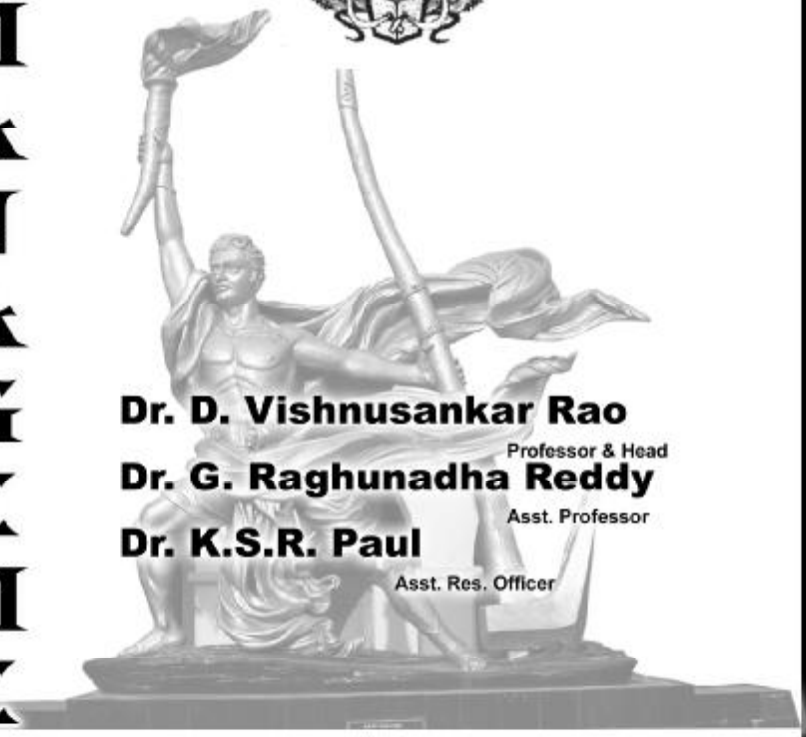
FARM MANAGEMENT

PRODUCTION ECONOMICS

PRACTICAL MANUAL

FARM MANAGEMENT AND PRODUCTION ECONOMICS

COURSE NO. AECO 241 (1+1)



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DEPARTMENT OF AGRICULTURAL ECONOMICS
ACHARYA N.G. RANGA AGRICULTURAL UNIVERSITY
AGRICULTURAL COLLEGE, BAPATLA - 522 101

PRACTICAL MANUAL

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FARM MANAGEMENT AND PRODUCTION ECONOMICS

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AGRICULTURAL COLLEGE, BAPATLA – 522 101

Acharya N.G. Ranga Agricultural University

Agricultural College

BAPATLA

Certificate

Certified that this is a bonafide record of Practical work done by

Mr/Miss.....I.D.No.....

in Course No.**AECO 241 (1+1) FARM MANAGEMENT & PRODUCTION ECONOMICS** during the First / Second Semester of -

Teacher in-charge

Dept. of Agril. Economics

Agricultural College

BAPATLA

Place :

Date :

PREFACE

The curriculum of B.Sc. (Ag.) programme of Acharya N.G. Ranga Agricultural University was revised in the year 2007, based on the recommendations of Fourth Dean's Committee (2006) of ICAR. The courses in the discipline of Agricultural Economics were also revised. The course on Farm Management and Production Economics was a (2+0) credits course without practical component, so far. During the revision process the course was revised as (1+1) credits course with practical component to be offered in second year B.Sc. (Ag) programme. Introduction of practical component in this course is required to train and expose the students to practical skills and techniques related to management and economic decision making in managing the agricultural farms.

This practical manual was prepared for the first time in this University to provide hands on work experience to U.G. Students in practical farm management decision making process. The manual was also useful to students to get an early exposure to the 'Rural Economics' course component of RAWE Programme in final year, as it includes major components of rural economics record work. The relevant basic terms and concepts, farm cost output relationship, cost of cultivation and computation procedures, depreciation methods, farm holding survey of agricultural and livestock farms, farm inventory analysis, balance sheet analysis, preparation of farm plans, enterprise and partial budgeting techniques were presented in the manual.

Each student has to collect the relevant data through farm holding surveys and use the same data as examples and case studies in all the exercises as far as possible. This gives the students an in-depth understanding and knowledge of real farm situations as well as application of various farm management and production economics concepts and techniques.

The authors solicit suggestions from the teachers and students to improve upon and modify this manual for future revisions.

Bapatla

March, 2009

With regards

D. VISHNUSANKAR RAO
G. RAGHUNADHA REDDY &
K.S.R.PAUL

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CONTENTS

ABBREVIATIONS

AC	=	Average cost
AFC	=	Average fixed cost
AP	=	Average product
AR	=	Average revenue
ATC	=	Average total cost
AVC	=	Average variable cost
AVP	=	Average value product
BCR	=	Benefit cost ratio
BEO	=	Break even output
BEP	=	Break even point
CR	=	current ratio
Ep	=	Elasticity of production
F(x)	=	Function of ‘X’
ICL	=	Iso cost line
IRL	=	Iso revenue line
LCC	=	Least cost combination
LDR	=	Law of diminishing returns
LP	=	Linear programming
MC	=	Marginal cost
MP	=	Marginal product
MR	=	Marginal revenue
MRS	=	Marginal rate of substitution
MRTS	=	Marginal rate of technical substitution
MRPS	=	Marginal rate of product substitution
MVP	=	Marginal value product
NCR	=	Net capital ratio
PR	=	Price ratio
PV	=	Present value
Px	=	Price of input ‘x’
Py	=	Price of output ‘y’
RTS	=	Returns to scale
TC	=	Total cost
TFC	=	Total fixed costs
TP	=	Total product
TR	=	Total revenue
TVC	=	Total variable cost
TVP	=	Total value product
WR	=	Working ratio
ΔX	=	Change in input
ΔY	=	Change in output

EXERCISE NO. : 1 DATE :

BASIC TERMS AND CONCEPTS

1. Introduction:

In the farm management and production economics we make use of several concepts and techniques from the disciplines of economics and management. Therefore students have to take stock of some of the fundamental concepts and terms which are relevant to provide the framework for the analytical skills required in this course.

2. Learning Objectives:

The purpose of the exercise is to

- Define a few concepts and terms basic to farm management and production economic analysis.
- Exemplify these concepts and terms to apply in different situations
- Understand their relevance in the managerial decision making and economic analysis.

3. Activity:

Teachers to explain the following basic terms and concepts, their definitions/meaning and their utility and applicability in farm management, and production economics.

4. Assignment activity:

1. Students have to refer any of the prescribed text book of this course and briefly write down the definitions/meaning of each of the above concepts and terms in one or two sentences.
2. Write down their formulae wherever applicable.

Basic terms and concepts:

1. Production
2. Product
3. Productivity
4. Resources and resource services
5. Variable resources
6. Fixed resources
7. Flow resources
8. Stock resources
9. Substitute resources
10. Complement resources
11. Farm-firm
12. Transformation period
13. Economic unit

14. Technical unit
15. Short run period
16. Long run period
17. Choice indicator
18. Production function
19. Total physical product
20. Average physical product
21. Total value product
22. Average value product
23. Marginalism
24. Marginal product
25. Marginal value product
26. Elasticity of production
27. Cost
28. Variable cost
29. Fixed cost
30. Total cost
31. Average cost
32. Marginal cost
33. Opportunity cost
34. Cost of production
35. Cost of cultivation
36. Break-even point
37. Isoquant
38. Iso costline
39. Iso revenue line
40. Production possibility curve
41. Assets
42. Liabilities
43. Equity(or) Networth
44. Depreciation
45. Farm inventory
46. Risk
47. Uncertainty
48. Compounding
49. Discounting
50. Discounting rate
51. Revenue-Gross revenue/gross income/gross returns
52. Expenses
53. Profit – Net income/net revenue/net returns
54. Benefit-cost ratio
55. Competitive relationships

56. Supplementary relationship
57. Complementary relationship
58. Specialization
59. Diversification
60. Credit and creditor
61. Debit and debtor
62. Farm plan and Farm budget
63. Partial budget

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EXERCISE NO : 2 DATE :

PRODUCTION COSTS AND THEIR CLASSIFICATION

1. Introduction :

Cost refers to the money value of effort expended or sacrifice made in producing a commodity or rendering a service or achieving a specific objective.

Costs and revenues are the two major factors that a profit maximizing farm firm needs to monitor continuously. It is the level of cost relative to revenue that determines the farms overall profitability. In order to maximize profits, a farm tries to increase its revenue and lower its cost. The firm's output level is determined by its cost. The purpose of this exercise is to explore cost and its relevance to decision-making.

2. Learning Objectives :

1. To define different types of costs relevant for production, planning and control.
2. To relate the concepts of production and costs.
3. Application of costs and analysis in farm managerial decision-making.

Classification of costs :

The manner in which costs are classified or deferred is largely dependent on the purpose for which the cost data are being outlined. There are many different types of costs relevant for decision-making under varying situations.

1. Fixed and variable costs :

	Fixed costs		Variable costs
1.	Fixed costs are those costs which do not vary with changes in output	1.	Variable costs are those costs which increase with the level of output
2.	The costs associated with fixed resources are called fixed costs	2.	The costs associated with variable resources are called variable costs
3.	Fixed costs are associated with the very existence of a production unit and therefore must be paid even if the output is zero	3.	Variable costs are paid when there is some output
4.	Ex : Interest on borrowed capital, rental payments, portion of depreciation charges on equipment and buildings, salaries of permanent employees and managers, taxes *etc.*	4.	Ex : Payments for raw materials, seed, fertilizers, pesticides, charges on fuels and electricity, wages of casual labour and salaries of temporary staff *etc.*
5.	The distinction is only for the short run	5.	In long run all costs are variable.
6.	Fixed costs are not relevant for decision making purpose	6.	Variable costs are relevant for decision making purposes

2. Explicit and Implicit costs :

Explicit costs are those that are recorded in their books as representing an actual transfer of money. These are explicit or nominal costs and often do not represent full economical costs, that should be considered on a given decision. Actual outlay of cash relevant for managers to exercise control over it. Out of pocket costs Economists use implicit costs or imputed cost in evaluating a decision. Time cost in money terms can be referred as implicit cost. Do not involve actual outlay of cash. Assumed costs or hypothetical costs. Do not affect business funds and costs of operation of farm business.

