

EXERCISE - 1

ESTIMATION OF CREDIT REQUIREMENT OF FARM BUSINESS- A CASE STUDY

Modern business with agriculture being no exception depends for its financial requirements largely on credit with the introduction of improved techniques of production/cultivation becoming more and more capital intensive. Farmer's own capital resources are turning out to be insufficient. They have to therefore, depend to a large extent on borrowed funds. If credit is not available, it is not possible for the farmer to adopt improved production techniques.

➤ **Hypothetical data of small farmers for operating expenses**

Sr. No.	Crop	Area	Based on the existing technology operating expenses	Based on the improved technology operating expenses
1	Groundnut	1.00	12,000	22,000
2	Cotton	1.00	15,000	32,000
3	Wheat	1.00	10,000	18,000
Total Need			37,000	72,000
Available			25,000	25,000
Capital Need			12,000	47,000

The above example indicates that even by adopting existing techniques, farmers have insufficient capital. So, how can we expect him to adopt new techniques of farm business? So, for adopting modern technology, he needs sufficient amount of capital which he can acquire from banks or other institutions to fulfill his requirements of credit.

To work out the credit requirement, generally paid out costs (variable costs) which has to be paid in cash during the production process are taken into consideration. Farmers need money in the form of cash for paying labour, purchase of seeds, insecticides/pesticides *etc.* Credit need is therefore considered the total of all variable costs i.e. cost 'A'. We know formula or method for calculation of cost 'A' which is given below.

COST 'A' :-

- (1) Value of hired human labour.
- (2) Value of hired bullock labour.
- (3) Value of owned bullock labour.
- (4) Value of use of owned machinery.
- (5) Hired machinery charges.

- (6) Value of seed (both farm produced and purchased).
- (7) Value of manure (own farm & purchased).
- (8) Value of fertilizer.
- (9) Value of insecticides & pesticides.
- (10) Irrigation charges.
- (11) Depreciation of farm buildings & implements.
- (12) Interest on working capital.
- (13) Other paid out expenses (if any).

As farmers are not paying depreciation cost in cash, while estimating the credit requirement of the farmer, value of depreciation of farm building and implements etc. are subtracted from cost 'A'.

CREDIT REQUIREMENT = COST A – DEPRECIATION

Note: During the calculation of T.W.C. **depreciation cost** and **family labour** cost should not be included in it.

Sr. No.	Item	Physical Unit	Value (Rs.)
1.	Human Labour		
	Family (Man Days)	25	2,500
	Hired (Man Days)	35	3,500
2.	Bullock Paired Days	8	3,200
	Tractor Charges (hours)	2	300
3.	Seeds (Kg)	140	3,500
4.	Manure (carts)	20	4,000
5.	Fertilizer (Kg) DAP=200kg N:P:K = 36:92:00	36:92:00	1,949
6.	Irrigation (hours)	60	1,800
7.	Insecticide/Pesticide	-	750
8.	Miscellaneous Cost	-	1,500
9.	Depreciation	-	450
Total working capital		-	23,449
Interest on working capital(12%)		-	938
Cost A (Operating Expenses)		-	24,387

$$\begin{aligned}
 \text{Credit Requirement} &= \text{Cost A} - \text{Depreciation} \\
 &= \text{Rs. } 24,387 - 450 \\
 &= \text{Rs. } 23,937
 \end{aligned}$$

Micro model to assess short term credit need requirement of an individual farmer

Formula: $CF = PiJ * Area * Cost A$

Where,

CF=Credit requirement of an individual farmer

PiJ=Proportion of credit requirement of small, medium or large farmer

PiJ for,

Small Farmer = 0.55 or 55%

Medium Farmer = 0.45 or 45%

Large Farmer = 0.35 or 35%

Now, our farmer is considered as small farmer,

$$\begin{aligned} CF &= PiJ * Area * Cost A \text{ (Small Farmer)} \\ &= 0.55 * 1.00 * 24,387 \\ &= \text{Rs. } 13,412.85 \end{aligned}$$

EXERCISE - 2

PREPARATION AND ANALYSIS OF BALANCE SHEET

Balance Sheet (Networth Statement) Analysis

Various tools of financial analysis i.e. balance sheet, income statement, cash flow statement, break even analysis etc. are available to assess the performance of the farm business.

Any farmer, whether marginal, small, medium or large, measures financial performance of the farm business during an agricultural year or over a period of time. There is a possibility in the variation of degree of keenness that is shown by the different categories of farmers. In other words, as the size of the farm gets increased, the capital requirement also gets enlarged forcing the farmer to be more vigilant in running the farm business, since the risk element is much higher in the event of any unforeseen eventuality. Management component plays a pivotal role in managing higher financial outlays. Nevertheless, management of finance is equally important even for marginal and small farmers, if not, at the magnitude that is viewed at by large farmers in the farm business.

The balance sheet indicates an account of total assets and total liabilities of the farm business revealing the financial solvency of the business. More specifically it is a statement of the financial position of a farm business at a particular time, showing its assets, liabilities and equity. If the assets are more than the liabilities it is called net worth or equity and its converse are known as net deficit. The typical balance sheet shows assets on the left hand side and liabilities and equity on the right hand side. Both sides are always in balance hence the name given as balance sheet.

Net worth is placed on the right hand side, along with liabilities in order to indicate that like any other creditor the farmer has a claim against the farm business equal to the equity amount.

Importance of balance sheet:

- Farmer claim against the farm business equal to the equity amount.
- It can be easily prepared it farm records.
- It useful to know financial position of the farm business at any point of time.
- It can also study the performance of a business over years.
- If the net worth increases over the defiance period, indicate efficient performance of the business.

Important terminology:

Assets: Assets are those which are owned by the farmer.

Liabilities: These refer to all things, which are owed to others by the farmer.

- **Tangible Assets:** Assets which have physical existence and which can be seen, touched and felt are called "tangible assets", e.g. building, plant, machinery, furniture etc.
- **Intangible Assets:** Assets which have no physical existence and which cannot be seen, touched or felt are called "intangible assets", e.g. goodwill, patent right, trade mark etc.

