante poverty" (Haughton and Khandker 2009). He explained the vulnerability as a forward looking concept and it focuses on "exposure to poverty rather than the poverty outcome itself" (Dercon 2001). Poverty measures whether one fell below poverty line in the past while vulnerability measures the probability of falling below the poverty line in the future. Thus vulnerability is a dynamic concept, while poverty is essentially a static concept. Several development policies have been undertaken for poverty reduction but it is necessary to take policies for preventing future poverty from occurring immediately after natural disasters or other shocks. Measurement of poverty is easier than the measurement of vulnerability in future. Measurement of vulnerability to poverty for future period is more difficult since challenges are involved in arriving at precise prediction of expected consumption expenditure and income which are affected by shocks. However, in order to assess poverty, measurement of vulnerability is important since it is conceived as a dynamic part of poverty itself. Policies should not be undertaken only for poverty reduction and intervention supports should not be given to the poor only at ex post. Policies should also take account of those who are ex ante poor as well as those who are vulnerable to shocks. The goal of poverty reduction will not be successful unless vulnerability to poverty is adequately taken account into.

15.3 Causes of Vulnerability

Vulnerability is caused by social, economic and ecological factors. For instance, when any social conflict, unrest and war occurs, assets may be degraded and land tenure may become uncertain. Household income may be reduced by natural disasters such as drought, flood, cyclone, crop failure. Income erosion may also occur due to illness of key bread earner, which will affect well-being of household members. Some of the important idiosyncratic and covariate causes of vulnerability proposed by Dercon (2001) and reported by Haughton and Shahidur (2009) are reproduced in Table 15.1.

Table 15.1 List of potential causes of vulnerability

Causes of vulnerability
• Income erosion due to ill health or unemployment
• Land tenure insecurity
• Asset damage due to climate change, war or disaster
• Uncertain access to common and public goods
• Loss of value of financial assets
• Output failure due to climatic shocks, crop disease or conflict
• Rise of output prices
• Loss of skills due to technological change
• Uncertain cash flow during production
• Weak contract enforcement, unpaid wages
• Inadequate information on employment opportunity and market
• Price fluctuation in food markets
• Food rationing
• Uncertain quality of public provision in health care and education
• Inadequate information on how to achieve good health and nutrition

Source: Haughton and Shahidur (2009)

15.4 Method for Measurement of Vulnerability

Estimation of vulnerability to poverty here is drawn extensively from methodology developed by Chaudhuri (2000) and subsequent works by Suryahadi and Sumarto (2001) and Chaudhuri et al. (2002). The underlying idea of their methods is to construct appropriate probability distribution of consumption expenditures conditional to household characteristics. The method is reviewed and discussed in detail below:

Let $\mathbf{y_{it}}$ be the per capita consumption level of i-th household at time t and z be the poverty line. Then the household is poor if

$$\mathbf{y_{it}} < \mathbf{z}$$

Again let $\mathbf{V_{it}}$ is the vulnerability index of the i-th household at time t given the probability that the household will be poor in time t+1 (in next year) is as $\mathbf{V_{it}} = \mathbf{P_{rob}}\left(\mathbf{y_{i,\,t+1}} < \mathrm{Z}\right)$. But in actual practice it is very difficult to observe $\mathbf{y_{i,t+1}}$ directly as it represents the expectation of the household's per capita consumption in the next year (Haughton and Khondker 2009).

Now for cross section data let us assume that for the i-th household the stochastic process generating income/consumption expenditure is as follows:

$$\ell\mathbf{n}\mathbf{y_i} = \mathbf{X_i}\beta + \varepsilon_\mathbf{i}, \quad \mathrm{i} = 1, 2, \ldots, 1212 \tag{15.1}$$

where $\mathbf{y_i}$ is the per capita income/consumption expenditure (welfare indicator); $\mathbf{X_i}$ represents a set of observable household characteristics which are assumed to be the determinant of a household's vulnerability index; β is a vector of parameter and $\varepsilon_\mathbf{i}$ is any idiosyncratic factor (shocks or crisis) that differentiates per capita income/expenditure between two households having same characteristics. Also $\varepsilon_\mathbf{i}$ being the

usual disturbance term used in the statistical model along with the additional assumption of zero mean to secure the unbiasedness property of the estimates of β_s. The independence and normality assumptions of ε_i are also obligatory, so that any objectionable systematic pattern does not endanger our estimate's validity. But ε_i's are not supposed to be identically distributed among households at various levels of expected income. On the other hand, the assumption of homogeneity of variance of ε_i is not maintained. Nevertheless as variance of $\ell \mathbf{ny}_i$ is, in general, less than that of $\mathbf{y}_i$, and variance of $\ell \mathbf{ny}_i$ equals the variance of ε_i, the problem of heteroscedasticity is not as bad in the model of $\ell \mathbf{ny}_i$ as the simple model of $\mathbf{y}_i$ faces. This is the basic motivation for preferring the model of $\ell \mathbf{ny}_i$ in (15.1).

To conciliate the dilemma of heteroscedasticity further, several parametric models are suggested concerning the variance of ε_i, denoted by σ^2, relating to the set of observable household characteristics $\mathbf{X}_i$. For simplicity we select the following direct model:

$$\sigma_i^2 = \alpha \mathbf{X}_i \tag{15.2}$$

The estimation of these parameters α and β from models (15.1) and (15.2) can be carried out by the three-step feasible generalized least squares (FGLS) procedure, originally suggested by Amemiya (1977). The estimation procedure is outlined below.

First, we apply the ordinary least squares method on the model (15.1). We construct the estimated residual index using the parameter values obtained by the method.

Second, we use the squared estimated as εi/OLS the crude estimate of the variance of ε_i, that is, σ^2, which is a common methodology in econometrics. These are used in model (15.2) for the parameter estimation purpose. Then the model for estimation becomes as follows:

$$\hat{\varepsilon}_{i|OLS}^2 = \alpha \mathbf{X}_i + \xi_i \tag{15.3}$$

where ξ_i is the disturbance term for the model (15.3), that allows for not only the lack of homoscedastic behaviour of the data but also covers another major issue, the measurement error in the survey data that inflates the volatility. Therefore, despite of pervasive measurement error in the data, we need not get anxious about it because of the use of model (15.3). Using the ordinary least squares method (OLS) on the model (15.3), we get the estimate $\widehat{\alpha}_{OLS}$ of the parameter α.

Next, using this estimate, we transform the model as:

$$\frac{\hat{\varepsilon}_{i|OLS}^2}{\widehat{\alpha}_{OLS}\mathbf{X}_i} = \alpha \left[\frac{\mathbf{X}_i}{\widehat{\alpha}_{OLS}\mathbf{X}_i}\right] + \frac{\xi_i}{\widehat{\alpha}_{OLS}\mathbf{X}_i} \tag{15.4}$$

Now, the parameter α is estimated once more by using ordinary least squares. This estimate has the enviable statistical property that it is an asymptotically efficient FGLS estimate, which solves our inefficiency problem as a consequence of heteroscedasticity. Using this estimate in model (15.2), we get the consistent estimate of σ_i^2.

$$\hat{\sigma}_i^2 = \widehat{\alpha}_{FGLS}\mathbf{X}_i \tag{15.5}$$

Similarly, to estimate β, we construct another form of the model using the estimate of σ as follows:

$$\frac{\ell n y_i}{\hat{\sigma}_i} = \beta\left[\frac{\mathbf{X}_i}{\hat{\sigma}_i}\right] + \frac{\varepsilon_i}{\hat{\sigma}_i} \tag{15.6}$$

The estimate $\hat{\beta}_{FGLS}$ also has the asymptotic efficiency property.

Therefore, by using the FGLS estimate of β and α, we get the expected value of log per capita income/consumption expenditure and its variance is as follows:

$$\widehat{E}\left(\ell n y_i \middle| \mathbf{X}_i\right) = \hat{\beta}_{FGLS}\mathbf{X}_i \tag{15.7}$$

and the variance of log per capita income/expenditure:

$$\mathrm{Var}\left(\ell n y_i \middle| \mathbf{X}_i\right) = \widehat{\alpha}_{FGLS}\mathbf{X}_i, \text{ for each household i} \tag{15.8}$$

Assuming that income/expenditure follows log-normal distribution, we can use these estimates to form an estimate of the probability that a household with the characteristics $\mathbf{X}_i$ will be poor after a shock or crisis. In other words, a household's vulnerability level (v_i) which is originally corrected by the expected value of the model and scaled up by its volatility is obtained as follows:

$$\hat{v}_{i=\hat{P}rob}\left(\ell n y_i < \ell n Z \middle| \mathbf{X}_i\right) = \varphi\left[\frac{\ell n Z_i - \left\{\ell n y_i / x_i\right\}}{\sqrt{Var\left\{\ell n y_i \middle| \mathbf{X}_i\right\}}}\right] = \theta\left\{\frac{\ell n Z - \mathbf{X}_i\hat{\beta}}{\hat{\sigma}_{ci}}\right\} \tag{15.9}$$

where $\varnothing[.]$ is the cumulative density of the standard normal distribution and z is any poverty-level income. In consequence of the normality assumption of disturbance terms ε_i in the basic models, $\hat{v}_i$ is essentially normal, evidently in its standard form. The value of $\hat{v}_i$ varies from 0 to 1.

15.5 Determination of Poverty Line Income

The poverty line income (z) for 2004 is estimated by the Bangladesh Bureau of Statistics (BBS) and it was Tk.595.0 per person per month for rural area. This poverty-line income (z) was used for estimating vulnerability index (v) for 2004. The same functional form as in 2004 has been considered for determination of poverty-line income (z) for 2009 and it is as follows:

$$\ell n y_i = a + bc_i + e_i \tag{15.10}$$

where y_i = per capita monthly expenditure (food and non-food of the i-th individual/household)

Table 15.2 Distribution of sample households by vulnerability category and poverty status, 2004

Vulnerability to poverty (v)	Current per capita expenditure (y), n = 1,282		Expected per capita expenditure [E(y)]
	y < z	y ≥ z	
v ≥ 0.5	A = 521 (40.6)	D = 116 (9.0)	E (y) < z
	B = 0	E = 0	E (y) ≥ z
v < 0.5	C = 149 (11.6)	F = 496 (38.7)	

$\mathbf{c_i}$ = Per capita per day calorie intake of the i-th individual/household
$\mathbf{e_i}$ = Disturbance term

Based on the above model and estimated value of per capita expenditure and predetermined calorie intake of 2,122 kcal per person per day, the poverty-line equation is estimated as:

$$\hat{\ell n y_i} = \mathbf{6.0559} + \mathbf{0.00049 c_i} \tag{15.11}$$

From the above estimated equation, the poverty-line income (z) for 2009 is estimated at Tk.1207.0 per person per month for the predetermined calorie intake of 2,122 kcal per person per day. This poverty-line income (z) is used for measurement of vulnerability index (v) for each household.

15.6 Measurement of Vulnerability

The vulnerability index (v) is estimated for each household which is equal to the probability of falling into poverty in the next year or near future after any crisis or shock (Suryahadi and Sumarto 2001). On the basis of the estimated vulnerability index (v), poverty-line income (z), expected and current income/expenditure level, the sample households can be classified into several vulnerability and poverty groups such as (1) poor, (2) chronically poor, (3) transient poor, (4) non-poor, (5) highly vulnerable non-poor, (6) less vulnerable non-poor, (7) highly vulnerable group, (8) less vulnerable group and (9) total vulnerable group.

To classify sample households into vulnerable groups, the value 0.5 of the vulnerability index (v) is considered as a threshold level. Important features for taking the mid-point as threshold level to measure vulnerability have been discussed in detail by Suryahadi and Sumarto (2003) in their research work. Pritchet et al. (2000) has also proposed the reasons for considering v = 0.5 as a threshold level in their work. Based on the threshold level v = 0.5, a household is said to be highly vulnerable if its probability of falling below poverty-line income (z) is greater than or equal to 0.5. Conversely, a household is said to be less vulnerable if its probability of falling below poverty-line income (z) is less than 0.5. Based on these criteria, the distribution of households by poverty and vulnerability categories is presented in Table 15.2 for 2004 and in Table 15.3 for 2009.

Table 15.3 Distribution of sample households by vulnerability category and poverty status, 2009

Vulnerability to poverty (v)	Current per capita expenditure (y), n = 1212		Expected per capita expenditure [E(y)]
	y < z	y ≥ z	
v ≥ 0.5	A = 411 (33.9)	D = 84 (6.9)	E (y) < z
	B = 98 (8.1)	E = 55 (4.5)	E (y) ≥ z
v < 0.5	C = 126 (10.4)	F = 438 (36.1)	

Figure in parentheses is the % of the total sample size
z = Poverty-line income = Tk.595 per person per month for 2004 and Tk.1207 for 2009
Poor = A + B + C
Chronically poor = A
Transient poor = B + C
Non-poor = D + E + F
Highly vulnerable non-poor = D + E
Less vulnerable non-poor = F
Highly vulnerable group = A + B + D + E
Less vulnerable group = C + F
Total vulnerable group = A + B + C + D + E

From Tables 15.2 and 15.3 almost no change in the proportion of poor (A + B + C) is observed between 2004 (52.2%) and 2009 (52.4%). The current per capita expenditure ($\mathbf{y}_i$) of households (A + B) for 2009 is less than the poverty-line income (z). In respect of vulnerability, about 42% of the total households have probability greater than or equal to 0.5 of being poor in the near future and the expected per capita expenditure of 34% of households (A) is also less than the poverty line income [E(y) < z]. Of the total poorer group (A + B + C) only 10.4% households (C) is less vulnerable (v < 0.5) and their per capita expenditure is expected to be greater than or equal to z in near future [E(y) ≥ z]. The proportion of chronically poor households (A) has been reduced from 41% in 2004 to 34% in 2009. This group of household is highly vulnerable (v ≥ 0.5), and their current and expected (B + C) per capita expenditure has increased over the last five years from about 12% in 2004 to 18% in 2009. Among the transient poor, about 8% are highly vulnerable (v ≥ 0.5) and 10% are less vulnerable (v < 0.5) but their expected per capita expenditures are greater than z [E(y) ≥ z].