Ex : Interest on owned capital, contribution of family labour and owners, rental charges on owned land.

3. Direct costs and indirect costs :

There are some costs which can be directly attributed to production of a given product. The use of raw materials-seed, fertilizers, labour input and machine-time involved in the production of each unit can easily be determined.

There are certain costs like depreciation of machinery and buildings, electricity charges, administrative expenses and stationery charges, that cannot easily and accurately be separated and attributed to individual units of production, except on arbitrary basis.

While referring to the separable costs of first category accountants call them direct or prime costs per unit.

The joint costs of the second category are referred to as indirect or over-head costs.

Direct and indirect costs are not exactly synonymous to what economists refer to as variable costs and fixed costs.

4. Private costs versus social costs :

Private costs are those that accrue directly to the individuals of firms engaged in relevant activity.

External costs, on the other hand are passed on to persons not involved in the activity in any direct way, they are passed on to society at large.

5. Relevant costs and irrelevant costs :

The relevant costs for decision-making purposes are those costs which are incurred as a result of the decision under consideration. These costs are also referred as incremental costs.

There are three main categories of relevant or incremental costs.

1. Present period explicit costs
2. Opportunity costs implicitly involved in the decision
3. Future cost implications that flow from the decision

Costs that have been incurred already and costs that will be incurred in future regardless of the present decision are irrelevant costs.

6. Separable and Common costs :

Costs can also be classified on the basis of their traceability.

The costs that can be easily attribute to a product, a division or a process are called separable costs and the rest are called non-separable or common costs. They are also referred as direct and indirect costs.

The distinction between direct and indirect costs is of particular significance in a multi product firm for setting up economic prices for different products.

7. Opportunity costs and Actual costs :

Opportunity cost refers to the value of benefits of a foregone alternative.

The cost of using one resource in production of a product is the return that would have been received from the same resources if used in its most profitable alternative use.

It is the cost, equivalent to the returns foregone from the next best alternative.

Actual costs are the costs actually increased by spending costs.

Seven production costs

In short run a firm incurs some costs that are also associated with variable factors and others that result from fixed factors. The seven production costs are ;

1. Total variable costs
2. Total fixed costs
3. Total costs
4. Average variable costs
5. Average fixed costs
6. Average total costs or average cost
7. Marginal cost

1. Total variable costs (TVC) are the sum of the variable costs associated with variable resources.
2. Total fixed costs (TFC) are the sum of fixed costs associated with fixed resources.
3. Total costs are the sum of total variable costs and total fixed costs.
   TC = TVC + TFC
4. Average variable costs (AVC) is derived by dividing the total variable costs with the corresponding level of output.

$$AVC = \frac{TVC}{Y}$$

5. Average fixed costs (AFC) is derived by dividing the total fixed costs with the corresponding level of output

$$AFC = \frac{TFC}{Y}$$

6. Average total costs (ATC) or average costs (AC) is derived by dividing total costs by total output

$$ATC = \frac{TC}{Y} \quad \text{or} \quad AFC + AVC$$

It is the sum of the average fixed costs and average variable costs.

7. Marginal cost (MC) is defined as the extra or additional cost to produce one more unit of output. It is the change in total cost as a result of an increase in output by one unit

$$MC = \frac{\Delta TC}{\Delta Y} = \frac{\text{Change in total cost}}{\text{Change in output}} \quad \text{(or)} \quad \frac{\Delta TVC}{\Delta Y}$$

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EXERCISE NO. : 3 DATE :

COMPUTATION OF SEVEN PRODUCTION COSTS AND RELATIONSHIP WITH OUTPUT

In short run a firm incurs some costs that are associated with variable factors and others that result from fixed factors. The seven production costs are :

1. Total variable costs (TVC) :

1. Costs that are associated with variable factors are called variable costs.
2. Variable costs change as the level of output changes. Therefore can be expressed as a function of output (Y) *i.e.*, VC = f(Y)

   $TVC = Px_i.x_i^-$

   Ex : Raw materials , seed, fertilizers, feed, fuel, labour, pesticides, utilities *etc.*
3. The total of variable costs changes directly with output.
4. Increases in variable costs associated with each unit increase in output are not constant. As production begins, variable costs will for a time increases by a decreasing amount and rise by increasing amount by each successive unit of output.
5. The explanation of this behaviour of variable costs lies in the law of diminishing returns

2. Total fixed costs (TFC) :

1. Fixed costs are not a function of the level of output and are constant in the short run. ***i.e.,*** **FC = K**
2. Ex : Property taxes, cost of leases on land, building and equipment, interest charges on the long term borrowed funds, insurance costs, *etc.*
3. Firm's fixed costs figure prevails at all levels of output including zero level.

The distinction between fixed and variable costs is of great significance to the farm managers. Variable costs are those costs which managers can control or alter in the short run by changing the level of production on the other hand, fixed costs are clearly beyond managers control in the short run and must be paid regardless of output level.

3. Total costs :

1. The sum of total fixed and total variable costs at each level of output.
2. At zero unit of output, total cost is equal to the firm's fixed cost.
3. For each unit of production, total cost varies at the same rate as does variable cost

   TC = f(Y), TC = TFC + TVC

Average costs or per unit costs

Average fixed cost, average variable cost and average costs are the per unit fixed, variable and total costs.

4. Average fixed costs (AFC) :

1. Average fixed cost is derived by dividing total fixed cost (TFC) by the corresponding output (Y). **AFC = TFC / Y**
2. AFC declines so long as output increases. As output increases a given total fixed cost of Rs.100 is obviously being spread over a larger and larger output.
3. Managers commonly refer to as 'Spreading the overheads'.
4. AFC curve is continuously declining as the output is increasing. The shape of this curve is of an asymptotic hyperbola.

5. Average variable costs (AVC) :

1. AVC is found by dividing total variable cost (TVC) by the corresponding output.

$$AVC = \frac{TVC}{Y} = \frac{Px_i.x_i}{Y}; \qquad \frac{Pxi.xi}{Y} = \frac{Pxi}{\frac{Y}{---}} = \frac{Px_i}{APP}$$

$$AVC = Px_i \frac{I}{APP}$$

2. AVC declines initially, reaches a minimum and then increases again.
3. This is a U-shaped curved or saucer shaped.
4. AVC reflects law of diminishing returns like TVC. Because of increasing returns initially it takes fewer and fewer additional variable resources to produce each of the first four units of output. As a result VC per unit will decline.
5. AVC hits a minimum with 5^{th} unit of output beyond this point AVC rises as diminishing returns necessitated the use of more and more of variable resources to produce additional output.

6. Average total costs (ATC) :

1. ATC can be found by dividing total cost (TC) by total output (Y) or by adding AFC and AVC

$$ATC = \frac{TC}{Y} = AFC + AVC \qquad (OR) \qquad \frac{TFC + TVC}{Y} = AFC + AVC$$

2. AC curve reaches its minimum point but always at a greater level of output that at which AVC curve is at its lowest.
3. AC continues to falling beyond the lowest point on the AVC curve.

4. AFC curves falls at a faster rate than the rate of increase of AVC curve.
5. As soon as the rate of decrease of AFC becomes lower than the rate of rise of the AVC curve, AC curves starts rising.

7. Marginal cost (MC) :

1. Marginal cost is defined as the extra or additional cost of producing one more unit of output. Change in TC as result of an increase in output by one unit.
2. MC can be determined for each additional unit of output simply by noting the change in total cost which that units production entails.

$$MC = \frac{\Delta TC}{\Delta Y} = \frac{\text{Change in total cost}}{\text{Change in output}} = \frac{\Delta TVC}{\Delta Y}$$

3. MC concept is very crucial from the managers point of view. It designates those costs which the firm has the most direct control. MC indicates those costs which are incurred in the production of the last unit of output and therefore also the cost which can be 'saved' by reducing total output by the last unit.
4. A firm's decision as to what output level to produce is largely influenced by its marginal cost.
5. When coupled with marginal revenue (MR) MC allows a firm to determine whether it is profitable to expand or contract its level of production.
6. The shape of MC curve is a reflection of and consequence of law of diminishing returns. MC curve is a mirror reflection of MP curve.
7. When MP is at its maximum, MC is at its minimum and when MP is falling, MC is rising.

$$MC = \frac{\Delta TVC}{\Delta Y} = \frac{Pxi.\ \Delta xi}{\Delta Y} = \frac{Px_i}{\frac{\Delta Y}{\Delta x_i}} = \frac{Px_i}{MPP}$$

$$MC = PX_i \frac{1}{MPP}$$

Relationship of MC to AVC and ATC :

1. MC cuts both AVC and ATC at their minimum.
2. When both MC and AVC are falling, average cost will fall at a slower rate.
3. When MC and AVC are both rising, MC will rise at a faster rate. As a result MC will attain its minimum before the AVC.
4. MC is less than AVC (MC<AVC), AVC will fall. When MC exceeds AVC, (MC>AVC) AVC will rise.
5. At the point of intersection whose MC = AVC, AVC is minimum. AVC has just used to fall and attained its minimum but not yet begin to rise. MC = AVC at the lowest point of AVC.
6. MC curve cuts the ATC at the latter's minimum point. MC = AC at the lowest point of AC.
7. AVC and AC curves fall as long as the MC curve is below them and vice versa.

Managerial uses of cost concepts :

1. The relevant costs to be considered for decision making will differ from one situation to other depending on the problem by the manager.
2. The total cost concept is quite useful in finding out the break-even quantity of output, cost of cultivation of various crops.
3. The total cost concept is also used to find out whether firm is making profits or not.
4. The average cost concept is important for calculating the per unit profit of a farm business unit.
5. The marginal and incremental cot concepts are essential to decide whether a firm should expand its production or not.
6. Managers can control or alter the VC in the short run by changing the level of production.