Assets are of three types, viz., current, intermediate or working and long term or fixed assets. Same way liabilities are also three types, viz., current, intermediate or working and long term liabilities. This classification of assets and liabilities facilitates the analysis of liquidity of the farm business.

Types of assets:

Current Assets: They are very liquid or short -term assets. They can be converted into cash within a short time, usually one year. For example, cash on hand, agril. Produce ready for disposal, i.e., stocks of paddy, jowar, wheat, black gram etc.

Working Assets (Intermediate assets): Intermediate assets are less liquid than the current assets. These assets take two to five years to convert into cash form. e.g. Machinery, Equipment, livestock, tractors, trucks etc.

Long term Assets: (Fixed assets): An asset that is permanent or will be used continuously for several years is called long-term assets. It takes longer time to convert into cash due to verification of records, legal transactions etc. e.g. land, farm building etc.

Type of Liabilities: 3 Types

Current liabilities: Debt that must be paid in the short term or in very near future. e.g. crop loans, cost of maintenance of cattle, hand loans etc.

Intermediate liabilities: These loans are due for the repayment within a period of two five years e.g. Livestock loans, Machinery loans etc.

Long term liabilities: The duration of loan payments five or more years. e.g. Tractor loans, orchard loan, land development loans *etc.*

Test ratios:

The balance sheet is analyzed with the help of ratio measures so as to know the exact financial position and stability of the farm business. The test ratios viz., current ratio, intermediate ratio, net capital ratio, quick ratio, debt-equity ratio, current liability ratio and equity-value ratio are used to analyze the balance sheet (Table).

Table: Balance sheet of a hypothetical farm

Assets	Amount (Rs.)	Liabilities	Amount (Rs.)
Current Assets		Current Liabilities	
Cash on hand	10,000	Crop loans to be repaid to institutional agencies	8,000
Saving in bank	8,000	Accounts payable	11,000
Value of grains ready for disposal	38,500	Hand loans	5,000
Livestock products (eggs, birds, etc.)	60,000	Money owned to input supply	25,000
Fruits, vegetable, fodder and feed ready for sale	8,000	Annual installment of M.T. and L.T. loans	19,000
Value of bond and share to be realized in same year	2,000	--	--
Sub total	1,26,500	Sub total	68,000
Intermediate Assets		Intermediate Liabilities	
Dairy cattle	10,000	Livestock loan (outstanding)	8,000
Bullocks	9,000	Machinery loan (outstanding)	15,000
Poultry birds	15,000	Unsecured loans (outstanding)	10,000
Machinery and equipment	15,000	--	--
Tractor	1,75,000	--	--
Sub total	2,24,000	Sub total	33,000
Long Term Assets		Long Term Liabilities	
Land	6,00,000	Tractor loan (outstanding)	1,20,000
Farm Buildings	25,000	Orchard loan (outstanding)	25,000
--	--	Unsecured loans (land development)	10,000
Sub total	6,25,000	Sub total	1,55,000
Total of Assets	9,75,500	Total of Liabilities	2,56,000
Networth			7,19,500

$$\begin{aligned}
 \text{Net worth or equity} &= \text{Total Assets} - \text{Total Liabilities} \\
 &= 975500 - 256000 \\
 &= \text{Rs.719500}
 \end{aligned}$$

1. Current Ratio:

This ratio indicates the capacity of the farmer to meet immediate financial obligations. A ratio of more than one indicates a favorable run of the farm business.

$$\begin{aligned}
 \text{Current ratio} &= \frac{\text{Total Current Assets}}{\text{Total Current Liabilities}} \\
 &= \frac{126500}{68000} \\
 &= 1.86
 \end{aligned}$$

In this example, the ratio is more than one indicates a favorable run of farm business. If current assets are more than current liabilities and if the borrowers fail to repay the loan, this is the case of willful defaulter. These types of willful defaulters are more common in respect of large farmer borrowers of financial institutions. If by chance the ratio falls less than one due to certain unforeseen contingencies, his case for further lending cannot be ruled out by the institutional agencies, as it is a temporary setback and he may be given a chance to prove his credit worthiness.

2. Intermediate Ratio (Working Ratio):

This ratio indicates the liquidity position of the farm business over an intermediate period of time, ranging from 2 to 5 years. Here, certain time is allowed for the farmer to build up the farm business to improve his liquidity position. This ratio should also be more than one to indicate sound running of the farm business.

$$\begin{aligned}
 \text{Intermediate Ratio} &= \frac{\text{Total Current Assets} + \text{Total Intermediate Assets}}{\text{Total Current Liabilities} + \text{Total Intermediate Liabilities}} \\
 &= \frac{126500 + 224000}{68000 + 33000} \\
 &= \frac{350500}{101000} \\
 &= 3.47
 \end{aligned}$$

This ratio observed progress for a given farm business over time implies, the increase in the value of current and intermediate assets due to minimal physical loss and price decline. The steady growth of this ratio over a period is a healthy sign of the business.

3. Net Capital Ratio:

This ratio indicates the solvency position of the farmers. If the net capital ratio is more than one, the funds of the institutional agencies are safe. A consistently increasing ratio over the years reveals the sound financial growth of farm business. The farmer with this record should be a very prompt re-payer of all types of credit obligations. This ratio is also the most important measure of overall solvency position of the farmer borrowers.

$$\begin{aligned}
 \text{Net Capital Ratio} &= \frac{\text{Total Assets}}{\text{Total Liabilities}} \\
 &= \frac{975500}{256000} \\
 &= 3.81
 \end{aligned}$$

4. Acid Test Ratio or Quick Ratio:

This ratio reflects adequacy of cash and income surplus to cover all current liabilities during the period of one year or very short period. If ratio is more than unity, it will consider as the sound liquidity position of the farmer.

$$\text{Acid Test Ratio} = \frac{\text{Cash Receipts} + \text{Account Receivable} + \text{Marketable Securities} \\ (\text{Bond, Share, etc.}) \text{ Available in more than Year}}{\text{Total Current Liabilities}}$$

