Practical Manual

on

Farm Management, Production and Resource Economics

AEC 328 – (1+1) Credit Hours 2(1+1)

(For Undergraduate Agricultural students)

Dr. V. David Chella Baskar
Assistant Professor
College of Agriculture

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RANI LAKSHMI BAI CENTRAL AGRICULTURAL UNIVERSITY, Jhansi-284003

Syllabus:

Practical: Preparation of farm layout. Determination of cost of fencing of a farm. Computation of depreciation cost of farm assets. Application of equi-marginal returns/opportunity cost principle in allocation of farm resources. Determination of most profitable level of inputs use in a farm production process. Determination of least cost combination of inputs. Selection of most profitable enterprise combination. Application of cost principles including CACP concepts in the estimation of cost of crop and livestock enterprises. Preparation of farm plan and budget, farm records and accounts and profit & loss accounts. Collection and analysis of data on various resources in India.

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Chapter No. 1

Objective: Preparation of Farm Layout and Estimation of Cost of Fencing of a Farm

Farm layout means the physical arrangement of fields and other permanent structures such as buildings, roads, channels etc. Farm layout has direct relationship with cost and efficiency in use of machineries, man power, animal power, irrigation and drainage and in turn affects the profit. Hence, there is a need for good farm layout. Good farm layout should ensure;

- Optimum size of fields to suit the cropping pattern.
- Minimum area under buildings, roads and irrigation channels.
- Easy access to all fields and buildings.
- Uniformity of soil in each field or within a block.
- Efficient and economic irrigation structures.

An efficient layout is one which fits well with the enterprise and crop rotation leading to the saving of time, energy and money and efficient operation of the farm business.

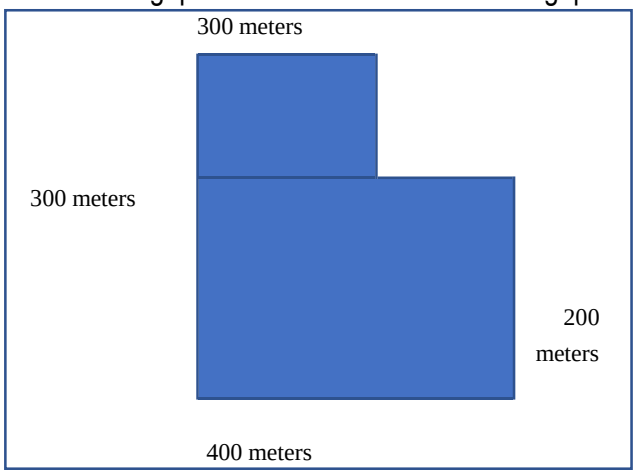
Gliricidia sepium is a common live fence post species established through large stem cuttings root with relative ease, and it has multiple uses such as a forage and green manure. Combination of Agave, Sisal and Gliricidia is suggested as live fence. The cost of live fence is very minimal @Rs 78 per running feet. A perimeter of 3000 ft. (10 Acres) would cost around Rs. 25,000 as against other alternatives.

Farm wired fencing costing Rs 50 to Rs 120 per running feet. Particularly for Barbed wire, Electric/ invisible, woven wire, hog wire and Hog panel, Deer and mesh & chicken wire are suitable for farm based on the requirement.

Type of fence	Materials	Rs. Per ft.
Security style wire fence	Wire mesh, chain link and metal option	100-250

Exercise No. 1

Problem: Estimate the cost of fencing for 10-hectare farm of the given layout. Use barbed wire type fencing for 6 feet height of which 3 feet for 15 cm x 30 cm gap at bottom and 30cm x30cm gap for remaining upper 3 feet height. Use supporting stone post at every 7 feet on the cost of Rs 150 per post. In order to give strength to the structure, provide two side supporting post at every 100 feet. Total height of the stone post is 7 feet of which erect them at one feet depth with concrete support, costing Rs 20 per pit for including labour and material. The barbed wire costing Rs 8000 per quintal running to the length of 3000 fts. An average amount of Rs 30 per feet is required as labour cost for fencing. (Hint: Estimate the barbed wire cost per 10' x 6' and estimate the total material (stone post and barbed wire) costs. Layout of the farm is given below.