There is no significant change in proportion of non-poor (D + E + F) households over the 5 years. The current and expected per capita expenditures of non-poor group (E + F) are greater than or equal to z, [i.e., (y ≥ z) and E(y) ≥ z] except for 7% households (D). In terms of vulnerability there is some change between 2004 and 2009. In 2009, about 12% of the non-poor households (D + E) are highly vulnerable (v ≥ 0.5) though their current per capita expenditure is higher than z (i.e., y ≥ z) but the expected per capita expenditure of D group of households is less than equal to z [i.e., E(y) < z] and expected per capita expenditure of E group is greater than equal to z [i.e., E(y) ≥ z]. The majority (36%) of the non-poor households (F) is less vulnerable (v < 0.5) and the current and expected per capita expenditures are also greater than z [(i.e., y ≥ z) and E (y) ≥ z]. The proportion of highly vulnerable group (A + B + D + E) has increased from 50% in 2004 to 54% in 2009, while the proportion of less vul-

Table 15.4 Changes in vulnerability of sample households, 2004 and 2009 (%)

	Year	
Category of poverty and vulnerability	2004	2009
Poor (A+B+C)	670 (52.2)	635 (52.4)
Chronically poor (A)	521 (40.6)	411 (33.9)
Transient poor (B+C)	149 (11.6)	224 (18.5)
Non-poor (D+E+F)	612 (47.7)	577 (47.6)
Highly vulnerable non-poor (D+E)	116 (9.0)	139 (11.5)
Less vulnerable non-poor (F)	496 (38.7)	438 (36.1)
Highly vulnerable group (A+B+D+E)	637 (49.6)	648 (53.5)
Less vulnerable group (C+F)	645 (50.3)	564 (46.5)
Total vulnerable group (A+B+C+D+E)	786 (61.3)	774 (63.9)

Source: For 2004, Rahman et al. (2009)

nerable group (C+F) has been reduced from 50% to 47% over the same period. The proportion of total vulnerable group (A+B+C+D+E) has increased from 61% to 64% between 2004 and 2009 due to abnormal increase of food and non-food prices, floods, cyclones in 2007 and 2008. These factors adversely affected the livelihoods of rural people and their endowments. Table 15.4 shows comparisons and changes in vulnerability between 2004 and 2009.

15.7 Poverty and Vulnerability by Different Categories

Considering variations in the level of poverty and vulnerability among households, some important socio-economic indicators need to be studied in order to understand the reasons for these variations. Vulnerability as well as poverty is examined each by average years of schooling, landholding size, age and gender of household heads, social capital and occupations of household heads.

15.7.1 Poverty and Vulnerability by Years of Schooling

Education is an important element of human capital formation. It is also important for poverty reduction as those with higher educational level have increased mobility in the labour market and has higher chances of getting better employment opportunities and well-salaried employment. Without education knowledge and skills cannot be easily gathered. Productivity is also related with the educational level. The higher the education level, the higher is the marginal productivity of labour. Thus education has important role in reduction of poverty and vulnerability. It is observed from household expenditure surveys (HESs) of BBS that the incidence of poverty

Table 15.5 Poverty and vulnerability categories by years of schooling, 2009

Vulnerability to poverty level (v)	Current per capita expenditure (y), n = 1,212		Expected per capita expenditure [E(y)]
	y < z	y ≥ z	
Households with no education, n = 92			
v ≥ 0.5	A = 39 (42.4)	D = 6 (6.5)	E (y) < z
	B = 13 (14.1)	E = 7 (7.6)	E (y) ≥ z
v < 0.5	C = 2 (2.2)	F = 25 (27.2)	
Household with average years of schooling less than 5 years, n = 804			
v ≥ 0.5	A = 368 (45.8)	D = 78 (9.7)	E (y) < z
	B = 74 (9.2)	E = 45 (5.6)	E (y) ≥ z
v < 0.5	C = 80 (10.0)	F = 159 (19.8)	
Households with average years of schooling between 5 and 10 years, n = 308			
v ≥ 0.5	A = 4 (1.3)	D = 0	E (y) < z
	B = 11 (3.6)	E = 3 (1.0)	E (y) ≥ z
v < 0.5	C = 44 (14.3)	F = 246 (79.9)	
Households with average years of schooling above 10 years, n = 8			
v ≥ 0.5	A = 0	D = 0	E (y) < z
	B = 0	E = 0	E (y) ≥ z
v < 0.5	C = 0	F = 8 (100.0)	

decreases with increased level in education. This means that the poverty level and educational level are negatively correlated and shocks have little effect on the highly educated. This is because, though the welfare of the highly educated is affected by shock like the poor, their reduced welfare level may remain well above the poverty line. Of the total 1,212 sampled households, about 8% of households have no education (0 year of schooling), 66% of households have less than 5 years of schooling, 25% have 5–10 years and only 0.66% households have above 10 years of schooling on average. The distribution of households by poverty and vulnerability categories across educational level as measured by average years of schooling of household members is shown in Table 15.5.

Households with no education have the highest level of both poverty and vulnerability, while the lowest level of poverty as well as vulnerability is observed among households with average years of schooling above 10 years. Households with average years of schooling 10 years and above are only eight (Table 15.5). It is also observed that households with no education not only contain higher proportion of the poor (A + B + C = 59%) but also contain a much higher proportion of the chronically poor (A = 42%). Per capita current and expected monthly expenditures of this group are below the poverty-line income [i.e., y < z and E(y) < z]. The vulnerability index of this group is also higher than 0.5 except for 2% of households (C); but only two households fall in this category. The level of poverty and vulnerability decreases with the increase of average years of schooling. The selected important socio-economic indicators by years of schooling show distinct variations between vulnerability categories (Appendix D).

Table 15.6 Poverty and vulnerability categories by landholding size (in acres)

Vulnerability to poverty level (v)	Current per capita expenditure (y), n = 1,212		Expected per capita expenditure [E(y)]
	y < z	y ≥ z	
Landless households, n = 63			
v ≥ 0.5	A = 46 (73.0)	D = 4 (6.3)	E (y) < z
	B = 4 (6.3)	E = 2 (3.2)	E (y) ≥ z
v < 0.5	C = 2 (3.2)	F = 5 (7.9)	
Small farmers (land of 0.01–2.49 acres), n = 939			
v ≥ 0.5	A = 355 (37.8)	D = 71 (7.6)	E (y) < z
	B = 86 (9.2)	E = 40 (4.3)	E (y) ≥ z
v < 0.5	C = 101 (10.8)	F = 286 (30.5)	
Medium farmers (land more than 2.50–7.49 acres), n = 173			
v ≥ 0.5	A = 10 (5.8)	D = 9 (5.2)	E (y) < z
	B = 8 (4.6)	E = 13 (7.5)	E (y) ≥ z
v < 0.5	C = 17 (9.8)	F = 116 (67.3)	
Large famers (land more than 7.5 acres), n = 37			
v ≥ 0.5	A = 0	D = 0	E (y) < z
	B = 0	E = 0	E (y) ≥ z
v < 0.5	C = 6 (16.2)	F = 31 (83.8)	

15.7.2 Poverty and Vulnerability by Landholding Size

Land is considered as the most important source of income and livelihood of rural people. It is one of the most precious productive assets and possession of land is a symbol of social status and economic security. It facilitates certain kinds of economic activities such as crop production, fishing, and poultry rearing. But the rural society is highly differentiated into a complex structure of landless, marginal and small farmers, medium farmers and large farmers. Of the total sampled households, about 5% of households are landless, more than 77% are marginal and small farm households having land size 0.01–2.49 acres, 11% are medium farm households having land size 2.5–7.49 acres, and the rest 3% of households are large farm households that possess land 7.5 acres and more. Poverty strikes disproportionately on the landless, marginal and small farm households. Poverty and landownership are negatively correlated. The higher the size of landownership, the lower is the incidence of poverty (HEIS 2005). Vulnerability is also negatively related with landownership size. Table 15.6 shows the distribution of households by poverty and vulnerability categories and by landholding size.

It is notable from Table 15.6 that the estimated poverty rate and depth of vulnerability by landholding size are more pronounced than the disparities observed by any other household characteristics such as education, gender of household head, occupation, social capital. The incidence of poverty and vulnerability vary widely between landholding sizes. Among the landless households about 83% are poor (A + B + C) and their current per capita expenditures are less than the poverty-line income (y < z). Out of the total poor group, about 73% of households are chronically poor (A) and

Table 15.7 Poverty and vulnerability categories by gender of household head

Vulnerability to poverty (V)	Current per capita expenditure (Y), n = 1,212		Expected per capita expenditure [E(y)]
	y < z	y ≥ z	
Household heads: male, n = 1,092			
v ≥ 0.5	A = 378 (34.6)	D = 76 (7)	E(y) < z
	B = 85 (7.8)	E = 49 (4.5)	E(y) ≥ z
v < 0.5	C = 107 (9.8)	F = 397 (36.4)	
Household heads: female, n = 120			
v ≥ 0.5	A = 33 (27.5)	D = 8 (6.7)	E(y) < z
	B = 13 (10.8)	E = 6 (5.0)	E(y) ≥ z
v < 0.5	C = 19 (15.8)	F = 41 (34.2)	

their current and expected per capita expenditures are less than the poverty-line income. These households are also highly vulnerable (v ≥ 0.5). The rest 10% of the poorer group (B + C) is transient poor whose current per capita expenditure is less than the poverty-line income (z) [y < z, but E(y) ≥ z].

It is notable that among the landless households, five households are found to be less vulnerable non-poor (F) [i.e., y ≥ z, E (y) ≥ z and v < 0.5]. In small farm holdings (0.01–2.49), about 58% of households are observed to be poor among which 38% are chronically poor (A) and 20% are transient poor (B + C) but about 42% of them are non-poor (D + E + F). Of the total non-poor about 31% are found to be less vulnerable non-poor (F) [i.e., y ≥ z, v < 0.5 and E(y) ≥ z]. In medium farm holdings only 6% are chronically poor (A) and 14% are transient poor (B + C), but 80% of them are non-poor (D + E + F). More than 67% of households of medium farm holding are observed to be less vulnerable non-poor [y ≥ x, v < 0.5 and E(y) ≥ z]. Conversely, no chronically poor household (A) is observed in large farm holdings but nearly 84% of households are less vulnerable non-poor (F) and 16% of households are transient poor (C). There are no highly vulnerable non-poor (D + E) households in large farm holdings. The selected socio-economic indicators by landholding size and vulnerability category are shown in Appendix E.

15.7.3 Poverty and Vulnerability by Gender of Household Head

There is a general belief that female-headed households are poor relative to male-headed households. This is because they are less educated and as such they are less involved in income generating activities. Of the 1,212 sampled households, there are 1,092 male-headed and 120 female-headed households and we find some differences in the poverty and vulnerability status between the two groups (Table 15.7).

Table 15.7 shows that 54% of female-headed households are poor (A + B + C), whose per capita expenditure is less than z (y < z); while the figure for male-headed households is 52%. But the rate of chronically poor (A) and highly vulnerable group (A + B + D + E) is found to be lower in female-headed households than their male

Table 15.8 Poverty and vulnerability categories by social capital

Vulnerability to poverty (v)	Current per capita expenditure (y), n = 1,212		Expected per capita expenditure [E(y)]
	y ≤ z	y ≥ z	
Households with social capital, n = 219			
v ≥ 0.5	A = 25 (11.4)	D = 7 (3.2)	E(y) < z
	B = 20 (9.1)	E = 5 (2.3)	E(y) ≥ z
v < 0.5	C = 31 (14.2)	F = 131 (59.8)	
Households without social capital, n = 993			
v ≥ 0.5	A = 386 (38.9)	D = 77 (7.8)	E(y) < z
	B = 78 (7.9)	E = 50 (5)	E(y) ≥ z
v < 0.5	C = 95 (9.6)	F = 307 (30.9)	

counterparts. There is a distinct variation in proportion of transient poor (B + C) between the two groups, but small variation is observed in proportion of less vulnerable non-poor (F) between them.

The target group-oriented safety-net programs of the government and the micro-credit programs of the NGOs for the poor women might have increased their self-employment opportunities and income flow and narrowed the gap in incidence of poverty and vulnerability between the male-headed and female-headed households. The significant variations in selected socio-economic indicators are observed between gender of household heads and vulnerability category (Appendix F).

15.7.4 Poverty and Vulnerability by Social Capital

In broader sense, social capital refers to features of social organizations that can improve efficiency of society by facilitating coordinated action (Robert 1992). But in narrower sense it refers to social network with neighbours, relatives, rich, influential people and political leaders. Relational capital is not structured and governed by rules and regulations but it is important for deriving benefits from public and private resources. It is also important for getting help when the people face crisis and unfortunate events. Social capital is one kind of intangible asset (Bebbington 1999) which provides benefits through membership in social network and household can get benefits in crisis (see Chap. 13).

