

**Ambo University Woliso Campus**

**Department of Agricultural Economics**

**Rural Finance**

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## UNIT ONE: CONCEPTS AND DIMENSIONS OF RURAL FINANCE

Rural finance is an important subject matter for small scale farmers and modern farming businesses. However, rural finance has faced various problems and challenges in which case there is a common opinion to follow a new approach for successful operation in rural area, and agriculture as well.

Recently, rural and agricultural finance have changing and emerging paradigm whereby various facts and opinions are commonly understood and developed as to how to bring about development and decrease poverty in rural areas of least developing countries. By now, there is a great focus and commitment to follow a new paradigm for rural finance based on past experiences learnt.

### 1.1. Meaning and Scope

Terminologies related to rural finance should be defined to avoid ambiguities in understanding the whole concept of finance in agriculture. In an attempt to be clear with terminology, we use the following definitions for the financial sector to differentiate agricultural finance from rural finance.

There is a great deal of ambiguity among finance, rural finance, agricultural finance, and microfinance. *Finance* is narrowly interpreted as capital in monetary form that is in terms of funds lent or borrowed, normally for capital purposes, through financial markets or institutions.

*Rural finance*, as defined by the World Bank, is the provision of a range of financial services such as savings, credit, payments and insurance to rural individuals, households, and enterprises, both farm and non-farm, on a sustainable basis. It includes financing for agriculture and agro processing.

*Agricultural finance* is defined as a subset of rural finance dedicated to financing agricultural related activities such as input supply, production, distribution, wholesale, processing and marketing. Agricultural finance is the economic study of the acquisition and use of capital

in agriculture. It deals with the supply of and demand for funds in the agricultural sector of the economy. Knowledge of fundamental economic and management principles and analytical procedures facilitates obtaining control over capital and using it efficiently.

*Microfinance* is the provision of financial services for poor and low income people and covers the lower ends of both rural and agriculture finance.

Financial analysis related to farm income, repayment capacity, and risk management indicates the total amount of capital the farm business can profitably and safely use. Information and knowledge on the legal aspects of borrowing, leasing, and contractual arrangements helps the farmer select the means of acquiring and controlling resources that will contribute most to the farming operation.

## **1.2. Roles of Rural Finance and Financial Systems**

What are the roles of finance for growth and development? How does the duty of finance be smoothly operated? Finance and financial systems are highly related concepts. Acquisition of finance for some business objectives will be effective if the acquired finance is managed by appropriate financial systems.

### **1.2.1. Role of Rural Finance to Growth**

Technological revolution including mechanization, improved varieties, modern chemical pesticides and fertilizers, and new production methods have contributed to the increase in production per acre, per animal, per labor-hour. These technological and structural changes in agriculture have increased the risks of owning and operating a farm business. The increased use of credit in farm business along with narrower profit margins has increased the financial risk of farming. The importance of finance in agriculture has significantly increased over time in accordance with the change in technology and the increase in production.

Policy should be directed at developing a market-based financial system for rural finance, but because of market failures to support disadvantaged groups, a special-priority program may be needed to get credit to women, smallholders and the rural non-formal sector. Subsidizing interest rates is not the way to help marginal borrowers. Instead, they can be helped through fixed-cost subsidies and self-selected targeting. Commercial banks should be encouraged to lend on other bases than the mortgage and passbook system. They should consider lending for such downstream agricultural activities as agro-processing. To improve rural financing, the system of property rights, title and default enforcement must also be strengthened, among other reforms.

Generally, to improve performance in the rural economy and efficiency in financial institutions, rural credit markets must be liberalized. The following reforms are important in an economy:

- 1) Avoiding produce and price controls;
- 2) Operation of commercial banks in a competitive environment;
- 3) Availability of credit to support productivity growth for agricultural smallholders and small producers of the rural non-formal sector, where growth potential of developing countries lies; and
- 4) Credit availability to women and to the rural poor for consumption-smoothing and for sustainable income-generating activities.

### **1.2.2. Role and Functions of Financial Systems**

The financial system plays a key role in a market economy because of its importance in mobilizing and allocating resources to finance agricultural investment projects that are necessary for economic development. A poorly functioning financial system can be a major constraint to private investment and entrepreneurship without which growth would be difficult to sustain over the long run. Investment can be constrained by low returns on investment or high cost of finance. In turn, high cost of finance can be traced to bad external finance or bad local finance, while bad local finance can be caused by low savings or poor financial intermediation.

Financial systems ease market frictions and in the process influence the allocation of resources across space and time. The costs of acquiring information, enforcing contract, and making transactions create incentives for the emergence of particular types of financial contracts, markets and intermediaries.

Financial systems have many functions contributing to growth and development of a country. The five key functions of financial systems that are essential to growth can be identified as follows:

1. Produce information about possible investments and allocate capital;
2. Monitor investments and exert corporate governance;
3. Facilitate the trading, diversification, and management of risk;
4. Mobilize and pool savings; and
5. Ease the exchange of goods and services.

### **1.3. Challenges in Rural Finance**

It is recognized that rural areas and populations remain underserved, yet economic development for these areas and populations are key components in the overall development of a country. The donor community and providers entering the market have shown a renewed interest in economic growth leading to poverty reduction within rural populations. In spite of their renewed commitment, significant challenges to the successful implementation of effective delivery of services and outreach remain prevalent. Given these facts the question remains: what are these challenges and what can institutions do to respond to them to make agriculture credit work?

Some factors unique to rural and agricultural markets that constrain both the supply and demand for finance in those areas could be economic, political, legal, institutional, and weather related.

***Economic challenges:*** Rural finance faces varieties of challenges resulting from the economic reality of a country including the following:

- 1) Transaction costs – High transaction costs for both borrowers and lenders;
- 2) Economic activities – Often limited economic opportunities available to local populations;
- 3) Risk – High risks faced by potential borrowers and depositors due to the variability of incomes, exogenous economic shocks and limited tools to manage risk;
- 4) Concentration of activities – Heavy concentration on agriculture and agriculture related activities exposes clients and institutions to multiple risks;
- 5) Crowding – Crowding out effect due to subsidies and directed credit;
- 6) Portfolio concentration – Increased risks associated with the concentration of a portfolio on agricultural activities;
- 7) Collateral – Lack of adequate or usable collateral (lack of assets, unclear property rights);
- 8) Infrastructure – Undeveloped or inadequate infrastructure;
- 9) Land fragmentation – Land held may be too small to be sustainable in an optimal use; and
- 10) Sources of income – Individuals may be dependent upon only one crop with no other external sources of income.

***Political, legal and institutional challenges:*** The following are some of the political, legal, and institutional challenges faced in rural finance.

- 1) Institutional capacity – Weak institutional capacity including poor governance and operating systems, low staff and management skills;
- 2) Political intervention – Risk of political intervention, which can undermine payment morale through debt forgiveness and interest rate caps;
- 3) Policy – Inhospitable policy, legal and regulatory frameworks;
- 4) Legal systems – Undeveloped legal systems, inadequate contract enforcement mechanisms;
- 5) Information – Lack of reliable information about borrowers; and lack of market information and/or market access

***Cultural and geographical challenge:*** Cultural and geographical challenges are the common problems faced in rural finance some of which are listed below:

- 1) Population density and demand – Generally lower population density and dispersed demand;
- 2) Repayment culture – History of poor repayment culture, many in the rural populations historically associate poverty reduction efforts with charity from NGO's and view the microfinance institutions in the same way making it a challenge to develop good repayment behavior; and
- 3) Accessibility – It is sometimes difficult to gain access to the communities and to get the community to accept credit terms.

***Weather challenges:*** Developing countries with a great dependence on rain-fed agriculture are highly influenced by weather related challenges including:

- 1) Rainfall – Rainfall patterns vary by region resulting in some areas with one growing season and others with three;

- 2) Natural disaster – Susceptibility to natural disasters which can cause sudden and severe devastation to livelihoods; and
- 3) Seasonality – potentially affecting both the client and the institution

Unfortunately, financial services providers in rural markets are not able to choose which challenges they will face. More often than not the various challenges reinforce and compound each other. For example, the high risk inherent in agriculture means increased importance in screening and monitoring of clients and therefore higher transaction costs for both clients and institutions, which are exacerbated by the dispersion of the client base and small loan sizes. Calvin Miller (2004) has identified 12 key challenges in rural finance. These challenges can be grouped into four as vulnerability constraints, operational constraints, capacity constraints, and political and regulatory constraints in a country.

***Vulnerability constraints:*** Vulnerability constraints include systematic risk, market risk, and credit / financial risk arising from the following issues in a country including: (1) weather condition, (2) plagues and diseases, (3) prices, (4) production, (5) useable collateral, (6) demand preferences, and (7) health and family needs.

***Operational constraints:*** These constraints are caused by low investment returns, low investment and asset levels, and low geographical dispersions of the rural financial institutions in a country. These constraints include: (1) low growth potential, (2) low velocity of capital, (3) non-competitive technologies, (4) lack of market integration, (5) lack or quality of roads and communication, (6) low efficiencies of business operations, and (7) high operating costs.

***Capacity constraints:*** Capacity constraints are related to infrastructural capacity, technical and training capacity, social exclusion, and institutional competency. These are caused by the following constraints: (1) lack of business investment, (2) lack of competitive technologies, (3) lack of roads, (4) lack of communication, (5) lack of education, (6) lack of technical and management skills, (7) lack of institutional capacity, and (8) lack of social representation (civil society).

***Political and regulatory constraints:*** These challenges include political and social interference, and regulatory framework. They are related to the following challenges: (1) political interference, (2) NGO donation interference, (3) cultural and gender constraints, (4) land tenure laws, and (5) financial regulations and tax policy.

## **UNIT TWO: RESOURCE ACQUISITION AND USE OF CREDIT IN AGRICULTURE**

The capital requirements of a farm or ranch business are large and increasing due to inflation, technological change, and increase in farm size. With the need to control land, machinery, livestock, and other resources worth hundreds of thousands of dollars, many prospective young farmers as well as policymakers are asking with increasing concern, "How can the capital needed for a viable farming operation be acquired?"

The questions related to the amount, type, timing, and benefits of credit are very important for a farmer's decision in acquiring additional funds using credits. How should a farmer decide how much credit to use in the farm operation and where to use it? What are the contributions that credit can make? What types of credit are available? How a farmer can work with a lender for successful credit?

### **2.1. Resource Acquisition in Agriculture**

Resources of a farm business are limited in which case an owner of a farm business should try to acquire the optimum size of financial and other resources in order to involve in an optimum size of operation. These resources have various sources including internal and external sources.

Sources of funds used to control capital assets can be classified as *equity* and *non-equity* or debt financing. Equity capital is the capital owned by the operator while nonequity capital is the capital gained from debt financing. They include savings and retained earnings, gifts and inheritance, pooling equity capital through a partnership or corporation, leasing, contract farming, and borrowing.

#### **2.1.1. Savings and Retained Earnings**

Assume you get a certain amount of capital. Let its source be either from your own earnings, or borrowing from your friend or bank. Which source makes you more confident to use? Is there any source which makes you less confident?

Despite the growing financial barriers to farm business entry, on going farm business firms can use their own capital sources to improve and diversify their farms. However, accumulating the beginning equity base needed to start farming by saving part of one's earnings from farm or non-farm employment is difficult. Because of this limitation of equity capital, farm operators are required to use nonequity capital.

### 2.1.2. Gifts and Inheritances

Because of the dominance of family farm in most countries' agriculture, much of the owner equity in agriculture can be acquired through gifts and inheritances from the previous generation of farm operators. The disadvantage of this type of source of capital is that such funds are often not received when needed most. The availability of such funds for young farmers depends on the average life expectancy in a country.

### 2.1.3. Pooling Equity Capital

There are several methods of combining equity capital in a farm business. One of the most common is the case where older farmers furnish capital to younger family members through partnership, incorporation, or some other type of formal or informal agreement. Although these arrangements are usually made among members of the same family, two or more unrelated individuals can pool their equity in a farm business. Formal agreements are not always necessary to use the equity in an existing operation as a base for growth and expansion. Informal arrangements for exchanging labor for machinery or possibly renting land from a successful neighbor or relative can reduce the need for large capital investments and provide management assistance in the early years.

The primary advantages of pooling equity capital are to take advantage of economies of size and to distribute risk among two or more persons. Generally, the participants in a farm business venture should share profits in direct proportion to their respective contributions of labor, management, and capital. Failure to recognize this basic rule is almost certain to result in an unsatisfactory arrangement. Other essentials of a successful business organization involving two or more farmers include the following:

- The goals of all participants should be compatible;
- They should be capable of getting along together and respecting each other's judgment;
- The business must be large enough to provide an adequate living for all parties; and
- Good records, sound farm management, and common sense in the handling of money will help to avoid disagreement.

The pooling of equity capital follows various organizations including partnerships, and incorporation to pool capital from family members, and non-farm equity capital from nonfarm investors.

**Partnerships:** A partnership exists whenever two or more persons associate to conduct a noncorporate business. Partnership may operate under different degrees of formality, ranging from informal, oral understandings to formal agreement. In forming a partnership, the participants should know and understand what is involved and give proper attention to legal aspects. Each person entering into a partnership assumes considerable responsibility for actions of the other partners.

**Corporation:** A corporation is a legal entity authorized by law and is capable of doing business, making contracts, borrowing money, and the like, just as an individual proprietor. For this and other reasons, the services of a qualified attorney are essential for



incorporating a farm business. The advantage of a corporation from a financing stand point is that the owners have limited liability. There are also a number of disadvantages associated with incorporating a farm business, and they should be carefully and thoroughly considered. Management of the farm not in line with the interest of minority owners, and additional time, expenses, and taxes paid unlike other farm business organizations are some of the major disadvantages.

***Nonfarm equity capital in agriculture:*** Most farm partnerships and corporations are formed for the purpose of pooling equity capital of family members, to reduce taxes, or to facilitate estate planning. In some cases, however, the objective may be to bring in capital from nonfarm investors. The most common legal entities used are corporations and partnerships involved in cattle feeding, livestock breeding, vineyards, orchards, poultry operations, vertical integration, and various types of real estate, equipment, and livestock leases.

#### **2.1.4. Leasing**

A *lease* is basically a capital transfer agreement that gives the *lessee* (the user farmer) control over assets owned by the *lessor* for a specific period of time for an agreed-upon payment or rent. Leasing is an alternative to purchase an asset in order to acquire the services of that asset. By leasing an asset the lessee essentially acquires its use value from the lessor, who actually purchased and owns the asset.

There are various types of leasing facilities. The major types of leasing common in agriculture include financial lease, operating lease, and leverage lease. *Financial lease* is a contract that is non-cancelable and the lease period is usually shorter than the useful life of the asset being leased. During the life of the contract all of the cost of the property plus financing and servicing charges should be recovered through periodic payments. The lease assumes complete financial responsibility for the leased asset; and, if operated successfully, the lessor or owner will recover original investment.

*Operating lease* is a service available for which there is an established leasing and second-hand market. Assets are leased over periods from around six months, shorter periods being more in the nature of plant hire, up to three years for most types of equipment and machinery. An operating lease may be alternative when a firm requires a machine for a relatively short period. The operating lessor's function in assuming the obsolescence risk in uncertain circumstances is comparable to an insurance contract.

Under *leverage lease* the lessee assigns his interest in a purchase order to lessor who agrees to advance only a portion of the total asset cost, and arranges to borrow the remaining portion from institutional lenders.

Leasing covers various assets including real estate, machinery, and livestock leasing.

**Real-estate leasing:** Leasing is a common way for farmers to obtain control of additional land. Real estate leases can be the *share lease* or the *cash lease*. With a share lease part of a crop or livestock production is paid to the lessor as rent. With cash leasing arrangements, the lessor is paid a specified cash payment and usually furnishes the land, building, and other improvements. The concepts of cash and share rent are sometimes combined in what is called *standing rent*. In this case, in place of cash, the rental payment is made in a fixed measure of products, *i.e.* the dollar amount of rent the lessor receives varies with the price of the product, as it would with share rent, but the amount of product he will receive is known in advance.

**Machinery leasing:** Purchase of machinery often with borrowed funds is the traditional method of acquiring control over farm machinery. However, rapidly rising machinery prices have prompted many farm operators to consider leasing as an alternative to ownership of farm equipment. It can be *operating lease*, or *financial lease*. An operating lease is a short term contract in which case the farm operator leases the equipment by the hour, day, week, and month, etc. The lessor is responsible for insurance, taxes, and major repairs, and the lessee covers variable expenses such as fuel, lubricants, and routine maintenance.

However, there are many variations of operating lease including *custom hiring*, an operating lease arrangement whereby the owner of the equipment furnishes the machine operator in addition to covering all operating expenses, and a *full-service lease*, an operating lease contract under which the lessor assumes total responsibility for all repairs and maintenance costs. The *financial lease*, in contrast to the operating lease, is a long term contract under which the lessor essentially provides financing to the lessee. Usually the lessee is responsible for all repairs and maintenance just as if he had purchased the equipment outright.

**Livestock leasing:** The typical livestock-share lease contract usually covers land, buildings, and livestock. These contracts cover basic herd livestock such as dairy cows, beef cows, and sows. The lessor assumes fixed ownership costs including depreciation, taxes, and interest on investment, while the lessee is responsible for variable costs such as feed, housing, veterinary services, and labor.

**Advantages of leasing to the lessee:** Some of the merits of leasing from a lessee's point of view are the following:

1. **Asset procurement:** Leasing may be the cheapest means of obtaining the use of the most suitable machinery or equipment because of import or export controls or patent rights.
2. **Additional source of finance:** By leasing, the use of asset is obtained without capital outlay. It also raises debt capacity of the firm as additional source of finance.
3. **Certainty:** It has the fixed nature of a leasing contract to the lessor and to the lessee. This assures the *availability* of an asset with certainty.
4. **Flexibility:** Leasing arrangements are very flexible.
5. **Convenience:** Leasing is regarded by lessees as a simple and convenient method of financing the acquisition of capital assets.

6. *Disposal problem:* There is no disposal problem associated with leasing.
7. *Higher incomes:* An operating lease tend to inflate the incomes of early years of life compared with the expenses resulting from buying the asset.
8. *Step-by-step financing*
9. *A well-defined cost*
10. *Maintenance is cheap and certain:* With leasing the maintenance may be contracted and this contract may be attractive.

***Disadvantages of leasing to the lessee:*** The advantages of leasing over other forms of finance in any given circumstances need to be weighted against the possible disadvantages listed below:

1. *Ownership flexibility:* A purchaser of asset avoids any of the restrictions found in leasing agreements concerning the operation of the asset and the requirement to obtain the lessor's approval to the insurance arrangements.
2. *Residual value:* A lessee gives up some or all of the benefit of the residual value of the asset at the end of lease period.
3. *Security value:* A lessee is unable to include the leased asset in a pool of assets which is then available as security for general borrowing.
4. *Understatement of assets:* The right to use asset for a major part of its useful life is an intangible asset which is not shown on a lessee's balance sheet unless leased assets are capitalized at economic value.
5. *Prestige:* Ownership may be thought to be prestigious and to give an emotive sense of satisfaction denied to lessees.

### **2.1.5. Contract Farming**

An increasing amount of resources used in the farming sector can be furnished by farm input suppliers, processors, and distributors under various types of producer contracts. Contract farming is, therefore, a way for an operator to obtain additional funds.