5. Current Liabilities Ratio:

This ratio indicates the farmer's immediate financial obligation against the net worth. A ratio less than one indicates a healthy performance of the farm business and over the years the ratio should become smaller and smaller to reflect a consistently good performance.

$$\begin{aligned} \text{Current Liability Ratio} &= \frac{\text{Current Liabilities}}{\text{Owner's Equity}} \\ &= \frac{68000}{719500} \\ &= 0.09 \end{aligned}$$

6. Debt-equity Ratio (Leverage Ratio):

This ratio indicates the capacity of the farmer to meet the long term commitments. Also it throws light on the extent of indebtedness in the farm business or conversely the amount of capital raised by the farmer in running the farm business. A consistently falling ratio indicates a very heartening performance of farming and ability of the farmer to reduce dependence on borrowings.

$$\begin{aligned} \text{Debt-equity Ratio} &= \frac{\text{Total Debts}}{\text{Owner's Equity}} \\ &= \frac{256000}{719500} \\ &= 0.36 \end{aligned}$$

7. Equity-value Ratio:

This ratio highlights the productivity gained by the farmer in relation to the assets he has. The improvement in the ratio over the years makes it clear regarding the increased strength in the financial structure of the farm business. This ratio has a direct bearing on the type of assets one has. Managerial ability of the farmer is an essential element in raising the productivity of the assets.

$$\begin{aligned} \text{Equity-value Ratio} &= \frac{\text{Owner's Equity}}{\text{Value of Assets}} \\ &= \frac{719500}{975500} \\ &= 0.74 \end{aligned}$$

EXERCISE -3

PREPARATION & ANALYSIS OF INCOME STATEMENT- A CASE STUDY

Introduction

Income Statement or Profit and Loss Statement is entirely different from balance sheet in the sense that in a balance sheet, we considered assets and liabilities and did not consider operational efficiency in terms of receipts and expenses. An income statement is the list of all farm expenses on one hand and all receipts on the other.

Income Statement can be defined as a **summary of receipts (or gains) minus expenses (or losses)** during a specific period. Thus, basically it consists of three items, viz., **receipts, expenses and net income**. It is prepared for the **entire farm** for **one agricultural year**. It is also called Profit and Loss Statement.

Receipts

1. It includes returns obtained from the sale of crop produce and other supplementary products like milk, eggs, etc.
2. It includes income in form of wages and receipt in form of gifts.
3. Gain in the form of appreciation in the value of assets is also included in the receipts.
4. However, returns from the sale of capital assets, such as livestock, machinery, farm buildings etc. are not included.

Expenses

1. It includes operating costs as well as fixed costs.
2. Losses in the form of depreciation on the asset value fall under the expenditure item.
3. However, the amount incurred on the purchase of capital assets is not considered. Crop loans are included in operating expenses.

Net Income

It constitutes net cash income, net operating income and net farm income.

- a) **Net Cash Income:** It gives the position of cash receipts minus cash expenses only during the period for which income statement is prepared.
- b) **Net Operating Income:** It is arrived at by deducting operating expenses from the gross income. Fixed costs are not given any consideration.
- c) **Net Farm Income:** Net farm income equals net operating income less fixed costs. It is relatively a better measure of assessing the performance of a farm. It is the return accrued to owned capital and family labour employed.

Importance or Advantages

1. It provides information on cost and returns of the farm.
2. It provides the basis for a study and analysis of farm business.
3. Performance of a farm can be gauged by preparing income statements over the years.
4. It provides farmer an opportunity to compare the results with his expectations.
5. It helps to make comparisons of his efficiency with the performance of other farmers operating under similar situations.

Income Statement of a hypothetical Farm for the year 2010-11

Sr. No.	Particulars	Amount (Rs.)
I	RECEIPTS	
	Returns from the sale of crop output	2,00,000
	Returns from Supplementary enterprise	
	(i) Revenue from Milk and Milk Products	50,000
	(ii) Revenue from poultry Products	25,000
	Gift	10,000
	Gross Cash Income (a+b+c)	2,85,000
	Appreciation on the value of Assets	50,000
	Gross Income (d+e)	3,35,000
II	EXPENSES	
	Operating expenses or costs:	
	Hired human labour	10,000
	Bullock labour	5,000
	Machinery	25,000
	Seeds	10,000
	Feeds	15,000
	Manures & Fertilizers	20,000
	Plant Protection Measures	5,000
	Veterinary aid	2,000
	Miscellaneous	10,000
	Interest on working capital (a) int. on borr.cap.= 9000 +(b) int. on own.cap.= 4000	13,000
	Total operating costs	1,15,000
	Fixed Expenses or Costs	
	Depreciation	5,000
	Land revenue	500
	Interest on fixed capital (a) int. on farm bldg = 500 + (b) int. on term loan = 2000	2500
	Rental value of owned land	30,000
	Total Fixed cost	38,000
	Total Expenses (a+b)	1,53,000
III	Net Cash Income = (2,85,000 – 1,15,000)	1,70,000
IV	Net Operating Income = (3,35,000 – 1,15,000)	2,20,000
V	Net Farm Income = (3,35,000 – 1,53,000)	1,82,000

Financial Test Ratios or Income Ratios

The performance of farm business can be assessed through the income analysis of the data presented in Income Statement. Financial test ratios help the farmer to know the financial position of his farm and landing holdings. There are two sets of income ratios:

A. Expense-Income ratios

B. Income-Investment ratios

A. Expense-Income Ratio

$$\begin{array}{rcl} & \text{Total Operating Expenses} & 1,15,000 \\ 1. \quad \text{Operating ratio} = & \frac{\text{-----}}{\text{Gross Income}} & = \frac{\text{-----}}{3,35,000} = 0.34 \end{array}$$

The ratio explains the relationship of operating costs to gross income. This ratio underlines the magnitude of working expenditure incurred for a rupee of gross income. This is a **direct ratio**, since operating costs are direct costs. **Low ratio indicates better performance** of investment.