Almost every individual or household has some sort of social network, but the rich have many higher and stronger social networks than the very poor. As a result, households having no social capital are more likely to be easily exposed to poverty and vulnerability. However, among our sample households, about 18% of households mentioned that they have social networks with rich and influential persons and relatives, while the rest 82% affirmed that they have no such social network. Table 15.8 shows that the highest proportion of the poor (56%) and the highly vulnerable group are found among the households having no social capital. But the households having social capital in the form of social networks are less poor (34%)

and vulnerable. Thirty-nine percent households having no social capital is chronically poor [$y<z$, $v\geq 0.5$ and $E(y)<z$], while this figure for households having social network is only 11%. The proportion of highly vulnerable group ($A+B+D+E$) is 60% of households without social capital but this figure is only 26% of households having social networks. More pronounced scenario is observed between the two groups with respect to less vulnerable group ($C+F$). Sixty percent of households with social capital are less vulnerable non-poor [$y\geq z$, $v<0.5$ and $E(y)\geq z$]. The figure for households without social capital is almost half (31). The total vulnerable group ($A+B+C+D+E$) is also much higher (69%) of households having no social capital, while the figure for households having social capital is 40%, indicating significant difference between the two groups of households.

The distinct variations in selected indicators are observed between households having social capital and without social capital and vulnerability category as shown in Appendix G.

15.7.5 Poverty and Vulnerability by Occupation

Occupation refers to livelihood strategies of an individual's choice as the main source of income. An occupation in rural area is diversified and varies with the economic class and gender. But in the absence of rural industry and sufficient non-farm activity, rural people depend on agricultural sector. Agricultural and non-agricultural labour, business, petty trade, rickshaw/van-pulling, artisanship are also livelihood strategies for many poor people. Service is another source of income for the educated people. Thus poverty and vulnerability vary across the different occupational groups. From the survey, it is observed that about 35% of households heads is engaged in farming, 4% is service holder, 13% is engaged in business, 28% is included in other professional groups such as carpenter, blacksmith, potter, mechanics, rickshaw/van puller and 20% of household heads are agricultural and non-agricultural day labourers. Table 15.9 shows the distribution of households according to poverty and vulnerability by occupational status of household heads.

Looking down across each occupation in Table 15.9, it is seen that 22% of farm households, 13% of service holders, 29% of business households, 34% of other occupational households and 63% of labour households are the chronically poor (A). Their current and expected per capita expenditure is less than poverty line and vulnerability index is greater than 0.5 [i.e., $y<z$, $E(y)<z$ and $v\geq 0.5$]. Households earning income from service have the least proportion of the transient poor ($B+C$) and highly vulnerable group ($A+B+D+E$), highly vulnerable non-poor ($D+E$), but have highest proportion (71%) of the less vulnerable non-poor. Conversely, households earning income from selling their labour have highest proportion of the chronically poor ($A=63\%$) and lowest proportion of the non-poor ($F=7.2\%$). The current and expected per capita expenditure are always found to be less than the poverty line (z) income and the vulnerability index is greater than 0.5 [i.e., $y<z$, $E(y)$, z and $v\geq 0.5$] for this group of households.

Table 15.9 Poverty and vulnerability categories by occupation of household heads

Vulnerability to poverty (v)	Current per capita expenditure (y), n = 1,212		Expected per capita expenditure [E(y)]
	y < z	y ≥ z	
Households with head as farmer (own land/share cropping), n = 430			
v ≥ 0.5	A = 93 (21.6)	D = 26 (6)	E(y) < z
	B = 35 (8.1)	E = 19 (4.4)	E(y) ≥ z
v < 0.5	C = 51 (11.9)	F = 206 (47.9)	
Households with head as service holder (government & non-government), n = 45			
v ≥ 0.5	A = 6 (13.3)	D = 0	E(y) < z
	B = 3 (6.7)	E = 2 (4.4)	E(y) ≥ z
v < 0.5	C = 2 (4.4)	F = 32 (71.1)	
Households with head as businessman, n = 157			
v ≥ 0.5	A = 46 (29.3)	D = 16 (10.2)	E(y) < z
	B = 11 (7.0)	E = 6 (3.8)	E(y) ≥ z
v < 0.5	C = 12 (7.6)	F = 66 (42.0)	
Households with head having other occupations, n = 343			
v ≥ 0.5	A = 117 (34.1)	D = 25 (7.3)	E(y) < z
	B = 27 (7.9)	E = 16 (4.7)	E(y) ≥ z
v < 0.5	C = 41 (12.0)	F = 117 (34.1)	
Households with head as labourer (agri + non-agri), n = 237			
v ≥ 0.5	A = 149 (62.9)	D = 17 (7.2)	E(y) < z
	B = 22 (9.3)	E = 12 (5.1)	E(y) ≥ z
v < 0.5	C = 20 (8.4)	F = 17 (7.2)	

The proportion of labour households in vulnerable group (A + B + C + D + E) is about 93%, while only 7% of labour households is found to be in the less vulnerable non-poor group (F) [y ≥ z, E(y) ≥ z and v < 0.5]. Households engaged in business are less vulnerable than the other occupational groups (carpenter, artisan, blacksmith, rickshaw/van puller). The proportion of highly vulnerable non-poor (D + E) [y ≥ z, E(y) < z and v ≥ 0.5] is 14% but the figure for other occupational group is 12%. Twenty-nine percent of households who are engaged in business is chronically poor [y < z, E(y) < z and v ≥ 0.5]; and the figure for other occupational group is also 34%. These households are chronically poor since they are currently poor (y < z) and their expected per capita expenditure is also below the poverty-line income [E(y) < z]. These facts indicate that the chronically poor households have no scope to move out of poverty in the near future. Variations in selected socio-economic indicators by occupation and vulnerability category are observed in Appendix H.

15.8 Multiple Logistic Regression Model: An Alternative Approach for Vulnerability Assessment

From the preceding discussions it is revealed that understanding of poverty and vulnerability is a complex matter. Poverty and vulnerability are found inextricably in interwoven network of social, economic, occupational and structural factors.

Very few analytical studies on causes of vulnerability in rural area have been done. Moreover, only a few of these studies provide any specific investigation on causes, direction and magnitude of vulnerability.

The main concern of this section is to integrate and bring together all the factors as mentioned in vulnerability analysis in order to explain variations of their relative effect on vulnerability in a measured form. By using multiple logistic regression models, relationship between a dichotomous outcome and a set of covariates is estimated to identify factors that increase the likelihood of a household to be vulnerable. Another important aspect of this analysis is to understand the policy implication for vulnerability reduction.

15.8.1 Descriptions of Model Variables

The explanatory variables are of different kinds. Some are specific to individual (household head) and some other variables are specific to household levels. For instance, age and occupation are specific to household head, while other variables are specific to household level. Age of household head (AGHH), household size (HS), and dependency ratio (DEPR) have been selected to represent demographic characteristics of household. Occupational status of household head (OCCUPSTAT) and average year of schooling (AYROS) and social capital (SC) have been selected to represent social characteristics, while the agricultural landholding size (AGLAND) is selected to represent economic status of household. The outcome variable or dependent variable—vulnerability status (VS) of household is a dichotomous variable. It takes the value one with probability p (say) if a household's value of vulnerability index (v) is less than equal to 0.5 ($v \geq 0.5$) and zero with probability (1-p) if the value of vulnerability index (v) is less than 0.5 ($v < 0.5$). The vulnerability status of a household depends on the value of the vulnerability index (v). A household is said to be vulnerable if the value of v is greater than or equal to 0.5, while a household is said to be not vulnerable if its value of v is less than 0.5.

15.8.2 Empirical Results

An attempt has been made to examine the relationship between a dichotomous dependent variable (vulnerability status of household) and a set of covariates as selected and discussed in the previous section. The main feature of the analysis is to identify risk factors that affect vulnerability status of a household and to analyse the direction of their differentials between the vulnerable and not vulnerable groups. In order to grasp the above problem, a well-known statistical technique—the logistic regression model is used. The pioneer of the logistic regression model was Cox (1958) and subsequently this model was illustrated by Walker and Duncan (1967) and Cox himself (Cox 1970). More recently, Lee (1980), Fox (1984) and Hosmer and Lemeshow (1989) have further illustrated the Cox's model.

The estimated regression coefficients obtained from the log likelihood function with the help of maximum likelihood estimation for each factor is presented in Table 15.10. Since the dependent variable is coded one if a household falls in the vulnerable group ($v \geq 0.5$), positive coefficient indicates that the household is more likely to be vulnerable, while reverse is indicated by the negative value.

Most of the independent variables in logistic regression model are highly significant except for age of household head above 30 years, business as occupation and other occupations. But these variables have expected signs (Table 15.10). The estimated regression coefficients for households with five to six members (1.725) and more than six members (2.713) are positive and highly significant which further indicate that household with less than five members are less likely to be vulnerable. Conversely, households with five to six members and more than six members have 5.6 times and 15.1 times higher risk to be vulnerable than those households having less than five members (reference group). The odds ratio increases sharply as the household size increases more than six members.

The regression coefficients on account of age of household heads are insignificant but have expected signs. Households with very young heads (under 30 years) have a greater chance to be vulnerable. On the other hand, household with middle-aged (30–49) heads and households headed by aged persons (above 49 years) are less likely to be vulnerable. The odds ratio indicates that these two groups (30–49 years and above 49 years) have 1.23 times and 1.63 times lower risk to be vulnerable as compared to the reference group (under 30 years).

Social capital in terms of social network in rural society is important to derive benefits through membership in social network at crisis time. It plays important role in reducing vulnerability. The regression coefficient (−1.176) for social capital is highly significant and the odds ratio suggests that households having social capital have three times lower risk to be vulnerable than those households having no social capital (reference group).

Electricity connection in the households is important for higher income potentiality through a variety of income generating activities which again result in reducing vulnerability. The regression coefficient (−1.969) for households having electricity connection is highly significant and indicates that these households have less chance to be vulnerable. On the contrary, the households without electricity connection (reference group) have greater risk to be vulnerable. The odds ratio suggests that households having electricity connection have 7.14 times lower risk to be vulnerable than that of reference group. The values of socio-economic indicators are also higher among households having electricity connection than those having no electricity connection (Appendix I).

The estimated regression coefficient (1.408) for dependency ratio (DR) is highly significant and has expected sign. The dependency ratio and vulnerability are closely and positively associated and vulnerability is higher among households having more children and aged members. This is presumably because of fewer earning members and higher dependency burden. The odds ratio indicates that a household is four times more likely to be vulnerable for one unit increase of dependency ratio.

Table 15.10 Estimated logistic regression coefficients of vulnerability status for rural households in Bangladesh

Variables	Estimated coefficient	Standard error	Odds ratio ($e^{\hat{\beta}}$)	95% CI of $e^{\hat{\beta}}$
Dependent variable: vulnerability [vulnerable$^{(1)}$ ($p \geq 0.5$), non-vulnerable$^{(0)}$ ($p < 0.5$)]				
1. Household size				
[Less than 5[a]]	–	–	–	–
[5–6]	1.725***	0.227	5.614	(3.60–8.75)
[Above 6]	2.713***	0.313	15.08	(8.16–27.84)
2. Age of household head				
[<30 years[a]]	–	–	–	–
[30–49 years]	–0.207	0.380	0.813	(0.38–1.71)
[Above 49 years]	–0.489	0.379	0.613	(0.29–1.29)
3. Social capital				
[No[a]]	–	–	–	–
[Yes]	–1.176***	0.258	0.308	(0.18–0.51)
4. Electricity access to the household				
[No[a]]	–	–	–	–
[Yes]	–1.969***	0.201	0.140	(0.09–0.20)
5. Dependency ratio	1.408**	0.185	4.089	(2.84–5.88)
6. Average schooling years of the household				
[0 year[a]]	–	–	–	–
[1–5 years]	–1.096***	0.337	0.334	(0.17–0.64)
[> 5 years]	–4.468***	0.466	0.011	(0.0–0.02)

(continued)

Table 15.10 (continued)

Variables	Estimated coefficient	Standard error	Odds ratio ($e^{\hat{\beta}}$)	95% CI of $e^{\hat{\beta}}$
7. Land assets of the households				
[Landless[a]]	–	–	–	–
[Small farmers (0.05–2.49)]	−1.190**	0.492	0.304	(0.11–0.79)
[Medium and large farmers (≥ 2.5 acres)]	−3.052***	0.555	0.047	(0.0–0.02)
8. Occupation of the household head				
[Service[a]]	–	–	–	–
[Agriculture]	−0.566	0.60	0.568	(0.17–1.84)
[Labour]	1.06*	0.63	2.889	(0.84–9.93)
[Business]	−0.211	0.63	0.810	(0.23–2.78)
[Others]	0.091	0.60	1.095	(0.33–3.58)
9. Intercept	2.264			
−2 log-likelihood	803.34			
Model chi-square	871.02			
Cox and Snell R^2	0.513			

*p<0.1; **p<0.05; ***p<0.01

[a]Reference group

The social factor—average years of schooling (AYROS) has a significant coefficient which is −1.096 for households having 1–5 years (AYROS) and −4.468 for households having more than 5 years of AYROS. The regression coefficients explain the lower chance of vulnerability with higher AYROS. On the contrary, households having no education have higher risk to be vulnerable. The odds ratio explains that households having 1–5 years AYROS have three times lower risk to be vulnerable; while households having more than 5 years AYROS have nine times lower risk to be vulnerable than those households with zero AYROS (reference group).

The effect of ownership of agricultural land (AGLAND) is one of the important factors for reduction of poverty and vulnerability. The coefficient (−1.190) for households having land 0.05–2.49 acres (small farmers) and the coefficient (−3.052) for households having land more than 2.5 acres (medium and large farmers) are highly significant and suggest that these groups of households have lower risk of vulnerability than the landless households (reference group). Vulnerability varies inversely with landholding size. The highest vulnerability is observed among landless households. The odds ratio increases sharply as the landholding size crosses 2.5 acres and households having more than 2.5 acres of land have 21.3 times lower risk to be vulnerable as compared to the households having no land (the reference group).