*Forward contract* refers to a futures contract to buy or sell a specific physical commodity at some time in the future. There are three basic types of forward contracts used in farming namely *market specification contracts*, *production-management contracts*, and *resource-providing contracts*. When the traditional open-market form of market coordination fails to provide the needed market outlet for input suppliers or farm products of the proper specification at reasonable prices for marketing firms, market specification contracts can be used. It is an agreement under which farm inputs or products will be exchanged at some specified future date at an agreed-upon price (or basis for calculating price). This contract specifies the acreage to be grown, the price per ton, and in some cases the delivery schedule.

Production-management contracts provide the same features as market specification contracts, but in addition the farmer receives technical advice and management services from the input supplier or processor. Market specification and production-management contracts typically do not provide any financing per se; however, they do have financial

implications for the farmer because lenders tend to look more favorably on a loan application if marketing arrangements are guaranteed by a producer contract. Under resource-providing contracts the farmer receives financing from the marketing firm as well as guaranteed market outlet and production-management assistance.

As with any method of acquiring control of assets, contracting has its weaknesses and strengths. The most important advantage is the financing the farmer receives both directly from the contracting firms and indirectly through other lenders, who are more assured of loan repayment when a contract is in existence. In addition to financial help, the farmer usually receives managerial advice and technical assistance such as production scheduling, high-quality breeding stock and seed varieties, fertilizer recommendation, veterinary services, custom-blend feed, the latest equipment, and other supplies and services that might not otherwise be available. Contracting also leads to better coordination of production and marketing phases, thereby resulting in higher profits and reduced risk for both farmers and contracting firms.

Perhaps the most obvious disadvantage of contract production is the loss of managerial control. The farmer may become little more than a hired hand and may also have to accept lower net returns to compensate the contracting firm for providing financing and sharing production and marketing risks. Finally the farmer loses the opportunity to benefit from higher market prices if forward prices are specified in the contract.

### **2.1.6. Borrowing**

Borrowing constitutes the remaining method of farmers use to acquire funds. The word '*borrow*' means to receive some thing with the understanding that it or its equivalent will be returned as agreed upon. Stated another way borrowing means the ability to command capital or services currently for a promise to repay at some future time. In terms of money, borrowing involves obtaining a certain amount of funds to be repaid as specified in the note.

Borrowing is not the exact synonym of *credit*. The word *credit* comes from the Latin word *credo* meaning "I believe." Hence credit is based upon confidence. The term credit means the capacity to borrow. Hence, one's credit can be used by borrowing, or it can be held in reserve.

Since credit is a resource that can be used or held in reserve, borrowers and nonborrowers alike are concerned with several questions. For example, a farmer might ask: How much credit is available, and how much should be used? What are the costs of credit? What are my legal obligations as a borrower? Which lender is most likely to be able to serve my credit needs?

***How much credit?*** Credit use will increase return to equity and firm growth rates as long as the rate of return on capital invested exceeds the cost of borrowing. However, financial risk limits the amount of credit one can actually use without jeopardizing the survival of the business. The question can be answered by understanding the factors that lenders

consider in evaluating loan application. The steps are indicated by the three R's of credit in section 2.2.3.

**Credit costs:** Borrowing involves several costs, including finance charges, legal fees, closing costs, etc., and it is sometimes difficult to identify and compare these costs. The only meaningful way of measuring the cost of credit is to express all charges and fees in terms of a compound annual rate of interest.

**Legal aspects:** Since widespread access to reasonably priced credit is vitally important in the growth and development of a market economy, a standardized set of laws, regulations, and procedures has evolved that protects the rights of borrowers and lenders.

**Sources of credit:** If there is widespread use of credit, there will be many borrowers with different needs and characteristics. As a result, specialization among lenders will be developed so that all borrowers will be served efficiently.

## **2.2. Role and Classification of Credit**

### **2.2.1. Role of Credit**

Credit is important and necessary in nearly all commercial farm businesses. The potential to improve net farm income should be one of the determining factors in the decision of whether to use credit. Credit can contribute in the improvement of net income in several ways:

1. Create and maintain an adequate size. Most farms exhibit decreasing costs as the size of the business increases because of economies of size;
2. Increase efficiency. Use of credit increases substitution, utilization of idle resources, and intensity of production to secure efficient use of resources;
3. Adjust to changing economic conditions of technology and market;
4. Meet to seasonal and annual fluctuations in income and expenditures;
5. Protect against adverse conditions of weather, disease, and price; and
6. Provide continuity of business during transfer.

### **2.2.1. Classification of Credit**

There are many different types of business credit, and proper classification will facilitate communication and financial analysis. Four primary classifications are presented here based on time, purpose, and lender.

**Classification by time:** Based on the length of the terms of loans, credit can be classified into three:

- a. Short-term credit (production credit):
  - Monthly credit (0-3 months);
  - Seasonal credit (3-9 months); and
  - Annual credit (9-1 year).

- b. Intermediate-term credit: 1-10 years.
- c. Long-term credit: Real-estate credit (more than 10 years).

**Classification by purpose:** This classification can facilitate analysis of the profitability of a specific loan if records as to income and expenses are kept.

- a. Production loans (short-term and intermediate-term loans): Used to buy inputs, pay operating expenses, buy feeder livestock, range livestock, dairy cattle, machinery, and finance storage.
- b. Real-estate loans (long-term loans): Used to purchase a farm, additional land, finance buildings, drainage, irrigation, and other permanent or long-life improvements.

**Classification by lender:** Lender classification of credit is frequently used because the policies of lenders vary greatly:

- a. Short-term and intermediate-term (non-real-estate) loans may be provided by commercial banks, credit associations, commodity credit corporations, merchants and dealers, or individuals.
- b. Long-term (real-estate) loans may be provided by commercial banks, insurance companies, or individuals.

### 2.3. Bases of Credit

Numerous factors influence the creditworthiness of a farmer. Credit managers usually talk of the seven C's of credit: character, capacity, collateral, capital, condition, courage, and competition.

1. **Character:** Character or integrity is the most important factor of confidence. The first step in selling one's credit to a lender is to be honest in all business and personal dealings, because the confidence factor is vitally important.
2. **Capacity (or risk-bearing ability):** Risk-bearing ability measures whether the farm operation can withstand financial losses without being forced into liquidation or insolvency. If production and prices decline and losses occur, they must be absorbed or covered by equity capital or net worth. The basic document used to measure the risk-bearing ability of the farm business is the balance sheet. The key ratios used in the analysis of risk-bearing ability are those related to total assets, or debt to equity. These ratios show the proportion of the business financed with debt compared to owner's equity and thus indicate the claims by others on the asset if liquidation should occur.
3. **Collateral:** Collateral security is any security (other than personal security such a guarantee) taken by a bank or lender when it tends to make an advance to a borrowing customer, and which it is entitled to claim in the event of default. Hence, the presence or absence of collateral matters to get credit.
4. **Capital (or repayment capacity):** A lender wants to be paid in cash; he has little interest in repossessing the security or collateral as satisfaction of the debt obligation. The ability to repay a loan is consequently an important determinant of whether credit

should be extended and is influenced by the income-generating capacity of the business; the liquidity of the farm as indicated by the balance sheet, and the cash flow of the firm. In short run an indication of repayment capacity is that if current assets are not sufficient to pay current liabilities a repayment problem will very likely occur as an indication of repayment capacity in short run. In long run the key issue is whether there is sufficient revenue after paying for operating expenses, family living, and farm expansion to repay any debt obligation.

5. **Condition (or return):** It is a combination of all the relevant facts about an agribusiness firm and its situation in the existing economic environment. The basic question with respect to returns is whether or not the use of credit will add to potential profits. Only if the profits of the business will be increased will there be additional income available to make principal and interest payments on the borrowed capital. Two questions are of interest in evaluating income or returns. The first is the issue of whether the planned use of credit is the most profitable use in the farm business. The second question with respect to the returns is whether the farm business is generating an adequate income to compensate for contributions of family labor and management as well as for equity accumulation. The profitability of the entire farm operations must be evaluated to assess the possibility of income generated from profitable enterprises to cover losses on unprofitable ones.
6. **Courage:** This is the courage of the credit executive when faced with a difficult decision making situation.
7. **Competition:** The extent of competition to extend credit also matters to get credit. If there is no sufficient number of competitors involved in the financial market (in credit extension), getting credit may be difficult and vice versa.

#### **2.4. Features of Successful Agricultural Credit Provider**

An institution that is successfully providing *agricultural credit*; amongst other financial services should have the following key features of success:

1. **Household as a financial unit:** Treating the farm household as a financial unit integrating a variety of economic activities, and basing lending decisions on repayment capacity rather than how funds are utilized;
2. **Managing systemic risk:** Managing systematic risk in agriculture by three levels of diversification: (1) across rural and urban branches; (2) across both agricultural and non-agricultural activities in rural branches; and (3) across diverse household economic activities;
3. **Long term relationships:** Long-term relationships to lower transaction costs for both lenders and borrowers;
4. **Various types of collateral:** Using various types of collateral, including non-traditional collateral from poorer households;
5. **Decentralized decision making:** Delegated and decentralized decision making by well trained loan officers;
6. **Regular monitoring:** Regular monitoring of clients to ensure that repayment capacity is not jeopardized, opportunities are realized, and the borrower-lender relationship is strengthened;

7. *Management and information system*: An effective management and information system and a commitment to high loan recovery (including seizure of collateral where necessary as a signal to other clients); and
8. *Adapting rural services*: Adapting rural services to become more flexible in timing, amounts disbursed and repayment schedules – (bi-monthly, trimester, semester, annual, end of crop cycle and irregular repayment schedules).

## 2.5. Advantages and Disadvantages of Credit

### 2.5.1. Advantages of Credit

Modern economy is said to be a credit economy. Credit is of vital importance for the working of an economy. It is the oil of the wheel of trade and industry and helps in the economic prosperity of a country in the following ways:

1. ***Economical***: Credit instruments economize the use of metallic currency. They are cheaper than coinage. The metal used in coins can be used for other productive purposes.
2. ***Increases productivity of capital***: Credit increases the productivity of capital. People having idle money deposit it in banks and with non-bank financial institutions which is lent to trade and industry for productive uses.
3. ***Convenient***: Credit instruments are a convenient mode of national and international payments. They help in transferring payments with little cost and without the use of actual money from one place to another quickly.
4. ***Internal and external trade***: As a corollary to the above by facilitating payments quickly, credit helps in the expansion of internal and external trade of a country.
5. ***Encourages investment***: Credit is the payment along which production travels, and that bankers provide facilities to manufacturers to produce to full capacity. Credit encourages investment in the economy. Financial institutions help mobilizing savings of the people through deposits, bonds, etc. These are, in turn, given as credit to trade, industry, agriculture, etc. which lead to more production and employment.
6. ***Increases demand***: A variability of cheap and easy credit increases the demand for goods and services in the country. This leads to increase in the production of such durable consumer goods. These raise the standard of living of the people when they consume more goods and services. Consumption loans by banking and non-banking financial institutions coupled with the use of credit cards have made these possible.
7. ***Utilizes resources***: Credit helps in the proper utilization of a country's manpower and other resources. Cheap and easy credit encourages people to start their own businesses which provide them employment. Agriculture develops when farmers get seeds, fertilizers, pumping sets, tractors, etc. on credit. Similarly transport, communications, industry, mines, plantations, power, etc. develop with the help of credit.
8. ***Price stability***: Credit helps in maintaining price stability in a country. The central bank controls price fluctuations through its credit control policy. It reduces the credit supply to control inflation and increases the supply of credit to control deflation.
9. ***Helpful to government***: Credit helps the government in meeting exigencies or emergencies when the usual fiscal measures fail to fill the financial needs of the



government. Government resorts to deficit financing for economic development by creating excess credit.

### 2.5.2. Disadvantages of Credit

Credit is a dangerous tool if it is not properly controlled and managed. The following are some of the defects of credit:

1. ***Too much and too little credit harmful:*** Too much and too little of credit are harmful for the economy. Too much of credit leads to inflation which causes direct and immediate damage to creditors and consumers. On the contrary, too little of credit leads to deflation which brings down the level of output, employment and income.
2. ***Growth of monopolies:*** Too much of credit leads to the concentration of capital and wealth in the hands of a few capitalists. This leads to growth of monopolies which exploit both consumers and workers.
3. ***Wastage of resources:*** When banks create excessive credit, it may be used for productive and unproductive purposes. If too much of credit is used for production, it leads to over capitalization and over production, and consequently to wastage of resources. Similarly, if credit is given liberally for productive purposes, it also leads to wastage of resources.
4. ***Cyclical fluctuations:*** When there is an excess supply of credit, it leads to a boom. When it contracts, there is a slump. In a boom, output, employment and income increase which lead to over production. On the contrary, they decline during a depression thereby leading to under consumption. Such cyclical fluctuations bring about untold miseries to the people.
5. ***Extravagance:*** Easy availability of credit leads to extravagance on the part of people. People indulge in conspicuous consumption. They buy those goods which they do not need. With borrowed money, they spend recklessly on luxury articles. The same is the case with businessmen and even governments who invest in unproductive enterprises and schemes.
6. ***Speculation and uncertainty:*** Over issue of credit encourages speculation leading to abnormal rise in prices. The rise in prices, in turn, brings an element of uncertainty into trade and business. Uncertainty hinders economic progress.
7. ***Black money:*** Excessive supply of credit encourages people to amass money and wealth. For this they tend to adopt underhand means and exploit others. To become rich, they evade taxes, conceal income and wealth and thus, hoard black money.
8. ***Political instability:*** Over issue of credit leading to hyper-inflation leads to political instability and even the downfall of government.

## UNIT THREE: FINANCIAL MANAGEMENT IN AGRICULTURE

A farmer maximizes his utility if the expected returns are maximized and the risk is minimized. The theory of financial management defines the manager's role as maximizing the utility of the owner of the business, where utility is assumed to be a function of return and risk. Most business decisions can be thought of as a problem of selecting a portfolio of risky assets. Principles of financial management in agriculture are the main subject matters of this unit.

### 3.1. Function and Scope

*Financial management* can be defined as the management of capital sources and uses so as to attain the desired goals of the firm, *i.e.* maximization of owner's wealth. The firm's capital consists of items of value that are owned and used, and items that are used but not owned. Examples of the use of the capital of the firm are receivables, inventories, and fixed assets.

As an area of study, financial management has two distinct functions: financing function and investing function. The *financing function* represents the management of the sources of capital, whereas the *investing function* indicates the type, size, and percentage of composition of capital uses. Investing function deals with the question "how much of the total capital provided by the financing sources should be invested in receivables, marketable assets, inventories, and fixed assets?" The specialized set of management duties and responsibilities that center the financing and investing functions are referred to as financial management.

The problems and opportunities that a financial manager faces and the business decisions he makes entirely depend on the goals of his organization. Profit seeking firms should behave in a way they maximize the wealth of the owners. It is also important to distinguish between wealth maximization and profit maximization as goals of business firms.

Finance, in general, consists of three interrelated areas: money and capital markets, investments, and financial management. The money and capital markets are deals with asset markets and financial institutions. To succeed in doing such jobs, we need to have a general knowledge on all aspects of farm business administration, because the management of financial institutions involves accounting, marketing, personnel management, as well as financial management. The investments area deals with the decision of both individual and institutional investors as they choose among enterprises for their investment portfolios.

Financial management involves the actual management of business firms. The types of decisions encountered in agricultural financial management range from farm plant

expansion to choosing what type of enterprises to include to financial expansion of the farm business. Financial management has three objectives:

- Determining the size and growth rate: Financial management aims at determining how large the business firm should be and how fast should it grow.
- Determining asset composition: Financial management aims at determining the best percentage composition of the firm's assets.
- Determining the composition of liabilities and equity: Financial management aims at determining the best percentage composition of the firm's combined liabilities and equity decision related to capital sources.

### **3.2. Economic Activities of a Farm Business**

The manager of a farm business is responsible for planning, implementing, and controlling three types of economic activities: production, marketing, and financing. Every activity requires set of decisions to be made. Production activities require decisions on what to produce, how to produce, and how much to produce. Marketing activities involve managerial decisions on matters such as procurement of inputs and pricing and distribution of outputs. Financial activities require management decisions on capital acquisition and use.

The scope of the finance function overlaps production and marketing activities. Decision on what to produce and how much to produce, for example, determines in part the amount of capital the business needs. Similarly, marketing and finance are interrelated because the selection of input suppliers and product marketing outlets as well as the timing of purchase and sales are often dictated by the amount and terms of available finance.

***Managerial process:*** The manager's job is to make decisions in an environment of risk and uncertainty. No one knows exactly what the future will bring. The prices, yields, costs, and the institutional structure within which the business operates may change bringing about unexpected results. These and many other uncertainties that characterize the real world require management.

The managerial process can be defined in terms of a step-by-step procedure. The financial manager is responsible for formulating goals, recognizing and analyzing problems, making decisions, taking actions, and accepting the responsibility for actions taken with regard to the financial affairs of the farm business.

***Defining goals:*** Financial management is not an end in itself, but a means of accomplishing goals and objectives. The first step in financial management is to determine individual and family goals that grow out of needs and interests, past experiences, and values. These goals are the ends toward which individuals and families work.

Goal setting is a continuous process whose establishment involves weighing interests and needs, and modifying either the goals or the methods of attaining them. Goals ordinarily define specific objectives. Since they indicate investments that will be called for, expenses to be met, and income to be realized, goals are important in financial management. They should be formulated with these resources in mind and sufficiently explicit and nonduplicating so that associated finances can be estimated. The timing of goals should be recorded to indicate when funds will be needed and/or when income will be forthcoming.

***Profit Maximization as a goal:*** Profit maximization is usually assumed to be the overriding goal of management. However, this assumption has two short comings:

- It fails to account for the *timing* of earnings, and
- It fails to account for *risk* and *uncertainty*.

Although the terms "risk" and "uncertainty" are frequently used interchangeably, there is a classical distinction between them. Both define a situation in which a number of outcomes are possible. *Risk* describes a situation in which these outcomes follow a known probability distribution, while *uncertainty* refers to cases where the probabilities of different outcomes are unknown. The two major sources of risk are *business risk* and *financial risk*.

*Business risk* is the variation in net earnings arising from the nature of the kinds of enterprises in which the firm is engaged, including weather, disease, and price changes. The profit maximization rule, which compares mean or average returns, could be used to select superior projects with more profit, while standard deviation is used to select projects with less risk. A project with higher return and low risk can be considered as a profitable project. However, the choice is largely subjective depending on personal preference for risk versus returns as well as on financial ability to carry the greater degree of risk involved.

*Financial risk* determines how much capital should be acquired. Financial managers really have only two basic capital sources: their own equity capital and nonequity capital. However, the use of nonequity capital creates a fixed financial commitment in the form of principal, interest, rent, or other obligations. This commitment to the supplier of nonequity capital results in financial risk. As leverage, the amount of nonequity capital relative to equity capital, increases, the financial commitment increases, so that the risk increases also.

### **3.3. Risk and Return as Goals**

The primary objective of a farm business may be profit maximization. However, profit maximization is associated with a variety of risks involved in every business. While we are planning to maximize our returns from a farm business activity, we are planning to face risk and uncertainty. How can we measure risk and uncertainty in agriculture? What are the major decision rules applicable to select an optimal portfolio of enterprises? The

major problem of agricultural investment is the high variability in returns associated with various factors and constraints prevalent in the sector. It is also difficult to measure the risk associated with the environment and individual enterprises. In this section, returns and risk are set as goals of a business, and the principles of diversification to maximize returns and to minimize risk from an investment are introduced with relevant applicability in agriculture.

Before we go to the details of return and risk, it is important to explain what risk is. Risk can be defined in terms of variability of returns. It is the potential for variability in returns. Risk refers to the chance that some unfavorable event will occur. An investment whose returns are fairly stable is considered to be a low-risk investment, whereas an investment whose returns fluctuate significantly is considered to be a high-risk investment.