Example 1 : Total and average cost schedules for an individual farm in the short run (Hypothetical data in rupees)

Total product (kgs)	Total cost data			Average cost data			
	Total fixed cost	Total variable cost	Total cost	Average fixed cost	Average variable cost	Average total cost	Marginal cost
Y	TFC	TVC	TC= TFC+ TVC	AFC= TFC/Y	AVC=TVC/Y	ATC=TC/Y)	MC =ΔTC/ΔY
0	100	0	100				
1	100	90	190	100	90	190	90
2	100	170	270	50	85	135	80
3	100	240	340	33.33	80	113.33	70
4	100	300	400	25	75	100	60
5	100	370	470	20	74	94	70
6	100	450	550	16.67	75	91.67	80
7	100	540	640	14.29	77.14	91.43	90
8	100	650	750	12.50	81.25	93.75	110
9	100	780	880	11.11	86.67	97.78	130
10	100	930	1030	10.0	93.0	103	150

Assignment activity :

1. Calculate the total cost, average variable cost, average fixed cost, average total cost and marginal cost from the information given in the table.
2. Draw the seven cost curves taking output values on x axis and cost data on y axis.
3. How the seven costs changes as output changes.
4. Explain the relationship of the seven costs with each other.

Example 2 :

1) Fill in the blanks in the cost schedule table given below.
2) Draw all the cost curves with the data using appropriate scale

Output	TFC	TVC	TC	AFC	AVC	ATC	MC
1	50		55				
2	50	8		25			
3			60.5				
4		13					
5			65				
6		18			3	11.34	3
7			72.5				
8	50	28					
9			86				
10	50	45		5		9.5	9

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EXERCISE NO. : 4 DATE :

FARM COST CONCEPTS AND THEIR IMPUTATION

Introduction:

Indian farm economists have developed different farm cost concepts and new ideas of imputation which are more relevant to Indian agriculture situation. The objectives of farm cost studies are achieving cost efficiency through appropriate techniques of cost control and cost reduction, planning and control of farm business activities. All forms of business decisions centre on cost, so the cost efficiency could be a reality. They also help in pricing decision and price fixation aspects of farm products. These cost concepts are : Cost-A_1, Cost-A_2, Cost-B_1, Cost-B_2, Cost-C_1, Cost-C_2 and Cost-C_3.

Learning objectives:

1. To make the students aware of the different farm cost concepts relevant to farm management under Indian conditions.
2. To learn about the imputational procedures related to costing of various input and input services used on the farm.

Farm cost concepts:

Dr Sen's special expert committee for improving the cost of cultivation/production estimates (1979) recommended the following classification of costs to be adopted and later they were slightly modified. The different cost items that are to be included under each cost concept are detailed below with their imputational procedures.

CATEGORIZATION OF FARM COST CONCEPTS

The Commission on Agricultural Costs and Prices (CACP), Govt. of India, had categorized the farm costs concepts as follows.

1. **Cost A1** : It includes all actual expenses in cash and kind incurred in production by the farmer.
    - i) Value of hired human labour
    - ii) Value of bullock labour (both hired and owned)
    - iii) Value of machine power (both hired and owned)
    - iv) Value of seeds (both owned and purchased)
    - v) Value of insecticides and pesticides, weedicides
    - vi) Value of manures (both owned and purchased)
    - vii) Value of fertilizers
    - viii) Depreciation of implements and farm buildings
    - ix) Irrigation charges
    - x) Land revenue, cess and other taxes
    - xi) Miscellaneous expenses (electricity charges etc)
    - xii) Interest on working capital

2. **Cost A2 :** Cost A1 + rent paid for leased in- land
3. **Cost B1** : Cost A2 + interest on value of owned capital assets (excluding land)
4. **Cost B2** : Cost B1 + rental value of owned land
5. **Cost C1** : Cost B1 + imputed value of family labour
6. **Cost C2** : Cost B2 + imputed value of family labour
7. **Cost C3** : Cost C2 x 1.10, (10% of cost C2 is added to cost C2) : this is a recently added concept to provide allowance for managerial functions undertaken by the farmer. It is the Total Cost or **comprehensive cost** of cultivation.

$$8.\ \text{Cost of production} = \frac{\text{Cost C3} - \text{Value of byproduct}}{\text{Yield}}$$

Cost of production = (Cost C3-Value of byproduct) / Yield

Activity 1 : Work out cost of production at cost A1, Cost B and Cost C level per unit (quintal) of output, by dividing the net costs (gross costs minus value of by-product) by the output.

Activity 2 : **Farm business income measures :** Workout the following farm business income measures or returns over different cost concepts.

1. **Gross returns:** Value of main product plus byproduct. The main products and byproducts are to be imputed taking into account the actual marketed prices, or the village level prices prevailed at the time of enquiry.
2. **Farm business income** = Gross return-Cost A1
3. **Owned farm business income** = Gross return-Cost A2
4. **Family labour income** = Gross return-Cost B2
5. **Net income** = Gross return-Cost C3
6. **Intensive income** = Net income + rental value of owned land+ interest of fixed capital
7. **Farm investment income =** Farm business income-Imputed value of family labour

Imputation procedure to be followed while estimating cost of cultivation of crops

1. **Casual labour:** Actual cash wages or kind wages and perquisites are to be imputed considering the ruling price in the village at the time of operations.
2. **Attached servants:** The per day wage rate is to be arrived based on total wages (cash + kind + perquisites) paid and the number of days.
3. **Bullock labour:** Hired – actual charges paid are considered. In case of owned bullock labour the per work day or per work hour cost of maintenance is to be taken into account.
4. Owned manures, seeds and other are to be imputed at the prices prevailed in the village at the time of their use.
5. **Interest on working capital** – Interest on entire cash costs are to be charged @ 7 per cent per annum, for half of the crop period only. Actual interest charges are to be considered in respect of borrowed capital.

6. Depreciation on fixed assets (other than the value of land such as farm implements, farm buildings, irrigation structures, work cattle, pump sheds, following the straight line method. The total amount of depreciation/year is to appropriated to each crop according to the proportion of usage of assets and equipment in each crop or in proportion to the each crop acreage in the cropping pattern on the farm.
7. **Rent on owned land:** Local prevailing lease amount for land is to be considered or 30 per cent of the value of output (main product plus by product) is to be considered as rental value of owned land.
8. **Interested on owned fixed capital (other than the land value) :** It is to be charged @ 10 per cent per annum. The total amount is to be apportioned to each crop as per the proportion of each crop in the cropping pattern on the farm.
9. **Family labour:** Men family labour is to be charged on par with the attached servants (average wage value) of the village, while family women labour is to be imputed considering the wages paid to the women labour for the similar operation.
10. The actual costs plus transport charges are to be considered in case of other purchased inputs such as fertilizers, insecticides *etc*.
11. **Machine labour:** Actual hire charges are to be taken and in case of owned machine prevailing hire charges are to be adopted.

After imputation, the proportionate charges (based on gross cropped area and total costs per farm) of each item is to be considered in the costs of crops for which these inputs are used in the farm.

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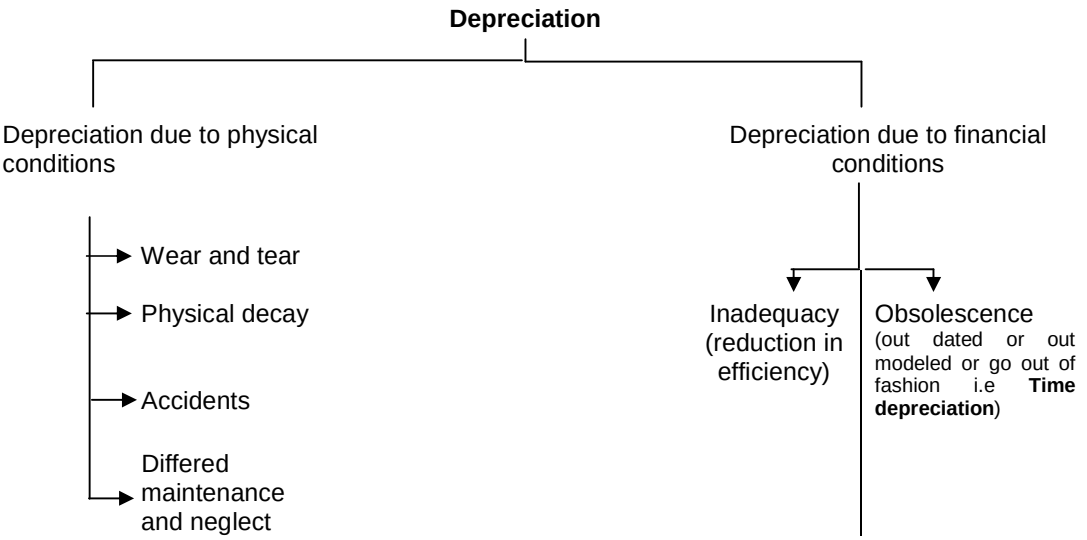
EXERCISE NO. : 5 DATE :

DEPRECIATION METHODS

Introduction:

Depreciation is the decline in the value of capital equipment due to wear and tear. Whenever any machine or equipment performs useful work, its wear and tear is bound to occur. Its efficiency reduces and becomes uneconomical to be used further and needs replacement by another new one. So some money must be set aside every year from the profits so that when that equipment becomes uneconomical, it can be replaced by the new one. Therefore the initial cost of machine plus installation charges plus repair charges minus scrap value is charged against the overheads and spread over the machines useful life. For this purpose, depreciation charges are added in the total costs of production of farm products. This is not a cash payment. It is an accounting cost. Annual depreciation is a charge against the years profits, to build up a reserve fund, out of which the asset can be replaced when required. It is important to note that depreciation is not the result of changes in the prices.

Depreciation can be classified as :



Learning Objectives :

1. To understand the concept of depreciation and its need and importance in valuation of assets as a charge against annual profits.
2. To learn different methods of estimation of depreciation and compare their importance.
3. To learn the method of apportionment of total depreciation amount among different crop enterprises.

Concepts:

1. **Original cost of the asset:** This is the cost incurred in making the asset available for use in the first instance.
2. **Salvage value:** The expected recovery of sales value of the asset at the end of useful life. If it was not exactly mentioned, it can be taken as purchase value of the asset / expected life of that asset.
3. **Useful life:** The expected time period for which the asset is to provide economic service *i.e.,* the period for which the asset could be used for production.
4. **Depreciable cost or Total anticipated depreciation amount:** The original cost minus salvage value.
5. **Written down value:** Written down value of an asset at any point of time is the original cost less accumulated depreciation to date. This is also referred to as book value or remaining values.

Methods of Depreciation:

1. Straight line method :

It is the simplest method. In this method a constant sum per year is taken as the depreciation amount per year.

$$D = \frac{C - S}{N}$$

D = Depreciation amount per annum
C = Purchase cost of the fixed asset
S = Scrap value or residual value or junk value
N = Useful life period of the asset

The total anticipated depreciation amount (C-S) during the life of the asset is divided by the useful life period of the asset to get annual depreciation amount.