Interpretation:

Chapter No. 2

Objective: Computation of Depreciation and cost of Farm Assets: Valuation of Assets by Different Methods

Depreciation: While estimating cost or expenditure incurred, there is no problem in accounting for the cost of mono period resources. The difficulty arises in accounting for the cost of poly period resources, as they provide services for a number of years to the farm business. Farmer uses different resources during the production period of an agricultural year. It is not rational to account for the entire purchase price of these resources as a cost in a single production cycle, since they are used in many production cycles. Depreciation is such an accounting procedure to account for the cost of services rendered by the poly period resources in each production cycle in which they are used. It is also known as capital consumption allowance.

1. **The straight - line method:** By this method, the annual depreciation of an asset is computed by dividing the original cost of the asset less salvage value by the expected years of life.

$$AD = \frac{OC-SV}{EL}$$

Where AD, OC, SV and EL stands for annual depreciation, original cost, salvage value and expected life period in years respectively.

Annual depreciation remains the same for each year during the useful life of the asset. This method is relatively simple and easy to understand even by semi-literate farmers. However, equal loss in value every year during the entire expected useful life of an asset may sometimes be too unrealistic. This method is useful for durable assets like buildings and fences which may require uniform maintenance during their lifetimes.

2. **The Declining- Balance method**

According to this method, a fixed rate of depreciation is used every year and applied to the remaining value of the asset at the beginning of each year. It is important to note that salvage value is not subtracted from the original cost as in the previous method. Instead, a fixed rate of depreciation which should be nearly twice that used under the straight-line method is applied to the uncovered balance until the salvage value is reached, after that no depreciation is worked out.

DDB = (C-A)xR

DDB = Depreciation / year by declining balance method C = Purchase Cost
A = Accumulated depreciation taken in prior years
R = Rate at which depreciation is taken (usually twice the straight line method)

This is useful in a situation, where an asset depreciates at a faster rate in the beginning as in the case with most machinery and the automobiles. This method is suitable for a situation where an asset depreciates at a faster rate in the beginning as in the case with most machinery and automobiles.

3. **The sum- of - the -year Digits method**

The following formula is used for calculating the annual depreciation (AD) by this method:

AD = F x Amount to be depreciated,

Where amount to be depreciated equals the cost less salvage value and F is a fraction. F for any year, say the second year, for an asset with an expected life of five years can be calculated as follows:

F = Years of remaining life at the beginning of accounting period Sum-of-the-year-digits

$$F = \frac{4}{1+2+3+4+5} = \frac{4}{15}$$

Similarly, F for first and fifth and year will be respectively. As the value of F keeps on declining each year, the annual depreciation also declines with the advancement in age of the asset as in the declining balance method. This method also suits those assets for which relatively higher depreciation needs to be charged during the earlier years of their life.

This method is perhaps much more complicated than the straight - line method and thus not as popular.

Exercise No. 2

Problem 1: What would the annual depreciation for an asset be whose cost is Rs. 1,000, salvage value Rs.100 and expected useful life 10 years?

Problem 2: Assume, Rs. 1,200 as value of an asset with an expected life of 10 years and a salvage value of Rs. 200. The rate of depreciation is 20 percent.

Exercise No. 3

Problem 3: **Work out the depreciation values three methods such as straight-line method, the declining-balance method and the sum- of - the -year digits method for a power sprayer (purchased in 2008) and a tractor (purchased in 2004). The power sprayer was purchased for Rs 10000 (salvage Rs 100) and the tractor was purchased at Rs 2.5 lakhs (salvage 10 % cost). Use 20% depreciation rate for power sprayer and 10% depreciation for tractor for calculating Declining balance method. Calculate the depreciation by all three method and offer your comments.**

Problem 4: **Calculate depreciation for the power tiller purchased for Rs.1, 50,000 by the above three methods. The salvage value is Rs.15,000, depreciation percentage is 12% per year and its economic life is 12 years. Offer your comments.**

Problem 5: Calculate depreciation value (by any two methods) of an oil engine purchased at Rs.12, 000 with an expected life of 10 years and salvage value of Rs.1, 200.