$$\begin{array}{rcl} & \text{Total Fixed Expenses} & 38,000 \\ 2. \quad \text{Fixed ratio} = & \frac{\text{-----}}{\text{Gross Income}} & = \frac{\text{-----}}{3,35,000} = 0.11 \end{array}$$

This ratio indicates the relationship between fixed expenses and gross income. It depicts the amount of fixed expenses incurred to realize a rupee of gross income. This is an **indirect ratio**, since fixed costs are indirect costs.

$$\begin{array}{rcl} & \text{Total Expenses} & 1,53,000 \\ 3. \quad \text{Gross ratio} = & \frac{\text{-----}}{\text{Gross Income}} & = \frac{\text{-----}}{3,35,000} = 0.46 \end{array}$$

This is the ratio which is obtained when both operating expenses and fixed expenses are totaled up and compared with gross income. This can be called **input-output ratio**.

All these ratios should be less than one to indicate the profitable run of the farm business. When these ratios are estimated over the years, if they are **descending**, reflects a healthy trend of farm business.

B. Income-Investment Ratio

Gross Income 3,35,000

$$1. \text{ Capital turnover ratio} = \frac{\text{Gross Income}}{\text{Avg. Capital Investment}} = \frac{3,35,000}{16,00,000} = 0.21$$

Avg. Capital Investment 16,00,000

Here, Average Capital Investment is arrived by adding the value of assets at the beginning of the agriculture year and at the end of the year than averaging the two values. It indicates gross income obtained for each rupee capital invested over the year.

Net Return to Capital 1,92,000

$$2. \text{ Rate of Return on Investment} = \frac{\text{Net Return to Capital}}{\text{Avg. Capital Investment}} = \frac{1,92,000}{16,00,000} = 0.12$$

Avg. Capital Investment 16,00,000

Here, Net Return to Capital = Net Farm Income 1,82,000

+ Interest on working capital + 13,000

+ Interest on term loans + 2,000

- unpaid family labour - 5,000

Net Return to Capital = Rs 1,92,000

This ratio gives the net return for every rupee of capital invested.

Above two ratios explain the income generated over investment and are called **income -investment ratios**. If they increase over the years, reflect a healthy trend of farm business.

Management Ratios

These also measure the productivity of farm business. They can be derived using data of income statement as well as from other related information. They are discussed as under:

$$1. \text{ Management Return} = \begin{array}{rcl} \text{Net farm Income} & \text{.....} & 1,82,000 \\ - \text{Unpaid family labour wage} & \text{.....} & - 5,000 \\ - \text{Interest on owned capital} & \text{....} & - 4,000 \end{array}$$

Management Return = Rs.1,73,000

2. Crop yield & its value

Comparing the yields obtained by the farmers for different crops with those of average yields of the area. So also value can be compared. These data overtimes can be used for appraising the ability of the farm manager.

3. Livestock income

The efficiency of livestock can be measured by comparing the feed expenditure against livestock income.

4. Gross income per man (labour efficiency)

Gross income divided by number of labour employed gives the measure of labour efficiency.

A progressively higher ratio (management ratio) over the years reflect a better run of the business.

EXERCISE - 4

PROCEDURAL FORMALITIES IN SANCTION OF FARM LOANS

The financing bank is entrusted with the powers either to accept or reject the farmer's loan application. This is equal to an objective appraisal of farm credit proposals and procedures and formalities followed in the processing of loans. Here, an attempt is made to explain the set of procedures and formalities required in processing of a farm loan application. The processing procedure is detailed under the following sub-heads.

1. Interview with the farmer;
2. Submission of loan application by the farmer;
3. Scrutiny of records;
4. Visit to the farmer's field before sanction of loan;
5. Criteria for loan eligibility;
6. Sanction of loan;
7. Submission of requisite documents;
8. Disbursement of loan;
9. Post-credit follow-up measures; and
10. Recovery of loan.

(1) Interview with the farmer

A banker studies the farmer-borrower in the interview regarding his credit characteristics such as honesty, integrity, frankness, progressive thinking, indebtedness, repayment capacity etc. The banker explains to the farmer the terms and conditions under which the loan is going to be sanctioned. Interview helps the banker to understand the genuine credit needs of the farmer. So interview is more than a mere formality, as it facilitates the banker to study the farmer in detail and assess his credit requirements.

(2) Submission of loan application by the farmer

After getting satisfied with the credentials of the farmer, the banker gives a loan application form to him. Details regarding the location of the farm, purpose of the loan, cost of the scheme, credit requirements, farm budgets, financial statements etc. as required in the form are filled in by the farmer. Certificates such as ownership of the land, statement showing cropping pattern adopted by the farmer-borrower, farm map, no objection certificate from the co-operatives, and affidavit from the borrower regarding his non-mortgage of land elsewhere are appended to the loan application. A passport size photograph is fixed to the loan application form

(3) Scrutiny of records: Verify the ownership of land and the acreage held by the applicant through title deeds 7/12, 8-A etc.

(4) Visit to the farmer's field before sanction of loan

After verifying the records, the Field Officer of the bank pays a visit to the farm to verify the particulars given by the farmer. The pre-sanction visit is expected to help the banker to identify the farmer and guarantor, locate the boundaries of land as per the map and assess the managerial

capacity of the farmer in farming and allied enterprises and the farmer's attitude towards latest technology. Thus, pre-sanction visit of the bank officials is very important to verify credit-worthiness and trust-worthiness of the borrower. While appraising different types of loans, different aspects should be verified. For example, to advance loan for well-digging, the location of proposed well, ground water availability, distance from the nearby well, rainfall command area of the well etc., are verified in the pre-sanction visit. All these aspects are included in the report submitted to the Branch Manager for taking up final decision in the sanction of the loan.

(5) Criteria for loan eligibility

The following aspects are considered in judging the eligibility of a farmer-borrower to receive loan.