Occupation is one of the determinants of poverty and vulnerability. Among the occupational groups, the coefficient (1.06) for labourer households is positive and significant, indicating that this group of households has a very high likelihood to be vulnerable. Then followed is other occupational group whose coefficient is also positive but not significant. When compared with the reference group, service, business and farming as occupations show lower chance to be vulnerable though their coefficients are negative but not significant. The odds ratio indicates that the labourer households have three times higher risk to be vulnerable than the reference group (service as occupation).

Before concluding this chapter, the following facts need to be explained. Given the findings from logistic regression analysis as well as distribution of households by poverty and vulnerability status among different socio-economic categories, we may conclude that households with larger size, prime and middle-aged head, no social capital, no electricity connection, high dependency ratio, little or no education, and households who earn income by selling labour are more likely to be highly vulnerable. The factors mentioned above suggest that human resource development through education and health sectors, productive asset accumulation (land), infrastructure development, electricity and water supply and rural development, formulation of productive and preventive social protection strategies, low population growth are essential for reduction of poverty and vulnerability. Otherwise, shocks and crisis tend to be converted more directly to increased vulnerability for households with few assets and coping resources. Thus efforts must be directed towards the target groups with appropriate policies and programs for reduction of vulnerability. Without these efforts there will be more likelihood of a cumulative increase of vulnerability in rural area of Bangladesh.

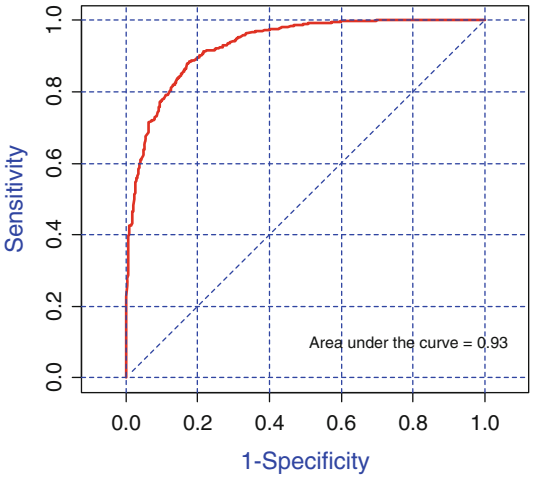

Fig. 15.4 ROC curve for logistic model

15.8.3 Assessment of Discriminatory Performance of the Logistic Model

The regressand in our logit model is binary and takes a value of one or zero. If the predicted probability is greater than or equal to 0.5 (threshold point), we classify that as 1, but if it is less than 0.5, we classify that as 0. In such a situation the coefficient of determination ($\mathbf{R^2}$) is not an appropriate measure of goodness of fit of the model. But the count $\mathbf{R^2}$ which may be defined as the ratio of number of correct predictions to the number of total observations may be used. It should be mentioned that in binary regressand models such as logit, probit models the goodness of fit is of secondary importance, and the expected signs of the coefficients and their SE's have more practical significance (Gujrati 2004).

For the present context, the discriminatory performance of our binary logistic regression model with 0.5 threshold point of vulnerability has been tested by using the "Receiver Operating Characteristic (ROC) curve and area under the ROC curve (Kleinbaum and Klein 2010). The ROC curve is a plot of the sensitivity (Se) values (on y-axis) against the compliment of specificity (1-Sp) values (on x-axis). The term sensitivity (Se) = Pr (true positives/total positives) and specificity (Sp) = Pr (true negatives/total negative). If both Se and Sp are equal to 1, then perfect discrimination would occur. The ROC curve will lie above the central diagonal ($\mathbf{45^o}$) line that corresponds to Se = 1 − Sp (Fig. 15.4). It is a good technique for organising classifier and visualizing their performance. The curve is also useful for assessing the accuracy of prediction. If the area under curve (AUC) is closed to 1, the test will have high diagnostic accuracy. In other words, the larger the area under the curve, the better is the discrimination. But there are several guidelines for AUC values for grading the discriminatory performance. For instance, if the value of AUC is between 0.90 and 1.0, then the discriminatory performance is said to be "excellent".

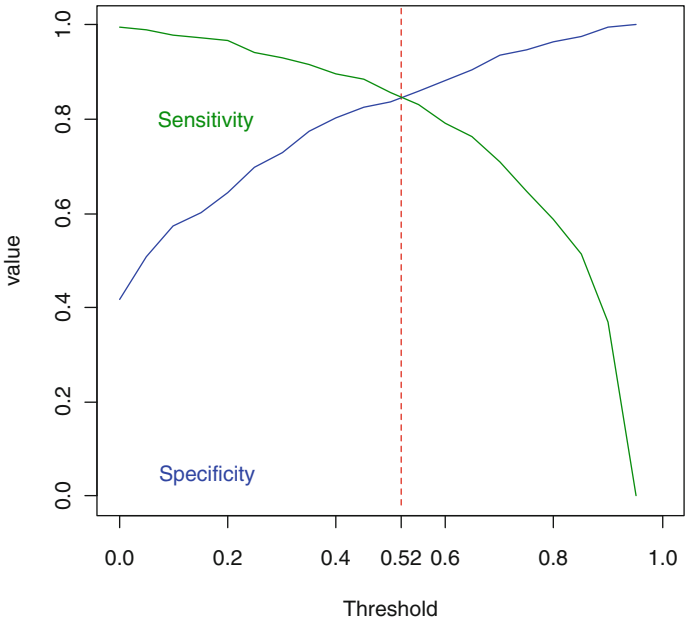

Fig. 15.5 Sensitivity and specificity vs. threshold

On the contrary, if the value falls between 0.50 and 0.60, then it is termed as failed discrimination (Kleinbaum and Klein 2010). However, from our fitted model, the area under the ROC curve is found to be 0.93 and lies between 0.90 and 1.0, indicating an excellent discriminatory performance of our binary logistic model and to find the positive outcomes of the model (Fig. 15.4).

Figure 15.5 of Se and Sp (on y-axis) for different threshold points (on x-axis) also indicates that our predetermined threshold point of 0.50 is very close to optimum threshold point (0.52) at which the model is classified correctly and showed an outstanding performance in discriminating vulnerable and non-vulnerable households.

Chapter 16
Participatory Approach for Understanding Poverty Dynamics

16.1 Introduction

Despite the long history and accumulation of poverty study, it is difficult to say how many people were born in poor family and how many people were born in rich family in any country. It is difficult to identify who and how many people have become poor and how many formerly poor people have escaped from poverty within their lifetime. It is also difficult to identify reasons why only some poor succeeded in moving out of poverty and why some others falling into poverty. Thus, poverty has to be studied in dynamic sense. For that it is important to understand reasons for people to move out and fall into poverty (Krishna 2009). Keeping that in mind focus group discussions were conducted with groups of rural people. The focus group discussion (FGD) is a participatory approach that relies on community perception of poverty at household level. The overall perception regarding poverty status of households in the community is assessed, and explanation is sought for changes in poverty status over time. This approach has been used in order to have in-depth information about people's poverty situation and about inadequacies, indignities and sufferings commonly experienced by the poor.

In all, six focus group discussions (FGDs) were conducted in six sample villages in six districts to know more in-depth information about people's perception about various aspects of poverty. In each FGD, there was a group of eight persons who were mainly from the four economic categories. Among 6 FGDs, three were conducted among groups of people from chronically poor and descending non-poor categories, while other three were conducted among groups of people from non-poor and ascending poor categories. Focus group discussion was guided by a facilitator, also called moderator. During group discussion, members talked freely and spontaneously about the causes and effects of poverty. Explanations were also sought for changes in poverty status over time. One of the major challenges in FGDs was to enable the realities and priorities of the local people be expressed and communicated to researchers. FGDs were done to establish dialogue between local people and researchers around the issues of poverty at the micro level. It helps the

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professionals and policy makers to understand the realities of local people, so that changes in policies at micro and macro levels can be linked to benefit the poor. However, the following are the common perceptions of local people regarding changes of poverty status in locality between 2004 and 2009.

16.2 Changes of Economic Condition in the Survey Areas

Economic development is an important element for changes of economic condition of people and consequently poverty reduction. When the participants were asked to state regarding changes of their economic condition in the survey areas during the 5-year period, they stated the following:

The FGD participants of both poor and non-poor groups mentioned that during the 5-years economic condition of some people in the area have improved (reported by 20 poor and 9 non-poor participants), while others have become poorer than before (mentioned by 24 participants). They also mentioned that some poor people have become destitute (reported by six participants). Six participants (four poor and two non-poor) reported that the poor people in the area have remained poor, in other words, that their economic condition remains the same as before. According to them a few rich people in the area, have become richer than before (said by six poor and three non-poor participants). Therefore, it was found that the FGD participants expressed their mixed views regarding process of changes of economic condition of rural people in the survey areas.

When the explanations were sought from the FGD participants for changes in economic condition of the non-poor, they identified the following as the causes for deterioration of economic condition over time:

- Large family size (reported by eight poor and two non-poor)
- Increased family expenses due to soaring market price (mentioned by three poor participants)
- Burden of recurrent loans
- Involvement in litigation (pointed out by three poor participants)
- Loss of crops due to natural calamities (opined by eight poor participants)
- Addiction to gambling (reported by two poor participants)
- Dowry for daughter's marriage (mentioned by five poor and two non-poor participants)

The FGD participants also identified the following causes for economic deterioration of the poor:

- Household income less than household expenditure (pointed out by three poor participants)
- Taking loans to maintain family, but unable to pay back (reported by nine poor participants)

- Lack of assets (mentioned by three poor participants)
- Dowry for daughter's marriage (confided by eight poor and one non-poor participants)
- No saving and investment, and as such unimproved economic conditions (reported by nine poor and ten non-poor participants)
- Burden of recurrent loans to maintain family, making some poor people destitute (mentioned by three poor and four non-poor participants)
- Lack of employment in the lean period (informed by 12 non-poor participants).

On the other hand, some poor people of the area have improved their economic conditions during the 5-year period. The FGD participants mentioned the following ways of improvement:

- Proper utilization of loan money for income generating activities (reported by eight poor participants)
- Family members working abroad (mentioned by eight poor and five non-poor participants)
- Gain in business (reported by seven non-poor participants)
- Increase of earning members in the households (said by seven poor participants)
- Hard work (claimed by four poor participants)
- Participation of adult women family members in income generating activities (told by one poor participants)

16.3 Changes of the Living Due to Changes of Economic Condition

In the opinion of the FGD participants following are the types of change in the life and living of those people who could improve their economic condition in the area during the period:

- Five years back, poor people could not take three full meals a day, now they can (claimed by five poor participants)
- Five years back, poor people would eat coarse wheat flour cake, potato and corn, but now they can eat rice (mentioned by eight poor and eight non-poor participants)
- Five years back, poor people of the area could not afford to take good food and wear good clothes but now they can (pointed out by three poor and three non-poor participants)
- Now all classes of people of the area participate in social activities especially in school management committees and village development committees (affirmed by one non-poor participant)
- More children in the survey area are now studying in school (stated by five non-poor participants)

16.4 Changes in Economic Condition of FGD Participant's Family

When asked any change of economic condition of their own families during the period, they stated the following:

With regard to changes of economic condition of the FGD respondent's own family, five poor participants reported that food intake of their families have improved to some extent, 5 years back they could take one full meal a day, now they can take three full meals a day. Eleven participants (four poor and seven non-poor) informed that their economic condition has not been changed, that is, they remained in the same economic condition. On the other hand nine participants (eight poor and one non-poor) mentioned that their economic condition was good 5 years ago but now it has deteriorated and they have identified the following reasons for deterioration:

- Increased family expenditure due to increase of family members (reported by eight poor and two non-poor participants)
- Loss of income due to ill health of income earning members (mentioned by eight poor participants)
- Inability to repay loan (said by four poor participants)
- Loss of crop due to natural calamities (claimed by two poor and one non-poor participants)
- Loss in business (claimed by one poor participant)

On the other hand, 13 non-poor participants mentioned that economic conditions of their families have improved during the period due to the following reasons:

- Rich families having land and other resources. They sometimes engage in services and business simultaneously and get foreign remittance, which give huge income. After meeting all family expenditure, they can accumulate huge surplus and hence such families become richer or can retain their economic condition (reported 30 poor and 13 non-poor participants).
- Sons and daughters of rich people by dint of their higher education are doing good service and contributing to the family income (mentioned three non-poor participants).

16.5 Causes and Effects of Poverty in the Area

16.5.1 Causes of Poverty

The FGD participants identified the following specific reasons for prevalence of poverty among the people in the area:

1. Unemployment/underemployment
2. Landlessness, no inheritance
3. High cost of living
4. Lack of asset/inherited investment

5. Laziness
6. Crop damages due to natural disasters
7. Large family size
8. Involvement in litigations
9. Loan distress
10. Addiction to gambling
11. Lack of physical infrastructure
12. Income erosion due to illness
13. Dowry
14. Death of income earning member
15. Defalcation of money given for going abroad

16.5.2 Effect of Poverty

When asked to identify the effects of poverty on life and living of rural people, they stated the following effects:

1. Shortage of adequate food
2. Shortage of necessary clothes
3. Burdened with recurring loans
4. Children remain out of school
5. Children work as child labour
6. Migrate elsewhere
7. Become destitute
8. Exposed to idiosyncratic shocks
9. No access to medical care
10. Distress sale of assets
11. Advance sale of labour
12. Disturbed family stability
13. No recognition in the society
14. No assets and savings
15. No voice in the society

The cause and effect of poverty has been shown schematically in Fig. 16.1.

16.6 Present Occupation of Majority of People in the Survey Areas

The employment opportunities in rural area are limited. Agricultural activities are the main sources of employment and the majority are engaged in agricultural activities.