The measures of profitability and risk can be used in two cases of analyses. Assets, businesses, investments, or enterprises can be analyzed:

- a) On a stand-alone basis, where the enterprise is considered in isolation to estimate the expected return and risk involved in a single business; and
- b) On portfolio basis, where the enterprise is held as one of a number of enterprises in a portfolio to select among alternative enterprises or investments.

Thus, an enterprise's *stand-alone risk* is the risk an operator would face if he held only this one enterprise. Most enterprises are held in portfolio, but it is necessary to understand stand-alone risk in order to understand risk in a portfolio context.

In financial management, the profit maximization goal can be modified to account for the fact that decision makers actually consider both expected return and risk. The financial manager is assumed to have a goal of maximizing the *utility* of the owner of the business, where utility is a function of both risk and expected returns. In this case, *utility* is the capacity of the business to satisfy the profit wants of the owner, *i.e.* maximum return and minimum risk. It is generally assumed that the manager prefers a higher return (or profit) over a lower value. It is also assumed that the manager is risk-averse in which case lower amount of risk is preferred. The general utility function for a profit-maximizing, risk-averse decision maker is given by

$$U = f(E, V); \tag{3.1}$$

$$\text{Profit maximizing: } \frac{\partial U}{\partial E} > 0; \tag{3.2}$$

$$\text{Risk-aversion: } \frac{\partial U}{\partial V} < 0 \tag{3.3}$$

Where  $U$  = Utility,  
 $E$  = Expected return, and  
 $V$  = Risk

The position of the manager can be represented on a two-dimensional diagram such as Figure 3.1, which characterizes the risk-return utility function as a pair of *indifference curves*  $I_1$  and  $I_2$ . These curves indicate that the decision maker is indifferent to (or derives the same utility from) all combinations of risk and return along any given indifference curve. Along curve  $I_1$ , for example, the decision maker is assumed to be indifferent to combinations of risk and expected returns denoted by  $e_1v_1$ ,  $e_2v_2$ ,  $e_3v_3$ , and  $e_4v_4$ . To assume more risk (e.g.,  $0v_2$  instead of  $0v_1$ ), the decision maker must be compensated by higher expected returns, in this case  $0e_2$  instead of  $0e_1$ .

Figure 3.1: Indifference curves describing the risk-return utility function.

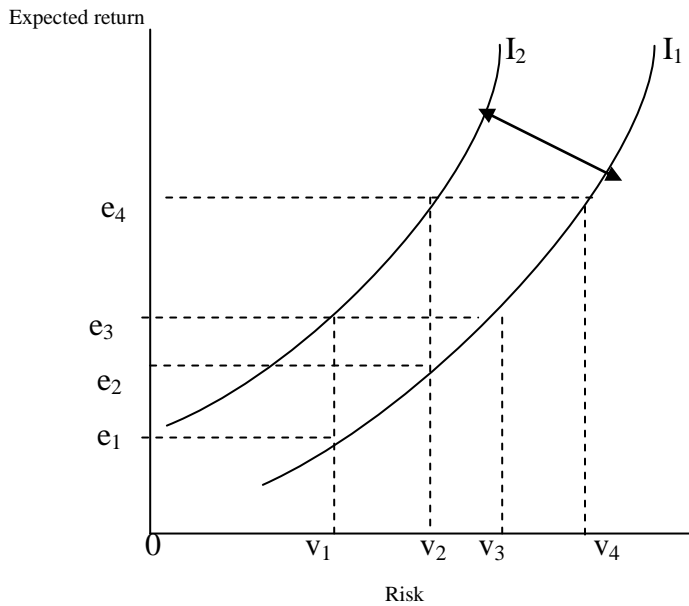
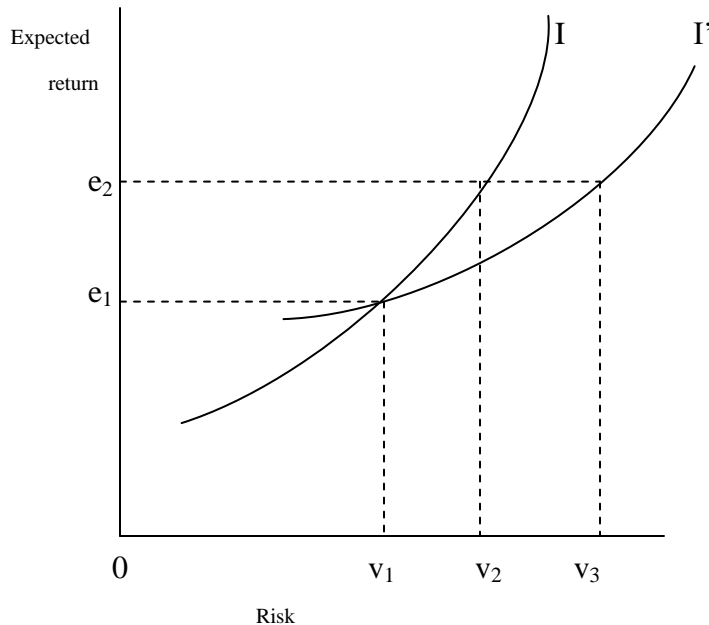


Figure 3.1 also illustrates the utility increases with movements up and to the left to higher indifference curves. Such a shift represents less risk for any amount of expected return or greater expected return for any given amount of risk.

Figure 3.2: Illustration of varying degrees of risk aversion.



Decision makers will vary in their willingness to accept risk. In Figure 3.2, risk-return preference function I illustrate more risk aversion than I'. For a given increase in expected returns  $e_1e_2$ , the decision maker whose risk-return preference function is I is willing to assume  $v_1v_2$  units of additional risk. For the same increase in expected return the decision maker represented by I' is willing to assume  $v_1v_3$  units of additional risk. However, even though I' illustrates less risk aversion than I, both indifference curves illustrate the general rule of risk-averse behavior.

### 3.4. Measuring Expected Return and Risk

Thus far the analysis of the risk-return or E-V trade-off has been in terms of undefined units. The basic issue in analyzing the benefit of investments is how to measure the expected returns and the risk associated with returns. Before proceeding, we must define units for measuring both return and risk.

#### 3.4.1. Expected Return

The *expected return* of an investment is the probability weighted average of all the possible returns. The concept of return provides operators with a convenient way of expressing the financial performance of an investment or business. There are two measures of returns: monetary terms and rate of return. The monetary return is the amount received less the amount invested. Although expressing return in monetary terms is easy, two problems arise

- a. To make a meaningful judgment about the adequacy of the return, you need to know the scale (size) of the investment; and

- b. You also need to know the timing problems of monetary returns. A \$100 return on a \$110 investment is a very good return if it occurs after one year, but the same return after 20 years would not be very good.

The solution to the scale and timing problems of monetary returns is to express investment results as rates of return, or percentage returns. The rate of return is the monetary returns per unit of investment. The rate of return standardizes the return by considering the return per unit of investment.

The expected return for a possible return is estimated as

$$E = \sum_{i=1}^{i=n} E_i P(E_i) \quad (3.4)$$

Where  $E$  = Expected return

$E_i$  = Possible outcome of return in period (or situation)  $i$

$P(E_i)$  = Probability of occurrence of return  $E_i$ .

$i = 1, 2, \dots, n$

The mean or average value of returns is used as a measure of expected reruns estimated as

$$E = (\sum_{i=1}^{i=n} E_i) / n \quad (3.5)$$

Where  $E_i$  = Return in year  $i$ ;

$n$  = Number of observations.

### 3.4.2. Risk

Risk can be measured in different ways, and different conditions about an asset's riskiness depending on the measure used. This can be confusing, but, it will help if you remember the following five issues:

1. *Cash flow risk*: All financial assets are expected to produce cash flow, and the riskiness of an asset is judged in term of the riskiness of its cash flow;
2. *Stand-alone risk versus Portfolio risk*: The riskiness of an asset can be considered in two way: on a stand-alone basis, where the asset's cash flows are analyzed by themselves, or in a portfolio context, where the cash flows from a number of assets are combined and then the consolidated cash flows are analyzed;
3. *Diversifiable risk versus market risk*: In a portfolio context, an asset's risk can be divided into tow components: a diversifiable risk component, which can be diversified way and hence is of little concern to diversified investors, and a market risk component, which reflects the risk of a general asset market decline and which cannot be eliminated by diversification, hence does concern investors. Only market



risk is relevant, diversifiable risk is irrelevant to most investors because it can be eliminated;

4. *High risk and high return:* An asset with a high degree of relevant (market) risk must provide a relatively high expected rate of return to attract investors. Investors in general are averse to risk, so they will not own risky assets unless those assets have high expected returns;
5. *Financial assets and physical assets:* Financial assets such as stocks and bonds, are different from physical assets such as machines, crops, land, and livestock. However, the basic concepts apply to both types of assets.

The variance and the standard deviation measure the extent of variability of possible returns from the expected return. The variance is computed as

$$\sigma^2 = \sum_{i=1}^{i=n} [(E_i - E)^2 P(E_i)] \quad (3.6)$$

Where  $\sigma^2$  = The variance of the return, and  
 $\sigma$  = The standard deviation.

**Example 3.1:** Assume a single crop A and its hypothetical possible returns (in monetary terms) and the associated probability of occurrence of these returns as indicated in the first two columns of Table 3.1. Compute the expected return, standard deviation, and variance of the returns.

Table 3.1: Estimation of expected return (pay-off matrix) and risk for a single enterprise.

Possible returns, $E_i$ (\$)	Probability, (%) $P(E_i)$	Deviation, (\$) $(E_i - E)$	$(E_i - E)^2$	Product $(E_i - E)^2 P(E_i)$
30	0.10	-18	324	32.4
40	0.30	-8	64	19.2
50	0.40	2	4	1.6
60	0.10	12	144	14.4
70	0.10	22	484	48.4

**Solution:** Here, the sum and the mean of the returns are 250 and 50, respectively. The expected return from the business is estimated to be 48. However, expected return will not indicate the variability of the return or the risk associated to the expected return. The expected returns, the variance, and the standard deviation are 48, 116, and 10.8, respectively. These figures will enable to know the absolute magnitude of returns and variability for a single business.

This widely used approach for assessing risk is known as *mean-variance approach*. However, variance or standard deviation provides a measure of the total risk associated with an enterprise or business. The total risk comprises two components, namely *systematic risk* and *unsystematic risk*. Systematic risk is the variability in business returns caused by changes in the economy or the market, whereas unsystematic risk is the risk

which is specific or unique to a business firm. Unsystematic risk associated with an enterprise can be reduced by combining it with another enterprise having opposite characteristics. This process is known as *diversification*.

**Example 3.2:** Assume further, in addition to crop A, that there is a second crop B with possible returns and the probability of occurrence of the returns. The computational procedures of expected returns and standard deviations are similar as in Example 3.1. A reasonable basis for measuring expected return is past performance. For the two cropping alternatives, hypothetical data on 10 years of past performance are given in Table 3.2.

Table 3.2: Selection of alternative enterprises (portfolio selection) using expected returns and standard deviation.

Year	Net returns above fixed costs (birr per acre)	
	Return for crop A	Return for crop B
1	136	86
2	88	64
3	104	92
4	148	102
5	62	82
6	176	78
7	192	62
8	142	90
9	48	94
10	34	60
Mean return (E)	113	81
Variance ( $\sigma^2$ )	2953.11	215.33
Standard deviation ( $\sigma$ )	54.34	14.67

**Solution:** This example illustrates the general problem of selecting a portfolio of risky assets when resources are limited. The limited resource is land, and the risky assets are crops A and B. As shown in the table, the mean annual returns are 113 for crop A and 81 for crop B. Using this measure, crop A is more profitable on average. However, the standard deviation is 54.34 for crop A and 14.67 for crop B indicating that crop A is more risky business with a greater degree of year-to-year variability.

### 3.5. Decision Rules for Risk-return Trade-off

If a producer is assumed to produce only one crop, there are several decision rules to follow when choosing between A and B on the basis of expected return and risk

However, if a choice must be done between two investments which have the expected rate of return but different standard deviation, most people would choose the one with lower standard deviation, and therefore, the lower risk. Similarly, given a choice between two investments with the same risk (standard deviation) but different expected rates of

returns, investors would generally prefer the investment with the higher expected rerun. But, how do we choose between two investments when one has the higher expected rate of return but the other has the lower standard deviation? To help answer this question, we use other measures of risk known as *coefficient of variation* and *highest lower bound*.

### 3.5.1. Coefficient of Variation

It may be desirable to select the alternative that offers the least amount of risk per dollar of net return. The measure for this decision rule is given by the *coefficient of variation*. The coefficient of variation shows the risk per unit of return, and it provides a more meaningful basis for comparison when the expected returns on two alternatives are not the same. The coefficient of variation is estimated as the percentage of the standard deviation to the expected return as

$$CV = \frac{\sigma}{\bar{E}} \times 100 \quad (3.7)$$

Where  $CV$  = Coefficient of variation.

The CV is 48% for crop A and 18% for crop B indicating that crop B offers less risk per dollar of expected return and would be preferred over A.

### 3.5.2. Highest Lower Bound

Another decision rule would involve selecting the alternative with the *highest lower bound*. This rule is useful in a situation where the decision maker feels that net return below a certain level would be insufficient to meet financial obligations. One statistical measure of the lower bound is two standard deviations below the mean computed as

$$L = E - 2\sigma \quad (3.8)$$

Where  $L$  = The highest lower bound.

For our hypothetical crop data the lower bounds (in birrs) are

- For crop A:  $113 - 2(54.34) = 4.32$ ;
- For crop B:  $81 - 2(14.67) = 51.66$ .

According to the highest lower bound rule, the decision maker would select crop B in Example 3.2 because its lower bound is birr 51.66 compared with birr 4.32 for crop A. Note that both the coefficient of variation and the highest lower bound have resulted in selection of the same crop B. It is also sometimes possible that the two measures may end with different results. However, neither rule accounts for the risk-return trade-off shown by the decision maker's risk-return utility function, because it is difficult to get numerical estimates of utility functions. Nevertheless, the concept of risk-return indifference curves

is useful for explaining why some decision makers would rationally choose to grow crop A while others would prefer crop B.

### 3.6. Diversification

In our analysis in the previous subsection, it was suggested that the choices were limited to crop A or crop B, a conservative decision maker would choose B, while a decision maker who displays comparatively less risk aversion would choose A. Both decisions would be rational according to the utility-maximizing approach using the standard deviation as the measure of risk. There is a possibility that some combination of crops A and B can be grown, known as *portfolio*.

*Portfolio*, in financial context, can be defined as a combination of different enterprises, investments, or assets held by an owner which can be evaluated in terms of their combined risks and returns. Observation of the data in Table 3.2 suggests that some diversification between crops A and B might be a useful risk-reducing strategy because there is no apparent tendency for the net returns from A and B both to be below average in the same years, and vice versa.

Diversification among two or more enterprises will generally be desirable if returns tend to be *independent*, or *negatively correlated*. The *covariance* and the *coefficient of correlation* between two random variables such as net returns of two crops provide statistical measures of the degree of independence if it is less significant, and the degree of interdependence if it is more significant.

#### 3.6.1. Covariance:

Covariance is the statistical measure that indicates the interactive risk of a business relative to others in a portfolio of enterprises. In other words, the way business returns vary with each other affects the overall risk of the portfolio. The covariance between the two crops A and B can be calculated using the following formula.

$$CovE_{ab} = \frac{\sum_{i=1}^{i=n} (E_{a,i} - E_a)(E_{b,i} - E_b)}{n} \quad (3.9)$$

Where  $CovE_{ab}$  = The covariance between returns of crops A and B;

$E_{a,i}$  = Net return from crop A at time i;

$E_{b,i}$  = Net return from crop B at time i ( $i = 1, 2, \dots, n$ );

$E_a$  and  $E_b$  = Mean values of expected returns from crops A and B, respectively; and  $n$  is paired sample size.

The covariance is a measure of how returns of two investments move together. If the returns from the two crops move in the same direction consistently, the covariance would be positive. If the two returns move in opposite direction consistently, the covariance would be negative. If the movements of returns are independent of each other, covariance would be close to zero. Covariance is an absolute interactive risk between two enterprises or businesses.

**Example 3.3:** The two enterprises in Example 3.2 are again considered in Table 3.3 to discuss the covariance and the correlation analysis. What is the covariance of reruns from crops A and B?

Table 3.3: Covariance and correlation analysis between returns of crops A and B.

Year (t) (1)	Returns from crop A (2)	Returns from crop B (3)	$E_{a,i} - E_a$ (4)	$E_{b,i} - E_b$ (5)	$(E_{a,i} - E_a)^2$ (6)	$(E_{b,i} - E_b)^2$ (7)	Product of deviations (8 = 4*5)
1	136	86	23	5	529	25	115
2	88	64	-25	-17	625	289	425
3	104	92	-9	11	81	121	-99
4	148	102	35	21	1225	441	735
5	62	82	-51	1	2601	1	-51
6	176	78	63	-3	3969	9	-189
7	192	62	79	-19	6241	361	-1501
8	142	90	29	9	841	81	261
9	48	94	-65	13	4225	169	-845
10	34	60	-79	-21	6241	441	1659
Total	1130	810	0	0	26578	1938	510
Mean	113	81	0	0	2657.8	193.8	51

**Solution:** The covariance of the returns from crops A and B is computed by equation (3.9).

$$CovE_{ab} = \frac{510}{10} = 51.$$

The value of the covariance is 51 indicating that the returns from the two crops move together in the same direction. The co-movement of the two variables indicates the interdependence of the returns from the two crops. This positive value of the covariance may indicate the lower level of gains expected from diversification. However, the covariance is an absolute measure of interdependence in which case the degree of independence or interdependence, and comparison across portfolios may not be accurately indicated. It is difficult to interpret the magnitude of the covariance term, so a related statistic known as correlation coefficient is generally used to measure the degree of comovement between two variables.

### 3.6.2. Correlation Coefficient

To facilitate comparison, covariance can be standardized by dividing the covariance between the two returns by the product of standard deviation of the returns from each enterprise, or crop in this case. The reason two enterprises can be combined to form a riskless portfolio is that their returns move countercyclically to each other- when returns from one asset falls, those from the other rise and vice versa. The tendency of two variables to move together is called correlation, and the correlation coefficient a standardized measure used to measure this tendency. Values of the correlation coefficient range from  $r = -1$  (perfect negative correlation) to  $r = 1$  (perfect positive correlation). The lower the absolute value of the correlation coefficient, the independent will be the two variables, and hence, the greater the gains from diversification will be. The simple correlation coefficient can be estimated as

$$r_{ab} = \frac{CovE_{ab}}{\sigma_a \sigma_b} \quad (3.10)$$

Where  $r_{ab}$  = Correlation coefficient of net returns between crops A and B, ( $0 \leq r_{ab} \leq 1$ )  
and  $n$  is paired sample size);  
 $\sigma_a$  = Standard deviation of returns of crop A; and  
 $\sigma_b$  = Standard deviation of returns of crop B.

If we solve for the covariance using the formula for the coefficient of correlation, the covariance of returns may also be computed as

$$CovE_{ab} = r_{ab} \sigma_a \sigma_b \quad (3.11)$$

Being the weighted average of the standard deviation of individual enterprises, the portfolio standard deviation will lie between the standard deviations of the two individual enterprises. Thus, when the returns from alternative enterprises are perfectly positively correlated, diversification provides only risk averaging, not risk reduction. This is because the portfolio risk cannot be reduced below the individual enterprise risk. Hence diversification is not a productive activity when enterprises are perfectly positively correlated.