1. He should have sound character and financial integrity,
2. His dealing with friends, neighbors, financial institutions etc., must be proper (He should not be defaulter in the past),
3. He must have progressive outlook and be receptive to modern technology,
4. He should sincerely implement the proposed scheme and ensure proper use of credit,

(6) Sanction of loan

After examining all the aspects presented in the pre-sanction farm inspection report, the Branch Manager takes a decision whether to sanction the loan or not. Before sanctioning, the Branch Manager considers the technical feasibility, economic viability and bankability of proposed projects including the repayment capacity, risk-bearing ability and sureties offered by the farmer-borrower. If the loan amount is beyond the sanctioning power of the Branch Manager, it is forwarded to the regional manager or Head office of the bank, incorporating his recommendations.

(7) Submission of requisite documents

After sanctioning the stipulated amount to the farmer-borrower the following documents are obtained.

1. Demand promissory note;
2. Deed of hypothecation;
3. Guarantee letter;
4. Installment letter;
5. Authorization letter regarding the payment of loan from the marketing agencies or intermediaries on behalf of the farmer.

Title deeds are examined by the legal officer of the bank and his opinion with regard to clear, marketable and unlitigated title is sought.

(8) Disbursement of loan

As soon as the execution of documents is completed, the loan amount is credited to the borrower's account. The loan amount is disbursed in a phased manner, that too after ensuring that the loan is used by the farmer-borrower properly. A realistic repayment plan is framed and given to the farmer keeping in view the income flow of the proposed project.

(9) Post-credit follow-up measures

The Branch Manager or Agricultural Officer pays a visit to the farmer to ascertain the proper use of the credit. This also benefits the farmer for; they can get the technical advice if any needed from the Agricultural officer in the implementation of the scheme. These visits are also meant for developing a close rapport between the farmer and the banker. Such visits also facilitate in assessing any further requirement of supplementary credit to complete the scheme.

(10) Recovery of loan

The bank reminds the farmer-borrower in advance about the repayment of loan in time. If needed recovery camps, special drives, village meetings etc. are organized at an appropriate time. All appropriate measures are taken to persuade the farmer-borrower to repay the loan in time. In the case of failure, the reasons for the same are ascertained to find out whether the borrower is deliberate defaulter or not. If the reason is genuine, the borrower is further helped by extending finance to accelerate farm production. In such situations, a close supervision is necessary. If the bank officials find that the borrowers are willful-defaulters stringent measures are initiated to recover the loans through court of law. In all possible cases, the bank officers make tie-up arrangements, i.e., the recovery of the loan is linked with marketing. Re-phasing of repayment plan is allowed in the case of justifiable cases.

EXERCISE - 5

DIFFERENT TYPES OF REPAYMENT PLANS

For term loans which are characterized by partially liquidating nature, the loan repayment plan is not as similar to that of short term loans. These loans are recovered through a given number of instalments depending upon the nature of asset and the amount advanced for the asset in question. Various repayment plans, in use are listed and briefly explained here.

1. Straight-end payment plan or single repayment plan or lump sum repayment plan;
2. Partial repayment plan;
3. Amortized repayment plan;
 - (a) Amortized decreased repayment plan;
 - (b) Amortized even repayment plan;
4. Variable repayment plan;
5. Optional repayment plan;
6. Reserve repayment plan.
- 7.

1. Straight-end payment plan or single repayment plan or lump sum repayment plan

The entire loan amount is to be cleared off after the expiry of loan period stipulated. More clearly in this method, the principal component is repaid by the farmer at a time in lump sum when the loan matures, while the interest component is paid each year.

2. Partial repayment plan

The farmer is expected to settle the entire loan amount in quarterly, half-yearly or annual instalment (principal + interest). It implies that repayment of loan will be done partially over the years. Usually, the instalment amount will be decreasing as the years pass by except in the maturity year (final year) during which the investment generates sufficient revenue for liquidation.

Example: Loan amount: Rs. 10,000

Time period: 6 years

Rate of interest: 12 %

Table: 1 Partial Repayment Plan

Year	Principal (in Rs.)	Interest (in Rs.)	Instalment (in Rs.)	Balance amount (in Rs.)
1	1,000	1,200	2,200	9,000
2	1,000	1,080	2,080	8,000
3	1,000	960	1,960	7,000
4	1,000	840	1,840	6,000
5	1,000	720	1,720	5,000
6	5,000	600	5,600	-
Total	10,000	5,400	15,400	-

This is also known as **balloon repayment** plan, as the large final payment is made at the end of the loan period following a series of smaller partial payments.

3. Amortized repayment plan

It is an extended version of partial repayment plan. **Amortization** means the repayment of the entire loan amount in a series of instalments. There are two types of amortization plans, viz., amortized decreasing repayment plan and amortized even repayment plan.

(a) Amortized Decreased Repayment Plan

In this repayment plan, the principal component remains constant over the entire repayment period, while the interest part decreases continuously. With the principal amount remaining fixed and interest amount decreasing, the annual instalment amount decreases over the years. The advance made for the purchase of machinery does not demand much repairs in the initial years of loan payments enabling the farmer to repay a large amount of instalment in the initial years. The diagrammatic representation of the repayment schedule is shown in figure 1:

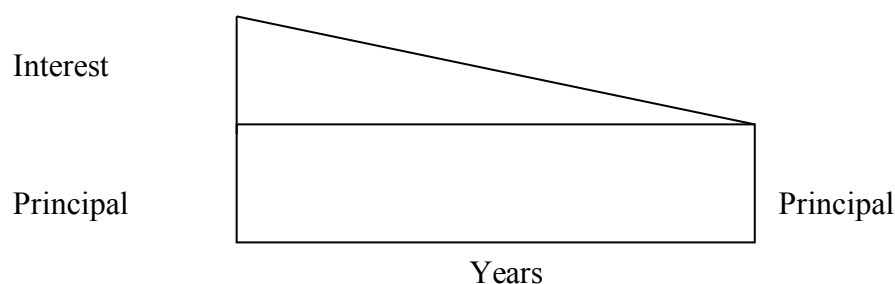


Figure1: Amortized Decreased Repayment Plan

The arithmetic calculation of the plan is embodied in Table 2

Example: Loan amount: Rs. 10,000

Time period: 6 years

Rate of interest: 12 %

Table: 2 Amortized Decreased Repayment Plan

Year	Principal (in Rs.)	Interest (in Rs.)	Instalment (in Rs.)	Balance amount (in Rs.)
1	1,666.67	1,200	2,866.67	8,333.33
2	1,666.67	999.99	2,666.66	6,666.67
3	1,666.67	799.99	2,466.66	5,000.00
4	1,666.67	600.00	2,266.67	3,333.33
5	1,666.67	399.99	2,066.66	1,666.67
6	1,666.67	199.99	1,866.67	-
Total	10,000	4,199.96	14,199.96	-