The FGD participants mentioned that the majority in the survey areas are engaged in the following occupations and activities. The non-poor are usually engaged with:

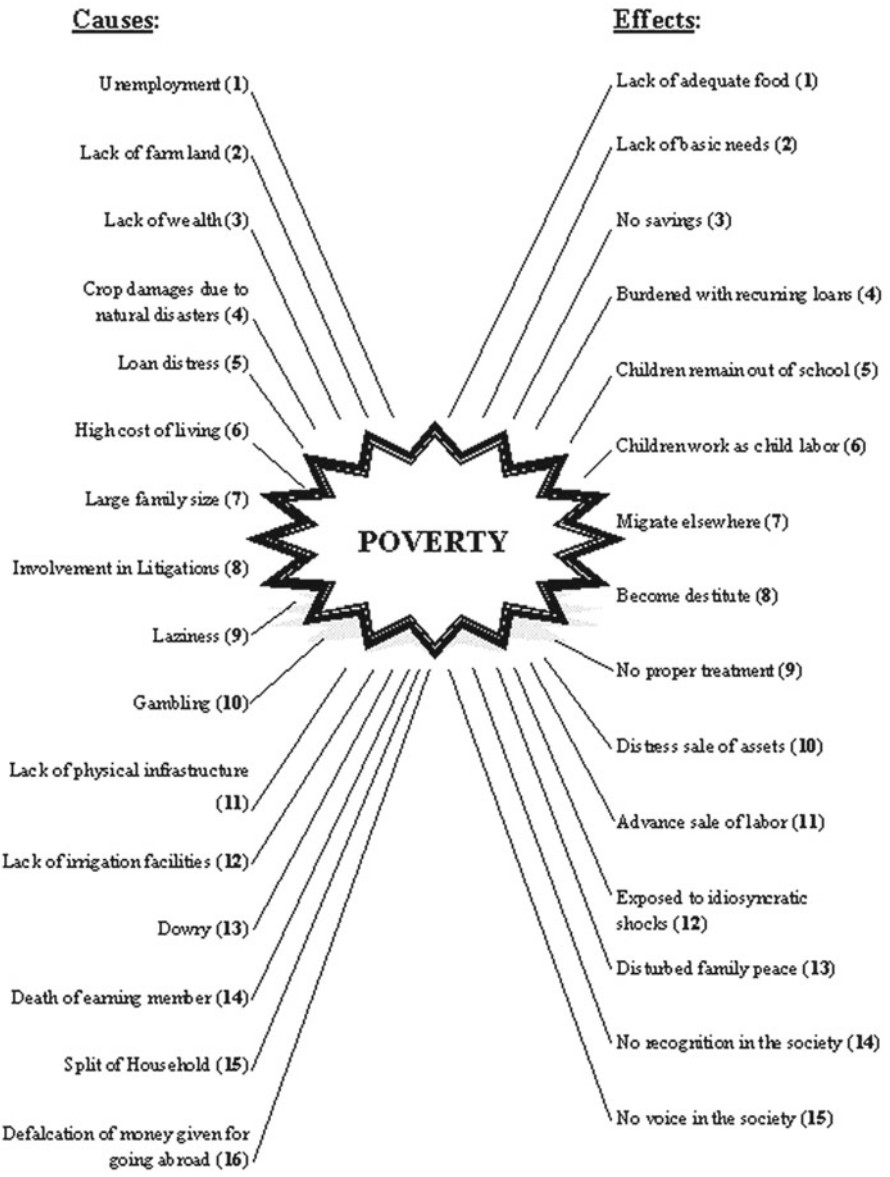

Fig. 16.1 Cause and effect diagram of poverty

- Farming (mentioned by 14 poor and 25 non-poor participants)
- Service (reported by 17 poor and 10 non-poor participants)
- Business (pointed out by 11 poor and 16 non-poor participants)
- Employment abroad (mentioned by 16 poor and 11 non-poor participants)

Although some of the poor do the above works, the majority are engaged in the following occupations:

- Agricultural and non-agricultural labour (mentioned by 14 poor and 13 non-poor participants)
- Rickshaw/van pulling (reported by 11 poor and 8 non-poor participants)
- Picking stones and sand from river (mentioned by three poor participants)
- Day labour in earth cutting, construction work and brick field (reported by 16 non-poor participants)
- Leased in farming and share cropping (opined by three poor and eight non-poor participants)
- Small trading (reported by one non-poor participant)

The FGD participants (21 poor and 16 non-poor) pointed out that poor and non-poor people are doing the same type of work as they had been doing 5 years before except only a few. For instance, some agricultural labours shifted to pulling rickshaw/van and other non-farm activities such as construction work, earth cutting. Very few occupational changes have taken place among the non-poor people and they are now doing the same types of works as they did 5 years ago.

16.7 Temporary and Permanent Migration for Livelihood

Migrants shifts their job and location for seeking better opportunities. Temporary migration for the purpose of employment abroad began to be significant source of labour emigration from Bangladesh only in the late 1970s. The rural to rural migration has lost its importance over time and the rural to urban migration has witnessed a substantial increase. Dhaka, the capital city of Bangladesh, receives the largest number of immigrations followed by nearby district towns and other divisional cities. Both the male and the female are the immigrants to Dhaka city. Majority of the immigrants are young able-bodied unskilled and illiterate or only basically literate people. The immigrants are in general labourers, students, self-employed or domestic workers. They are generally absorbed in the informal sector activities, garments factories or domestic work. Lack of adequate livelihood and employment opportunities in the locality particularly during lean period has been the prime driver for most of the migrants to move out.

16.7.1 Causes of Emigration

When asked the causes of emigration, they mentioned the following:

- Lack of employment or work opportunity in distressed areas (mentioned by 16 poor and 23 non-poor participants)
- Distressed economic condition during lean seasons (opined by six poor participants)

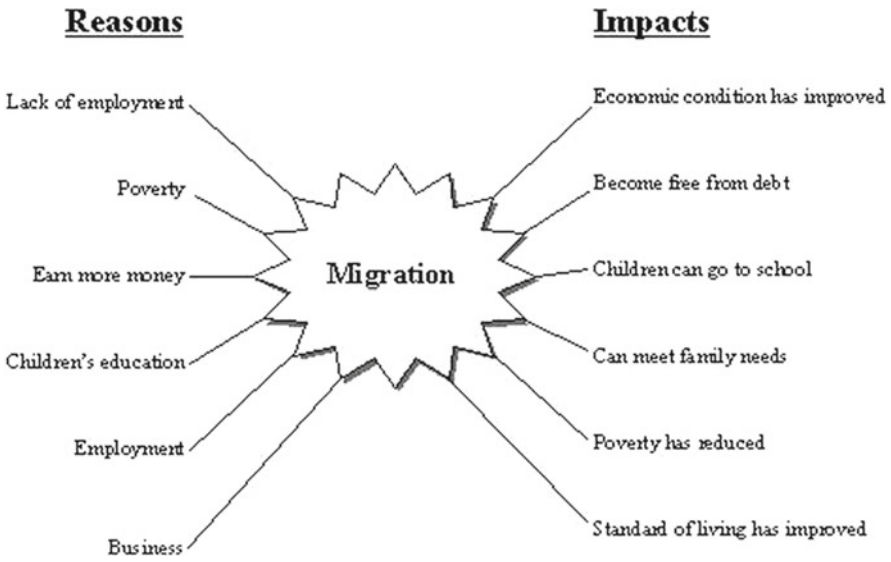

Fig. 16.2 Reasons and impacts of migration

- Need of earning more money to repay loans from institutions (pointed out by five poor participants)
- Children's education in better environment
- Services in formal and informal sectors (reported by eight non-poor participants).

16.7.2 Effects of Migration

The FGD participants further mentioned that due to the effect of internal or external migration following changes have taken place in the economic condition of the migrated families or families having migrated earning members:

- Improved economic condition (reported by eight non-poor participants)
- Liberation from the curse of debt (mentioned by 6 poor and 16 non-poor participants)
- Improved standard of living (opined by 4 poor and 15 non-poor participants)
- Children able to study in school (reported by four poor and three non-poor participants)
- Meeting family needs (mentioned by two poor participants)
- Reduced poverty in migrant families (pointed out by eight poor and eight non-poor participants).

The causes and effects of migration are shown in Fig. 16.2.

16.8 What the Government Should Do

The followings are FGD's participants' view with regard to government policies and actions:

- Construction/repair of pucca/katcha roads (mentioned by 21 poor and 11 non-poor participants)
- Excavation of canals (reported by 16 poor participants)
- Providing loans with low interest rate or with no interest (opined by 16 poor and 6 non-poor participants)
- Financial help (said by eight poor participants)
- Improvement of road communication system (reported by eight poor and eight non-poor participants)
- Continuation of food for work program (disclosed by 16 poor participants)
- Providing rickshaw/van (opined by two poor participants)
- Creating work/job opportunity by establishing mills and factories or by other means (mentioned by 16 poor and 2 non-poor participants)
- Creating opportunity for foreign employment (pointed out by one poor participant)
- Creating work/job opportunity by establishing poultry farm (opined by eight poor participants)
- Digging ponds for fish culture (suggested by eight poor participants)
- Providing interest free or low interest loans for fish culture, poultry farming and raising cows and goats (reported by eight poor and five non-poor participants)
- Establishing deep tube-well (mentioned by eight poor participants)
- Providing sewing machines on grant (pointed out by six non-poor participants)
- Supply of electricity for irrigation (mentioned by 15 non-poor participants).

Chapter 17
Poverty Dynamics and Poverty Reduction Strategies

17.1 Introduction

Analysis of Household Income and Expenditure Survey 2010 data (HIES 2010) by the BBS indicates a remarkable reduction of poverty in rural Bangladesh during 2005–2010 as the incidence of poverty in rural area dropped from 43.8% in 2005 to 35.2% in 2010, 8.6 point in percentage reduction over the period (BBS 2011). At national level this reduction was from 40.0% in 2005 to 31.5% in 2010 (8.5%). Though a large number of households (7,840) were interviewed in HIES 2010, these findings have limited explanatory power and do not explain the process of poverty reduction. Of course, this type of static analysis has limitations to explain the processes of falling into poverty and getting out of it and, thus, to get a deeper understanding of the dynamic nature of poverty. Static analysis does not provide complete guidelines for framing appropriate policies for poverty alleviation. In order to overcome this type of limitations, there is a need for measuring dynamics of poverty in multidimensional aspects such as household characteristics, human capital, vulnerability, women's empowerment, assets and liabilities beyond analysis of income and consumption expenditure. Such a cross-disciplinary analysis is important for measuring poverty dynamics and for framing policies for poverty reduction.

The study of poverty dynamics requires panel data. In this study, dynamics of poverty is examined by using a 2-year panel data set of rural households. For this purpose data were collected from the same sample of 1,212 households first in 2004 and then in 2009. These data sets enabled us to address poverty dynamics in the context of changes in poverty situation and other factors that explain the changes. Although the mechanisms of measuring changes in income, landholding, education, food security, vulnerability, occupation are easier, it is difficult to explain the evidence for changes and the forces of dynamics underlying poverty.

Our empirical analysis indicated that in addition to income dynamics there are also dynamics in non-income dimensions such as education, health, nutrition, occupation,

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food security which are related with poverty dynamics. With limitations of our panel data of 5-year period (2004–2009) at our disposal and in mind, it is worth while to explore our findings further.

The aim of this chapter is to synthesize the knowledge gathered and concepts developed through the analysis of panel data regarding dynamics of poverty and to discuss about poverty reduction strategies for both income and non-income factors that contribute to the welfare of the poor, influence their economic potential, and enhance the capabilities of the rural poor in Bangladesh.

17.2 Demography, Physical Capital and Income

17.2.1 Demographic Characteristics

Household size and dependency ratio are directly related with poverty dynamics. The lower the dependency ratio the lower is the economic burden on the household as well as the incidence of poverty. According to HIES-2010, the average household size in rural area fell from 4.89 in 2005 to 4.53 in 2010, while the dependency ratio declined from 74.1 in 2005 to 69.3 in 2010. The same study indicated 8.6 percentage point decline in poverty level in rural area. Thus, demographic characteristics and poverty are mutually reinforcing each other.

In our study, there is also no significant change in average household size in the study areas over the 5-year period. The average household sizes of the sample households were 5.1 in 2004 and 5.2 in 2009 but there was a structural change in household compositions. The proportion of child population (0–4 years) has declined, while the working age population (15–64) has increased. Consequently, there is a significant reduction in overall dependency ratios and it is reduced from 71.6% in 2004 to 64.5% in 2009. Sex ratio also matters household monetary and non-monetary poverty, but there is no significant change in sex ratio over the 5-year period in the study areas. It is worth mentioning that the dependency ratio and sex ratio among the chronically poor households are much higher than those in non-poor and transient poor households. This implies that the number of children in chronically poor households is higher than that in other economic classes, which leads to a higher dependency ratio in chronically poor households. Higher average sex ratios also indicate the higher number of female members in the chronically poor households. A slight fall in household size and significant reduction of dependency ratio increase the per capita income and consumption expenditure, which lead to changes in well-being and reduction of poverty.

During the same period, the proportion of female-headed households particularly in chronically poor group has increased and they have far less earned income than the male-headed households. Poverty in female-headed households is more severe than that of male-headed households. Female-headed households are also susceptible to becoming poor when there are no male earning members in the households because of death of husband, abandonment or divorced by the husband. It may

be mentioned that the rate of widowhood, incidence of divorce or abandonment is higher among chronically poor households. Virtually all women of these categories are vulnerable and suffer from various social barriers to work outside home. As a result they become more susceptible to poverty. Thus, there is a clear gender dimension and one would expect this to show up as higher incidence of poverty in female-headed households than male-headed households. Female-headed households are not only more likely to be poor but also more likely to stay in poverty longer. Changes in demographic characteristics discussed above cause a lot of inter-temporal and intergenerational income mobility and changes in incidence of poverty.