This method assumes that assets are used more or less to the same extent every year and therefore equal amounts of costs on account of their use can be charged every year (constant usage of machine over the life time of the asset is expected). It is the widely used method because of its easy computation.

2. Diminishing balances method :

In this method a constant percentage is taken of the written down value every year. Written down value is the value of the machine remaining after deducting total depreciation to date.

This method is generally used to calculate the depreciation of the assets whose usage is varying. Intensive usage in initial years when the asset is brand new and therefore the wear and tear is also rapid. Where as when the asset becomes older, its usage also gradually decreases, so wear and tear is also low. The annual depreciation decreases as the asset gets older. Junk value is not deducted here, but used to calculate the annual depreciation.

The written down percentage fraction is calculated using the following formula:

$$D = \left[1 - \left[\frac{S}{C} \right]^{1/n} \right]$$

D = Annual depreciation amount
S = Salvage value
C = Purchase cost
n = Useful life of the asset

3. The sum of the years digits method :

In this method a reducing fraction of the anticipated total depreciation (C-S) is taken each year. The denominator is the sum of the individual years the assets expected useful life period. If the life period is 10 years the denominator would be (10+9+8+7+6+5+4+3+2+1 = 55).

The numerator is the years of life remaining at the start of the year

Therefore, the fraction for first year is $\frac{10}{----}$

Fraction for second year is 9 / 55

Fraction for third year is 8 / 55

and so on until it is in the 10^{th} year as 1 / 55

Annual depreciation = Depreciable cost x Fraction = (C-S) F

$$= C - S \times \frac{\text{Years of life remaining at the beginning of accounting period}}{\text{Sum of the years digits}}$$

Activity:

Question 1: Use the three methods of depreciation and observe the variation in annual depreciation amount.

Question 2: Draw the graphs of the three methods using the annual amount of depreciation in Y axis and life period of the asset on X axis.

Activity 1: Calculate the yearly depreciation amount and written down value of Taiwan sprayer whose purchase cost is Rs.14,000/- and salvage value is Rs.500/- after seven years.

Activity 2: Calculate the yearly depreciation amount and written down value of a tractor costing Rs.4,00,000/- and salvage value of Rs.50,000/- after 10 years.

Graphical presentation of depreciation methods :

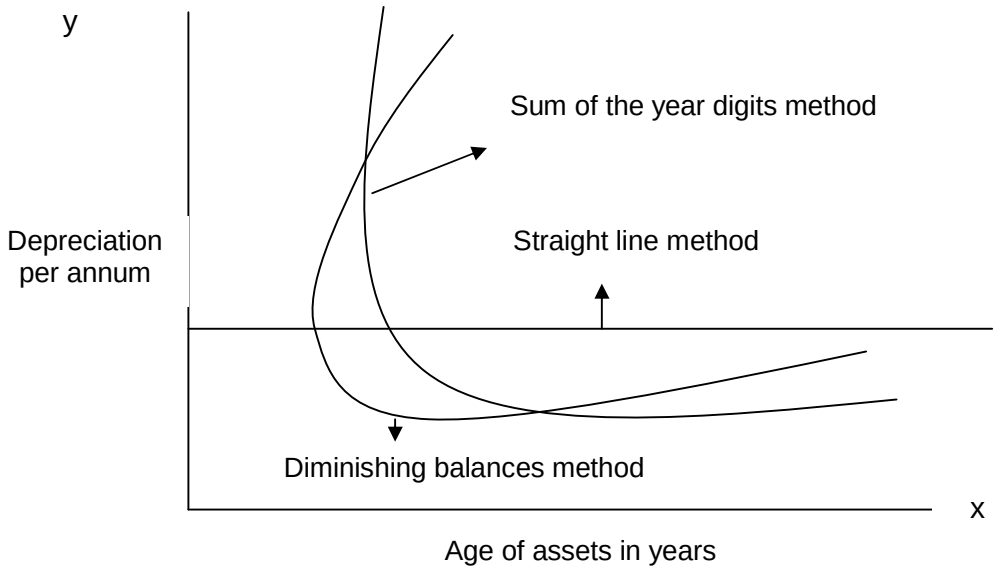


Fig. 1 : Annual Depreciation

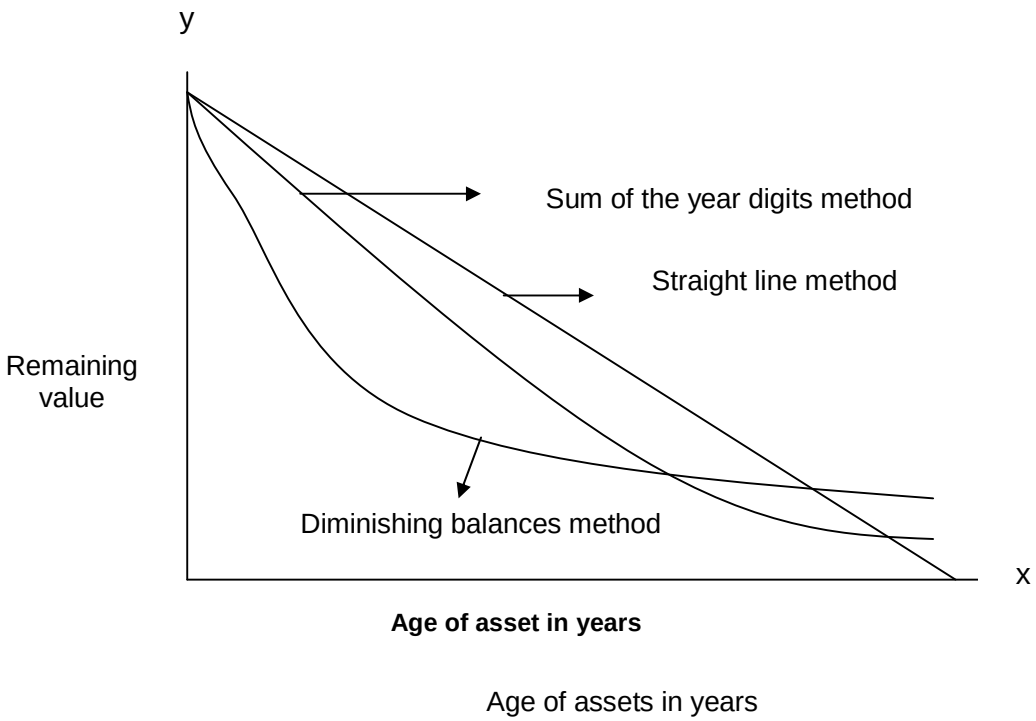


Fig. 2 : Written down value

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EXERCISE NO. : 6 DATE :

FARM HOLDING SURVEY - 1

Introduction:

Farm holding survey refers to the collection of data, information related to farm activities through structured questionnaire with the help of a schedule or through proforma containing set of questions related to farm activities. The collection is to be done through personal interviews of the firm owners using the survey schedule or favour or farm records and register sources. The proforma contains details of holding or acreage, crop livestock and other enterprises, farm implements, machinery, irrigation sources and structures, labour use, capital use including loans, cost of cultivation details, yield and income sources etc.

Learning Objectives :

1. To familiarize the student with socio-economic conditions of the farmers and farm production activities.
2. To impart practical field training and develop skills in conducting farm holding surveys.
3. To impart knowledge related to systematic recording of various farm production activities, physical and monetary values related to resource use and output, through farm holding survey schedules.

Activity 1: This exercise has to be done as a team activity. Each student has to collect the detailed information from farmers through personal interview method as per the farm holding survey schedule given. Students can form into a group consisting of 2 or 3 students in each group while collecting the information from the farmers and estimating the cost data. This will help the students to interact and clarify their doubts and easiness in collection of data from farmers and in computing cost concepts.

Activity 2: Prepare a brief report on various aspects of farm holding survey.

Course No: AECO 241
Farm Management and Production Economics

Name of the Student : _____ I.D. No : _____

FARM HOLDING SURVEY SCHEDULE

1. General

Village: _____ Name of the farmer: _____

Main occupation: _____ Subsidiary occupation: _____

2. Details of family

Name	Age	Relationship to head	Literacy level	Occupation		Remarks
				Main	Subsidiary	

3. Farm labour

3.1 Family labour available to farm use

No. of adult male: _____

No. of adult female: _____

No. of children: _____

Permanent labour engaged :

Seasonal/Annual	Number	Purpose	Payment		Perquisites
			Cash	Kind	

4. (i) Details of holding

Item	Unirrigated	Irrigated	Irrigated dry	Total area
Owned				
Lease in				
Leased out				
Present value per acre				
Rental value per acre				
Land revenue/cess per acre				

Total extent of operated holding under

Un-irrigated: _____

Irrigated: _____

Irrigated dry: _____

Total: _____

4 (ii) History of the holding :

- Give history and subdivision of holding for atleast two generations
- Relative advantages and disadvantages of land with regard to soil, drainage and irrigation

4 (iii) Cropping scheme:

Season	Crop	Variety	Area	Crops in the preceding year		Remarks
				I year	II year	
Kharif						
Rabi						
Summer						

4 (iv) Reasons for deviation in the cropping scheme, if any.

1._____

2. ._____

3. ._____

4. ._____

5. Livestock

Kind	No.	Breed	Age	Home bred	Purchased	Present value	remarks

6. Farm implements and machinery

Kind	No.	Value	Life	Purchase		Depreciation		Remarks
				Year	Amount	Rate	Amount	

7. Farm buildings

Particulars	Cost	Life span	Year of purchase/construction	Depreciation		Remarks
				Rate	Amount	

Do you have adequate facilities to store farm produce? Yes/No

If not, what are the problems?