(b) Amortized even repayment plan

This is called equated annual instalment method. The annual instalment over the entire loan period remains the same in this method. The principal portion of the instalment increases continuously, while the interest part declines gradually. This method is mostly adopted for term loans. Loan granted for farm development, digging of wells, construction of godowns, dairy, poultry etc., are the examples. This is depicted diagrammatically in figure 2.

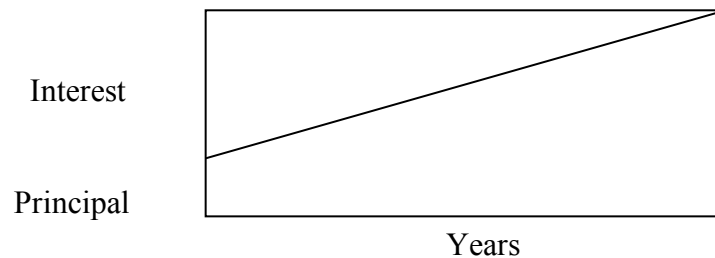


Figure 2: Amortized Even Repayment Plan

The annual instalment is arrived at through the formula given below:

$$I = B \frac{i}{1 - (1+i)^{-n}}$$

Where,

I = Annual instalment in Rs.

B = Principal amount borrowed in Rs.

n = Loan period in years

i = Annual interest rate in fraction

The plan is shown in table: 3

Example:

Loan amount: Rs. 10,000; Time period: 6 years; Rate of interest: 12 %

$$I = B \frac{i}{1 - (1+i)^{-n}} = 10,000 \times \frac{0.12}{1 - (1+0.12)^{-6}}$$

$$\begin{aligned}
& 0.12 \\
& = 10,000 \times \frac{0.12}{1 - (0.12)^6} = 10,000 \times 0.243225 = \text{Rs. } 2,432.25
\end{aligned}$$

Table: 3 Amortized Even Repayment Plan

Year	Instalment (in Rs.)	Principal (in Rs.)	Interest (in Rs.)	Balance amount (in Rs.)
1	2,432.25	1,232.25	1,200.00	8,767.75
2	2,432.25	1,380.12	1,052.13	7,387.63
3	2,432.25	1,545.73	886.52	5,841.90
4	2,432.25	1,731.22	701.03	4,110.68
5	2,432.25	1,938.97	493.28	2,171.71
6	2,432.25	2,171.64	260.61	-
Total	14,593.50	9,999.93	4,593.57	-

4. Variable repayment plan

As the very name indicates, various levels of instalment are paid by the borrower over the loan period. In times of good harvest, a higher instalment is paid, while in periods of low yields lesser amount is credited towards instalment to the lender. According to the convenience, the borrower effects the repayment. This method is not found with institutional borrowings.

5. Optional repayment plan

In this method provision is made for the borrower to make payment towards the principal amount in addition to the regular interest annually.

6. Reserve repayment plan

This type of repayment is made by the borrowers in areas which are subject to high income variability of farms. The impending problem here is that the farmers are haunted by the fear that they may not be able to keep up their promise of repaying crop loans or instalment towards term loans at scheduled time. To overcome such situations, the farmer makes advance payments of the loan realized from the saving of the previous year. This type of repayment is advantageous to the banker as the institutional agency need not worry regarding loan collection during the periods of crop failure.

EXERCISE - 6

PRINCIPLE OF OWNER'S EQUITY AND INCREASING RISK

The principle hinges upon the fact that the risk in farming tends to increase at an increasing rate as the owner's equity decreases. When owned capital (equity capital) is limited with the farmers, borrowings will become necessary to raise the needed capital for production. The leverage which is nothing but the ratio of debt to equity will be higher on farms using more and more non-equity capital. The non-equity capital is productive, when everything goes right on farms, but is equally destructive when the farmers' expectations go topsy-turvy. The borrowed capital which earlier brought prosperity to the farmers now spells doom.

Principle of Equity and Increasing Risk

Sl. No.	Items	Farms				
		A	B	C	D	E
1	Owned or Equity capital (Rs)	5000	5000	5000	5000	5000
2	Borrowed or non-equity capital (Rs)	-	2500	5000	7500	10000
3	Total Capital (Owned + Borrowed Capital) (Rs)	5000	7500	10000	12500	15000
4	Leverage Ratio	0	0.5	1.0	1.5	2.0
5	Gain @15% on total capital	750	1125	1500	1875	2250
6	Interest to be paid to the institutional agency @12%	-	300	600	900	1200
7	Owned capital at the end of the year(Rs)	5750	5825	5900	5975	6050
8	Gain on owned capital in %	15.0	16.5	18.0	19.5	21.0
9	Loss @15% on total capital	750	1125	1500	1875	2250
10	Interest to be paid to the institutional agency @12%	-	300	600	900	1200
11.	Owned capital at the end of the year (Rs)	4250	3575	2900	2225	1550
12	Loss on owned capital in %	15.0	28.5	42.0	55.5	69.0

Statement of the Principle

As the debt-equity ratio or leverage increases, the borrower runs a greater risk of losing owned capital. This principle is clearly explained with the help of the example presented in the table and with the help of the formula on percentage of equity.

$$\text{Percentage of equity} = [\text{Owned Capital} / (\text{Owned} + \text{Borrowed Capital})] * 100$$

We have considered five farms with an identical owned capital of Rs 5,000 each. Barring farm A, the other four farms have borrowed an amount of Rs 2500, Rs 5000, Rs 7500 and Rs 10000, respectively. Consequently, the total capital available with A, B, C, D and E farms exhibited an increasing trend. Assuming a gain of 15 per cent uniformly on all five farms, the resultant profit would be Rs 750, Rs 1125, Rs 1500, Rs 1875 and Rs 2250 on the corresponding farms.