When enterprises are perfectly negatively correlated, the diversification may become entirely risk-free even though the portfolio contains risky assets. Hence, diversification becomes a highly productive activity when enterprises are perfectly negatively correlated, because portfolio risk can be considerably reduced and sometimes even eliminated.

**Example 3.4:** What is the correlation coefficient between returns of the two crops in Table 3.3?

**Solution:** The correlation coefficient between the net returns of crops A and B in Table 3.3 becomes

$$r_{ab} = \frac{510}{(163.03)(44.02)} = 0.071.$$

Significance level: 0.845 (two-tailed, t-test).

This value of the correlation coefficient close to zero suggests that diversification between crops A and B would be a useful risk-reducing strategy because of the almost complete lack of correlation between their net annual returns. The correlation coefficient is not also significant indicating that the estimated 7.1% correlation between the two time series returns is not a significant relationship.

### 3.7. Portfolio Risk and Returns

Diversification does nothing to reduce risk if the portfolio consists of perfectly positively correlated assets. Returns on two perfectly positively correlated assets would move up and down together, and a portfolio consisting of two such assets would be exactly as risky as the individual assets.

An asset held as part of a portfolio is less risky than the asset held in isolation. From an operator stand point, the fact that return from a particular enterprise goes up or down is not very important. What is important is the return on his portfolio and the portfolio's risk. The risk and return of an individual enterprise should be analyzed in terms of how that enterprise affects the risk and return of the portfolio in which it is held. One important use of portfolio concepts is to select efficient portfolios, defined as those portfolios that provide the highest expected return for any degree of risk, or the lowest degree of risk for any expected return.

To determine the exact benefits of diversification, the expected return (E) and standard deviation ( $\sigma$ ) values from various combinations of crops A and B must be calculated. Assuming one risky asset of cropland and only two crops, the total proportion of cropland used to both crops (100%) less the proportion of cropland used to production of crop A equals the proportion of cropland used to production of crop B. The variance of the returns from a combination of the two random variables is given by

$$\sigma_{ab}^2 = L_a^2 \sigma_a^2 + (1 - L_a)^2 \sigma_b^2 + 2r_{ab} L_a (1 - L_a) \sigma_a \sigma_b \quad (3.12)$$

Where  $\sigma_{ab}^2$  = Portfolio variance;

$L_a$  = Proportion of cropland planted to crop A; and

$1 - L_a$  = Proportion of total cropland used to crop B.

Portfolio standard deviation can be computed by taking the square root of the portfolio variance.

The expected value of a combination of two random variables is defined as

$$E_{ab} = L_a E_a + (1 - L_a) E_b \tag{3.13}$$

**Example 3.5:** Consider the data in Table 3.3. If 20% of the available cropland is planted to crop A and the remaining 80% is planted to crop B, what is the variance of this product combination?

**Solution**

$$\sigma_{ab}^2 = (0.2)^2(2953.11) + (0.8)^2(215.33) + 2(0.071)(0.2)(0.8)(54.34)(14.67) = 274.05$$

As indicated in Table 3.4, the standard deviation of the net returns from the 20% to 80% combination of crops A and B is, therefore, 16.55. Using equation (3.13), for the 20%-80% combination of crops A and B, respectively, the expected net return is  $87.40 = 0.2(113) + 0.8(81)$ .

Table 3.4: Expected returns, standard deviations, coefficients of variation, and lower bounds for selected combinations of crops A and B.

Cropland used (%)		Expected return (birr)	Standard deviation (birr)	Coefficient of variation (%)	Lower bound (birr)
Crop A	Crop B				
0	100	81.00	14.67	18	51.66
20	80	87.40	16.55	19	54.30
40	60	93.80	24.02	26	45.76
60	40	100.20	33.54	33	33.12
80	20	106.60	43.78	41	19.04
100	0	113.00	54.34	48	4.32

Table 3.4 shows the expected returns, standard deviations, coefficients of variation, and lower bounds for several combinations of crops A and B. The results of the two crops illustrate the gains from diversification. Using the coefficient of variation as a basis for the decision, complete specialization in crop B is the best among the other combinations shown. If the choice is based on the combination providing the maximum lower bound, the 20%-80% combination of crops A and B, respectively, is best.

To illustrate the effects of diversification with two enterprises, we will see two perfectly correlated enterprises called M and N, or M' and N'. The enterprises are assumed to have perfect negative correlation or perfect positive correlation.

**Case I: Perfectly negatively correlated enterprises:** The data in Table 3.5 shows the five-year time series expected returns and standard deviations of the two perfectly negatively correlated enterprises. The opposite movement of the rate of return from the two enterprises enables to neutralize the individual risk associated with each enterprise so that the rate of return after diversification remains unchanged.



Table 3.5: Rate of return and risk for two perfectly negatively correlated enterprises and their portfolio (percentage).

Year	Enterprise M	Enterprise N	Portfolio MN
1	40.0	-10.0	15.0
2	-10.0	40.0	15.0
3	35.0	-5.0	15.0
4	-5.0	35.0	15.0
5	<u>15.0</u>	<u>15.0</u>	<u>15.0</u>
Average return	<b>15.0</b>	<b>15.0</b>	<b>15.0</b>
Standard deviation	<b>22.6</b>	<b>22.6</b>	<b>00.0</b>

**Case II: Perfectly positively correlated enterprises:** In this case, perfectly positively correlated enterprises are considered in order to compare the result of diversification if the two enterprises are combined. Table 3.6 shows the data on these enterprises. As the returns from these enterprises are perfectly moving in the same direction, both the expected rate of return and the risk after diversification remain unchanged.

Table 3.6: Rate of return and risk for two perfectly positively correlated enterprises and their portfolio (percentage).

Year	Enterprise M'	Enterprise N'	Portfolio M'N'
1	-10.0	-10.0	-10.0
2	40.0	40.0	40.0
3	-5.0	-5.0	-5.0
4	35.0	35.0	<u>35.0</u>
5	<u>15.0</u>	<u>15.0</u>	<u>15.0</u>
Average return	<b>15.0</b>	<b>15.0</b>	<b>15.0</b>
Standard deviation	<b>22.6</b>	<b>22.6</b>	<b>22.6</b>

We can illustrate graphically the effect of diversification if two enterprises are perfectly positively correlated in a similar fashion as we did in the first case. The combination of the two enterprises has nothing to reduce the amount of risk associated with the individual enterprises before diversification. Note that the risk explained by the standard deviation is unchanged after diversification. Hence, the variability of the rate of returns is still there if the two enterprises are perfectly positively correlated.

We can observe that the two perfectly negatively correlated enterprises have zero standard deviation if they are held in a portfolio. However, diversification does nothing to reduce risk if the portfolio consists of perfectly positively correlated as indicated by the second assumption in the table. The portfolio expected returns and risk (standard deviation) are unchanged.

### 3.8. Diversification with More than Two Enterprises

What would happen if we include more than two enterprises in the portfolio? As a rule the riskiness of a portfolio will decline as the number of enterprises in the portfolio increases. If we can find a set of enterprises whose correlations are zero or negative, all risk can be eliminated. In the real world, where correlations among individual enterprises or assets are generally positive but less than 100%, some, but not all, risk can be eliminated.

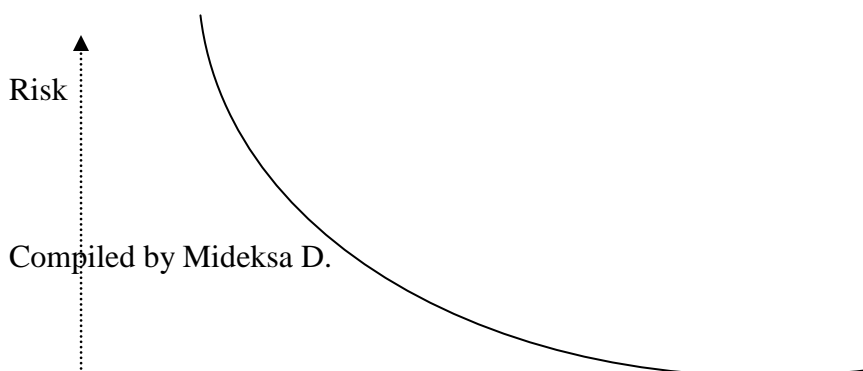
So far we have considered a portfolio with only two enterprises of crops A and B. The benefits from diversification increase as more and more enterprises with less than perfectly positively correlated returns are included in the farm business. As the number of enterprises added to a portfolio increases, the standard deviation of the portfolio becomes smaller. Hence, an owner of a farm business can make the portfolio risk arbitrarily small by including a large number of enterprises with negative or zero correlation in the portfolio.

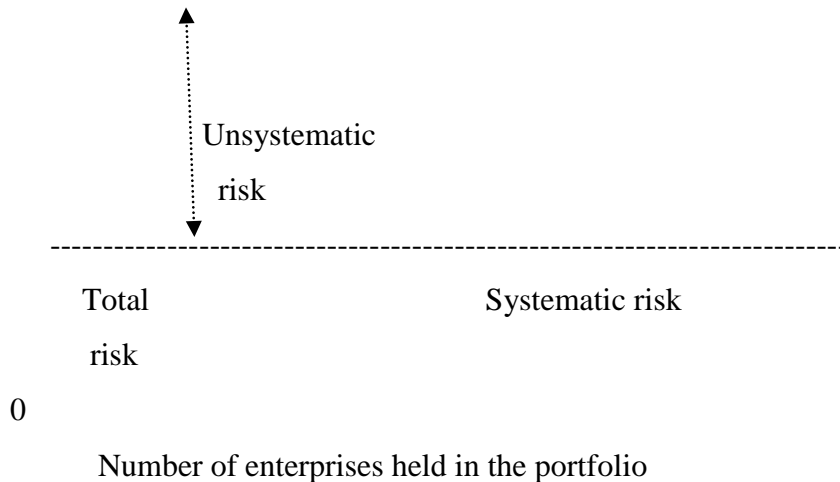
Adding enterprises to a portfolio reduces risk because in reality enterprises are not perfectly positively correlated. However, the effects of diversification are exhausted rapidly because the enterprises are still positively correlated to each other though not perfectly correlated. Had they been negatively correlated, the portfolio risk would have continued to decline as portfolio size increased. Therefore, in practice, the benefits of diversification are limited.

The total risk of an individual enterprise comprises two components; the market related risk called systematic risk and the unique risk of that particular enterprise called unsystematic risk. By combining enterprises into a portfolio, the unsystematic risk specific to different enterprises is cancelled out. Consequently, the risk of the portfolio as a whole is reduced as the size of the portfolio increases. Ultimately when the size of the portfolio reaches a certain limit, it will contain only the systematic risk of enterprises included in the portfolio.

The systematic risk, however, cannot be eliminated. Thus, a fairly large portfolio has only systematic risk and the relatively little unsystematic risk. That is why there is no gain in adding enterprises to a portfolio beyond a certain portfolio size. Figure 3.3 shows the diversification of risk in a portfolio. It indicates the portfolio risk declining as the number of enterprises in the portfolio increases. But, the risk reduction ceases when the unsystematic risk is eliminated. The risk that remains after diversification is market risk, or the risk that is inherent in the market, and it can be measured by the degree to which a given enterprise tends to move with the market.

Figure 3.3: Illustration of risk diversification





**Portfolio returns:** The expected return of a portfolio is the weighted average of the returns of individual enterprises in the portfolio, the weight being the proportion of investment assets in each enterprise. The formula for calculation of expected portfolio return is the same for a portfolio with two enterprises and for portfolio with more than two enterprises. It is computed as

$$E_p = \sum_{i=1}^{i=n} X_i E_i \quad (3.14)$$

Where  $E_p$  = The expected return of a portfolio;

$X_i$  = The proportion of investment assets invested in each enterprise;

$E_i$  = The expected return of enterprise  $i$ ; and

$n$  = Number of enterprises in the portfolio.

**Example 3.6:** Consider a hypothetical portfolio of a farm business with four enterprises of livestock development called A, B, C and D (we may consider each enterprise as various types of livestock enterprises like cattle or sheep production, beef production, dairy farming, and poultry). The rate of returns and proportion of capital investment is indicated in Table 3.7.

Table 3.7: Characteristics of a portfolio with four enterprises.

Enterprise	Returns (%)	Proportion of investment (%)
A	12	0.2
B	17	0.3
C	23	0.1
D	20	0.4

**Solution:** The expected return of this livestock portfolio is 17.8% computed as

$$\bar{E}_p = (0.2)(12) + (0.3)(17) + (0.1)(23) + (0.4)(20) = 17.8\%$$

**Portfolio risk:** Two key concepts in portfolio analysis are the covariance and the correlation coefficient. Covariance is the measure which combines the variance (volatility) of an enterprise's return with the tendency of those returns to move up or down at the same time with other enterprises.

The portfolio variance and standard deviation depend on the proportion of investment in each enterprise, as also the variance and covariance of each enterprise included in the portfolio. The variance of a portfolio with more than two enterprises can be estimated as

$$\sigma_p^2 = \sum_{i=1}^{i=n} \sum_{j=1}^{j=n} X_i X_j CovE_{ij} \tag{3.15}$$

Where  $\sigma_p^2$  = Portfolio variance;

$X_i$  = Proportion of assets invested in enterprise i (the first of a pair of enterprises);

$X_j$  = Proportion of assets invested in enterprise j (the second of a pair of enterprises);

$CovE_{ij}$  = The covariance between the returns of the pair of enterprises i and j; and

$n$  = Total number of enterprises in the portfolio.

If we substitute the previous formula for the covariance by its equivalent in equation (3.15), then portfolio variance will be estimated as

$$\sigma_p^2 = \sum_{i=1}^{i=n} \sum_{j=1}^{j=n} X_i X_j r_{ij} \sigma_i \sigma_j \tag{3.16}$$

The double summation operator indicates that  $n^2$  number of values is to be summed up. These values are computed by substituting the values of the three variables for each possible pair of enterprises.

A convenient way to obtain the result is to set up the data required for computation in the form of a *variance-covariance matrix* as indicated in Table 3.8. Similarly, the variance-covariance matrix can be used to compute portfolio variances using matrix algebra.

The variance of each enterprise and the covariance of each possible pair of enterprises may be set up as a matrix shown in Table 3.8 for three enterprises called X, Y, and Z.

Table 3.8: Variance-covariance matrix of returns (%) for a hypothetical portfolio.

Weight →	0.2	0.3	0.5
↓ Enterprise	X	Y	Z

0.2	X	52	63	36
0.3	Y	63	38	74
0.5	Z	36	74	45

The entries along the diagonal of the matrix represent the variances of enterprises A, B and C. The other entries in the matrix represent the covariances of the respective pairs of enterprises as A and B, A and C, and B and C. Each cell in the matrix represents a pair of two enterprises. There are three combinations of the three enterprises. The variance or the covariance in each cell has to be multiplied by the weights of the respective enterprises represented by that cell. When all these products are summed up, the resulting figure is the portfolio variance. The square root of the variance gives the portfolio standard deviation.

The variance is computed as

$$\begin{aligned}\sigma_p^2 &= (0.2 \times 0.2 \times 52) + (0.2 \times 0.3 \times 63) + (0.2 \times 0.5 \times 36) \\ &\quad + (0.3 \times 0.2 \times 63) + (0.3 \times 0.3 \times 38) + (0.3 \times 0.5 \times 74) \\ &\quad + (0.5 \times 0.2 \times 36) + (0.5 \times 0.3 \times 74) + (0.5 \times 0.5 \times 45). \\ &= 53.71.\end{aligned}$$

The portfolio standard deviation is 7.3287.

Generally, the proper goal of portfolio construction would be to generate a portfolio that provides the highest return and the lowest risk. Such a portfolio is known as the *optimal portfolio*. The process of finding the optimal portfolio is described as *portfolio selection*. With a limited number of enterprises, a farm business owner can create a very large number of portfolios by combining these enterprises in different portfolios. These constitute the feasible set of portfolios in which the operator can possibly invest. This is also known as *portfolio opportunity set*.

The selection of efficient portfolios by the operator will be guided by two criteria:

1. Given two portfolios with the same expected return, the operator would prefer the one with the lower risk;
2. Given two portfolios with the same risk, the operator would prefer the one with the higher expected return.

## UNIT FOUR: FINANCIAL ANALYSIS OF A FARM BUSINESS

*Financial analysis* involves maintaining and using records and other information needed to measure the financial performance of the business. A farmer cannot possibly make the intelligent decisions on the allocation and use of capital unless adequate information regarding the current financial condition and past progress of the operation is at hand.

Financial statements report both on a farm's position at a point in time (the balance sheet) and on its operations over some past period (the income statement and statement of cash flows). However, the real value of financial statements lies in the fact that they can be used

to help predict future earnings. From an investor's standpoint predicting the future is what financial statement analysis is all about, while from management's standpoint, financial statement analysis is useful both to help anticipate future conditions and, more important, as a starting point for planning actions that will affect the future course of events.

The most widely used financial statements are

- the balance sheet,
- income statement, and
- cash flow statement.

#### **4.1. Financial Structure Analysis**

The balance sheet shows assets, debts outstanding, and owner equity as of a specific date. The primary purpose is to measure the financial structure and solvency of the business or the extent to which outstanding debt obligations would be covered if assets were liquidated.

##### **4.1.1. The Balance Sheet**

The balance sheet, otherwise known as a net worth statement, is a summary of the assets and liabilities of the business, together with a statement of the owner's equity or net worth. Its primary function is to measure risk-bearing ability or financial solvency. It shows the margin by which debt obligations would be covered if the business was terminated and all assets sold.

The balance sheet also indicates the financial structure of the business, i.e., liabilities that must be repaid within the current year, liquid assets available for sale to pay current obligations, and long-term obligations and assets. The balance sheet is a comparatively simple statement commonly used in the business world. Lenders usually obtain a balance sheet as part of every loan application and keep an up-to-date statement of the financial condition of each borrower on file. Financial statements also are used by farmers in record keeping and making out income tax reports and may be used by landlords in interviewing prospective tenants.

The structure of the balance sheet is obtained from the basic accounting equation

$$\text{Assets} = \text{Liabilities} + \text{Owner equity} \quad (4.1)$$

This relationship essentially indicates that the value of the claims on assets by the owner and creditors is equal to the value of the assets. Thus the balance sheet is always divided into three parts:

1. the assets or value of things owned;
2. the debts owed (liabilities); and
3. the difference between items 1 and 2, which is the owner's equity (or deficit if debts exceed assets). This last item makes the statement balance.

The balance sheet for a hypothetical farm known as Highland Farms as of December 31, 2004 is shown in Table 4.1. The first point to observe is the date. A balance sheet represents a snapshot of the business at just one instant, in this example at the close of

business on December 31, 2004, and the beginning of business on January 1, 2005. Since the ending of one year is the beginning of the next, the instant is midnight, December 31. The statement given does not hold for the end of the day on January 2 because, for example, a load of grain may have been sold during the day. Obviously, this transaction would affect the picture. It is important, therefore, that the balance sheet be recognized for what it is — a statement of the financial position of the farm business as of a certain date. The income and cash flow statements are more like moving pictures that show what happens over time.

Table 4.1: Balance sheet for Highland Farms, January 1, 2005.