8. Irrigation

Description	No.	Area irrigated	Period of avail-ability	Year of establi-shment	Life pan	Depreciation		Repairs & mainte-nance charges	Rema rks
						Rate	Amount		
1. Open well									
2. Bore well									
3. Submer sible pump									
4. Tube well									
5. Motor									
6. Pump set									
7. Others									

8.1 Is the existing water availability sufficient for the present cropping scheme? Yes or No.

8.2 If not, what changes do you propose in the existing cropping scheme?

9. Permanent improvements

Nature of improvement	Total cost	Proportionate charges per year

9.1 Do you like to have additional permanent improvement? Yes or No.

9.2 If yes, indicate the proposed improvements with costs and benefits

10 Agricultural loans

S.No.	Type of loan	Agency	Purpose	Amount	RI	Amount repaid	Loans out-stanading	remarks

10.1 Do you feel that the credit available is sufficient and timely? Yes or No

10.2 If not, indicate problems and suggestions

11. Cost of cultivation (Give separately for major crops)

A) Labour costs

S.No.	Operation	Owned labour					Hired labour					Wage rates					Amount
(1)	(2)	TP (3)	CPD (4)	M (5)	W (6)	C (7)	TP (8)	CPD (9)	M (10)	W (11)	C (12)	TP (13)	CPD (14)	M (15)	W (16)	C (17)	(18)
i.	Land preparation																
a.	Removal of stubbles																
b.	Ploughing																
c.	Harrowing																
d.	Leveling																
e.	Puddling																
f.	Trimming of bunds																
g.	Forming ridges and furrows																
h.	Others																

Note : TP = Tractor power CPD = Cattle pair day M= Mean W= Women C=Children

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
2.	Application of manures																
a.	Carting																
b.	Spreading																
3.	Sowing/Transplanting																
4.	Fertilizer application																
5.	Earthing up																
6.	Intercultivation																
7.	Weeding																
8.	Irrigation																
9.	Wrapping and propping																
10.	Plant protection																
11.	Harvesting																
12	Threshing and winnowing																
13.	Bagging and transportation																
	Others if any																
	Total																

Note : TP = Tractor power CPD = Cattle pair day M= Mean W= Women C=Children

(B) Material costs

S.No.	Item	Quantity		Rate	Value
		Owned	Purchased		
1.	Seeds				
2.	FYM				
3.	Fertilizers				
	i				
	Ii				
	Iii				
	Iv				
4.	Plant protection chemicals				
	I				
	Ii				
	Iii				
5.	Other materials if any				
	Other materials if any				
	Total of A and B				
C)	**Interest on working capital**				
Total operational costs (A+B+C)					
D)	**Fixed costs**				
1.	Land revenue				
2.	Rental value of owned land/leased in land				
3.	Interest on fixed capital				
4.	**Others if any**				
Total Fixed Costs (D)					

12. Returns from crop enterprise: (for all the crops in the total cultivated area)

Name of the crop	Main product			By product			Total value (Rs.)(Main product + by-product)	Remarks
	Quantity	Rate/unit (Rs.)	Amount (Rs.)	Quantity	Rate/unit (Rs.)	Amount (Rs.)		
1.								
2.								
3.								
4.								
5.								
Totals								

13. Disposal of farm produce:

Name of produce	Agency	Village market	Mode of transport	Transport costs	Bagging costs	Loading and unloading costs	Market fee	Total marketing costs	remarks
				1	2	3	4	1+2+3+4=5	

13.1 Do you feel that the price received by you is remunerative? Yes or No

If not, what price do you expect?

13.2 Do you feel that available market facilities are sufficient? Yes or No

If not, what are the problems you face in marketing? Give suggestions

14. List out the constraints/problems faced by farmers

Input related
1._____
2. ._____
3. ._____

Production Related
1. ._____
2. ._____
3. ._____

Technology related
1. ._____
2. ._____
3. ._____

Market related
1. ._____
2. ._____
3. ._____

Others
1. ._____
2._____

EXERCISE NO. : 7 DATE :

Activity 1 : Conduct second farm holding survey of another farm and collect detailed information as per the survey schedule.

Activity 2 : Prepare a brief report on the farm holding aspects of the farmer

Name of the Student : _____ I.D. No : _____

FARM HOLDING SURVEY SCHEDULE-2

5. General

Village: _____ Name of the farmer: _____

Main occupation: _____ Subsidiary occupation: _____

6. Details of family

Name	Age	Relationship to head	Literacy level	Occupation		Remarks
				Main	Subsidiary	

7. Farm labour

3.1 Family labour available to farm use

No. of adult male: _____

No. of adult female: _____

No. of children: _____

Permanent labour engaged :

Seasonal/Annual	Number	Purpose	Payment		Perquisites
			Cash	Kind	

8. (i) Details of holding

Item	Unirrigated	Irrigated	Irrigated dry	Total area
Owned				
Lease in				
Leased out				
Present value per acre				
Rental value per acre				
Land revenue/cess per acre				

Total extent of operated holding under

Un-irrigated: _____

Irrigated: _____

Irrigated dry: _____

Total: _____

4 (ii) History of the holding :

- Give history and subdivision of holding for atleast two generations
- Relative advantages and disadvantages of land with regard to soil, drainage and irrigation

4 (iii) Cropping scheme:

Season	Crop	Variety	Area	Crops in the preceding year		Remarks
				I year	II year	
Kharif						
Rabi						
Summer						

4 (iv) Reasons for deviation in the cropping scheme, if any.

1._____

2. ._____

3. ._____

4. ._____

5. Livestock

Kind	No.	Breed	Age	Home bred	Purchased	Present value	remarks

6. Farm implements and machinery

Kind	No.	Value	Life	Purchase		Depreciation		Remarks
				Year	Amount	Rate	Amount	

7. Farm buildings

Particulars	Cost	Life span	Year of purchase/construction	Depreciation		Remarks
				Rate	Amount	

Do you have adequate facilities to store farm produce? Yes/No

If not, what are the problems?

8. Irrigation

Description	No.	Area irrigated	Period of avail-ability	Year of establi-shment	Life pan	Depreciation		Repairs & mainte-nance charges	Rema rks
						Rate	Amount		
1. Open well									
2. Bore well									
3. Submer sible pump									
4. Tube well									
5. Motor									
6. Pump set									
7. Others									

8.3 Is the existing water availability sufficient for the present cropping scheme? Yes or No.

8.4 If not, what changes do you propose in the existing cropping scheme?

9. Permanent improvements

Nature of improvement	Total cost	Proportionate charges per year

10.3 Do you like to have additional permanent improvement? Yes or No.

10.4 If yes, indicate the proposed improvements with costs and benefits

11 Agricultural loans

S.No.	Type of loan	Agency	Purpose	Amount	RI	Amount repaid	Loans out-stanading	remarks

11.1 Do you feel that the credit available is sufficient and timely? Yes or No

11.2 If not, indicate problems and suggestions

11. Cost of cultivation (Give separately for major crops)

B) Labour costs

S.No.	Operation	Owned labour					Hired labour					Wage rates					Amount
(1)	(2)	TP (3)	CPD (4)	M (5)	W (6)	C (7)	TP (8)	CPD (9)	M (10)	W (11)	C (12)	TP (13)	CPD (14)	M (15)	W (16)	C (17)	(18)
i.	Land preparation																
a.	Removal of stubbles																
b.	Ploughing																
c.	Harrowing																
d.	Leveling																
e.	Puddling																
f.	Trimming of bunds																
g.	Forming ridges and furrows																
h.	Others																

Note : TP = Tractor power CPD = Cattle pair day M= Mean W= Women C=Children

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
2.	Application of manures																
a.	Carting																
b.	Spreading																
3.	Sowing/Transplanting																
4.	Fertilizer application																
5.	Earthing up																
6.	Intercultivation																
7.	Weeding																
8.	Irrigation																
9.	Wrapping and propping																
10.	Plant protection																
11.	Harvesting																
12	Threshing and winnowing																
13.	Bagging and transportation																
	Others if any																
	Total																

Note : TP = Tractor power CPD = Cattle pair day M= Mean W= Women C=Children

(B) Material costs

S.No.	Item	Quantity		Rate	Value
		Owned	Purchased		
1.	Seeds				
2.	FYM				
3.	Fertilizers				
	I				
	Ii				
	Iii				
	Iv				
4.	Plant protection chemicals				
	I				
	Ii				
	Iii				
5.	Other materials if any				
	Other materials if any				
	Total of A and B				
C)	**Interest on working capital**				
Total operational costs (A+B+C)					
D)	**Fixed costs**				
1.	Land revenue				
2.	Rental value of owned land/leased in land				
3.	Interest on fixed capital				
4.	**Others if any**				
Total Fixed Costs (D)					

12. Returns from crop enterprise: (for all the crops in the total cultivated area)

Name of the crop	Main product			By product			Total value (Rs.)(Main product + by-product)	Remarks
	Quantity	Rate/unit (Rs.)	Amount (Rs.)	Quantity	Rate/unit (Rs.)	Amount (Rs.)		
1.								
2.								
3.								
4.								
5.								
Totals								

13. Disposal of farm produce:

Name of produce	Agency	Village market	Mode of transport	Transport costs	Bagging costs	Loading and unloading costs	Market fee	Total marketing costs	remarks
				1	2	3	4	1+2+3+4=5	

13.1. Do you feel that the price received by you is remunerative? Yes or No

If not, what price do you expect?

13.2. Do you feel that available market facilities are sufficient? Yes or No

If not, what are the problems you face in marketing? Give suggestions

14. List out the constraints/problems faced by farmers

Input related

1._____
2. ._____
3. ._____

Production Related

1. ._____
2. ._____
3. ._____

Technology related

1. ._____
2. ._____
3. ._____

Market related

1. ._____
2. ._____
3. ._____

Others

1. ._____
2._____

EXERCISE NO. : 8 DATE :

FARM HOLDING SURVEY – LIVESOTCK ENTERPRISES

Introduction :

In Indian agriculture, mixed farming (crop raising + livestock rearing) is the most commonly prevailing and important type of farming. Livestock enterprises and their products contribute substantially to the farm income, soil fertility and family consumption needs. In the present day changing agricultural situations income from livestock enterprises contribute a major share to the farm and family incomes of small and marginal farmers and agricultural labour. Therefore the study of livestock enterprises *viz.,* cattle sheep and goat, poultry, aqua culture and duck rearing etc. is an important exercise to the students of farm management.

Learning Objectives :

1. To learn and understand the role of livestock enterprises in farm business activity.
2. To estimate the costs and returns from livestock enterprises.

Activity :

Each student has to

- Conduct farm holding survey of any one of the livestock enterprises preferably cattle rearing by personally interviewing a farmer in a village.
- Estimate the costs and returns from the livestock enterprise.
- Prepare a summarized report on the contribution of livestock enterprises and their products in farm business and family income of the farmer.