After paying the interest to the lending agency, owned capital increased in ascending order for the respective farms. The percentage gain on owned capital too exhibited a similar trend. Now let us assume a loss of 15 per cent uniformly on all five farms, analogous to the profit trend, the loss calculated too reveals an increasing trend on farms A, B, C, D and E respectively. A perusal of the table infers that as the borrowed funds increase the percentage of equity gets reduced under the condition of losses. No doubt borrowed capital is productive as long as there is no setback, but in the context of any eventuality, it is equally destructive to the farmer. This amply demonstrates that credit is a double edged knife and hence the requisite amount only, needs to be borrowed by the farm

EXERCISE - 7

TIME VALUE OF MONEY

Future value of Present Money. A rupee today is worth more than a rupee in future. This is primarily due to its opportunity cost, i.e., interest. Interest will be added to the principal over time and hence its value increases. Future value of present sum is an important concept in financial analysis and this is called compounding. In the compounding process, the interest is added to the principal at the end of each time period. The future value of present investment is calculated by using the formula of compound interest:

$$A = P (1+i)^t$$

Where,

A= Future value of present sum invested,

P= Principal amount invested,

i = Interest rate in per cent, and

t = Number of years.

There are two methods of project appraisal, viz., undiscounted measures and discounted measures. In undiscounted measures, payback period, ranking by inspection, proceed per rupee of outlay etc., are important. Under discounting measures, Net Present Worth (NPW), Benefit-Cost Ratio, Internal Rate of Return (IRR) and Profitability Index are prominent.

UNDISCOUNTED MEASURES

The undiscounted measures are the naïve methods of choosing among the alternative projects. The methods listed under these measures often mislead in ranking of the projects and hence, choices go wrong.

Ranking by Inspection:

It is based on the size of costs and length of cash-flow stream. Suppose if the two projects are with the same investment and the same net value of production, but with difference in the length of the period, then the longer duration is preferred to the one with shorter time period. This leads to bias in the choice obviously due to the absence of appropriate analysis.

Payback Period:

Another simple method of ranking a project is the length of time required to get back the investment on the project.

The payback period of the project is estimated by using the straight forward formula:

$$P = \frac{I}{E}$$

Where,

P = Payback period of the project in years

I = Investment of the project in Rs. And

E = Annual net cash revenue in Rs.

The performance of a project is based on the shorter payback period.

Estimation of Payback Period

Initial Investment = Rs. 20,000

Year	Cash Flow (in Rs.)	
	Project – A	Project - B
0	-20,000	-20,000
1	5,000	4,000
2	5,000	4,000
3	5,000	4,000
4	5,000	4,000
5	5,000	4,000
6	5,000	4,000

Project- A = Rs. 20,000/ Rs. 5,000 = 4 years

Project- B = Rs. 20,000/ Rs. 4,000 = 5 years

It is inadequate to exercise the option among the alternatives, because it fails to consider very important points like, consistency of running, returns after the payback period and whether the cash-flows would be positive or negative in future.

Proceed per Rupee of Outlay

This is worked out by dividing the total proceeds with the total amount of investment, and a given project is ranked based on the highest magnitude of the parameters.

DISCOUNTED MEASURES

Cash-flows are yearly net benefits accrued from the project. If they are weighed by discount rate, they become discounted cash-flows. These discounted cash-flows are the best estimates to decide on the worth of the project. This approach will give the net present worth of the project. The present worth of the costs is subtracted from the present worth of the benefits in order to arrive at the net present worth of the project every year.

Measurement of the Cash flow of the Project

From the annual stream of gross benefits of the project, the capital invested and the other input costs like labour, machinery, fertilizers, pesticides, management, etc., are deducted.

Net Present Worth (NPW):

This is simply the present worth of the cash flow stream. Sometimes, it is referred to as Net Present Value (NPV). The selection criterion of the project depends on positive value of NPW when discounted at the opportunity cost of the capital.

$$NPW = \frac{P_1}{(1+i)^{t1}} + \frac{P_2}{(1+i)^{t2}} + \dots + \frac{P_n}{(1+i)^{tn}} - C$$

Where, P_1 = Net cash flow in first year,

i = Discount rate,

t = Time period, and

C = Initial cost of the investment.

Project with positive NPWs are given weightage in the selection compared to those with negative present values. Table 1 presents the particulars of NPV calculations for two projects.

Benefit-Cost Ratio:

We compare the present worth of costs with present worth of benefits. Absolute value of the benefit-cost ratio will change based on the interest rate chosen. While ranking the projects depending upon the B-C ratio, the most common procedure of selecting a project is, to choose the project, having B-C ratio of more than one, when discounted at opportunity cost of capital.