Assets		Liabilities and owner equity	
Cash	1,000	Accounts payable	1,600
Grain and hay	35,207	Bank note	56,290
Livestock	35,565	Real-estate contract	<u>118,300</u>
Machinery	27,368	Total	<u>176,190</u>
Insurance	<u>2,700</u>	Owner equity	<u>213,650</u>
Total	<u>389,84</u>	Total	<u>389,840</u>

The general form in Table 4.1 is the conventional one used in accounting. The assets or items owned on January 1, 2005, are listed on the left side of the statement. The total of these assets as shown is birr 389,840. This is the amount that would be received if the farm business was sold or liquidated, given a reasonable amount of time. On the right side of the statement are the debts owed, totaling birr 176,190. The difference between the assets and the debts outstanding is birr 213,650, which represents the equity or net worth of Highland Farms. The amount of net worth, not assets, and the relationship between assets and liabilities indicate the solvency of the business. A farmer may be operating a business with assets of birr 300,000; but if there are debts of birr 250,000, net worth is only birr 50,000.

The question is often raised as to why the net worth figure is placed on the liabilities side of the statement. It is placed there to show that the owner, like the creditors, has a claim against the assets of the business equal to the net worth figure. Thus, once the assets of the business have been valued, the people and businesses that have provided credit are allotted a portion of the assets equal to their total loans. The remainder of the assets is considered as belonging without qualification to the owner. If the assets were sold, the creditors would come first and the owner would get what was left, which would be more or less than the net worth, depending on whether the assets actually sold for more or less than their value on the balance sheet. So the net worth actually is an obligation or liability of the business, for the business owes that amount to the owner just as it owes stated amounts to the lenders.

When the amount of debt outstanding is greater than the value of assets, the difference is called the net deficit and the farmer is insolvent to the extent. A net deficit is placed on the assets side of the balance sheet because it represents a shortage of assets. Thus when the assets or shortage of assets are added, they will equal the total liabilities and the two sides of the balance sheet really balance.

**4.1.1.1. Assets**

Assets are usually listed or classified according to the time required to convert them into cash with a minimal loss. To facilitate financial analysis, it is best to place assets into three major categories: current assets, intermediate assets, and long-term or fixed assets.

*Current assets* include cash and inventory items that will be converted into cash during the year in the normal course of business. Inventory items would include grain and forage inventories as well as chemicals, supplies, and feeder or market livestock that will be sold during the upcoming year.

*Intermediate assets* include those resources used to support farm production that will not be sold or converted into cash during the coming year, such as breeding stock, machinery, and equipment. Intermediate assets typically have a useful life of one to ten years and are part of the productive plant (as contrasted with inventory) of the farm business.

*Long-term or fixed assets* are also part of the productive plant, but more permanent in nature and consist primarily of farmland and improvements.

**4.1.1.2. Liabilities**

The same classification system should be used for both assets and liabilities as current liabilities, intermediate-term liabilities, and long-term liabilities.

*Current liabilities* are the debts payable on demand or within the operating year, normally 12 months. Examples include operating notes, cattle notes, accounts payable, and taxes. The statement of Table 4.1 also includes a portion of intermediate and long-term debt that is due within the next 12 months as a current liability. This is done because, just like operating notes, the funds that will be used this year's payments on intermediate-term and long-term debts must come from the sale of current assets. So including the portion of these long-term obligations due this year as a current liability provides a better indication of the repayment and liquidity requirements of the business. Any interest obligation on short-term, intermediate-term, or long-term liabilities that have accrued up to the date of the balance sheet should also be included as current liabilities.

*Intermediate-term liabilities* include loans for farm improvements, equipment purchases, and breeding stock and usually have a term of 1 to 7-10 years. Long-term liabilities include obligations on fixed or long-term assets such as real-estate mortgages and land contracts. Remember that the amount of the payment due on intermediate-term and long-term obligations this year is included as a current liability and so should not be included in intermediate-term and long-term category. The balance sheet of Table 4.2 illustrates the structure and classification of assets and liabilities in more detail.

Table: 4.2: Balance sheet for Highland Farms, January 1, 2004

Assets		Liabilities and owner equity	
<i>Current</i>		<i>Current</i>	



Cash	1,000	Accounts payable	1,472
Corn, 6800 ton	17,000	Bank note, feeder cattle	7,800
Oats, 400 ton	560	Bank note, operating	25,121
Soybeans, 2100	9,660	Portion of intermediate-term due this year	1,040
Silage, 130 ton	2,730	Portion of long-term due this year	6,600
Hay, 45 ton	1,925	Total	42,033
Feeder cattle, 81, head	11,692	<i>Intermediate</i>	
Market hogs, 208 head	10,400	Tractor and machinery	1,040
Total	54,967	<i>Long-term</i>	
<i>Intermediate</i>		Real-estate contract	118300
Beef cows, 33 head	7,260	TOTAL LIABILITIES	161,373
Bulls, 2 head	1,000	OWNER EQUITY	138845
Sows, 31 head	4,960	TOTAL LIABILITIES AND OWNER EQUITY	300,218
Boars, 2 head	400		
Machinery, trucks, auto	12,931		
Total	26,551		
<i>Fixed</i>			
Real-estate and buildings, 320 acres (cost – birr 184,000)	216,000		
<i>Other</i>			
Cash value of life insurance	2,700		
TOTAL ASSETS	300,218		

#### 4.1.2. Balance Sheet Ratios

Ratio comparisons can be made against other farm firms, but some of the most valuable comparisons are among ratios for the same firm over time. Based on this, the most important financial ratios of balance sheet are discussed hereunder.

**Current ratio:** A classic measure of financial condition used in balance sheet analysis is the current ratio (CR), which indicates the extent to which current assets, if liquidated, would cover current liabilities outstanding computed as

$$CR = \frac{\text{Current Assets}}{\text{Current Liabilities}} \quad (4.2)$$

Standards as to what is good or minimum acceptable current ratio are rather difficult to establish. A 2 to 1 ratio (birr 2 of current assets for each birr 1 of current liabilities) is frequently used, but this standard may be too high for larger farm firms. A ratio below 1 to 1 would be unacceptable except in unusual circumstances. In general, any sudden decrease in the current ratio or a steady downward trend should be investigated.

Since current ratios include those normally turned into cash within one year, the current ratio in effect reflects liquidity within one year's time. If this period is too long, the quick ratio (also referred to as acid test) may be used to reflect the adequacy of cash, accounts receivable, and marketable securities (bonds, stocks, etc.) to cover all current liabilities.

**Example 4.1:** Consider the balance sheet in Table 4.2. Compute the current ratio for Highland Farms.

**Solution:** The current ratio is computed as

$$\begin{aligned} CR &= \frac{\text{Current Assets}}{\text{Current Liabilities}} \\ &= \frac{54,967}{42,033} = 1.31 \end{aligned}$$

**Working capital:** Another measure of current liquidity is working capital or current assets minus current liabilities. Working capital measures the amount of funds that would be available to purchase fertilizer, chemicals and other inventory items from the sale of current assets after all current debts have been paid. Again, the desired amount of working capital must be related to the size of the business, with a larger firm typically needing a larger absolute quantity but a smaller proportion of working capital in relation to current liabilities.

**Current debt versus owner equity:** A further indication of the liquidity of the business is the relationship between current debt and owner equity, which provides some indication of the ability to pay off obligations either by liquidating assets or by borrowing. Even though a business may show a very poor current ratio, if the operator has a large net worth, he may be able to borrow additional funds against long-term assets such as real-estate and restructure the debt from short- to long-term if necessary. Thus the financial position of such a business may be relatively secure. For instance, the current debt and the owner equity for Highland Farms are birr 42,033 and birr 138,845, respectively. This indicates that the farm has higher owner equity and fixed assets enabling it to borrow funds to overcome short-term obligations.

**Intermediate ratio:** The intermediate ratio (IR) is used to reflect the intermediate liquidity position of the business in much the same way as current ratio is used in the short-run:

$$IR = \frac{\text{Total Current and Intermediate Assets}}{\text{Total Current and Intermediate Liabilities}} \quad (4.3)$$

Over an intermediate period of time both current and intermediate assets will be converted into cash in the normal operation of the business. The ratio reflects the likelihood that cash derived in this process will be adequate cover debt payments coming due during the same time. A decline of trend of the intermediate ratio is not a favorable sign. In contrast, an upward trend reflects added risk-bearing ability as to the use of intermediate credit.

**Example 4.2:** Consider again the balance sheet in Table 4.2. Compute the intermediate ratio.

**Solution:** The total of current and intermediate assets and current and intermediate liabilities are given in the table and the ratio is computed as

$$\begin{aligned} IR &= \frac{\textit{Total Current and Intermediate Assets}}{\textit{Total Current and Intermediate Liabilities}} \\ &= \frac{54,967 + 26,551}{42,033 + 1,040} = \frac{81,518}{43,073} \\ &= 1.89 \end{aligned}$$

**Net capital ratio:** The long-term solvency position of a business is indicated by the net capital ratio (NCR):

$$NCR = \frac{\textit{Total Assets}}{\textit{Total Liabilities}} \quad (4.4)$$

This is probably the most important measure of overall financial position on the business because it reflects the likelihood that the sale of all assets would produce sufficient cash to cover all debt outstanding. The net capital ratio will be reduced if there is any major expansion using debt, because the purchase of additional assets does not change the equity base of the farm but increases both assets and debt. If leverage is used, the percent change in assets will typically be less than the percent change in debt, and the net capital ratio will decline.

The net capital ratio is considered a long-run concept, since real-estate is involved. Since good land is not converted into cash through the production process, as are other assets, this ratio is a measure of financial solvency if the farm is sold.

**Example 4.3:** Consider the balance sheet in Table 4.2 again. Compute the net capital ratio.

**Solution:** The net capital ratio is computed as

$$\begin{aligned} NCR &= \frac{\textit{Total Assets}}{\textit{Total Liabilities}} = \frac{300,218}{161,373} \\ &= 1.86 \end{aligned}$$

**Debt-to-equity ratio (DER):** Another commonly used overall measure of solvency is the ratio of total debt (liabilities) to owner equity:

$$DER = \frac{\textit{Total Liabilities}}{\textit{Owner Equity}} \quad (4.5)$$

Relatively large real-estate debt incurred by use of purchase contracts may cause a farmer's debt-to-equity ratio to be high (but this should not be interpreted as meaning that real-estate debts will always cause a high ratio). Conventional mortgage loans on real-

estate usually do not run much over 70% of the value, and periodic payments will gradually reduce this debt.

**Example 4.4:** Consider the balance sheet in table 4.2. Based on the table, compute the debt-equity ratio.

**Solution:** The debt-to equity ratio is computed as

$$\begin{aligned} DER &= \frac{\text{Total Liabilities}}{\text{Owner Equity}} = \frac{161,373}{138,845} \\ &= 1.16 \end{aligned}$$

**Equity-to-value ratio (EVR):** Equity is often related to the value of assets. This ratio is:

$$EVR = \frac{\text{Owner Equity}}{\text{Total Assets}} \quad (4.6)$$

Equities of less than 40%-50% of value of the assets are usually scrutinized with extreme care by lenders. But this figure is by no means a strict borderline. A 20% equity position for a well-managed farm business may be safer than a 60% equity where the management is questionable. The types of assets involved also have a bearing on the size of ratio that may be considered safe.

While the equity-to-value ratio may be used to reflect overall financial strength, it is also commonly used to depict owner equity in an individual item. The amount or percent paid down to purchase an asset reflects the ratio of owner equity to value of the asset.

Since the basic balance sheet relationship is total assets = total debt + owner equity, the equity-to-value ratio, the debt-to-equity ratio, and the net capital ratio are alternative ways of expressing the overall leverage position of the business. A decreasing debt-to-equity ratio is equivalent to increasing net capital and equity-to-value ratios.

The ratios of current assets to current liabilities, of intermediate assets to intermediate liabilities, and of fixed assets to long-term liabilities are often used as a simple test to determine whether debts are properly distributed among current, intermediate, and long-term obligations.

## 4.2. Return Analysis

### 4.2.1. The Income Statement

The primary objective of the income statement is to show the income produced and expenses involved in the operation of the business during the period covered by the statement, together with the net income (or loss) that is realized.

The income statement provides a measure of return from the business or the ability to meet financial obligations such as debt payments, rent, payroll, and other expenses during the year. Thus, the income statement reveals the success or failure of a farm business

over time as well as the costs and returns associated with the use of varying amounts of capital and credit.

Preparation and analysis of an income statement for a typical farm business can be accomplished using a single-entry accounting system that lists the receipts and expenditures in general categories. However, even a single-entry system may appear to be a complex and involved undertaking due to the wide range of activities included in the farm business.

Most of the problems encountered in determining the income of a large corporate business are found on a smaller scale in computing the income of a farm business. Consequently, one needs to have a clear understanding of what an income statement is, the information needed to prepare it, and how it is summarized and used.

An income statement, also called a profit and loss statement, is a measure of receipts and gains during a specified period, usually year, less expenses and losses during the same period, with net income or loss as a result.

#### ***4.2.1.1. Receipts***

Receipts are derived from sales of crops, livestock, and livestock products during the year and also from government payments and miscellaneous sources. On Highland Farms, receipts from these sources totaled birr 74,498 in 2004 (Table 4.3). Any farm products used in the home should be valued and also included in receipts.

The objective of the receipts section in the income statement is to show as accurately as possible the gross production of the farm, in monetary terms, during the year. This facilitates comparison of a given farm with others in the area as well as analysis of the trend in income on that farm over a period of years. Therefore, adjustments should be included to account for changes in the inventory value of livestock, crops, and other liquid assets during the year. The procedure of adjusting cash receipts for changes in inventory to determine gross income is called the accrual method of accounting. While relatively few farmers use the accrual basis to report income for tax purposes, recognition of inventory changes is very important in accurately analyzing the financial performance of a business.

Table 4.3: Income statement for Highland Farms, for year ended December 31, 2004.

RECEIPTS			
Livestock sales			
Cattle	28,045		
Hogs	36,173		
Total		64,218	
Crop sales		9,450	
Government payments		...	
Miscellaneous income		<u>830</u>	
Gross cash receipts			74,498
Increase (decrease) in current inventory			<u>3,8555</u>
Less Livestock purchased		10,381	
Feed purchased		<u>12,675</u>	<u>23,056</u>

## Rural Finance

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Gross income		55,297
<b>OPERATING EXPENSES</b>		
Machinery and power (fuel, lubricant, repairs)	8,630	
Hired labor	1,476	
Livestock (feed, veterinary, expenses, etc.)	1,416	
Seed, fertilizer, herbicides, lime, etc.	8,546	
Interest on operating loans	2,635	
Utilities	958	
Miscellaneous	<u>820</u>	
Total operating expenses		24,481
NET OPERATING INCOME		30,816
<b>FIXED EXPENSES</b>		
Property taxes	2,401	
Interest on intermediate- and long-term debt	9,299	
Repairs and insurance	2,401	
Depreciation on intermediate assets	4,233	
Depreciation on fixed assets	<u>1,000</u>	
Total fixed expenses		<u>19,334</u>
NET FARM INCOME		11,482

The sum of total receipts plus changes in inventories for farms with large purchases of feeder livestock and feed overstates the income actually produced on the farm. It is customary, therefore, to correct this overstatement by deducting purchases of livestock and feed to obtain gross income. The adjustment is analogous to subtracting "cost of goods sold" to obtain gross income in conventional double-entry accounting. The purchase of livestock for Highland Farms in 2004 totaled birr 10,381 and feed amounted to birr 12,675. These amounts deducted from birr 78,353 left a gross income of birr 55,297 for the year.

For purposes of financial analysis, receipts from the sale of assets such as real-estate or machinery are generally not considered as income, since such income is not really produced or earned during the period. However, for tax purposes income is adjusted for any gains (or losses) resulting from the sale of capital assets. A gain, for example, would be realized if the amount received from the sale of a capital item exceeds its depreciated or book value. This gain may be reported for tax purposes; or if the capital item is replaced by a similar asset, the potential gain could be subtracted from the basis of the new asset.

### **4.2.1.2. Expenses**

All expenses or costs involved in the operation of the business during the period covered by the income statement should be included. Thus all operating and fixed expenses are entered. However, capital expenditures to purchase fixed and working assets such as real-estate, machinery, milk cows, and breeding stock are excluded, since such items usually are used in the business for several years. The depreciation that occurs on these items during the period covered by the income statement is an expense, however, and should be included.

Operating or variable costs and fixed costs are shown separately in Table 4.3. Operating expenses or costs include items such as seed, fertilizer, and fuel, which vary with the level of production. Fixed expenses such as depreciation, taxes, insurance, and interest on intermediate-term and long-term debt remain relatively constant regardless of the level of production.

Consistent with the procedures used in most farm accounting systems, the income statement of Table 4.3 does not include an expense entry for operator or family labor or management. In larger incorporated businesses a salary for management and wages for operator and family labor would be entered as an expense. However, farmers who operate as sole proprietor or in a partnership typically do not draw a salary or wages, so the net farm income after expenses is really compensation for the operator's management and labor input as well as his capita contributions.

#### ***4.2.1.3. Net income***

Three net income (loss) figures are useful in analysis of the business:

- net cash income;
- net operating income; and
- net farm income

*Net cash income* equals cash receipts less cash expenses during the period covered by the income statement, excluding purchases and sales of capital assets. The net cash income figure provides an indication of the annual net cash flow of the business. It also is useful in preparing the income tax return when it is made on the cash basis.

*Net operating income* is computed by subtracting operating expenses from gross income. The net operating income of Highland Farms was birr 30,816 in 2004 as indicated in Table 4.3. This measure of income facilitates comparison of farms with various fixed-cost structures such as different mortgage debt and depreciation schedules. It also facilitates comparing operating income on the same farm over a period of years, even though fixed costs change due to changes in mortgage indebtedness, etc.

*Net farm income* is computed by deducting fixed costs from net operating income. The net farm income of Highland Farms amounted to birr 11,482 in 2004. Net farm income represents the income accruing to operator and family labor, management, and equity capital. Of the three measures of income it is perhaps the most useful. It represents more accurately than the other two the true return of the business during the period covered by the income statement. Provided the data used in its depreciation are accurate and realistic, net farm income approximates the amount available for family living, income taxes, and savings. Principal payments on debts (which are not accounted for in expenses) such as loans incurred to purchase land must be paid out of net income.

#### ***4.2.1.4. Inventory adjustments***

Inventory adjustments are required to accurately determine gross income. A similar adjustment, as well as an adjustment for depreciation, is made in deriving net farm income from net cash income, *i.e.*, net cash income plus (minus) the increase (decrease) in the current inventory less depreciation on intermediate and fixed assets gives net farm income.

If depreciation of intermediate assets and fixed improvements is included as an expense (a desirable accounting procedure), adjustments are not needed in the inventory value of these items in computing net farm income. If an increase (decrease) is made in the inventory value of land due to an increase (decrease) in the price level of land, the resulting increase (decrease) in owner equity is appropriately considered the same as a cash addition to (withdrawal from) the business. Such a change is not reflected in net farm income. On the other hand, if an increase is made in the inventory value of land due to an improvement practices that are not depreciated, the increased value is appropriately reflected in net farm income, assuming the costs involved have been included in farm expenses. The same would be true if a reduction was made in the inventory value of land due to deterioration of productivity as a result of farming practices.

Inventory adjustments are of paramount importance if a reliable net farm income figure is to be obtained. Increases or decreases in inventory values from the beginning to the end of the year are caused by changes in quantities and prices. Changes in quantities usually do not cause major problems, except possibly where quality or weight per unit or per head changes. But changes in prices may cause distortions in the income picture, making it difficult to judge the farmer's ability to produce income. These points can be clarified by reference to the 2004 beginning and ending inventory of current assets of Highland Farms in Table 4.4.

Table 4.4: Beginning and ending inventory of current assets for Highland Farms, 2004.