Chapter No. 3

Application of Equi-Marginal Returns / Opportunity Cost Principle in Allocation of Farm Resources

The law of equi-marginal return states that **"the profits are maximized by using the resource in such a way that the marginal returns from the resources are equal in all cases."**

Exercise No. 4

Farmers reach maximum return when he allocates every additional amount of capital so as to get equal marginal return. Thus, the producer will be in equilibrium when the following equation holds good:

$$\frac{MRx}{Cx} = \frac{MRy}{Cy} = \frac{MRz}{Cz} = MR$$

where MR = marginal return in each enterprise and C is cost/investment in each enterprise. This principle can be illustrated with the help of following example. Suppose, farmer is having Rs.50,000 for investing. His locality is favourable to take crop enterprise, dairy enterprise and poultry enterprise. What will be the Profit obtained from each enterprises.

S. No.	Investment pattern (Rs)	Return realized per Rs 10000		
		Crop	Dairy	Poultry
1	First			
2	Second			
3	Third			
4	Fourth			
5	Fifth			
	Total realized return			
	Total amount invested			
	Profit in each enterprise			

However, if the same amount is spent according to principle of **equi-marginal returns**, total net profit will be as shown below in the table given below.

Expenditure according to principle of equi-marginal return

Order of investment	Amount	Enterprise	Marginal Return
First		Poultry	
Second		Crop	
Third		Crop	
Fourth		Dairy	
Fifth		Poultry	
Total			
Net Profit			

Opportunity cost: In agriculture, resources are limited and have alternative uses. When resource is put to one use opportunities of other alternatives are lost. John A. Perrow defined "opportunity cost is the amount of the next best produce that must be given up (using the same resources) in order to produce a commodity." The concept was first developed by an Austrian economist, Wieser.

Opportunity cost are calculated by two methods:

On gross income basis-when cost of production are equal.

Enterprises	Gross income	Cost of production	Net income
Tobacco yield 12 qtl @ Rs 3000/qtl			
Potato yield 140qtls @ Rs400/qtl			

(a) On net income basis-when cost of production are not equal.

Income	Tobacco	Potato	Wheat (HYV)
Gross income			
Cost of production			
Net income			

Opportunity cost is the return, the resource can earn when it is put into its next best alternative use.

Chapter No. 4

Objective: Determination of most Profitable Level of Inputs use in a Farm Production Process (How much to produce)

A factor product relationship is considered as one of the basic relationships in production economics which helps to identify the optimum level of input to produce the output which give maximum profit. In the short run, this analysis explained the law of diminishing marginal returns or law of variable proportion. Actually, this refers to the study of output or return in situations where the proportion of inputs (variable inputs to fixed inputs) are varied, hence this principle is called as **law of variable proportion**.

Exercise No. 5

Problem: Gives the following factor product relationship between as Nitrogen response to Tomato yield per ha.

S. No	N in Kgs (X)	Output (Y) in Qtl (TPP)	APP = Y / X	ΔY	ΔX	MPP = ΔY/ΔX	MVP = MPP*Py	MCx= Px	Ep = MPP/ APP	Stage of Prod.
1	0	0								
2	20	50								
3	40	110								
4	60	175								
5	80	225								
6	100	255								
7	120	270								
8	140	275								
9	160	275								
10	180	260								
11	200	250								

Answer the following

1. Work out TPP, APP and MPP and draw their curves (use graph sheet).
2. Estimate the elasticity of production at different output level.
3. Demarcate the different regions of production function.

Estimate the optimum level of input use when the Nitrogen cost is Rs.10/ Kg and the price of Tomato is Rs. 40/- per unit.