Present worth of gross returns

Benefit – Cost Ratio = -----

Present worth of costs

Table: 1 Estimation of NPW for Two Projects (Hypothetical)

Sericulture (One ha.)						Mango orchard (One ha.)					
Year	Costs (in Rs.)	Returns (in Rs.)	Net income (in Rs.)	Discount factor at 15 %	NPW (in Rs.)	Year	Costs (in Rs.)	Returns (in Rs.)	Net income (in Rs.)	Discount factor at 15 %	NPW (in Rs.)
1	38,900	-	-38,900	0.8696	-33827.44	At the end of 6 th year	25,000	-	-25,000	0.4323	-10807.50
2	9,239,	28,475	19,236	0.7561	14544.34	At the end of 7 th year	4,250	10,260	6,010	0.3759	2259.16
3	10,575	32,550	21,975	0.6575	14448.56	At the end of 8 th year	4,792	12,550	7,758	0.3269	2536.09
4	11,952	35,610	23,658	0.5718	13527.64	At the end of 9 th year	5,368	14,530	9,162	0.2842	2603.84
5	12,858	39,802	26,944	0.4918	13251.06	At the end of 10 th year	5,975	16,275	10,300	0.2472	2546.16
				NPW	21944.17	At the end of 11 th year	6,456	19,396	12,940	0.2149	2780.81
						At the end of 12 th year	7,187	21,470	14,283	0.1869	2669.49
										NPW	4588.05

Table: 2 Estimation of Benefit-Cost Ratio for Two Projects (Hypothetical)

Sericulture (One ha.)						Mango orchard (One ha.)					
Year	Costs (in Rs.)	Returns (in Rs.)	Discount factor at 12 %	Present worth Of costs (in Rs.)	Present worth Of gross returns (in Rs.)	Year	Costs (in Rs.)	Returns (in Rs.)	Discount factor at 12 %	Present worth of costs (in Rs.)	Present worth Of gross returns (in Rs.)
1	38,900	-	0.8929	34,733.81	-	At the end of 6 th year	25,000	-	0.507	12,675.00	-
2	9,239,	28,475	0.7972	7,365.33	22,700.27	At the end of 7 th year	4,250	10,260	0.452	1,921.00	4,637.52
3	10,575	32,550	0.7118	7,527.29	23,169.09	At the end of 8 th year	4,792	12,550	0.404	1,935.97	5,070.20
4	11,952	35,610	0.6355	7,595.50	22,630.16	At the end of 9 th year	5,368	14,530	0.361	1,937.85	5,245.33
5	12,858	39,802	0.5674	7,295.63	22,583.65	At the end of 10 th year	5,975	16,275	0.322	1,923.95	5,240.55
				64,517.56	91,083.17	At the end of 11 th year	6,456	19,396	0.287	1,852.87	5,566.55
						At the end of 12 th year	7,187	21,470	0.257	1,847.06	5,517.79
										24,093.70	31,278.04
					BCR=1.41					BCR=1.29	

Internal Rate of Return:

In the computation of Internal Rate of Return (IRR), the time value of money is accounted. The method of working IRR provides the knowledge of actual rate of return from the different projects. Thus IRR is known as ‘Marginal Efficiency’ of capital or yield on the investment. It is the discount rate at which the present values of the net cash flows are just equal to zero, i.e., NPW = zero.

In the working procedure, an arbitrary discount rate is assumed and its corresponding NPW is arrived at. The positive NPW value of the project indicates that IRR is still higher and the next assumed arbitrary IRR value must be comparatively higher than the initial level. The process continued until NPW becomes negative. The IRR is found out using the following equation.

$$\text{IRR} = \text{Lower discount rate} + \frac{\text{Difference between the two discount rates} \times \text{Present worth of the cash flow at lower discount rate}}{\text{Absolute difference between the present worth of the cash flow at the two discount rates}}$$

Estimation of IRR for Sericulture (one ha.) (Hypothetical)

Year	Costs (in Rs.)	Returns (in Rs.)	Net Income (in Rs.)	Discount factor (40%)	Net Present worth (in Rs.)	Discount factor (45%)	Net Present worth (in Rs.)
1	38,900	-	-38,900	0.7143	-27,786.27	0.6897	-26,829.33
2	9,239	28,475	19,236	0.5102	9,814.21	0.4756	9,148.64
3	10,575	32,550	21,975	0.3644	8,007.69	0.3280	7,207.80
4	11,952	35,610	23,658	0.2603	6,158.17	0.2262	5,351.44
5	12,858	39,802	26,944	0.1859	5,008.89	0.1560	4,203.26
			52,913		1,202.69		-918.18

$$\begin{aligned}
 \text{IRR} &= 40 + 5 \{1202.69/1202.69+918.18\} \\
 &= 40 + 5\{0.5671\} \\
 &= 40 + 2.7249 \\
 &= 42.84 \%
 \end{aligned}$$

Profitability Index:

It is defined as the ratio of net present values of the cash flows to the initial capital expenditure (Co).

NPV

PI = -----

Co

Estimation of profitability Index

Original amount invested in a project = Rs. 60,000

Year	Cash flow (in Rs.)	Discount factor (15 %)	Net Present worth (in Rs.)
1	14,500	0.8696	12609.20
2	14,900	0.7561	11265.89
3	16,600	0.6575	10914.50
4	18,700	0.5718	10692.66
5	19,000	0.4918	9344.20
6	20,000	0.4323	8646.00
	1,03,700		63472.45

Net present values of the cash flow 63,472.45

PI = ----- = ----- = 1.06

Original amount invested 60,000

1. Compounding:

Compounding is used to translate present cash flow into their future values. Suppose we invest Rs. 1.00 in a bank which will pay 10% interest per year. At the end of the first year, the investment will earn an interest of 10 paisa. If we add this amount of interest to the original principal, we will have a new principal of Rs. 1.10 at the start of second year. At the end of second year, the new principal (Rs. 1.10) will earn an interest of Rs. 0.11 so that the principal at the start of third year will be Rs. 1.21. **Compounding factor enable calculation of future value of present money.**

What is the future value of the following investment?

Sr. No.	Initial Amount(Rs.)	Compounding rate of interest	Period (years)	Compounding factor	Future Value (Rs.)
1	6000	15	10	6000x4.045	24240
2	500	20	16	500x18.4884	9442

2. Discounting:

This is to derive the present value of future income at a specified rate of interest. This is because, money has time value. **Discounting factor enable calculation of present value of future amount.**

Sr. No.	Amount to be received(Rs.)	Future Period in Years	Rate of interest	Discounting factor	Present Value (Rs.)
1	24276	10	15	24276x0.247185	6000
2	9244	16	20	9244x0.054088	500

3. Annuity Factor:

This factor is used when a constant stream of benefits is expected for the entire project life or certain number of years of project life. **Annuity factor is the sum of total discount factors.**