January 1, 2004		December 31, 2004	
Corn, 6800 ton	17,000	Corn, 7600 ton	16,340
Oats 400 ton	560	Oats, 600 ton	780
Soybeans 2100 ton	9,660	Soybeans, 2050 ton	12,812
Silage, 130 ton	2,730	Silage, 140 ton	2,800
Hay, 45 ton	1,925	Hay, 45 ton	2,475
Feeder cattle, 81 head	11,692	Feeder cattle, 85 head	14,825
Market hogs, 208 head	10,400	Market hogs, 205 head	7,790
Total	53,967	Total	57,822

Different prices were used to value the corn, soybeans, and livestock inventoried at the beginning and end of 2004. These adjustments in prices for inventory items were made to more accurately reflect changes in market relationships.

#### 4.2.2. Financial Analysis of Income Statements

Analysis of financial relationships in the income statement provides information concerning performance of the farm business in addition to that obtained directly from the statement. Without a basis for comparison such as a summary of like relationships for similar farms in the area or similar information for the subject farm over a period of years, such ratios have little value. However, when a basis for comparison is available,



pertinent ratios provide useful information. Progressive lenders generally use financial tests of various kinds in loan analysis. Working with a large number of farms, they are in a position to develop ratio standards, formally or otherwise, to provide the basis for comparison needed to effectively use this type of information.

Income statement ratios can be divided into two categories:

- a) those that relate expenses to gross income, and
- b) those that relate income to capital investment.

Six of the common income ratios including

- operating ratio
- fixed ratio
- gross ratio
- capital turnover
- rate of return on capital
- rate of return on equity

#### **4.2.2.1. Expense-to-income ratios**

Expense-to-income ratios are used to measure the input-output efficiency of the business; *i.e.*, they measure the margin by which the value of total production exceeds production costs. Controlling expenses in relation to income is one of the keys to a profitable farm operation. To more accurately reflect the value of production and to permit comparisons among different types of farms, adjustments are required for purchased feed and feeder livestock in computing expense to income ratios.

**Operating ratio:** The operating ratio (OR), as the name implies, relates variable or operating expenses to gross income:

$$OR = \frac{\text{Total Operating Expenses}}{\text{Gross Income}} \quad (4.7)$$

**Fixed ratio:** The fixed ratio relates fixed expenses to gross income:

$$FR = \frac{\text{Fixed Expenses}}{\text{Gross Income}} \quad (4.8)$$

**Gross ratio:** The operating and fixed ratios comprise the gross ratio (GR):

$$GR = \frac{\text{Total Expenses}}{\text{Gross Income}}$$

**Example 4.5:** Consider the income statement in Table 4.4. Based on the table, compute and interpret

- a) the operating ratio
- b) the fixed ratio
- c) the gross ratio

**Solution**

a) The operating ratio is computed as

$$\begin{aligned} OR &= \frac{\text{Total Operating Expenses}}{\text{Gross Income}} \\ &= \frac{24,481}{55,297} \\ &= 0.44 \end{aligned}$$

In 2004 Highland Farms had an operating ratio of 0.44. This means that total operating expenses amounted to 44 cents per birr of gross income.

b) The fixed ratio is computed as

$$\begin{aligned} FR &= \frac{\text{Fixed Expenses}}{\text{Gross Income}} = \frac{19,334}{55,297} \\ &= 0.35 \end{aligned}$$

In 2004 Highland Farms had a fixed ratio of 0.35 which means that fixed or overhead expenses such as property taxes, insurance, depreciation, and interest on debt amounted to 35 cents per birr of gross income.

c) The gross ratio is computed as

$$\begin{aligned} GR &= \frac{\text{Total Expenses}}{\text{Gross Income}} = OR + FR \\ &= \frac{43,815}{55,297} = 0.44 + 0.35 \\ &= 0.79 \end{aligned}$$

This means that gross ratio of Highland Farms in 2004 amounted to 0.79 indicating 79 cents total expense per birr of gross income. Alternatively, net farm income of Highland Farm in 2004 amounted to about 21 cents per birr of gross income.

#### **4.2.2.2. Income-to-investment ratios**

Income-to-investment ratios are used to indicate the efficiency with which capital is being employed in the business.

**Capital turnover ratio:** The capital turnover ratio (CTR) is commonly used as a quick appraisal of efficiency of capital use:

$$CTR = \frac{\text{Gross Income}}{\text{Average Capital Investment}} \quad (4.9)$$

The unadjusted gross income figure is used purposely in the capital turnover calculation because feeder livestock and purchased feed inventories are part of capital investment; thus gross income, which is not adjusted for "cost of goods sold," is the appropriate income figure to use.

The average capital investment (ACI) figure is the average of beginning-of-year total assets (BTA) and end-of-year total assets (ETA). On January 1, 2004, Highland Farms

had total assets of birr 300,218; on December 31, 2004, assume total assets were birr 317,840. Average total assets are birr 309,029 computed as

$$\begin{aligned}
 ACI &= \frac{BTA + ETA}{2} && (4.10) \\
 &= \frac{300,218 + 317,840}{2} \\
 &= 309,029
 \end{aligned}$$

**Rate of return on capital:** The rate of return on capital (RRC) is obtained by dividing net return to capital (NRC) by average capital investment (total assets) for the year:

$$RRC = \frac{NRC}{ACI} \times 100$$

Net return to capital used in the business is derived from net farm income by adding back interest paid (to get adjusted net farm income) and subtracting an allowance for unpaid operator and family labor and management. The calculations for Highland Farms for 2004 are as follows:

	Net farm income	11,482
Plus:	Interest paid during the year	11,934 (= 2,635 + 9,299)
	Equals adjusted net farm income	<u>23,416</u>
Less:	Allowance for operator and family labor and management	<u>-10,000</u> (given)
	Equals return to total capital	13,416

**Rate of return to equity (RRE):** The return-to-owner equity may be obtained by subtracting a wage for operator and family labor and management from net farm income. The rate of return on equity can then be calculated as

$$RRE = \frac{\text{Return to Equity}}{\text{Average Net Worth}} \times 100$$

**Example 4.6:** Consider the income statement in Table 4.3 for highland Farms. Based on the statement compute

- the capital turnover ratio;
- the rate of return on capital; and
- the rate of return on owner equity given the owner equity at the end of 2004 to be birr 141,650.

**Solution**

a) The unadjusted gross income for 2004 was birr 78,353; thus the capital turnover ratio was 0.25 computed as

$$CTR = \frac{\text{Gross Income}}{\text{Average Capital Investment}} = \frac{78,353}{309,029} = 0.25$$

This indicates that for each dollar of capital invested, Highland Farms generated 25 cents in gross income in 2004.

- b) Dividing the return to capital by the average amount of capital invested in the business in 2004 gives a 4.3% return on investment computed as

$$RRC = \frac{NRC}{ACI} \times 100 = \frac{13,416}{309,029} \times 100 = 4.3\%$$

- c) Using the figure given above for 2004, the return to equity of Highland Farms was birr 1482 (birr 11,482 – birr 10,000). Owner equity at the beginning and end of 2004 are birr 138,845 and birr 141,650 which gives the average owner equity during 2004 to be birr 140,248. Therefore, the ratio can be computed as

$$\begin{aligned} RRE &= \frac{\text{Return to Equity}}{\text{Average Net Worth}} \times 100 \\ &= \frac{1482}{140,248} \times 100 \\ &= 1.1\% \end{aligned}$$

#### 4.2.2.3. Management and labor factors

Various additional measures of efficiency can be used to indicate the income-producing ability of a farm business. Several of the most common are discussed here.

**Management return:** Management return is derived from net farm income by deducting a wage for operator and family labor and a return on equity capital used in the business. Using 2004 data for highland Farms we have:

Net farm income	11,482
Less: Operator and family labor	-8,000 (given)
Interest on equity capital (birr 140,248 for 2004, 10%)	<u>-14,025</u>
Equals management return (loss)	-(10,543)

It will be observed that management return is derived from net farm income by following a procedure similar to that used in computing the return on capital. The amount deducted for operator and family labor is estimated on the basis of wage rates for farm labor in the area (the opportunity cost of labor). The objective is to deduct an amount that would have to be paid hired labor to do the work performed by the operator and his family, exclusive of management and supervision. Similarly, the objective in arriving at interest on equity capital is to estimate the opportunity return the operator could realize by investing his capital elsewhere (the opportunity cost of capital).

### 4.3. Repayment Analysis

#### 4.3.1. The Cash Flow Statement

The cash flow statement, also known as a sources and uses of funds or flow of funds statement, summarizes all cash transactions affecting the business during a given period such as a month, quarter, or year. The balance sheet and income statement are important tools for measuring the financial position and progress of the business. However, many farm lenders have experienced situations where a borrower has a good balance sheet and a high net farm income but is constantly slow in meeting financial obligations. This

rather perplexing situation can frequently be diagnosed and resolved by analyzing the cash flow of the business.

The income statement is the starting point for the cash flow statement; however, the two statements differ in their treatment of several important accounting entries. A complete cash flow statement or budget will include several nonfarm business items such as taxes, nonfarm income, and living expenses. Cash withdrawals for management salary and stock dividends would correspond to family living expenses in an incorporated farm business. Cash flow analysis also gives a more complete accounting of debt transactions by showing principal payments and interest payments. The cash flow statement or budget reflects the cash transactions that occur with the purchase and/or sale of capital items such as breeding livestock, machinery, and real-estate.

On the income statement, expenses associated with capital items are determined by allocating the money outlay for a capital item over its useful life through the use of a relatively constant annual depreciation allowance. Furthermore, the income statement includes changes in inventories, whereas a cash flow includes sales and purchases as they occur, with no adjustment for inventory changes.

#### 4.3.2. Sources and Uses of Funds

The sources and uses of funds for Highland Farms are summarized in Table 4.5 the year ended December 31, 2004. Note that total cash inflows (or sources of cash) are equal to total cash outflows (or uses of cash).

A close examination of the sources and uses columns of the table will illustrate the major characteristics of cash flow analysis and show its relationship to the balance sheet and income statement. Cash receipts and cash operating expenses were taken directly from the income statement of Table 4.3 and are reflected as cash inflows and cash outflows, respectively. In addition to operating income and expenses the sources and uses statement summarizes the cash flows associated with capital items as well.

The following are specifically indicated in the cash flow statement, unlike the income statement, of Highland Farms

- Capital purchase of a tractor as a cash outflow
- Family living expenses and income taxes
- Cash and credit transactions of the business during the year.

Table 4.5: Cash flow and sources and uses of funds for Highland Farms for the year ended December 31, 2004.

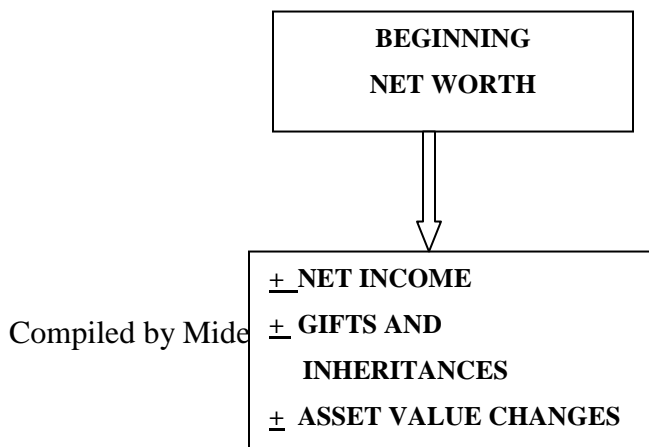
Item	Annual total	Sources	Uses
CASH INFLOW			...
Hogs	36,173	36,173	...
Cattle	28,045	28,045	...
Crops	9,450	9,450	...
Government payments	...	...	...
Miscellaneous	830	830	...
Nonfarm income	...	...	...
Capital sales	...	...	...
Total inflow	74,498	...	...

<b>CASH OUTFLOW</b>		...	...
Machinery and power	8,630	...	8,630
Hired labor	1,476	...	1,476
Livestock expense	1,416	...	1,416
Seed, fertilizer, etc.	8,548	...	8,548
Feed purchases	12,675	...	12,675
Livestock purchases	10,381	...	10,381
Rent	...	...	...
Utilities	958	...	958
Miscellaneous operating	820	...	820
Taxes, property	2,401	...	2,401
Repairs and insurance	2,401	...	2,401
Interest	11,934	...	11,934
Capital purchases	19,000	...	19,000
Total outflow	80,638	...	...
<b>FAMILY LIVING AND INCOME TAXES</b>	\$8,677	...	8,677
<b>CASH SURPLUS OR DEFICIT</b>	(14,817)	...	...
<b>CASH TRANSACTIONS</b>			
Beginning cash balance	1,000	1,000	...
Cash surplus or deficit	(14,817)	...	...
Debt repayment	63,792	...	63,792
New debt added	78,609	78,609	...
Ending cash balance	1,000	...	1,000
<b>CREDIT TRANSACTIONS</b>			
Beginning loan balance	161,373	...	...
Debt repaid	63,792	...	...
New debt added	78,609	...	...
Ending loan balance	176,190	...	...
Total		154,107	154,107

### 4.3.3. Coordination of Financial Statements

The three key financial statements – balance sheet, income statement, and cash flow or sources and uses of funds – provide information on different financial dimensions of the farm business. But these statements can be coordinated to provide a complete picture of financial progress over time. Specifically, the balance sheet provides a picture of the financial characteristics of the farm at a point in time. The income and cash flow statements provide information on the flow of income, expenses, and other financial transactions over time and thus can be used to document changes in financial position from one time to another. Figure 4.1 illustrates this relationship between and coordination of financial statements.

Figure 4.1: Coordination among financial statements



Farms can be used to specifically document changes in the balance sheet from one year to the next. Thus, the value of assets at the end of 2004 (or January 1, 2005) should be equal to:

	Beginning balance	300,218
Plus:	Capital expenditures	19,000
	Changes in inventory	3,855
	Land appreciation	0
Less:	Depreciation	<u>-5,233</u>
		317,840

This is exactly the amount of assets shown on the balance sheet for January 1, 2005.

Highland Farms had birr 161,373 of total liabilities on January 1, 2004. During the year, the cash flow sources and uses statement indicates that birr 63,792 of debt was repaid and birr 78,609 of new debt was added. Thus liabilities at the end of 2004 should be equal to:

	Beginning liabilities	300,218
Plus:	New debt added	78,609
Less:	Debt repaid	<u>-63,792</u>
		176,190

This is exactly the amount of liabilities shown on the balance sheet for January 1, 2005.

The balance sheet for January 1, 2004, shows owner equity of birr 138,845. During the year, Highland Farms generated birr 11,482 of net farm income (from the income statement), family living and income taxes used birr 8677 (from the cash flow sources and uses statement), and land appreciated by birr 0. Thus owner equity at the end of 2004 should be equal to:

	Beginning owner equity	138,845
Plus:	Net farm income	11,482
	Land appreciation	0
Less:	Family living and income taxes	<u>-8,677</u>
		141,650

This should be exactly the amount of owner equity on the balance sheet for January 1, 2005 after adjustment.

The coordination between the balance sheet, income statement, and cash flow sources and uses statement provides useful insight into the reasons for financial progress (or lack thereof) and can assist in assessing the potential for further gain.

## **UNIT FIVE: RISK MANAGEMENT STRATEGIES AND INSURANCE IN AGRICULTURE**

Business firms encounter two kinds of risk—business and financial. Business risk refers to the variation in net income resulting from the type of business (product line, enterprise combination, etc.) in which the firm is engaged. Financial risk refers to the relatively greater losses that occur under unfavorable business conditions when financial leverage is high. The combined effects of business risk and financial risk are embodied in the principle of increasing risk.

### **5.1. Sources of Risk and Uncertainty in Agriculture**

Risk-bearing ability and the capability to manage risks are necessary because of six different kinds of change or uncertainty faced by farmers. These are:

- production uncertainty,
- price uncertainty,
- causality risk,
- technological uncertainty,
- uncertainty caused by actions of others, and
- personal uncertainty,

#### **5.1.1. Production Uncertainty**

Production uncertainty is caused by variations in weather and by diseases, insects and other biological pests. Production uncertainty in crops is concentrated particularly in those areas where weather is unstable. These are high-risk areas because of their great variability of production. When yields are below normal, income may be inadequate to cover costs and, as a result, cash deficits accumulate. The risk would not be so great if a poor year were followed by one that was average or above. However, two or more years of drought often occur together. Other risks include disease and adverse weather conditions including freezes, windstorms, hail, excessive or too little moisture, floods, etc.

Livestock enterprises also involve production uncertainty. Death losses from diseases and adverse weather conditions are common. Losses from contagious disease may strike an individual farmer unusually hard. Losses from bad weather conditions at furrowing, calving, or lambing time also affect production.

Generally, natural hazards in all types of production are great. These factors need to be given full recognition in financial planning.

#### **5.1.2. Price Uncertainty**

Closely associated with weather and other natural hazards is the risk of price fluctuations. Low levels of production are generally associated with higher prices; however, this generalization may not hold for the individual farmer. Price uncertainty always has been



a major consideration in farming, and farm commodity prices have fluctuated dramatically in recent years.

Many forces cause prices to fluctuate, such as

- the level of national prosperity,
- production of other farmers, and
- Changes of consumer tastes.

Prices change from week to week, from month to month, and from year to year. These short-term and long-term price variations must be incorporated in financial plans. Government price support programs have been introduced by considerable public attention to minimize price fluctuations. These support programs have helped reduce price uncertainty, but input and product price fluctuations are still part of farming. The combined effect of such forces as narrow margin in farming, purchase of more inputs due to technological advancement, and processing of some outputs is that a high proportion of gross income is required to pay for purchased inputs. As a result, the farmer is particularly vulnerable to fluctuations in farm input and product prices.

### **5.1.3. Causal Risk**

Property losses due to fire, flood, windstorms, theft, etc., are a source of risk in any business. The magnitude of property losses in agriculture has been increasing steadily due to inflation in asset values and because of technological advances that have led to large investments in machinery and buildings. Causality losses can generally be covered by insurance; however, income may still be reduced by the interruption of normal business activity that often follows a major loss.

### **5.1.4. Technological Uncertainty**

Another type of uncertainty arises from the development and adoption of new techniques or methods of production. New crop varieties, chemicals, feed combinations, models of machines, and the like are continually being developed by research workers and business concerns. While these new developments usually are based on approved experimental procedures, the results realized may be different on a given farm from those expected. However, for various reasons a given farmer may not realize an increase. This type of technological uncertainty may increase the farmer's risk if the new practice does not work out as anticipated.

The rapidity of technological change can also continue to uncertainty. A new method may be adopted, but still better method may follow close behind, making the first investment obsolete. In such cases a substantial portion of the value of a machine disappears as soon as new model comes on the market, and risk-bearing ability is needed to stand the loss.

A third type of uncertainty associated with change stems from the possibility of being left behind by not adopting new techniques and adjusting the business to make full use of them. Many farmers who a decade or so ago had sufficient earning capacity and risk-bearing ability to use credit successfully now have become questionable credit risks. They have been slow to adopt new and improved practices and are operating the same size of units as formerly.

### **5.1.5. Uncertainty Caused by Actions of Others**

The course of action followed by firms and agencies with whom the farmer does business causes uncertainty. If the farmer requires part of his capital by renting, for example, the possible future action of the landlord creates uncertainty. The landlord may decide to increase the rent, rent to a relative, or sell the farm. If such things should occur, they might reduce the tenant's earning capacity and thereby curtail risk-bearing ability. Similarly, if the farmer obtains capital by borrowing, uncertainty may be caused by not knowing just what the lender will do. Another type of uncertainty that results from interaction with other people is the possibility of a lawsuit. An auto accident caused by an animal that strays onto a public road or an injury to a hired worker are only two examples of situations in which the farm may be held legally liable for damages suffered by others.