17.2.2 Physical Capital

Structure of house is the most important component of physical capital and indicates the quality of life in rural Bangladesh. Housing structure is based on five types of construction materials: thatched/jhupri (wall and roof made of bamboo, straw or leaves), kutcha (wall made of mud or clay), house made of durable materials (wall made of CI sheet), semi-pucca (wall made of bricks and CI sheet) and pucca (wall and roof are made of bricks). These are ordered in terms of increasing quality of house. Over the 5-year period many households in the study areas have upgraded their housing conditions and major upgradation is observed from kutcha house to CI sheet house in all economic classes. It is notable that improvements are also pronounced for chronically poor households between 2004 and 2009.

One would expect that when household income will increase they are likely to build house with better quality materials. Access to electricity connection, mobile phone, hygienic toilet facilities and safe drinking water indicates economic prosperity of a household. Access to safe drinking water and hygienic sanitation facilities is closely associated with a reduced disease burden, and then, better health outcome. It reduces expenditure on account of treatment and increases the consumption level. These indicators over time indicate the increase of households' welfare and well being of people. Access to information through phones, radio and television has also improved significantly in the study areas, leading to changes in household's welfare other than consumption on non-durable goods.

17.2.3 Income and Expenditure

Household income is the primary determinant of poverty status. Good earning opportunities keep families out of poverty, while lack or low wages causes families to be poor. A family may enjoy a decent life in one period of time but if the family's income is affected due to natural calamities or if the family head is unable to earn for 3 months due to health shocks, the family income may be reduced. This family will not be able to enjoy decent life style. Family income may again

come back to the level before when the crisis is over. Thus the evidence of actual income mobility pattern in the long run is difficult to determine. Between 2004 and 2009, average monthly nominal income at current price has become almost twofold but in real term it has increased by only 8%. The Kernel density curve also indicates that the bandwidth of per capita income was much wider in 2009 than that in 2004, which implies a distinct structural change over the 5-year period. According to Shorrock's index, income mobility between 2004 and 2009 was found to be high (0.678). Significant positive change in income is one of the important drivers of poverty dynamics. There are several reasons for upward income mobility, including employment opportunities, diversification of income sources, and crop diversification. The important reasons for downward mobility are high cost of treatment, death of main income earner, high dependency ratio and natural shocks.

Like income, average household monthly expenditure between 2004 and 2009 has also been doubled. The average monthly income of descending non-poor and chronically poor households was less than their average monthly expenditure. It is worth mentioning that although the per capita income in 2009 has become double compared to 2004, the average household income of the poorest five deciles was much lower than their average household expenditure due to increased prices of commodities. From the Kernel density curve it can easily be seen that the changes in per capita expenditure pattern between 2004 and 2009 and wide range of variation in expenditure pattern were observed in 2009 for all economic classes. It is obvious that income and expenditure are highly correlated and they go hand in hand. Significant battle against inflation can reduce expenditure and increase savings and consequently reduce poverty.

17.3 Food and Livelihood

17.3.1 Food Security

Although, there was a wide gap between household income and expenditure in 2009 than in 2004, the food security situation was observed to be better in 2009. Almost 96% of ascending poor, 42% of descending non-poor and 15% of chronically poor households could provide 3 meals a day in 2009, while the figure in 2004 was 89%, 47% and 9%, respectively, indicating some improvement in food security. Access to microcredit might have positive contribution to the improvement of food security of poor households. According to World Bank the access to microcredit becomes two-fold between 2000 and 2005 (World Bank 2005). In recent years there has been microfinance revolution but in the absence of proper data analysis it is difficult to link causal relation between poverty reduction and microfinance expansion. But at sub-district level there is a positive impact on poverty reduction with higher growth in microfinance coverage (Narayan and Zaman 2009).

17.3.2 Livelihood Strategies

Livelihood strategies of majority of rural people of Bangladesh are mainly agriculture, agricultural labour, daily non-agricultural wage labour and petty business. Livelihood strategy varies with the variation of economic class. Livelihood of non-poor people largely depends on farming, while selling of labour is the main livelihood strategy of the chronically poor. The proportion of chronically poor households with agricultural day labour as their main occupation declined from 37% in 2004 to 19% in 2009. On the other hand, the proportion of chronically poor households with non-agricultural day labour as the main occupation increased from 9% in 2004 to 26% in 2009. There is a great shift in the occupation of chronically poor households from agricultural labour to non-agricultural labour or employment. This shift may have greatly contributed to their increased economic conditions. Except the mobility between agricultural labour to non-agricultural labour, the degree of occupational mobility in rural Bangladesh is relatively low as indicated by the estimated Shorrock's mobility index (0.436). However, occupational status is believed to be another important determinant of poverty status. The HIES-2010 shows that the highest incidence of poverty prevails among the service workers, while among administrative and management workers the incidence of poverty is the lowest.

17.3.3 Household Assets

An important cause of poverty and its manifestation is the lack of assets. Household asset can be a better indicator of living standard than snapshot of income flow since it has been accumulated over time and last longer. Household assets including land are an important determinant of household welfare. Asset value at current market price between 2004 and 2009 has increased almost threefold for all economic classes but in real term it has increased just more than twofold. There is a great variation in asset value across economic classes. For instance, non-poor households have ten times higher asset value than that of chronically poor households. Particularly, the important household asset in rural area is land. The highest incidence of poverty is observed among landless households, while it is the lowest among big land owners. Increase in asset ownership is thus associated with decrease in incidence of poverty and there is strong negative correlation between land ownership and incidence of poverty.

17.4 Human Capital, Health and Coping Strategies

17.4.1 Human Capital Development

The two most important aspects of human capital development are education and health. Basic education and literacy are important elements for human development

and acquiring knowledge, which are essential for higher income opportunities. Increase in educational level has positive role in increasing per capita income, consumption and reducing poverty. Incidence of poverty shows a negative relationship with level of education. Between 2004 and 2009, the average years of schooling has increased for all economic classes and for both sexes, indicating a sign of positive improvement in welfare dynamics. Among children aged 6–10 and 11–16 years, school attendance rates have increased and gender disparity in attendance has been reduced over the 5-year period. More impressive fact is that gender parity is evident even among the chronically poor.

Like education, good health is also important element for human development. Health status in study areas has made good progress over the 5-year period. Infant and child mortality, maternal mortality and under five mortality have been reduced steadily. In the sample households, the proportion of pregnant women who received ANC and proportion of mothers who received PNC have increased between 2004 and 2009. Some improvements are observed with respect to delivery places and quality of delivery attendants, which have improved the maternal health condition and safe delivery of babies. Child nutrition status has also been improved as measured by different anthropometric indices such as underweight, wasted and stunted. These improvements have reduced morbidity, and therefore, the burden of the households, which have positive impact on poverty reduction and family welfare.

17.4.2 Social Capital and Shocks Coping Strategies

Social capital is an intangible asset which is non-physical and it may be difficult to express in monetary term. It plays an important role on poverty reduction through social network and relations. Social capital is also important for the well-being of the poor since they are repeatedly affected by the spike of high food price shocks, health shocks and natural shocks. The poor are less able to cope with shocks in the absence of social network, and they use coping strategies that could have negative welfare implications including sales and depletion of assets and reduction of essential consumption. These strategies have negative impact on income and savings and consequently on poverty of the affected households. On the other hand, for the poor who have few coping resources, shocks tended to affect more directly to lower their well-being. Thus social support networks can mitigate the effects of shocks through easy access to welfare benefits.

17.4.3 Labour Market Behaviour

Labour market behaviour and outcomes are strongly linked to the level of income and consequently to the level of poverty. Agriculture is still the main source of income but more recently the rural non-farm sector is growing rapidly, since availability of

land for cultivation is gradually declining. The share of employment outside agriculture of rural households and the share of income from these activities have been increasing significantly. Shifts of labour from low paid daily wage work in agriculture to those outside agriculture and to salaried employment have also brought higher income and significant reduction in poverty.

17.5 Vulnerability and Poverty

Bangladesh is a flood prone country and almost every year a large number of people suffers from recurring floods and other climate-related shocks. A bulk of the population of Bangladesh is at risk of falling into poverty due to high incidence of idiosyncratic and covariate shocks such as natural disaster, health shocks, income change from poor harvest. All these shocks make people vulnerable to poverty and vulnerability is an important aspect of household's poverty dynamics. Abrupt and big income shocks such as rise in food prices aggravate poverty. From our panel data sets it is observed that per capita income of 9% of the sample households in 2004 and 7% of the sample households in 2009 are marginally above the poverty line income (10% above the poverty line). These proportions of households are more vulnerable and they may fall into poverty even if any type of shock they face is small. Among the idiosyncratic shocks (household-specific shocks) such as health shocks particularly when these occur to income earners contribute to the loss of income and consequently worsen the poverty situation. Vulnerability as a result of shocks can have irreversible consequences on malnutrition, human capital and thus poverty.

17.6 Poverty Reduction Strategies

Although some progress in poverty reduction is observed, the poverty rate is still high and the challenge to reduce poverty remains a great concern in rural Bangladesh. Sustainable decline of fertility is crucial for reducing household size, dependency ratio and consequently reducing poverty. Performance of family planning programme by the use of contraceptive methods should be further enhanced to reduce population growth. This effort has substantive implications on demand for food, child survival, reproduction, morbidity and mortality. Higher population growth increases the demand for food increasing the food insecurity in turn.

Increasing educational attainment will have high dividends in terms of higher earnings and reduced poverty. As educational level rises, the poor can shift their occupation from low paid agricultural labour to salaried jobs. Educated women can also contribute to the household income and can involve themselves to household welfare activities. Given the importance of education for poverty reduction, proper policy

intervention with higher investment in education sectors should be undertaken. Like existing female stipend program from grade 6 to grade 12 in rural area, provision should be made for poor male students. If this facility is provided to male students, opportunities for getting educated workforce with higher skill and productive capacity will be increased. This will lead to higher income opportunities and poverty reduction. Thus, there are formidable needs of literate labour force and manpower with technical skills. The problem of adult illiteracy is the most important challenge to the government. Higher level of education also calls for attention. Health problem is a highly visible correlate of poverty. Ill health itself causes deterioration in the economic status of a household and easily makes the household fall into poverty. Like other welfare benefits, primary health care services to the rural poor should be provided. Health insurance may also be introduced and the premiums should be paid by the government for the poor who have incomes below the poverty line. Maternal nutrition is a good predictor of child nutrition. Thus improvements of health status of women are essential for stopping health shocks of children. It is, therefore, important to ensure access of the poor and women to education and health care services to help them getting out of poverty. And provisions should be made to ensure quality health care programmes, nutrition and family welfare services for the poor. Development of countrywide network of health care infrastructure has direct bearing on health outcomes and socio-economic development.

The most deprived in the rural area are those who cannot manage to survive on their own income. This group of people includes old, widows, divorced and separated women with small children. They are totally landless, assetless, illiterate and more or less unemployed. This group of the poor lacks access to less expensive financial services and they are compelled to take loans from shopkeepers, moneylenders and relatives with a high interest rate. This has been an important constraint for this group of people in smoothing consumption and protecting themselves against incidence of poverty and different types of vulnerabilities. This growing group of distressed people suffers from more than one shock. More than 4% of ascending non-poor, 58% of descending non-poor and 85% of chronically poor sample households in 2009 could not afford three meals a day in 2009. Access to welfare benefit programme such as cash grant for the elderly, food support for the vulnerable groups, food-for-work, rural maintenance programme was insufficient for the poor. In order to improve nutritional status and poverty situation, safety net programmes for the poor with wider coverage deserve special attention.

Almost 50% of the total population is women and they are more susceptible to fall into poverty. Social subordination makes women more vulnerable to poverty due to illiteracy, low asset holding, low earning capabilities. Poverty alleviation is not possible by keeping these large number of women outside the mainstream of development. Education, skill development training programmes, women's entrepreneurship development programmes, advocacy for gender equity should be implemented strongly and special attention should be given to these targeted programs. To empower women, provision for education, skill training, asset holding and participations in different economic activities are important. Thus, access to education, training and credit should be widened and increased for women, so that

they can participate in economic activities to improve their livelihoods. Women's labour should not be undervalued and barriers on their rights and choices in making personal decision at home and in the community should be removed by taking protection socially and legally. Helping against violence of women (VOW) through social protection schemes, good governance and changing attitude could keep many divorces, separated and widowed women out of poverty.

Rural economy is still dominated by agriculture sector. Again majority (40%) of the total income of rural households comes from this sector. Reduction of poverty is thus largely dependent upon the effective development of agriculture sector. Per capita landholding size is declining gradually and more than 80% of farm households are small farmers. Majority of them are poor and suffer from food insecurity. Adoption of improved practices in farming can play an important role in increasing agricultural productivity, food security and reduction of poverty. Effective land reforms including terms and conditions of reforms for tenant farmers, and adoption of improved practices are necessary for increased income of the poor. Access of poor farmers to credit will increase their farm productivity and reduce food insecurity. Rural infrastructure development including roads, electricity, irrigation facilities will contribute positively to the growth of agricultural productivity as well as to the reductions of rural poverty. Given the importance of enhanced access to markets, and income-earning opportunities, rural infrastructures such as road, electricity, irrigation facilities can play an important role in poverty reduction strategies.