Optimum level of input Py. MPPx = Px
Marginal value product (MVP) = Px Optimum level of output Py = MCx
d (profit)/dY = dTR/dY – dTC/dY = 0 i.e., MR-MC = 0 MR=MC'

Exercise No. 6

Problem 1: Nitrogen response of chillies is given below

Nitrogen(kg/ac)	0	10	20	30	40	50	60	70	80	90	100
Chillies yield (kg/ac)	0	160	390	610	800	960	1090	1185	1230	1235	1215

Find out:

1. TPP, APP & MPP and draw the curves (use graph sheet).
2. Determine the different regions of production function
3. Determine the optimum level of nitrogen use and the level of output

   (a) If cost of Nitrogen = Rs.45 per kg & price of Chillies = Rs.10 per kg.
   (b) Use tabular method (longhand method) also for (a).
   (c) If cost of Nitrogen = Rs.15 per kg & price of Chillies = Rs.30 per kg.
4. Estimate the Elasticity of production at MPP=9.5
5. Estimate the product price (Py), X, Y, TR, NR, when the Px=30 and MPP is 1.50 (use average input and output for APP)
6. The second order polynomial production function estimated for the above data is

   $Y=-0.0126X^2+25.15x$ then Estimate the economic and physical optima for the following pairs of input output price sets (12,32), (45,10), 28,12), 15,30).

Problem 2: Gives the following factor product relationship between as Nitrogen response to output per ha.

S. No	N in Kgs (X)	Output (Y) in Qtls (TPP)	APP = Y / X1	Y	X1	MPP = Y/ X	MVP = MPP*Py	Ep = MPP/APP	Stages of prodn.
1	0	0							
2	1	2							
3	2	5							
4	3	9							
5	4	14							
6	5	19							
7	6	23							
8	7	26							
9	8	28							
10	9	29							
11	10	29							
12	11	28							
13	12	26							

Answer the following

1. Work out TPP, APP and MPP and their curves.
2. Estimate the elasticity of production at different output level.
3. Demarcate the different regions of production function.

Estimate the optimum level of input use when the Nitrogen cost is Rs.20/- Kg and the price of output is Rs. 20/- per unit

Chapter No. 5

Objective: Determination of Least-Cost Combination (LCC) Of Inputs

Exercise No. 7

Problem: The following N and P fertilizers combination produce 2100 kg of Dry Chillies per ac. The cost of nitrogen is Rs 34/- and Phosphorus is Rs 42.5/-. Find out the least cost combination also draw the graph of iso-quant and iso-cost curves.

Nitrogen (X1)	Phosphorus (X2)	X1 Δ	X2 Δ	$\frac{\Delta X_1}{\Delta X_2}$ MRS=	Price ratio= $\frac{PX_2}{PX_1}$	Total Cost (Px1.X1+ Px2.X2
65	40					
70	25					
75	17					
80	11					
85	7					
90	4					
95	2					
100	0					

Problem 2: Different combinations of two animal feeds, Lucerne -X1 and Concentrate-X2 required to produce 2000 liters of milk in 280 days are given in the following table. (Column to be followed

$$X1, X2, \Delta X1, \Delta X2, MRTS = \frac{\Delta X_1}{\Delta X_2}, \frac{PX_2}{PX_1}, TVC = PX_1X_1 + PX_2X_2$$

(1) If the price of X1= Rs.0.6 and price of X2 = Rs 6.3 find out the least cost combination.
(2) Estimate LCC if PX1=Rs 0.30 and P X2= Rs 2.1
(3) Plot the iso- quant and iso- cost curve in a graph.

X1	6500	6680	6890	7140	7440	7790	8200	8685	9255	9915
X2	1050	1000	950	900	850	800	750	700	650	600

Chapter No. 6

Objective: Selection of Most Profitable Enterprise Combination

The aim of the study of product – product relationship is to determine the optimum combination of products for a given level of input. Here, products refer to different enterprises like crops, dairy, poultry, etc., which can be produced from the same inputs.

Exercise No. 8

Problem 1: For the given problem, work out the optimum product combination. Let price of Cumbu (Y_1) Rs. 600/- unit and Price of lady's finger (Y_2) Rs.1450/- unit

Cumbu Y_1	Lady's finger Y_2	ΔY_1	ΔY_2	MRPS= $\Delta Y_1/\Delta Y_2$	Price Py_2/Py_1 ratio	Total Revenue $Y_1.Py_1+Y_2.Py_2$
120	0					
108	8					
96	15					
84	21					
72	26					
60	30					
48	33					
36	35					
24	36					
12	36.5					
0	36.75					

Comment on the revenue maximizing combination of the two products.