SCHEDULE

1. a) Name of the farmer

   b) Village Mandal

2. No. of family members Male
   Female
   Total

3. Educational status of family members

4. **Details of farm holding** Irrigated Un-irrigated Dry Total
   No. of acres owned
   No. of acres leased in
   No. of acres leased out
   Total operational holiday

Cropping pattern :

Crops :	Kharif (ac)	Rabi (ac)	Summer (ac)	Total
1.				
2.				
3.				
4.				
5.				
Fodder crops				

5. Details of livestock maintained

Kind of livestock		Total	Number of animals.		Present value of each	Total value
			Homebred	Purchased		
1.	Buffaloes					
	Milch					
	Dry					
2.	Cows					
	Milch					
	Dry					
3.	Young ones					
4.	Bullocks/oxen					
5.	Sheep and goat					
6.	Poultry					
7.	Others					

6. Livestock maintenance charges

Type of the livestock enterprise: Cows / Buffaloes / Etc., **Number:**

S.No.	Farm produced		Purchased			
	Quantity	Value	Quantity	Value	Total value	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)
A. Concentrates						
a) Rice bran						
b) Horsegram						
c) Cotton seed						
d) Oil cake						
e) Mineral mixtures						
f) Vitamins						
g) Salts						
h) Others						
B. Roughages						
a) Paddy straw						
b) Jowar straw						
c) Bajra straw						
d) Groundnut haulms						
e) Sunhemp						
f) Bhusa						
C.Greenfodder						
a) Jowar						
b) Napier glass						
c) Green grass						
d) Others						

D. Medical care expenses

a) Medicines

b) Veterinary aid fees

c) Artificial insemination

d) Others

7. Labour utilization

A) Permanent labour No. for livestock care

Wages/Month/Year

Cash

Kind

Perquisites

Total

B) Casual labour

Activity	Family labour			Hired labour No.				Wages			Total wages
	M	W	Total	M	W	C	Total	M	W	C	
Grazing											
Feeding											
Cleaning of animals											
Fodder cutting, collection											
Milking											
Others											
Total											

8. Interest on working capital @ 9% per annum

9. Total maintenance cost/year

(Total of 6A+6B+6C+6D+7A+7B+8)

10. Fixed assets

Kind of assets	No.	Year of purchase	Value	Expected life period	Depreciation per year
1. Cattle sheds a)Thatched b)Tiles/Asbestos c) RCC					
2. Feeding troughs					
3. Ropes					
4. Feeding trays					
5. Others					

11. Total depreciation/year

(Depreciation on livestock + fixed assets)

12. Interest on fixed capital @ 10% per annum

(Value of livestock + fixed assets)

13. Total cost/year (total of 9+11+12)

14. Production and returns from livestock enterprises :

Kind of product	Main product			-			Total returns (value of main+by products) (Rs.)
	Qty	Value per unit (Rs.)	Total value (Rs.)	Qty	Value per unit (Rs.)	Total value (Rs.)	
a) Milk							
b) Butter							
c) Ghee							
d) FYM							
e) Sale of young ones							
f) Others							
Total returns							

15. Net maintenance cost = Total returns – value of FYM

16. Net maintenance cost/animal = Net maintenance cost/No. of animals

17. Cost of production/litre of milk = Net maintenance cost/milk production in litres

18. Net income = Total returns – Total cost 14 - 13

19.Net income per animal = Net income / no. of animals

20. Benefit cost ratio = Net income/total cost

21. Farm business income = Total returns – Total maintenance cost

Note: The activity for this exercise should be carried out by each student

*****

EXERCISE NO. : 9 DATE :

ESTIMATION OF COST OF CULTIVATION AND FARM INCOME MEASURES OF MAJOR CROPS

Introduction:

In the exercises No. 3 & 4 the students were introduced to he computation procedure of various costs and cost concepts to estimate cost of cultivation of crops. In exercise No. 6 & 7 the students conducted farm holding survey and collected data on various cultivation expenses. In this exercise the students have to estimate the cost of cultivation of major crops from farm holding survey data.

Learning objectives:

1. To learn the estimation process of cost of cultivation of crops and cost concepts.
2. To understand the role of different crop expenses in cultivation of crops.
3. To estimate different farm income measures based on cost of concepts.

Activity:

1. The students have to calculate the cost of cultivation of major crops – one major crop from each farm holding survey carried out in exercise No. 6 & 7. In calculating the cost of cultivation of crops the costs have to be estimated as per the computation procedure given and cost concept wise in exercise No. 4 *i.e.,* Cost-A1, Cost-A2, Cost-B1, Cost-B2, Cost-C1, Cost-C2, Cost-C3 and present them in the following table.
2. Calculate the percentage share of each cost item in total cost and identify the major cost items incurred by farmers in cultivation of major crops.
3. Calculate the different farm income measures based on cost concepts and draw the conclusions on the profitability of each crop.

1. **Cost of cultivation of major crop : (Name) :**_____

(On per acre or hectare basis)

S.No.		Cost items	Per acre/hectare		%age share in total cost *i.e.,* cost C3	Value (Rs./ ha)
			Qty	Value (Rs.)		
A.		**Cost A1**				
	1.	Value of hired human labour				
	2.	Value of bullock labour (both hired and owned)				
	3.	Value of machine power (both hired and owned)				
	4.	Value of seeds				
	5.	Value of insecticides and pesticides				
	6.	Value of weedicides				
	7.	Value of manures (both owned and hired)				
	8.	Value of fertilizers				
		i) Urea				
		ii) DAP				
		iii) Potash				
		iv) Others				
	9.	Irrigation charges				
	10.	Depreciation (machinery and farm buildings)				
	11.	Land revenue, cesses and taxes				
	12.	Miscellaneous expenses (electricity charges, fuel)				
	13.	Interest on working capital				
B.		**Total of Cost-A1**				
	14.	Rent paid for leased in land				
C.		**Cost A2 = (B+14)**				
	15.	Interest on value of owned capital assets (excluding land)				
D.		**Cost B1 = (C+15)**				
	16.	Rental value of owned land				
E.		**Cost B2 =(D+16)**				
	17.	Value of family labour				
F.		**Cost-C1 : (D+17)**				
G.		**Cost C2 : (E+17)**				
H.		**Cost C3 = Cost C2 x 1.10 (10% cost C2 added to Cost C2) Total cost**				
I.		**Yield/acre or hectare**				
J.		**Cost of production : Cost C3-value of by product/yield**				

2. Farm business income measures :

	Income measures	Formula	Worked out result
1.	Farm business income		
2.	Owned farm business income		
3.	Family labour income		
4.	Net income		
5.	Intensive income (or) Farm investment income		
6.	Benefit-cost ratio		

Inferences:

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EXERCISE NO. : 10 DATE :

FARM INVENTORY ANALYSIS

Introduction:

Farm inventory is a complete lists of all the physical property (Assets) of a business alongwith their values at a specific date. An inventory repeated at an other date would reflect the appreciation or depreciation or profit or loss during the period. Usually the period refers to an agricultural year. The inventory at the beginning of the year is compared with that at the end of the year. It is a necessary first step in farm financial accounting.

Learning Objectives:

1. This exercise would enable the student to look into the assets position of the farmers and how the farm business is growing or shrinking over two points of time.
2. The student will learn different methods of taking valuation of all farm assets, which will help in further financial analysis.

Activity:

Prepare farm inventory list (physical and monetary values) for the farmer from whom you had collected the farm holding survey in previous exercises.

Procedure for farm inventory analysis :

1. Preparing list of all assets through physical counting on a specific dates - current and fixed assets or depreciable assets and non-depreciable assets. The physical count may be through numbers, weights and measurements.
2. Valuation of each item using an appropriate valuation method. An error in valuation may render the accounting financial analysis results misleading.
3. Repeat the steps 1 and 2 after a year or say at the end of the year.
4. Measure the difference in inventory at the beginning (opening inventory) and end of the year (closing inventory). Observe whether the farm business has appreciated or depreciated during the period.

Methods of valuation:

The following methods are commonly used in valuation of farm assets.

1. **Cost minus depreciation**: Working capital assets such as machinery and equipment livestock can be valued by use of cost minus depreciation.

2. **Cost or market price which ever is lower**: All farm supplies can be valued at the cost of the market price, which ever is lower.

3. **Net selling price:** All assets that will be sold within the year can be valued at the net selling price (sales price-marketing costs). For crops, livestock products meant for sale in the market.

4. **Replacement cost minus depreciation:** Old farm buildings are valued by replacement cost minus depreciation method. New farm buildings may be valued at cost minus depreciation.

5. **Income capitalization:** This method is appropriate for the farm assets which contribution to the income of the farm business and having longer life. It is used for land valuation alongwith market price.

Capitalization formula =

$$V = \frac{I}{r}$$

V = value in rupees,

I = Average annual income for a number of years

r = Rate of interest

Farm inventory of farm as on _____

Name of the farmer: _____ **Village:** _____

S. No.	Assets	Beginning of the year Dt…….. (Opening inventory)		End of the year Dt…….. (closing inventory)	
		Qty	Value Rs.)	Qty	Value Rs.)
1.	**Non depreciable assets**				
a)	Crop produce				
	i) Paddy				
	ii) Pulses				
	iii) Maize				
	iv) Others				
b)	Supplies				
	i) Seeds				
	ii) Fertilizers				
	Urea				
	D.A.P.				
	M.O.P.				
	Other complex fertilizers				
	iii) Pesticides/insecticides				
	iv) Weedicides				
	v) Marketable livestock				
	vi) Livestock products				
	Sub total :				
2.	**Depreciable Assets**				
a)	Farm machinery				
	i) Tractors and tractor equipment				
	ii) Trailer				
	iii) Sprayers				
	iv) Seed cum fertilizer drills				
b)	Implements				
	Crowbar				
	Spade				
	Sickles				
	Others				

c)	Farm buildings/sheds Cattle sheds/pump sheds				
d)	Livestock Buffaloes Bullocks Cows Oxen Young ones				
e)	Land				
f)	Others				
	Sub total :				
3.	**Cash assets**				
a)	Cash on hand				
b)	Small savings in banks				
c)	Small savings in the form of money lending				
d)	Shares in co-op societies				
e)	Fixed deposits				
f)	Others (amount to be received from others)				
	Sub total :				
4.	**Grand total**				
5.	Change in the inventory (±/-) (Beginning inventory-closing inventory) =				

Conclusions/inferences from the above analysis :

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EXERCISE NO. : 11 DATE :

FARM FINANCIAL ANALYSIS
PREPARATION OF NETWORTH STATEMENT

Introduction:

Financial statements usually consist of 1. Balance sheet, 2. Profit and loss statement and 3. Cash flow statement. They provide summarized information of farms financial activities presented in systematic manner. These statements are severally presented and made available in the annual reports of the firms. These statements are useful to develop farm financial plans, to know the financial solvency and stability of the farm business, useful to convince the lenders about the long term and short term solvency of the business for financing and for developing financial ratios for use in decision making.