For the vulnerable who have a high risk of sliding down into poverty or further falling down from poverty to destitution, a better understanding of dynamics of changing process within individual and household life cycle than currently known is necessary. Therefore, there is a need for formulation of better protective and preventive social protection strategies for vulnerable people. Government and NGOs can take stronger initiatives in this regard by extending safety-net programs. Effective efforts to remove social barriers and to build up social institutions and social network are necessary for promotion of the vulnerable and the poor. Social institutions, local organizations and NGOs can develop systems of protection of the poor and the vulnerable from the risk of vulnerability.

Appendices

Appendix A Sample Design

Sample design has two aspects: sample selection process and estimation process. The former process deals with the rules and operations by which some sample units of the population are selected in the sample, while the latter process deals with the computation of sample statistics which represent the population characteristics. However, for better understanding of the mobility of dynamic poverty groups, a statistically sound multistage random sampling design was followed for selecting households from the four dynamic groups. The first baseline survey was carried out in 2004 with a total of 1,282 rural households (320 non-poor households, 225 ascending poor, 227 descending non-poor and 520 chronically poor households) selected at random from 32 villages spread over rural areas of 8 poverty prone districts. The first survey was carried out during 15 December 2004 to 15 January 2005. After 5 years, second time survey was carried out during 28 January to 28 February 2010 on the same 1,282 households to see the directionality of changes in the poverty situation during the period of 2004–2009. In Bangladesh there are about 23.53 million rural households. The selected households for the study comprise about 0.81% of the total rural households in the country.

Although the sample households covered in this study is not large compared to other national level surveys such as Household Income and Expenditure Survey (HIES), Sample Vital Registration Survey (SVRS) and Labour Force Survey (LFS), the randomly selected sample households in this study are widely spread out geographically covering wide regional spectrum, which help us creating a representative sample size in the survey baseline for long-term monitoring. Standard data collection procedures were followed and conceptual framework was worked out rigorously for the field investigators. An intensive training of the field investigators and field supervisors was given in respect of conceptual framework, questionnaire and rapport building with the respondents and village population to reduce anticipated non-sampling errors. For long-term and continuous monitoring of changes in the households it is also difficult and sometimes unrealistic to retain too large sample.

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Thus, this study is based on panel data with 5 years interval. Panel data are better suited to study the dynamics of change. Mobility of households from one economic class to another and labour mobility are also better studied with panel data. Although the sample size is not large enough compared with nationally conducted governmental surveys, our panel data hold almost all characteristics of valid sample and give more information with more variability, less collinearity among variables, more degrees of freedom, more efficiency and minimum bias and non-sampling error.

An important issue for panel data is the attribution rate across rounds. At the second round survey in 2009, 70 households were lost. The field investigators could not communicate with these households. Among the lost households 29 households (or 38% of the lost households) have migrated to Dhaka capital city, 3 migrated to nearby town, 3 migrated to nearby Upazila, 3 migrated to other villages, 3 left for unknown places to avoid repayment of loans, and 14 households temporarily migrated to other places to do seasonal work such as crop harvesting and crop plantation. Seven households have been merged with other relative's households and three mentally retarded household heads refused to respond to the investigators. Due to budget constraint and in the absence of addresses of migrant households we could not trace those households for interview. The attrition rate over 5 years was thus about 5.5%. Distribution of migrant households by category and place of migration is shown in Table A.1.

It is notable that majority of the migrants (50%) are primarily from chronically poor households, followed by descending non-poor. Higher income opportunities and increasing prospect for finding a job, Dhaka city has attracted majority of poor migrants. Lack of adequate livelihood and employment opportunities in the locality has been prime push factor for most such migration. Rural to rural migration has occurred mainly from area of low agricultural productivity to high yielding agricultural production region. Temporary or seasonal migration also occurs for higher income opportunities particularly during crop plantation and harvesting seasons. Thus higher income opportunities and better life intensify the movement of poor people to urban area. These two factors are the prime push factors for the poor for their migration. They consider that migration is an instrument for improving the economic status of poor households.

Data Collection Instruments

Both quantitative and qualitative approaches were applied to identify the reasons behind households movement into and out of poverty. For quantitative approach, one set of questionnaire was developed for the first baseline household survey. The questionnaire included modules on household demography, education, health, housing, income activities, expenditure, food consumption (7-day food frequency), women's empowerment, crisis coping strategies and household asset ownership. In the second household survey, same questionnaire was used with slight modification and some additional questions were included. Inclusion of additional questions was done to measure poverty by multidimensional approach. In the second survey in

addition to household survey, focus group discussions (FGDs) were also conducted with household members of the four poverty dynamic groups: non-poor, ascending poor, descending non-poor and chronically poor. For the focus group discussions, a guideline schedule was prepared to examine reasons for changes in the level of poverty and to examine broad directionality of changes. The focus group discussion (FGDs) is a participatory approach that relies on community perception of poverty at household level. The reasons and explanations were sought in FGDs for changes in poverty status over the 5 year period.

Table A.1 Distribution of households who were lost at the second round interview by category of household and reasons

Reason/destination	Non-poor	Ascending poor	Descending non-poor	Chronically poor	Total
Migrated to Dhaka capital city	05	05	07	15	32
Migrated to nearby town	04	01	01	01	07
Migrated to nearby Upazila	01	00	01	02	04
Migrated to other villages	00	01	00	10	11
Left villages to unknown places to avoid repayment of loans	00	00	04	03	07
Temporary seasonal migration	01	01	02	03	07
Refused to respond	00	01	00	01	02
Total	11	09	15	35	70

Appendix B

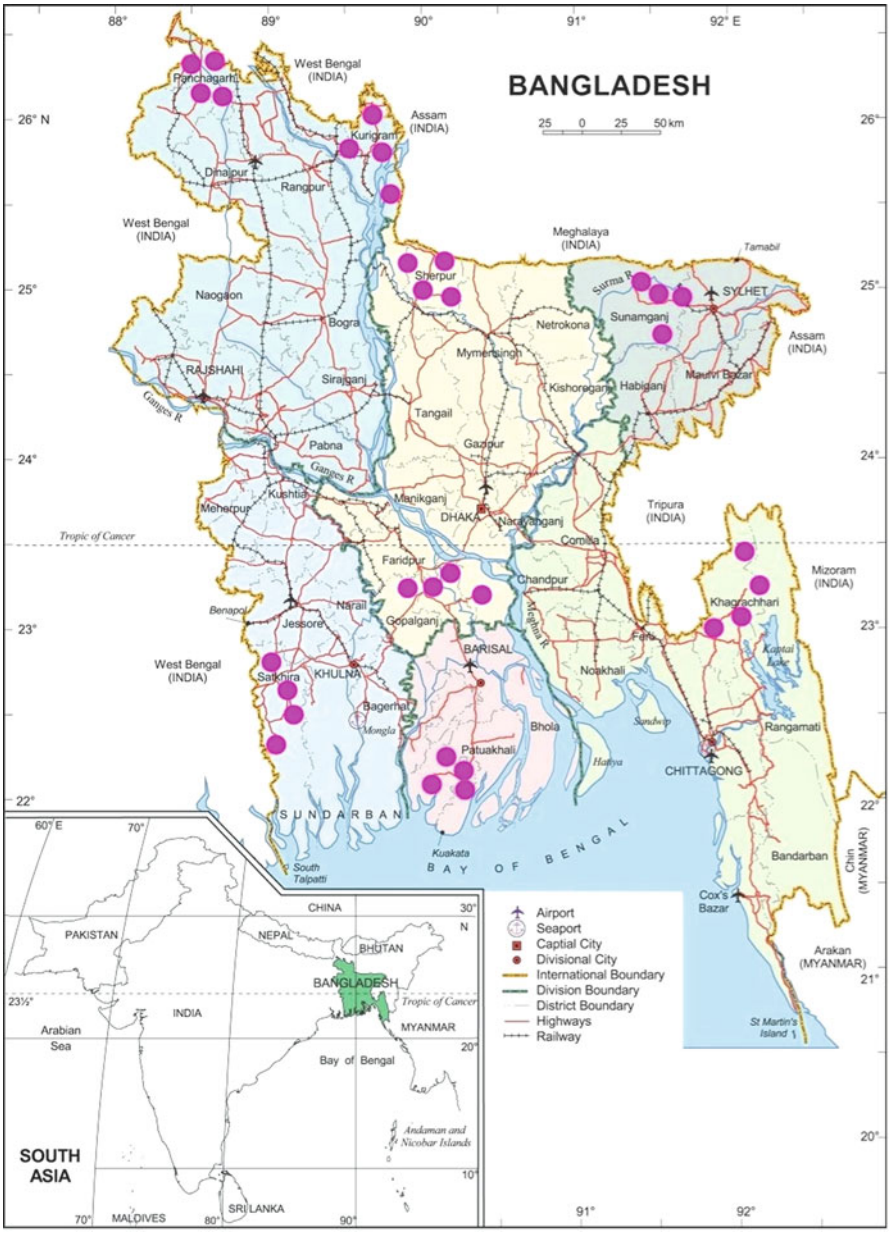
List and Location of Selected Villages

SL	Division	District	Upazila	Union	Village
01	Sylhet	Sunamganj	Biswambharpur	Dhanpur	Halabadi Puratan gaon
02	Sylhet	Sunamganj	Derai	Karimpur	Bangagaon
03	Sylhet	Sunamganj	Doara Bazar	Narsingpur	Lastober gaon
04	Sylhet	Sunamganj	Sadar	Gaura rong	Kamartuk
05	Rajshahi	Panchagarh	Atwari	Dhamur	Dhamur
06	Rajshahi	Panchagarh	Boda	Kajoldighi Kaliganj	Agun tola
07	Rajshahi	Panchagarh	Debiganj	Shalbhanga	Shikarpur
08	Rajshahi	Panchagarh	Sadar	Magura	Ajadpur
09	Rajshahi	Kurgram	Bhurungamari	Bhurungamari	Dakhkhin Para Baraitara
10	Rajshahi	Kurgram	Phulbari	Phulbari	Kabir Mamud
11	Rajshahi	Kurgram	Nageswari	Hasnabad	Beparir Hat
12	Rajshahi	Kurgram	Rowmari	Rowmari	Dakhkhin Notan Para
13	Khulna	Satkhira	Ashashuni	Ashashuni	Shitolpur
14	Khulna	Satkhira	Kolaroa	Jogi Khali	Paik para
15	Khulna	Satkhira	Sadar	Bolle	Mukunda pur
16	Khulna	Satkhira	Shyamnagar	Munshiganj	Moukhali (Munshiganj)
17	Dhaka	Madaripur	Kalkini	Baligram	Pashchim Barigram
18	Dhaka	Madaripur	Sadar	Dhurail	Khalashi Kandi
19	Dhaka	Madaripur	Rajoir	Bodor Pasha	Pathan Kandi
20	Dhaka	Madaripur	Shibchar	Char Janajat	Jalal Sarkar Kandi
21	Chittagong	Khagrachhari	Dighinala	Merung	Uttor Rashik Nagar
22	Chittagong	Khagrachhari	Sadar	Golabari	Pashchim Golabari
23	Chittagong	Khagrachhari	Matiranga	Guimara	Guimara (Bazar area)
24	Chittagong	Khagrachhari	Panchhari	Puch gang	Modhu Mongol Para
25	Dhaka	Sherpur	Jhinaigati	Jhinaigati	Jhinaigati
26	Dhaka	Sherpur	Nalita Bari	12 Kolosh Par	Gaglajani
27	Dhaka	Sherpur	Sadar	Bhatshala	Shapmari
28	Dhaka	Sherpur	Sribardi	Bhelua	Chokbandi
29	Barisal	Borguna	Amtoli	Amtoli	Mohish danga
30	Barisal	Borguna	Amtoli	Kukua	Purba Kukua
31	Barisal	Borguna	Sadar	Dhalua	Kodom tola
32	Barisal	Borguna	Betagi	Kajirabad	Kumrakhali

Note: *SL* = serial number

Appendix C

Selected Villages: Map of Bangladesh Showing Locations of Survey Villages (Map Adapted from BANGLAPEDIA, Asiatic Society of Bangladesh)



Appendix D

Socio-Economic Indicators of Sample Households by Years of Schooling and Vulnerability Category (No. of Households = 1,212)

	Vulnerability category					
Important indicator	A ($v \geq 0.5$, $y < z$ and $E(y) < z$)	B($v \geq 0.5$, $y < z$ and $E(y) \geq z$)	C($v < 0.5$, $y < z$ and $E(y) \geq z$)	D($v \geq 0.5$, $y \geq z$ and $E(y) < z$)	E($v \geq 0.5$, $y \geq z$ and $E(y) \geq z$)	F ($v < 0.5$, $y < z$ and $E(y) \geq z$)
Years of schooling = 0	**n = 39**	**n = 13**	**n = 2**	**n = 6**	**n = 7**	**n = 25**
Average household size	3.85	1.92	1	3.33	1.71	1.8
Per capita expenditure (in Tk.)	795	906	1,002	1,600	1,762	2,253
Average landholding size (in acre)	0.28	0.19	0.11	0.78	0.10	1.48
Per capita calorie intake (in kcal)	1,849	2,026	1,480	2,479	2,538	2,693
Average years of schooling	0	0	0	0	0	0
Years of schooling less than 5 years	**n = 368**	**n = 74**	**n = 80**	**n = 78**	**n = 45**	**n = 159**
Average household size	5.85	5.35	5.27	5.24	5	4.6
Per capita expenditure (in Tk.)	838	961	980	1,459	1,568	1,875
Average landholding size (in acre)	0.40	0.85	1.79	0.91	1.48	2.26
Per capita calorie intake (in kcal)	1,873	1,975	1,964	2,316	2,347	2,506
Average years of schooling	1.79	2.99	3.39	2.13	2.74	3.42
Years of schooling between 5 and 10 years	**n = 4**	**n = 11**	**n = 44**	**n = 0**	**n = 3**	**n = 246**
Average household size	8.25	6	5.5	–	6.67	5.24
Per capita expenditure (in Tk.)	878	926	1,021	–	1,375	2,173
Average landholding size (in acre)	0.23	0.86	1.37	–	3.6	3.09
Per capita calorie intake (in kcal)	1,920	1,865	2,006	–	2,411	2,425
Average years of schooling	5.6	5.63	6.07	–	5.72	6.83
Years of schooling above 10 years	**n = 0**	**n = 0**	**n = 0**	**n = 0**	**n = 0**	**n = 8**