### **5.1.6. Personal Uncertainty**

No one knows what the future health of family members will be, i.e., when a serious illness may occur or when death will take family members who are important to the farm business operation. Medical and hospital expenses caused by a major illness may be substantial. When the farm operator is incapacitated, income suffers from loss of labor and management in the business. Uncertainty arising from family health is of a major importance in the farm business and should be fully recognized in considering risk-bearing ability.

## **5.2. Evaluating and Reducing Risk and Uncertainty**

### **5.2.1. Analyzing Risky Situations**

The first steps in risk management are to assess one's attitudes toward risk and to develop a framework or set of rules for examining risky situations. Most managers exhibit risk-averse behavior. That is increased risk must be compensated for by a higher expected return. Moreover, individuals differ in their degree of risk-aversion— some requiring greater compensation than others to assume a given increase in risk. The choice among the alternatives may be conducted using decision trees or decision rules.

#### **5.2.1.1. Decision tree**

A *risky situation* can be defined as one in which the actual outcome may differ from the expected outcome. A *decision tree* is one method of examining the range of outcomes of a risky situation. It provides a clear diagrammatic representation of decision problems that include elements of non-certainty. The main value of decision trees may well be that their construction requires the manager to express all relevant alternative actions, events and events occur. Construction of a decision tree to represent what seemed a highly complex and interwoven decision situation may result in a better understanding of the choices that are available to the manager and the risks that must be faced.

Consider a farmer who has 1000 quintals of corn on hand. The marketing alternatives are:

- to sell the corn now for birr 2 per kilogram,
- to store the corn for future sale, or
- to feed the corn to 100 hogs.

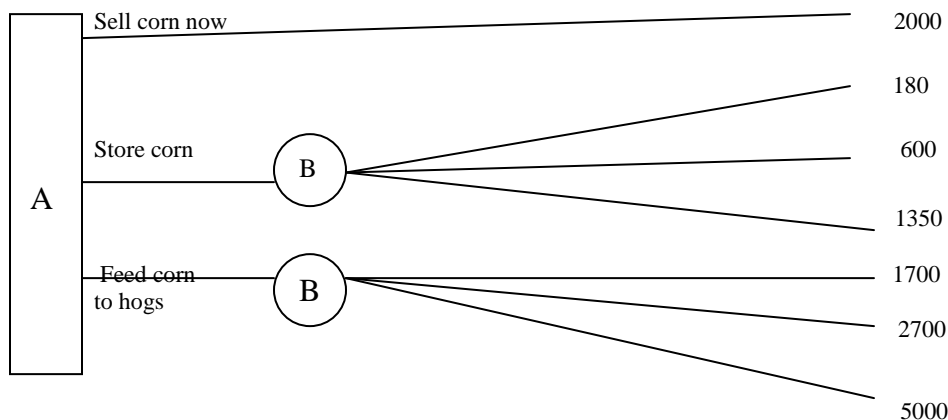
If the corn is stored for later sale, the possible net prices (after paying storage costs) and the associated probabilities (which reflect the decision maker's evaluation of the likelihood of occurrence for each possible outcome) are indicated in Table 5.1. The prices of hogs in birr per head in the three market conditions are also indicated. Total direct costs for feeding 100 hogs, excluding corn, are birr 7000.

Table 5.1: Probability of occurrence of selling prices in different market conditions of corn and hog marketing.

Market condition	Probability of occurrence	Sale price per unit	Expected return (birr)
<i>Sell corn now</i>	1.0	2.00	2000
<i>Store corn</i>			
Situation 1	0.1	1.80	180
Situation 2	0.3	2.00	600
Situation 3	0.6	2.25	1350
Gross income			2130
<i>Feed corn to 100 hogs</i>			
Situation 1	0.2	85	1700
Situation 2	0.3	90	2700
Situation 3	0.5	100	5000
Gross income			9400
Net income (gross income less direct costs)			2400

The decision tree for this situation as indicated in Figure 5.1 clearly depicts that the possible outcome of alternative courses of action at the tips of the branches and thus helps the manager to more clearly visualize the consequences of various courses of action. The three possible courses of action are represented by three act branches emanating from A, the node of the act fork. In this example, the possible outcomes in terms of net income range from a low of birr 1,500 to a high of birr 3,000. However, the "best" decision cannot be identified unless one has a rule for selecting among the alternatives.

Figure 5.1: decision tree for hypothetical corn marketing problem



### 5.2.1.2. Selection rules

These rules depend upon the decision maker's attitude toward risk. Based on the attitudes toward risk, selection criterion might be *maximin*, *maximax* or *safety-first* rule

**Maximin rule:** Some conservative decision makers appear to use a *maximin* rule (maximum of the minimum), which results in selection of the alternative with best of the worst outcomes. In this example, the maximin rule would result in the choice of selling the 1000 quintals of corn now for birr 2 per kilogram because the worst (and the best) outcomes for this alternative is birr 2000.

**Maximax rule:** A risk seeker might use the maximax rule (maximum of the maximum), which leads to the alternative with highest possible income. In our example, the maximax rule would result in deciding to market the corn by feeding it to 100 hogs, even though this alternative could result in a return of as little as birr 1500. One might question the wisdom of a risk seeker following the maximax rule. Consider, however, a situation where the decision maker believes that a return of at least birr 2500 is needed to stay in business. In this example, feeding the corn to hogs offers the only possibility of staying in business. Moreover, feeding hogs gives a 50% probability of achieving this goal.

**Safety-first rule:** The safety-first rule represents a compromise between the maximin and maximax rules. With a safety-first approach the alternative with highest expected return is selected, subject to an acceptably low chance that the income will fall below some minimum level. Suppose in our example, the decision maker believes that if the income from marketing of corn is birr 1800 or less the business will fail, but is willing to assume 12.5% of income being below this disaster level. The hog-feeding alternative would be ruled out because it involves a 20% chance that the income will be less than birr 1800. Storing the corn would be the best alternative; it offers a higher expected return than does selling the corn now, but the probability that income will fall to the birr 1800 disaster level is only 10%.

### **5.2.2. Strategies to Reduce Risk and Uncertainty**

Risk and uncertainty cannot be totally eliminated. However, risks can be reduced, and there are several strategies for improving one's ability to withstand adverse business conditions. Some of the risk management tools used in agriculture help reduce the amount of risk the manager faces, while others help soften the impact of an undesirable result. They all follow one of the four approaches listed below:

1. Reduce the variability of possible outcomes. The probability of a bad result is decreased, but the probability of a good result is reduced, as well.
2. Set a minimum income or price level, usually for a fixed charge. Most insurance programs operate this way. The cost of risk reduction is known, and the probability of achieving a better than average result is not affected.
3. Maintain flexibility of decision making. Managers do not "lock in" decision for long periods of time, in case price or production prospects change.
4. Improve the risk-bearing ability of the business, so that an adverse result is less likely to affect the survival of the farming operation.

There are many strategies that can be used to reduce risk and uncertainty. These include the following:

- financial strategies,
- marketing strategies, and
- Production strategies.

Risk-reducing strategies carry a payoff in the form of minimizing the consequences of adverse events. They also involve a monetary cost. In the case of insurance, this cost is represented by premium payments. Other risk-reducing strategies nearly always result in foregone income.

#### ***5.2.2.1. Financial Strategies***

These strategies include:

- cash reserves,
- non-cash reserves,
- reserve borrowing capacity, and
- Investing in high-yielding investment alternatives.

One way of reducing the consequences of adverse events is to carry adequate financial reserves. The cost of holding reserves is the difference between the rate of returns earned on reserves and the rate of return offered by alternative reinvestment opportunities in the business.

Farmers carry other resources in reserve besides cash savings. Most livestock farmers hold carryover feed supplies to protect themselves against low crop yields and /or high prices for purchased feeds. Also many farmers buy larger machines and equipment than might be needed in an average year to protect against crop losses in unusually bad seasons.

Reserve borrowing capacity is another very important form of protection against uncertainty. In fact, most rational businesses hold low amounts of cash or near cash reserves in comparison to the amount of unused credit because the cost of unused credit is lower than the cost of holding cash or savings. The cost of holding cash reserves is the difference between the rate earned on the savings account and the rate that could be earned in the business. If money invested in the farm business, for instance, offers a return of 15% per annum, reserve funds held in a savings account earn 6%, and money can be borrowed at 10%, the cost of holding cash reserves is 9% (= 15% - 6%). The cost of holding credit in reserve is the rate of return earned in the business (15%) minus the cost of borrowing money (10%), which is 5% (= 15% - 10%) in this example.

The cost of holding cash reserves can also be reduced by making certain that these funds are invested in high-yielding investment alternatives. Only a minimum amount of reserve funds should be held as cash. Most should be kept in savings accounts or invested in short-term securities that can be liquidated on relatively shorter notice. The cost of holding credit can also be minimized by borrowing from low-cost sources of credit and holding higher-cost sources in reserve. Other risk-reducing financial strategies include cash flow projections based on realistic estimates of variables, maintaining an appropriate balance between short-term, intermediate-term, and long-term debts. These will help to

ensure that cash inflows are adequate to cover financial commitments even when yields and/or prices fall below normal.

#### **5.2.2.2. Marketing Strategies**

Fluctuations in commodity prices can virtually wipe out a farmer's profit margin even though he may be a very efficient producer. Thus many producers as well as processors and wholesalers of agricultural commodities use strategies such as hedging, options, forward contracting, and spreading of sales or purchases to protect themselves against price changes. The proper use of marketing strategies can be an effective means of dealing with price risk. However, the improper use of these techniques can increase risk and reduce returns. These issues have complicated technicalities the details of which should be discussed in your marketing course.

**Hedging:** Hedging on the futures market allows buyers and sellers to establish now the prices of products they intend to buy or sell on some future date.

**Commodity options:** Commodity options offer sellers and buyers of many farm commodities an opportunity to ensure against adverse price movements without eliminating the possible gains from favorable price movements.

**Forward contracting:** Forward contracting is another method locking in prices. For many farmers forward contracting has some important advantages over hedging or options because problems such as an unstable basis, margin calls, premiums, or the minimum size of the contract are eliminated.

**Spreading sales:** spreading sales is a marketing technique that can be used for storable commodities if storage space is available.

#### **5.2.2.3. Production Strategies**

In addition to financial and marketing strategies, production strategies such as diversification, flexibility, and the use of commonsense practices to produce a stable and dependable income are important.

**Diversification:** As you might remember from the discussion in unit three, diversification is one of the more common methods employed to alleviate risk and uncertainty. By distributing the eggs among several baskets, the chance of a large loss from a single misfortune or at any one time is reduced. Similarly, by having more than one enterprise in the farm business, the chance of a large loss from a given hazard is reduced.

**Flexibility:** Flexibility has some advantages over diversification in contributing to stability and dependability of income. As time passes and added information is obtained, a flexible business can be adjusted to meet new circumstances, whereas an inflexible one allows little room for change. Flexibility in organization of a farm business can be of three types:

- time flexibility,
- cost flexibility, and
- product flexibility.

Time flexibility refers to the time involved in producing a product. Cost flexibility is attained by keeping fixed costs low in relation to total costs. Product flexibility refers to the possibility of adjusting the product produced to meet changing conditions.

### 5.3. Insurance in Agriculture

Insurance serves one basic purpose – to provide protection against economic losses arising from adverse events. Automobile insurance protects the policyholder against losing the asset itself because of accident, theft, fire, or other calamity. In addition, the liability component of auto insurance protects the policyholder's other assets and future income against claims for damages or injuries suffered by others. The basic purpose of life insurance is to protect surviving dependents against the loss of income and added expenses that occur when a family member dies.

#### 5.3.1. Pooling of Risks

Insurance is the combining or pooling of enough small unpredictable risks so that annual losses for the combined group become statistically predictable. The basis of all insurance is the “law of large numbers,” which may be stated as follows: actual results tend to equal expected results as the number of cases increases. What is a burdensome risk for the individual becomes in the pool an easily carried, relatively constant, annual loss expense for the insurance agency.

By paying a proportionate share of the losses for the group as a whole plus a share of the expenses of running the company, it is possible for a person to avoid the burden of a loss that, if borne alone, might cause business failure or a major financial setback. The premium paid by the individual can be charged as an expense to take care of the particular risk involved.

#### 5.3.2. Insurable and Non-insurable Risks

Some risks are more easily insured than others. Why it is so? We will discuss these factors.

**Predictability:** An event is insurable if the probability of its occurrence can be predicted and the cost of the event to the insured party can be determined.

**Size of loss:** Generally, the loss must be important enough to cause economic hardship to the insured. For this reason most insurance policies have deductive amounts to avoid the expense of processing small claims. At the same time very large or catastrophic losses are not generally insurable because a relatively small number would jeopardize the liquidity of the insurer.

**Moral hazard:** There must also be little or no “moral hazard”, *i.e.*, the risk must generally be accidental in nature, and the availability of insurance coverage should not reduce the incentive of the insured to prevent the loss or induce the insured to cause the loss to occur to collect the insurance fraudulently. The degree to which these conditions hold determines in large measure whether the risk can be feasibly covered by insurance.

**Isolated risk:** Natural hazards vary in their insurability. Where the occurrence of the risk is isolated, as with the usual farm fire, a local insurance company covering a county can handle most of the risks. But where the occurrence might be widespread, a state or nationwide unit is better able to handle the risk. Crop failures due to drought that may cover wide areas are difficult to predict. As a consequence neither local nor state units are big enough to do the insuring. Only a nationwide agency can cope with this type of risk.

***Predictable frequency and volume of cases:*** Personal hazards such as illness, accidents, and death lend themselves to insurance because they occur with predictable frequency when large numbers are included. It is unlikely that all individuals in any one area will be affected. It is, however, essential that the agency doing the insuring have a large volume of cases so it can be assured of experiencing about average frequency of loss.

***Widespread and unpredictable risk:*** Price fluctuations do not lend themselves to insurance as well as natural hazards because they are not as predictable and are likely to affect wide areas or even the whole nation at the same time. Prices do not oscillate about a predictable average because they are the result of unpredictable factors such as weather conditions and other natural hazards as well as regulations, and the like. It is true that normal prices are estimated, but there are no forces that make prices average this normal over time. Hence any agency that attempts to insure against low prices has little actuarial basis on which to operate. Therefore, central governments are the only agencies with a large enough resource base to attempt any sizable program of price insurance.

## **UNIT SIX: CREDIT INSTRUMENTS AND FINANCIAL MARKETS**

The financial institutions serving agriculture are part of the national and international capital markets and must operate within legal constraints and regulations developed by various state and federal government agencies. The national and international dimensions of the financial market suggest that agriculture and farmers are not immune to changes in economic and financial conditions in other sectors of the economy. Likewise, changes in government monetary policy that result in money or credit contraction or expansion will influence the availability and cost of funds to farmers. So to understand the operations and problems of local financial institutions that serve farmers, it is also necessary to know how these institutions are impacted by market forces and policy decisions in the financial markets.

### **6.1. Credit Instruments and Contracts**

The use of credit involves what might appear to be a bewildering array of laws, regulations, and forms. Borrowers and lenders should recognize that proper legal documentation is necessary to define the rights and obligations of both parties. The very existence of an efficient financial market depends upon a solid legal foundation. It is most important that all legal documents involved be studied carefully, and qualified legal counsel should be sought where necessary.

#### ***6.1.1.1. Characteristics of contracts***

Nearly all business transactions such as buying and selling, leasing, lending and borrowing, etc., constitute a contract, which is merely a legally binding agreement between two or more parties. These are known as basic characteristics of contracts. The four basic and essential elements of any contract are:

1. ***Legally competent parties:*** The parties to a contract must be legally competent. Generally, minor children and the insane or mentally retarded cannot enter into a contract because they are assumed to be incapable of fully understanding the implications.



2. *Legal and proper subject matter:* The subject matter of the contract must be legal and proper. Contracts that are themselves illegal (e.g., a price fixing agreement in a free market economy) or require one or more parties to commit an illegal act are not legally enforceable in a court of law.
3. *Offer and acceptance of the contract:* There must be evidence that all parties willingly consented to the agreement, as evidenced by an *offer* and an *acceptance*.
4. *Consideration:* There must be consideration, which in essence means that something of value must be received and/or given up by both parties.

With some exceptions, contracts do not have to be in writing to make them legally enforceable. However, virtually all loan contracts are in written form. As a practical matter all contracts should be written to minimize the possibility of misunderstanding.

#### **6.1.1.2. Credit instruments**

There are many credit instruments used in farm credit transactions of which the most important are:

- Promissory notes,
- Real property,
- Personal property, and
- Other credit instruments

**Promissory note:** A promissory note is the primary legal document in most loan contracts. It is the written promise of the borrower to repay the loan. When advancing loan funds, the lender receives in exchange a note signed by the borrower promising to pay the lender a certain stated principal amount with interest on a certain date or dates as specified in the note.

**Real property:** the *deed* is the instrument used to transfer ownership of real property. The *mortgage* is the instrument used to “perfect” (to bring into conformity with law) the lender’s (mortgagee’s) security interest in real property owned by the borrower (mortgagor).

**Personal property:** This includes both tangible and intangible properties. *Tangible personal property* includes items such as (1) consumer goods, (2) equipment, (3) farm products, and (4) inventory. *Intangible personal property* includes (1) instruments (negotiable instruments such as notes, bonds, stock certificates, etc.), (2) documents of title (warehouse receipts, dock receipts, gin tickets, etc.), (3) chattel paper, which refers to the combination of evidence of debt (i.e., note) and a security interest in specified property, (4) accounts (such as accounts receivable), (5) contract rights, and (6) other intangibles. It should be noted that the use of these credit instruments to get farm loans is determined by the laws and regulations in the country.

**Other credit instruments:** A large number of written instruments may be encountered in farm credit transactions. Of these the most important are abstracts, title insurance, liens, waivers, nondisturbance agreements, assignments, and releases. A real-estate *abstract* contains a brief account of all deeds, mortgages, foreclosures, and other pertinent facts that affect the title to the land.

In many areas *title insurance* is used in place of the real-estate abstract. It is used by a licensed title insurance company upon payment of a premium and insures the buyer or

mortgagee against defects in the title other than those that may have been specifically excluded.

A *lien* is a claim or encumbrance on a property. Tax liens generally arise from property taxes. A claim to insure payment for work done on a property is also a lien.

A *waiver* is relinquishment of a claim. Sometimes a lender will make loan only if parties having priority claims or liens waive their interest in property offered as security for the loan.

A *nondisturbance agreement* is a promise by one lender to a second lender that no action will be started against the borrower during a stated time. A short-term lender may be unwilling to lend to a borrower with a heavy mortgage debt unless the mortgage holder will sign a nondisturbance agreement to cover the period of the short-term loan.

An *assignment* is a transfer of notes, mortgages and other property from one party to another. A common assignment is the transfer of a mortgage from the lender that makes the original loan (such as a bank) to a second party such as an insurance company that buys the note and mortgage. The bank in this instance is the *assignor*, and the insurance company is the *assignee*.

A *release* or *satisfaction* is cancellation of a claim, usually of a real-estate mortgage or security interest. When recorded, a release gives notice to all concerned that the mortgage or security interest to which it refers no longer exists as a claim against the property specified.

## **6.2. Financial Markets and Intermediation**

The financial market (also referred to as the capital, credit, funds, or money market) in its broadest sense includes all transactions in financial instruments. These financial instruments include currency, bank deposits, charge accounts, loans, mortgages, bonds, and shares of corporate stock. Farmers and farm lenders are participants in this market. When buying supplies or equipment on credit, borrowing or repaying a loan, or buying a stock or bond, a farmer is participating in the financial market. Similarly, a farm lender who obtains funds by selling bonds or deposits and lends them to farmers is directly involved in this market.