Learning Objectives:

1. To understand the elements that influence the financial solvency and stability of farm business
2. To learn the procedure and steps involved in the preparation of balance sheet statement for farm business.
3. To understand the importance of balance sheet statement in financial analysis.

Balance sheet or Networth statement:

A balance sheet statement shows what a business owns (assets) what it owes (liabilities) and what investment the owners have in the business (Owners claim). It can be likened to a snap short that shows the financial make up and the condition of the business at a particular point in time.

Assets :

The possessions of the farm business that have monetary value are called assets. Assets are usually listed on the top or on the left hand side of the balance sheet.

Liabilities:

The amounts that the business owes to creditors is called liabilities. These are the dues/loans/borrowings of business/credit outstanding *etc*. Liabilities are generally located in the middle section or on the right side of the balance sheet. Legally creditors of the business would have first claim against any of its assets.

Owners claim:

The value of the assets over and above the liabilities can justifiably be called the owners claim against the assets or owners equity. Owners equity is often referred to as networth. The networth section usually appears just below the liability section.

Owner's equity consists of

1. Owners original investment to the business is listed as a separate entry called common stock.
2. Retained earnings represents net profits on owners original investment, the owners have chosen to leave in the business as additional contributed capital.

The balance sheet is set up to portray two aspects of each entry or event recorded on it. for each thing of value or asset, there is an offsetting claim against that asset.

The recognition of this concept leads to the fundamental balance sheet formula.

Assets = Liabilities + owners equity

This formula indicates there will be a balance between assets and the claims against them (liabilities + owner equity). The balance sheet is well named because it always balances.

Owners equity = Assets -- Liabilities

This is a balancing figure that the owners receive, whatever the assets are left after the liability claims have been recognized.

Classification of assets:

Assets are classified into current assets, fixed assets and other assets. The classification is based on the criterion of liquidity of the assets – which implies the length of time required to convert them into cash.

Current assets: Assets that can be converted to cash during one normal operating cycle of the business *i.e.,* within the account in year. The value of current assets bears a significant relationship to the stability of the business because it represents the amount of cash that might be raised quickly to meet current obligations.

The major current asset items may include the items *viz.,* cash on hand, bills receivable, account deposits in banks, cash register money, petty cash, prepaid expenses etc. and inventory – items that are held for sale *i.e.,* crop ad livestock produce and those items to be consumed in the process of producing crop and livestock products to be sold *i.e.,* seed, fertilizers and manures, feed and fuel, lubricants, pesticides and insecticides, weedicides etc. Marketable securities – shares and bonds etc.

Fixed assets: Fixed assets are those items that the business owns that have a relatively long life and takes long time to convert into cash. They include land, buildings, cattle sheds, pump sheds, storage structures, pump sets, wells, sprayers, tractors, machinery and equipment, implements and tools, livestock etc.

Other assets: A miscellaneous category called other assets accounts for any investment of the firm in securities – stocks and bonds, intangible asset – such as patents, franchise costs and good will.

Classification of liabilities:

A. **Current liabilities :** Current liabilities are those outsiders claimed on the business that will fall due within one normal operating cycle, usually one year. These are accounts/bills payable i.e., items purchased on credit, short term loans, notes payable, accruals-taxes payable, wages payable, specific portion of any long term and debt that will come due within a year, crop loans *etc.*

B. **Long term liabilities :** Outsiders claim against the business that do not come within one year are called long term liabilities. They include bonded indebtedness, mortgages, long term loans, cattle loans, pump sets loans, poultry loans, tractor loans, orchard development loans, land development loans etc. matches the total assets value figure.

Procedure of preparation of a balance sheet :

Step 1: List all the current assets with their values and sum the values of all current assets that the business owns.

Step 2: List all the fixed assets with their values and sum the values of all fixed assets.

Step 3: Estimate the total assets by adding the sum of the values of al the current and fixed assets that the business owns.

Step 4: List all the current liabilities and sum their values.

Step 5: List all the long term liabilities and sum their values.

Step 6: Estimate the total liabilities by adding the sum of al the values of current and long term liability that the business owes.

Total liabilities = Current liabilities + long term liabilities

Step 7: Calculate Networth or owners claim in the business by deducting the value of total liabilities from total assets value.

Networth or owners claim = Total assets – Total liabilities

Step 8: List the retained earnings *i.e,* the amount of net profit chosen to leave in the business.

Step 9: Complete the balance sheet by writing the balancing figure at the end of the statement by adding the sum of total liabilities and Networth that will exactly match the total assets.

Summarized form of Balance sheet :

Balance sheet of farmer (Name ……) as on date :

A.	Assets	Value (Rs.)	B.	Liabilities	Value (Rs.)
a)	Current assets		e)	Current liabilities	
b)	Fixed assets		f)	Long term liabilities	
c)	Other assets		g)	Total liabilities	
d)	Total assets = (a+b+c)		h)	Networth (d-g)	
			i)	Retained earnings	
Total assets = (balancing figure) = (g+h)					

Activity :

1. Prepare a balance sheet statement for a farmer by listing all the items of current assets, fixed assets, current liabilities and long term liabilities from the data available in farm holding survey in exercise No. 6 & 7.
2. Draw conclusions about the solvency of the farm business and major components of assets and liabilities that influences the financial stability of the farm business

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EXERCISE NO. : 12 DATE :

ANALYSIS OF BALANCE SHEET

Introduction:

Farm financial decision making is done with the help of financial ratios calculation. Financial ratio analysis is the process of determining and interpreting numerical relationships based on financial statements. They are useful to develop a standard criteria or indexes to financial data comparisons by eliminating weaknesses of rupee differences and absolute values. They are useful to monitor and make comparisons of profitability, liquidity, solvency and resource use position of the business at any time past and present performance.

Learning Objectives:

1. To learn how to use financial statements in financial analysis and decision making process.
2. To understand and interpret the numerical relationships among key financial data.
3. To determine how successful the farm business performance has been.
4. To prescribe changes needed to make the business more viable by analysing financial strengths and weakness of the farm business.

Ratio analysis:

A ratio is a statistical yardstick that provides a measure of the relationship between variables or figures. Ratio analysis is the process of determining and interpreting numerical relationship based on financial statements. A ratio is a pure number and has no units. This relationship can be expressed as a per cent or as a quotient.

I. Liquidity ratios: These ratios are useful in obtaining an indication of a firms ability to meet or pay its obligations or liabilities. Two important liquidity ratios are

1. **Current ratio :**

$$\text{Current ratio} = \frac{\text{Total current assets}}{\text{Total current liabilities}}$$

It attempts to measure the ability of a firm to meet its current bills and obligations or in other words the liquidity of the business in short term period. It is an important test by which the financial health of a company can with reasonable reliability be judged. In interpreting this ratio consideration should be given to the proposition of the various components of current assts. A ratio of 2:1 is preferred.

2. Acid test ratio or Quick ratio

$$\text{Acid test ratio} = \frac{\text{Cash + Marketable securities + accounts receivables}}{\text{Current liabilities}}$$

or

$$\frac{\text{Current assets - Inventories}}{\text{Current liabilities}}$$

Importance :

1. The need to quickly liquidate inventories, accounts receivable, marketable, securities *etc* may cause a sharp decrease in their value.
2. Therefore managers use a second ratio that more clearly delineates a firms ability to meet immediate cash needs.
3. This ratio is a better test of financial strength than the current ratio, as it gives no consideration to inventory which may be very slow moving.
4. It places much emphasis on immediate conversion of assets into cash than current ratio.
5. A quick ratio of 1:1 has usually been considered favourable, since for every rupee of current liabilities, there is a rupee of quick assets.
6. It is most meaningful and the only accurate measure of liquidity.

II. Debt ratios :

Debt ratios indicate the financial stability of farm business whether it can meet its future obligations.

1. Debt – Equity ratio $= \frac{\text{Long term debt}}{\text{Owner's equity}}$

It indicates the cushion of ownership funds available to debt holders.

2.Debt-coverage ratios

a. Percentage of debt financing $= \frac{\text{Creditor funds}}{\text{Total assets}} \times 100$

b. Equity to total assets $= \frac{\text{Equity funds}}{\text{Total assets}} \times 100$

These two ratios together equal to 100 per cent. These two ratios are complementary to one another *i.e.,* using of equity funds in place of creditor funds and vice versa.

c) Creditor-ship to equity ratio = Creditor funds/Equity funds

It measures the relative proportion of creditor and equity funds invested in the business.

III. Solvency Ratios :

$$\text{a) Solvency ratio} = \frac{\text{Total liabilities}}{\text{Networth}}$$

Solvency is related primarily to a firm's ability to meet long term debts or claims. Solvency measures the kinds of problems that lenders will incur in recording their money in the event of business failure.

A ratio of 1:1 as the absolute lower limit. It is useful in planning long range financial problems. Changes in this ratio signals danger of the lenders portion becomes excessively high.

A low percentage invested by lenders could signal the opportunity for expansion or additional borrowing potential.

$$\text{b) Net capital ratio} = \frac{\text{Total assets}}{\text{Total liabilities}}$$

Activity :

1. Work out the above ratios using the information in balance sheet statement prepared in exercise No. 11.
2. Draw inferences from the ratio values on the financial condition of the farm.

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EXERCISE NO. : 13 DATE :

PREPARATION OF FARM PLANS

Introduction:

Farm planning is an approach which introduces desirable changes in farm organization and operations and makes the farm a viable unit. Farm planning results in continuous maximization of net returns of farm business through proper allocation of resources and optimum combination of different enterprises. Farm plans can be 1) Simple farm plans 2) Complete or full farm plans. Simple farm planning is adopted either for a part of land, one enterprise or to substitute one resource by another. Complete or full planning envisages planning for the whole farm *i.e.,* for all enterprises on the farm, for a change in the farm structure and organization. It aims for complete change in cropping programme more income and market orientation.