(continued)

Appendix D (continued)

Important indicator	Vulnerability category					
	A ($v \geq 0.5$, $y < z$ and $E(y) < z$)	B($v \geq 0.5$, $y < z$ and $E(y) \geq z$)	C($v < 0.5$, $y < z$ and $E(y) \geq z$)	D($v \geq 0.5$, $y \geq z$ and $E(y) < z$)	E($v \geq 0.5$, $y \geq z$ and $E(y) \geq z$)	F ($v < 0.5$, $y < z$ and $E(y) \geq z$)
Average household size	–	–	–	–	–	4.13
Per capita expenditure (in Tk.)	–	–	–	–	–	2,910
Average landholding size (in acre)	–	–	–	–	–	4.21
Per capita calorie intake (in kcal)	–	–	–	–	–	2,665
Average years of schooling	–	–	–	–	–	11.08

Appendix E

Socio-Economic Indicators of Sample Households by Landholding Size and Vulnerability Category (No. of Households = 1,212)

	Vulnerability category					
Important indicator	A ($v \geq 0.5$, $y < z$ and $E(y) < z$)	B($v \geq 0.5$, $y < z$ and $E(y) \geq z$)	C($v < 0.5$, $y < z$ and $E(y) \geq z$)	D($v \geq 0.5$, $y \geq z$ and $E(y) < z$)	E($v \geq 0.5$, $y \geq z$ and $E(y) \geq z$)	F ($v < 0.5$, $y < z$ and $E(y) \geq z$)
Landholding size = 0	**n = 46**	**n = 4**	**n = 2**	**n = 4**	**n = 2**	**n = 5**
Average household size	5.52	2	3	3.50	1	3.80
Per capita expenditure (in Tk.)	855	827	977	1,448	2,745	3,242
Average landholding size (in acre)	0	0	0	0	0	0
Per capita calorie intake (in kcal)	1,922	1,823	1,686	2,590	3,481	2,118
Average years of schooling	1.82	1.38	3.13	2.23	0	2.86
Landholding size: 0.01–2.49 acre	**n = 355**	**n = 86**	**n = 101**	**n = 71**	**n = 40**	**n = 286**
Average household size	5.63	4.87	4.77	4.92	4	4.36
Per capita expenditure (in Tk.)	827	954	988	1,486	1,490	1,908
Average landholding size (in acre)	0.34	0.59	0.69	0.51	0.55	0.98
Per capita calorie intake (in kcal)	1,858	1,983	1,971	2,325	2,344	2,448
Average years of schooling	1.66	2.93	4.32	1.96	2.53	4.98
Landholding size: 2.5–7.5 acre	**n = 10**	**n = 8**	**n = 17**	**n = 9**	**n = 13**	**n = 116**
Average household size	8.1	7.5	7.76	7.33	7.31	5.53
Per capita expenditure (in Tk.)	982	967	1,050	1,345	1,686	2,314
Average landholding size (in acre)	3.84	2.99	4.35	4.48	4.33	4.1
Per capita calorie intake (in kcal)	2,103	1,895	2,060	2,240	2,299	2,493
Average years of schooling	2.14	3.22	4.13	2.01	3.01	5.94
Landholding size: >7.5 acre	**n = 0**	**n = 0**	**n = 6**	**n = 0**	**n = 0**	**n = 31**
Average household size	–	–	7.67	–	–	6.16

(continued)

Appendix E (continued)

Important indicator	Vulnerability category					
	A ($v \geq 0.5$, $y < z$ and $E(y) < z$)	B($v \geq 0.5$, $y < z$ and $E(y) \geq z$)	C($v < 0.5$, $y < z$ and $E(y) \geq z$)	D($v \geq 0.5$, $y \geq z$ and $E(y) < z$)	E($v \geq 0.5$, $y \geq z$ and $E(y) \geq z$)	F ($v < 0.5$, $y < z$ and $E(y) \geq z$)
Per capita expenditure (in Tk.)	–	–	945	–	–	2,646
Average landholding size (in acre)	–	–	9.96	–	–	12.5
Per capita calorie intake (in kcal)	–	–	1,823	–	–	2,702
Average years of schooling	–	–	4.34	–	–	6.37

Appendix F

Socio-Economic Indicators of Sample Households by Access to Electricity and Vulnerability Category (No. of Households = 1,212)

	Vulnerability category					
Important indicator	A ($v \geq 0.5$, $y < z$ and $E(y) < z$)	B($v \geq 0.5$, $y < z$ and $E(y) \geq z$)	C($v < 0.5$, $y < z$ and $E(y) \geq z$)	D($v \geq 0.5$, $y \geq z$ and $E(y) < z$)	E($v \geq 0.5$, $y \geq z$ and $E(y) \geq z$)	F ($v < 0.5$, $y < z$ and $E(y) \geq z$)
Access to electricity: yes	**n = 70**	**n = 31**	**n = 65**	**n = 11**	**n = 18**	**n = 265**
Average household size	6.19	5.55	6.05	7	5.78	5.11
Per capita expenditure (in Tk.)	877	952	999	1,432	1,562	2,191
Average landholding size (in acre)	0.32	0.58	1.65	2.13	1.81	3.08
Per capita calorie intake (in kcal)	1,958	1,916	2,004	2,299	2,252	2,493
Average years of schooling	1.79	2.75	4.36	2.05	2.42	5.51
Access to electricity: no	**n = 341**	**n = 67**	**n = 61**	**n = 73**	**n = 37**	**n = 173**
Average household size	5.57	4.7	4.48	4.82	4.14	4.29
Per capita expenditure (in Tk.)	825	949	989	1,475	1,592	1,917
Average landholding size (in acre)	0.40	0.8	1.58	0.72	1.23	2.17
Per capita calorie intake (in kcal)	1,854	1,994	1,935	2,332	2,434	2,446
Average years of schooling	1.63	2.96	4.18	1.97	2.64	4.92

Appendix G

Socio-Economic Indicators of Sample Households by Gender of Household Head and Vulnerability Category (No. of Households = 1,212)

	Vulnerability category					
Important indicator	A ($v \geq 0.5$, $y < z$ and $E(y) < z$)	B($v \geq 0.5$, $y < z$ and $E(y) \geq z$)	C($v < 0.5$, $y < z$ and $E(y) \geq z$)	D($v \geq 0.5$, $y \geq z$ and $E(y) < z$)	E($v \geq 0.5$, $y \geq z$ and $E(y) \geq z$)	F ($v < 0.5$, $y < z$ and $E(y) \geq z$)
Male-headed households	**n = 378**	**n = 85**	**n = 107**	**n = 76**	**n = 49**	**n = 397**
Average household size	5.8	5.35	5.64	5.12	4.98	4.94
Per capita expenditure (in Tk.)	843	947	995	1,461	1,558	2,075
Average landholding size (in acre)	0.40	0.87	1.68	0.87	1.49	2.81
Per capita calorie intake (in kcal)	1,898	1,952	2,000	2,294	2,320	2,475
Average years of schooling	1.65	3.06	4.43	1.99	2.69	5.43
Female-headed households	**n = 33**	**n = 13**	**n = 19**	**n = 8**	**n = 6**	**n = 41**
Average household size	4.30	2.77	3.26	5	2.17	3.27
Per capita expenditure (in Tk.)	728	969	992	1,546	1,784	2,158
Average landholding size (in acre)	0.21	0.10	1.25	1.21	0.87	1.83
Per capita calorie intake (in kcal)	1,575	2,085	1,810	2,653	2,820	2,473
Average years of schooling	1.64	1.78	3.37	1.86	1.43	3.84

Appendix H

Socio-Economic Indicators of Sample Households by Social Capital and Vulnerability Category (No. of Households = 1,212)

	Vulnerability category					
Important indicator	A ($v \geq 0.5$, $y < z$ and $E(y) < z$)	B($v \geq 0.5$, $y < z$ and $E(y) \geq z$)	C($v < 0.5$, $y < z$ and $E(y) \geq z$)	D($v \geq 0.5$, $y \geq z$ and $E(y) < z$)	E($v \geq 0.5$, $y \geq z$ and $E(y) \geq z$)	F ($v < 0.5$, $y < z$ and $E(y) \geq z$)
Social capital: yes	**n = 25**	**n = 20**	**n = 31**	**n = 7**	**n = 5**	**n = 131**
Average household size	6.12	6.5	7.39	5.43	7.5	5.55
Per capita expenditure (in Tk.)	832	988	1,005	1,507	1,351	2,266
Average landholding size (in acre)	0.52	1.26	3.01	1.14	2.84	3.88
Per capita calorie intake (in kcal)	1,730	2,070	2,042	2,283	2,014	2,530
Average years of schooling	1.85	3.14	4.39	2.17	2.67	6.07
Social capital: no	**n = 386**	**n = 78**	**n = 95**	**n = 77**	**n = 50**	**n = 307**
Average household size	5.65	4.58	4.6	5.08	4.4	4.46
Per capita expenditure (in Tk.)	834	940	991	1,466	1,606	2,005
Average landholding size (in acre)	0.38	0.64	1.16	0.88	1.28	2.22
Per capita calorie intake (in kcal)	1,881	1,944	1,948	2,332	2,410	2,451
Average years of schooling	1.64	2.83	4.24	1.96	2.54	4.94

Appendix I

Socio-Economic Indicators of Sample Households by Occupation of Household Head and Vulnerability Category (No. of Households = 1,212)

	Vulnerability category					
Important indicator	A ($v \geq 0.5$, $y < z$ and $E(y) < z$)	B($v \geq 0.5$, $y < z$ and $E(y) \geq z$)	C($v < 0.5$, $y < z$ and $E(y) \geq z$)	D($v \geq 0.5$, $y \geq z$ and $E(y) < z$)	E($v \geq 0.5$, $y \geq z$ and $E(y) \geq z$)	F ($v < 0.5$, $y < z$ and $E(y) \geq z$)
Occupation: service	**n = 6**	**n = 3**	**n = 2**	**n = 0**	**n = 2**	**n = 32**
Average household size	5.67	5.33	4.5	–	4	6.03
Per capita expenditure (in Tk.)	885	780	864	–	3,086	2,165
Average landholding size (in acre)	0.1	0.24	0.04	–	1.6	2.21
Per capita calorie intake (in kcal)	1,901	1,401	1,856	–	3,680	2,471
Average years of schooling	2.92	2.61	4.68	–	2.07	7.18
Occupation: agricultural farming	**n = 93**	**n = 35**	**n = 51**	**n = 26**	**n = 19**	**n = 206**
Average household size	6.44	5.71	6.08	6.12	6.05	4.68
Per capita expenditure (in Tk.)	897	959	1,006	1,476	1,525	2,100
Average landholding size (in acre)	0.9	1.38	2.37	1.62	2.86	3.42
Per capita calorie intake (in kcal)	2,010	1,915	2,008	2,356	2,131	2,508
Average years of schooling	1.90	3.19	4.38	2.42	2.67	5.07
Occupation: labour (agri + non agri)	**n = 149**	**n = 22**	**n = 20**	**n = 17**	**n = 12**	**n = 17**
Average household size	5.58	4.36	3.8	4.4	3.33	3.41
Per capita expenditure (in Tk.)	800	956	948	1,447	1,452	1,853
Average landholding size (in acre)	0.23	0.46	0.51	0.44	0.21	0.85
Per capita calorie intake (in kcal)	1,855	2,027	1,908	2,328	2,338	2,556
Average years of schooling	1.48	2.66	4.28	1.58	2.38	3.92
Occupation: business	**n = 46**	**n = 11**	**n = 12**	**n = 16**	**n = 6**	**n = 66**
Average household size	6.13	5.09	5.5	5	4.5	5.44
Per capita expenditure (in Tk.)	860	1,032	1,036	1,508	1,696	2,069
Average landholding size (in acre)	0.38	0.22	1.15	0.35	0.25	1.72

(continued)

Appendix I (continued)

Important indicator	Vulnerability category					
	A ($v \geq 0.5$, $y < z$ and $E(y) < z$)	B($v \geq 0.5$, $y < z$ and $E(y) \geq z$)	C($v < 0.5$, $y < z$ and $E(y) \geq z$)	D($v \geq 0.5$, $y \geq z$ and $E(y) < z$)	E($v \geq 0.5$, $y \geq z$ and $E(y) \geq z$)	F ($v < 0.5$, $y < z$ and $E(y) \geq z$)
Per capita calorie intake (in kcal)	1,860	2,004	2,128	2,346	2,349	2,300
Average years of schooling	2.02	3.74	4.19	2.11	2.72	5.31
Occupation: others	**n = 117**	**n = 27**	**n = 41**	**n = 25**	**n = 16**	**n = 117**
Average household size	5.03	4.41	5	4.72	4.19	4.46
Per capita expenditure (in Tk.)	814	919	997	1,453	1,520	2,072
Average landholding size (in acre)	0.2	0.5	1.44	0.83	1.05	2.48
Per capita calorie intake (in kcal)	1,787	2,044	1,916	2,288	2,538	2,503
Average years of schooling	1.46	2.39	4.14	1.71	2.54	5.31

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