Financial markets have two basic functions:

- a. to transfer funds from suppliers to users, and
- b. To ration funds among users.

The return of funds from users to suppliers also is a function of the financial market, but it comprises an auxiliary service function and is not dealt with here.

### **6.2.1. Transfer of Funds**

The transfer of funds from suppliers to user is essential to the functioning and growth of a market economy. Without this function every economic unit would be of necessity

financially self-sufficient. Expenditures of each unit would be limited to internal funds. Moreover, there would be no outlet for unused savings.

Two basic economic functions are involved in the transfer of funds that in turn are packaged and loaned. These are:

- primary market activities, and
- secondary market activities.

**Primary market activities:** The funds may be acquired, as from an individual who deposits funds in a bank, or they may be acquired by selling a new issue of a financial instrument in which case an intermediary is involved. These transfers are often referred to as *primary market activities* because they involve the acquisition of new funds and the issuing of new financial instruments.

**Secondary market activities:** The second transfer function consist of the allocation of outstanding financial instruments among financial units, such as those reflected by quotations in financial papers. This function does not involve the issuing of new instruments but the buying and selling of instruments that are already in the market. The transfers usually involve the services of an agent such as a broker or dealer in securities. Transactions of this type, generally referred to as *secondary market activities*, are essential to provide liquidity.

Without a secondary market the original purchaser of a financial instrument would have to hold it to maturity. Under such circumstances financial instruments would need to have very short maturities, or portfolios would become frozen because a purchaser of a long-term instrument could not sell it to move funds elsewhere. Either alternative would seriously limit the usefulness of financial instruments and the functioning of financial markets. Moreover, short maturities for financial instruments related to fixed instruments such as land would reduce the inclination to borrow and might at times endanger the stability of the financial market. If financial instruments were not transferable or negotiable, fewer buyers would be willing to participate in the market, and thus the volume of new issues would be reduced and interest rates would increase.

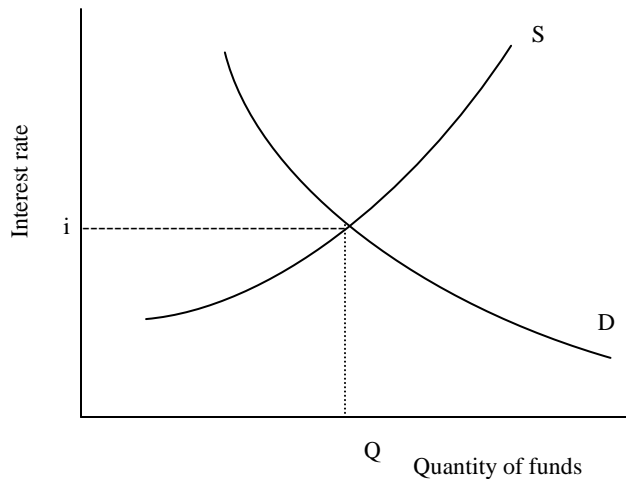
### **6.2.2. Rationing Funds**

A second basic function of financial markets, as of any market, is to allocate scarce resources among competing ends. Through the operation of financial markets, the limited supply of available funds is allocated to farmers and other economic units that need them. If the markets function well, the funds will be allocated to uses yielding the highest returns for a given level of risk. The allocation will be optimized when the marginal productivity of funds is equal for all uses.

The market mechanism for rationing funds among users is based on the concepts of demand and supply. The demand function or curve for funds indicates the amount that buyers or users desire at various interest or yield rates and repayment terms at a given time. As indicated in Figure 6.1, the demand curve (D) is downward sloping in traditional fashion. The supply function or curve (S) provides comparable information regarding the amount suppliers are willing to provide and is upward sloping, indicating the increased cost that is necessary to supply increasing amounts of funds to the market. The

intersection of the two curves indicates the equilibrium quantity  $Q$  of funds that are transferred from suppliers to users (demanders) and the equilibrium interest rate  $i$  or yield and terms. The demand and supply functions or curves for the various financial instruments in various markets are closely interrelated, but they are not the same.

Figure 6.1: The allocation or rationing mechanism in the capital markets.



Availability of funds in various financial markets depends on the direct flow of funds into them and also on the ability of financial instruments to obtain funds in one market and make them available in another.

### 6.2.3. Financial Intermediation

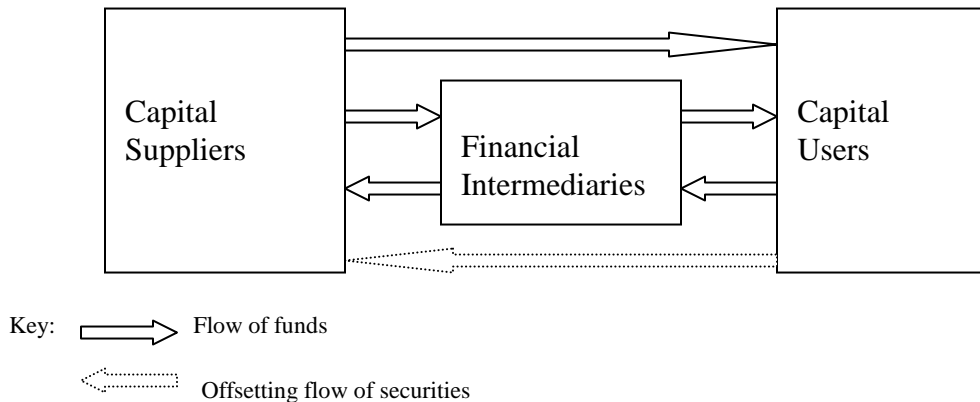
Financial intermediaries are firms whose assets are comprised primarily of claims on others and whose liabilities consist primarily of obligations to others. For example, assets of a commercial bank consist primarily of loans and investments in government securities, both of which are claims on others; its liabilities consist primarily of deposits that are obligations to the depositors. By way of contrast, assets of nonfinancial business firms consist largely of physical property such as real estate, machinery, and equipment, while their liabilities consist of notes, mortgages, etc. Therefore, the major types of financial intermediaries having these roles are:

- commercial banks
- insurance companies,
- thrift institutions such as savings, and loan associations and credit unions,
- investment bankers or underwriters,
- government sponsored and owned credit institutions,
- mutual funds, and
- firms that participate in stock and bond exchanges.

In addition to the suppliers and users of funds, intermediaries are the principal participants in financial markets. The position of intermediaries in the financial markets is illustrated in Figure 6.2. They occupy an intermediate position between suppliers and

users of funds. They provide the linkage between suppliers and users as, for example, a rural commercial bank links depositors and farm borrowers.

Figure 6.2: Flow of capital from suppliers to users with and without intermediaries



The role of financial intermediaries is to carry out the transfer and rationing functions of the financial market. They do this by creating various utilities of funds including time utility, place utility, form utility, and other characteristics of funds supplied by suppliers to make them available for users.

#### 6.2.4. Kinds of Financial Markets

There is no one financial market, but many. One way to understand the complexity of these financial markets is to review their national, local, and international characteristics.

##### 6.2.4.1. The national financial markets

National financial markets can be located in the capital of a country where all major financial intermediaries in the nation or their representatives are located. The large dealers in government securities, underwriters, and dealers in other types of equity and debt securities are located there.

Instruments traded in the national market generally are of high quality, broadly acceptable to a wide range of investors, and readily marketable. The national financial market provides large suppliers and users of capital an effective and efficient means of placing and obtaining funds.

##### 6.2.4.2. Local financial markets

Local financial markets are comprised of local suppliers and users of capital and the local intermediaries that serve them, such as commercial banks, savings, and loan associations, smaller insurance companies, merchants and dealers, finance companies, local affiliates of government credit agencies, and local stock and bond brokers.

The effectiveness of local financial markets in the overall financial framework of a nation depends in large measure on their connection or linkage with other and the national market. It would be possible for local markets to achieve optimum intermediation between locally originated funds and the local demand for capital. Linkages between local and national markets reduce the potential of vastly different rates in local markets

#### **6.2.4.3. International financial markets**

The national financial markets should be linked to the world financial markets in much the same fashion as local markets within the country are linked to the national market. International financial markets balance a complex set of transactions that include exports, imports, loans, savings, and foreign exchange rates. Each country has a capital flow comprised of a net balance of payments (exports less imports) plus net currency exchange (home currency sold less foreign currency bought). The international financial market consists of financial intermediaries whose trading produces the net balance of loans and net currency exchange.

### **6.3. Problems in Rural Financial Market Development**

The rural finance strategies should focus on how to improve access to three specific financial services: *credit*, *deposits*, and *insurance*. The primary but not exclusive target groups are small scale agricultural producers and business operators. In order to do so, several problems must be resolved:

- imperfect information ,
- high levels of price and production risk,
- high transaction costs,
- inadequate contract enforcement,
- the legacy of urban biased economic policies, and
- Weak intermediary institutional capacity.

If appropriate policies, technologies, and partnerships can be adopted to relieve these problems, rural financial intermediation will become more profitable and a greater number of rural residents will gain access to financial services. ***Rural financial markets*** are a subset of a country's larger financial system. Both the larger, mostly urban based financial markets and the smaller, rural ones involve promissory contracts, intertemporal valuations of cash flows, and trading of claims on assets for cash. What distinguish the two markets are:

- a. differences in density of clients,
- b. reliability and cost of gathering information, and
- c. The arsenal of risk evaluation and management techniques.

Due to greater spatial dispersion of clients, higher heterogeneity of production conditions, the marked seasonality of income flows, and a larger number of missing or incomplete complementary markets in rural areas, rural finance is a more challenging proposition than urban finance. For rural finance strategies to be effective the following priorities should be identified:

1. legal and regulatory preconditions needed and the institutional actions necessary to
  - strengthen the capacity,
  - improve the performance, and
  - increase the number of deposit taking financial intermediaries (banks and credit unions) present and active in rural areas;
2. agricultural risk management techniques;

3. other financial contracts --supplier credit, leasing and equipment rentals, bonded warehouses, contract farming;
4. deposit services;
5. secured transactions (the creation, perfection, and execution of security interests);
6. improvements in the transparency and disclosure of information such as credit bureaus, and
7. Innovations in microcredit technology and products.

The underlying premise of the rural finance strategy should be that rural enterprises must be made more profitable and less risky in order to become more bankable. Without rigorous analysis of elements that contribute to client creditworthiness and enterprise profitability, it will be difficult to design appropriate remedial action and in turn build market-based, sustainable rural financial markets.

#### **6.4. Preconditions for Development of Rural Financial Markets**

A fundamental responsibility of governments is in the creation of an enabling policy environment that will allow a complete, competitive, and deep rural financial market to emerge. To overcome this responsibility, the following favorable conditions should be fulfilled:

1. the establishment and maintenance of macroeconomic stability;
2. the pursuit of sartorially neutral economic policies;
3. clarification of property rights;
4. the establishment of an appropriate legal and regulatory framework; and
5. The development of a competitive rural financial intermediary environment.

##### ***Macroeconomic stability***

The existence of a stable macroeconomic environment, marked by price and exchange rate stability is a necessary but not sufficient condition for the orderly and sound development of a financial market. Consistent and rational economic policies foster investor and consumer confidence. In rural areas, the production of agricultural goods, many of which are tradeables, makes the sector very susceptible to foreign exchange movements, both in nominal and real terms. An improper management of the foreign exchange rate can have adverse effects on the soundness of rural financial intermediaries, especially if inflationary and recessionary effects swamp the demand boost for rural export and import substitute products. Massive devaluations can lead to repayment crises. On the other hand, the maintenance of an overvalued currency acts as a tax on agricultural export producers, making them less profitable and less bankable clients. The result is that farmers will tend to plant less of the taxed export crop, which is likely to have much better established marketing distribution channels and thus represents an investment of lower default risk for the banker to finance. In another scenario, where the commodity is domestic staple, an overvalued currency dampens export demand but stimulates urban import demand for foreign foods that are substitutes, thereby reducing farm income, and increasing bank default risk. In comparison, processed or transformed agricultural commodities (textiles or canned food) can benefit from a devaluation if the product is exported and most inputs are domestically sourced. In an overvalued regime,

when the outputs are import substitutes, demand for the good will fall. Rural, off-farm service enterprises and rural municipalities, are directly linked to the vagaries of agricultural price and yield movements, and tend to see demand for their services and tax bases move accordingly. If the fiscal management of the economy is weak, the use of tight monetary policy to control inflation, stifles rural loan demand, lowers investments in productive assets, and creates adverse selection risks.

### ***Appropriate sectoral economic policies***

The rural sector of most developing countries has historically suffered a legacy of urban biased policies, namely, administratively set low food prices and investments in infrastructure, health, and education skewed to urban areas. *As a result, profitably investment opportunities in rural areas were restricted, making fewer rural residents commercially bankable.* The rapid creation of non-farm jobs hinges on favorable infrastructure and a pool of well educated workers. Improvements in on-farm productivity and profitability depend on the quality and density of infrastructure and investments in agricultural crop research and post harvest handling technologies.

### ***Land titling and other clearly defined property rights***

The absence of clear and legally recognized ownership or access (note that farmers in Ethiopia have the right to use) contributes to underinvestment and unsustainable exploitation of the natural resource base. Farmers without title are less likely to invest in productivity enhancing technologies and are less likely to adopt soil and water conservation practices due to a variety of reasons. One of those reasons, however, is the financing constraint. Financial institutions are reluctant to lend for long gestating projects (e.g. perennial crops, soil and water conservation) without real collateral. Thus, the lack of land title, the most valuable asset a farmer usually possesses, makes long term agricultural financing very problematic. A clear challenge is to promote the clarification of property rights as means to strengthen and improve the functioning of financial markets.

### ***Legal and regulatory framework***

Adequate contract enforcement and bank supervision are important for the development of a sound and vital rural financial market. The legislation that governs the entry to banking, capital adequacy, legal lending limits, risk classification standards have a direct bearing on the competitiveness and the solvency of rural finance. If the delays and transaction costs are high in executing guarantees, transferring title, presenting a claim in the courts for breach of a contract, etc. are high and unreasonable, this represents a barrier to financial institutions to lend to rural residents and to innovate and develop new financial instruments or products.

The systematic and professional oversight of deposit taking financial institutions is crucial to protect the interest of small depositors and contain systemic risk to the entire financial system. The regulatory framework should clearly delineate the rights and obligations of parties engaging in financial transactions, and assure adequate disclosure, transparency, and protection for small and unsophisticated depositors and investors. Consolidated supervision of financial groups should also exist to eliminate regulatory arbitrage. The challenge, however, is finding the right balance of protection to depositors



and maintenance of system integrity without imposing onerous and uneconomic burdens on financial intermediaries.

### ***Competitive environment***

In order to develop deeper, more efficient and more complete markets, competitive forces have to be unleashed. In most parts of Ethiopia and other African countries, competition in rural financial services is absent. The predominant actors are publicly owned specialized intermediaries, credit granting non-governmental organizations, and informal suppliers. The clientele of each is segmented. The terms and conditions for each typical provider range tremendously. Financial costs are lowest for the publicly owned institutions but the transaction costs are the highest. The reverse is true for the informal lender. Each private intermediary (non-regulated or informal) has a very limited range of products to offer, usually one or two. Part of the solution requires a detailed analysis of barriers to entry, restrictions on foreign financial institutions, and other legal or regulatory restrictions that may impede competition. Another part of the solution requires building and strengthening trade finance. Savings and loan institutions are not the only and predominant actors in rural finance—supplier finance and interlinked contracts also have a significant role to play.

## **6.5. Strategies to Improve Rural Financial Services**

### **6.5.1. Credit Services Strategies**

Lack of access to agile and affordable credit has been a perennial complaint among rural entrepreneurs. The reasons why credit has not been forthcoming is due to a combination of factors including:

- asymmetric information,
- high transaction costs,
- perceptions of high risk,
- limited investment opportunities,
- lack of competition among suppliers of credit, and
- the legacy of ill conceived and poorly administered state interventions in input, product, and capital markets.

Presuming that overall economic environment is not hostile and profitable investment opportunities do exist, there are three strategic options:

1. reduce the information problem through creation of credit bureaus and the diffusion of group and graduated credit delivery methodologies that allows lender to "know" their clients and reduce transaction costs over time;
2. help lenders to better evaluate and manage idiosyncratic credit risks;
3. Reduce systematic risks in the rural sector through promotion and validation of various risk control techniques such as commodity futures and forward markets, hedging, and insurance.

### **6.5.2. Deposit Services Strategies**

Beliefs still linger that rural residents, especially small farmers and non-farm microentrepreneurs, cannot save because of they are too poor. However, research dating from the late 1970's and the deposit mobilizations successes of rural Asian financial

institutions demonstrate that rural residents can save and would like access to deposit services that are liquid, safe, and offer returns. The challenges for interested parties are how to design savings product attractive to rural residents, how to lower the cost of deposit mobilization in environments where population densities tend to be low so that these illiquid savings can be converted to monetarized savings, and how to assure asset quality and maintain sufficient liquidity in order to honor withdrawals and project an image of solvency.

In order to promote voluntary deposit mobilization, several impediments may need to be overcome:

- If the country has weak macroeconomic management then the regime imposes taxes on savers (via high legal reserve requirements and inflation) and discourages savings (results in low positive and even negative real rates of return on savings instruments);
- Ineffective supervision of depository institutions that put at special risk the savings of low-income, unsophisticated clients or in its absence full and independent disclosure of risk that would allow the investor/saver to make an informed decision;
- Inadequate regulatory frameworks that for example do not permit the most appropriate operational platform (minimum days and hours of operation, mobile units, etc.) to capture savings from low income individuals; and
- Lack of explicit deposit insurance as a last resort form of protection for small savers.

Typically, deposit taking institutions, with the exception of credit unions, focuses on attracting a large volume of deposits from a small number of clients for a term in order to minimize transaction costs and volatility. Besides a lack of conveniently located branches, small savers are either ignored or discouraged through minimum opening amounts and minimum balances. In other cases, some deposit taking institutions, are plagued by perceptions of impermanence and high risk, therefore savers are reluctant to accumulate large deposits.

### **6.5.3. Insurance Services Strategies**

Another important service that has been overlooked is the provision of insurance products. Policies that would pay death, accidental, and health benefits and cover damages caused by flood, fire, wind, pests, and drought, would allow rural households to be less vulnerable to welfare reducing contingencies. Why insurance markets have not appeared is due to average lower incomes of rural residents, costly information, client dispersion, and the size of the market. Efforts in this area will necessarily have to be cautious and gradual, and first attempted in countries with more auspicious settings.

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Year (t) (1)	Returns from crop A (2)	Returns from crop B (3)	$E_{a,i} - E_a$ (4)	$E_{b,i} - E_b$ (5)	$(E_{a,i} - E_a)^2$ (6)	$(E_{b,i} - E_b)^2$ (7)	Product of deviations (8 = 4*5)
1	136	86	23	5	529	25	115
2	88	64	-25	-17	625	289	425
3	104	92	-9	11	81	121	-99
4	148	102	35	21	1225	441	735
5	62	82	-51	1	2601	1	-51
6	176	78	63	-3	3969	9	-189
7	192	62	79	-19	6241	361	-1501
8	142	90	29	9	841	81	261
Total	1048	656	-144	-34	-16112	1328	-304
Mean	131	82	-18	-4.25	-2014	166	38

Variance for crop A=2956.33 and for crop B=216.51

Depending up on the above table find;

A) Coefficient of variation and interpret your answers