Learning Objectives:

1. To learn the farm planning steps and their application to a given farm situation.
2. To understand the elements and techniques in preparations of farm plans.
3. To develop skills required to profitably manage the farms through adoption of desired changes in the farm organization.

Activity:

1. For preparing the farm plans and farm budgets use the data generated in exercise No. 6, 7 *i.e.,* farm holding survey which will be the existing plan situation.
2. Follow the steps presented below and prepare a simple farm plan *i.e.,* an alternate farm plan by introducing desirable changes in the existing farm plan that will be adopted by the farmers immediately and will improve the profitability of the farmer based on the recommended package of practices.

Steps in preparing the farm plans :

1. Evaluating the present farm situation with respect to

(i) Resource position or inventory
(ii) Different crops grown
(iii) Extent of resources used
(iv) Level of production
(v) Costs and returns

i) Resource position: Detailed information is needed regarding

a) Land : Area-dry, wet and irrigated, type of soil, topography, drainage, soil conservation and water management measures, soil nutrient status etc.

b) Labour : Extent of family labour, permanent labour, hired labour, availability depending upon the type of work, wages, peak period, demand and supply etc.

c) Cattle and mechanical power – Availability and their hiring charges

d) Funds requirement : Funds availability on hand, credit required, sources available, extent of debts, rates of interest, repayment schedule etc.

e) Management : Skill of the farmer with respect to the production of different crops and livestock enterprises and extent of knowledge regarding each of them.

f) Irrigation : Source – coverage, period of availability, charges etc.

g) Other information: Farm buildings, equipments, machinery and other farm enterprises, their maintenance costs and returns, the level of complementary and supplementary of them with respect to crop production.

ii) Crops Grown: Information must relate to the type of crops, rotations, variety, their cultivation practices and reasons for deviation from the package of practices.

iii) Extent of resources used: This gives in detail the totality of each resource being used on the entire farm. Information must relate to the acre unit area *i.e,* being cultivated, amount of labour being utilized and wages paid, extent of family labour involvement, total amount of capital in terms of variable inputs being used in different enterprises. Such information is useful for identification of resource usage in different enterprises and possibility of readjustment from one crop enterprise to the other.

iv) Levels of production: The information here indicates the amount of main and byproducts being obtained from each farm enterprise.

v) Costs and returns: This is to be arrived at the profitability of each crop and livestock enterprises.

2. List out the risks to farm production

Incidence of pests and diseases, possibility of drought, cyclones, floods etc. are to be borne in mind while formulating an alternate plan.

3. Identifying the weakness of the existing plan

For immediate or short term changes that are to be brought, one must first identify the operational weaknesses like the suitable variety, type of fertilizer and plant protection chemicals, their marketing, cultural practices etc. minor operational changes may help in increasing the returns from a particular crop or farm enterprise.

4. Specification of technical coefficients of production

To identify a suitable technology, there is need to gather information from various sources regarding the improved farming methods and practices and the various inputs which can be applied under local conditions.

5. Specification of appropriate prices

For the specified production coefficients, average prices are to be determined to estimate the expected returns.

6. Preparation of enterprise budget

The enterprise budgets can be prepared with the help of extension leaflets, research station reports, publications etc. these budgets will give the input-output relationship of each enterprise.

7. Preparation of alternate plan

With the help of the profitability ranking chart, select such farm enterprises which are feasible within the limited resources of the farm, keeping in view the weaknesses-both structural and operational of the existing farm plan. At the same time, try to incorporate the latest technology by preparing a few alternate plans. Again these plans must involve minimum risk possible.

It is better to prepare, first, the short-run plans with operational changes. Later, an alternate plan maybe prepared by improving the present cropping scheme and by keeping in view the long range farm benefits.

8. Analyse the alternate plan to check the profitability

It is necessary to have a clear comprehension about the partial plan (partial budget) and alternate plan (full budget). In the former case, any single aspect of change in technology is considered. For example introduction of new variety, fertilizer, cultural operation, plant protection etc. in this case, the extra returns per rupee investment are estimated.

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EXERCISE NO. : 14 DATE :

PREPARATION OF ENTERPRISE BUDGET AND PARTIAL BUDGET

Introduction:

The budget is essentially a presentation of costs and returns, accompanied by a statement showing the physical quantities of input and output associated with value figure. Farm budgeting is a method of analyzing plans for the use of agricultural resources at the command of the managers. The expression of a farm plan in monetary terms by estimation of receipts, expenses and net income is called farm budgeting. There are three types of budgeting techniques, complete budgeting, enterprise budgeting and partial budgeting. An enterprise budget lists down all the expected requirement of inputs and corresponding expected output both in physical as well as value terms for a unit of a particular activity (*i.e.,* per hectare, per acre, per livestock or per 1000 birds etc) on the farm. Only variable costs are considered in preparation of enterprise budget since some costs are fixed and farmer has no control. Use recommended package of practices.

Partial budget can conveniently be presented in the form of an account with the sources of additional revenue and reduced costs *i.e.,* financial gains on credit side and details of increase costs and reduction in revenue i.e., financial losses on debit side. The extra profit likely to arise out of the proposed alternate plan is then derived from the difference between totals of credit and debit.

Learning Objectives:

1. To learn and understand technique of preparing enterprise budget and partial budget.
2. To learn the evaluation of farm plans through budgeting technique.
3. To understand the utility and application of budgeting technique in managerial decision making process.

Activity:

1. Prepare an enterprise budget for the simple farm plan as per the previous exercise *i.e.,* exercise no. 13.
2. Prepare a partial budget for the simple farm plan as per the previous exercise *i.e.,* exercise no.13.

A general format for a crop enterprise budget

(per hectare/acre)

Item			Quantity	Rate per unit (Rs.)	Total value (col. 2 x col. 3) (Rs.)
1			*2*	*3*	*4*
A.		Returns			
	(i)	Main product	-	-	-
	(ii)	By-product	-	-	-
	(iii)	Total revenue			(I+ii)
B.		Variable expenses			
	(i)	Seed	-	-	-
	(ii)	Manures and fertilizers			
		……	-	-	-
		……	-	-	-
		……	-	-	-
	(iii)	Pesticides/Fungicides			
		……			
		……			
	(iv)	Irrigation			
		Diesel, fuel & oil	-	-	-
		Electricity	-	-	-
		Canal water	-	-	-
		……	-	-	-
	(v)	Labour	-	-	-
		(If possible according to periods)			
	(vi)	Other cash expenses (Specify)			
		……	-	-	-
		……	-	-	-
		……	-	-	-
	(vii)	Total			(I+ii+…+ vi)
	(viii)	Interest on operating capital (as in (vii) above) at the existing rate of interest for half the period of crop duration	-	-	-
	(ix)	Total variable expenses			(vii + viii)
C.		Returns over variable costs (Returns to fixed farm resources			A (iii)-B(ix)

Working out Partial budget:

Example: Introduction of a HYV in the place of a local variety

			Rs.
A. Financial losses			
1.	**Added cost (for HYV-Paddy)**		
	a.	Cost of seed	275.00
	b.	Fertilizers	1285.00
	c.	Plant protection	190.00
	d.	Weeding	400.00
	e.	Harvesting, threshing and preparation for market	1600.00
		Total	3750.00
2.	**Reduced returns (for local variety)**		
	a.	Grain 4042 kg (Rate Rs.300/q)	12126.00
	b.	Straw	300.00
B. Financial gains		Total	12426.00
3.	**Added returns (for HYV)**		
	a.	Grain 4854 kg (Rate Rs.300/q)	14562.00
	b.	Straw	300.00
		Total	14862.00
4.	**Reduced costs (for local variety)**		
	a.	Cost of seed	240.00
	b.	Fertilizers	800.00
	c.	Weeding	200.00
	d.	Plant protection	80.00
	e.	Harvesting, threshing, preparation for market	1340.00
		Total	2660.00
Total of added returns + reduced costs (14862+2660)			17522.00
Total of added costs + reduced returns (3750+12426)			16176.00
Net income from substituting HYV paddy for local variety			1346.00

In case of an alternate plan (full budget of an economic activity/crop enterprise) the entire package of practices is to be introduced. This means if HYV is adopted it follows invariably the introduction of package of practices. Thus it is to be worked out the costs and returns for a traditional variety and for high yielding variety. Finally the returns are to be estimated for a rupee investment both for traditional and improved variety. The comparative economics will impress the farmer to adopt the alternate plan. Any number of alternate plans can be prepared based on the internal and external resources. Then, depending on the will and capacity of the farmer, he can choose any one or two.

Conclusions:

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EXERCISE NO. : 15 DATE :

STUDY OF FARM MANAGEMENT ASPECTS RELATED TO AGRICULTURAL COLLEGE FARM

Introduction:

Farming is carried out by private and public organizations. They are 1) State farms like Govt. farms and University farms managed for research, seed production or demonstration purposes 2) Corporate farms – managed and organized on commercial basis by private firms on large scale to feed their factories, processing industries, retail chains, 3) Individual commercial farms organized by individuals or on partnership basis on commercial scale.

These farms are managed by employing paid managers, who plans and organizes all activities regularly on commercial basis and capital is provided by owners and profits go to owners. Therefore there is a vast difference in management of these farms from those of farmer owned farms. Hence, the students should know the organizational and managerial issues of organized farms.

Learning Objectives:

1. To expose the students to the organizational and managerial aspects of organized farms.
2. To learn and understand the differences in farmer owned farms and organized public or private farms with respect to their management and organization.
3. To understand the role of planning and managerial functions and theei affect on costs and profitability etc.

Activity:

Study the farm management aspects related to Agricultural College Farm

1. Organizational structure of college farm: Staffing pattern – technical and non-technical.
2. Land area, soil types and fertility status, area irrigated and dry, sources of irrigation and availability, drainage facilities.
3. Land use pattern – Crops and cropping pattern, crop varieties, crop rotations, introduction of new crops in the recent years, crop wise productivity trends.
4. Annual planning of farm activities and crop operations.
5. Procurement of resources/inputs to the farm, seeds, fertilizers, pesticides, fuel, feed and implements.
6. Farm-labour requirement, wages, labour work distribution, supervision and management of labour work and operations.
7. Machinery availability on the farm and operations mechanized on the farm.
8. Farm budget/year, income and expenditure/year, sources of income, major heads of expenditure.
9. List the farm records and registers and accounts maintained with their purpose.
10. Suggestive measures for improving the efficiency of resources – land, labour, machinery, funds use and overall profitability of the farm.

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