Exercise No. 9

Problem 1: Choose the optimum combination of two enterprises, i.e. Bhendi and Chillies from the yield data given, if each one of these combinations can be produced by same level of input. The price of Bhendi is Rs. 21.5 per quintal and price of Chillies is Rs. 61 per quintal. Verify the results by working out the total revenue

Bhendi-Y_1	2510	4330	5840	6920	7810	8340	8590	8765	8885
Chilles-Y_2	5810	5630	5380	5000	4425	4005	3700	3440	3220

Problem 2: Combination of Tomato and Brinjal produced using 200kg of Nitrogen is given in the following table. Work out the optimum combination of Tomato and Brinjal for the given level of Nitrogen. (PY1 = Rs. 280 per quintal; P Y2 = Rs. 400 per quintal)

Tomato Y (qtl.)	Brinjal Y2 (qtl.)	ΔY1	ΔY2	MRPS	Price ratio Py2/Py1	Total Revenue Y1.Py1+Y2.Py2
0	60					
20	56					
40	50					
60	41					
80	30					
100	16					
120	0					

Chapter No. 7

Objective: Application of Cost Principles including CACP Concepts in the Estimation of Cost of Cultivation and Cost of Production of Agricultural Crops.

Exercise No. 10

Problem: Using the given data, work out the different Cost concepts, Cost of Production and different income measures.

S. No	Particulars	Tomato Rs/ha	Onion Rs/ha
1.	Value of human labour	48735	33345
2.	Value of machine labour	7410	5870
3.	Seeds/planting material	9855	19834
4.	Manures and Fertilizers	26939	33803
5.	Plant Protection chemicals	8906	9740
6.	Irrigation expenses	750	850
7.	Yield (Ton/Ha)	24	10
8.	Land Revenue and other Taxes	550	425
9.	Interest on Working Capital (7%)		
10.	Depreciation of farm implements and buildings	3938	1765
11.	Rental Value of Owned Land	2500	1765
12.	Imputed value of family labour	3500	2000
13.	Interest on Fixed Capital other than Land	2357	1434
14.	Price / Kg (value of main product)	10	25
15.	Value of by product	2000	1500

Problem 2: A farmer cultivated paddy in 2 hectares of land of which 0.4 ha was leased-in at a cost of Rs.10000 per year. He invested Rs. 18000 on the pump house and thrashing floor which depreciated @ of 3 % per annum. He owned implements worth of Rs. 800, whose depreciation was @ 8% of its value/year. The interest rate for long-term borrowing was 8.5% and short term borrowing 11 %. Land revenue is Rs. 250/ha/year land cess is Rs.100/ha/year and water charges Rs. 50/ha/year. His family put 20 hrs of family male hrs and 15 female family labour days in the production process. He cultivated three crops per year. Calculate cost of cultivation and cost of production of paddy. Workout the various income measures of the paddy farmer. The expenditure per ha is given below:

1. Seed: 60 Kg @ Rs. 18 per Kg.
2. Nursery Preparation: Bullock labour 8 hrs @ Rs.22.50 per hour. Human labour for land preparation 8 hrs @ **Rs.20.00** per hour.
3. Main field preparation: machine labour (Tractor) 2.3 hrs @ Rs.500.00 per hour.
   Human labour 48 hrs @ Rs.17.5 per hr.
4. Transplanting: Male labor 8 no's @ Rs. 100 per day; Female labor 35 @ Rs.60 per day
5. Fertilizers & Manure: FYM 6 tractor load @ Rs. 500 per tractor load Chemical fertilizers 500 Kg. @ Rs. 7.50 per Kg
   Application of fertilizers and manure: Male Labour 2 no's @ Rs. 100 per day.
6. Weeding: weedicide 1.25 liters @ Rs.380 per liter
   2 weeding @ 30 Female labour per weeding @ Rs.30 per female labour.
7. PP measures: 1 spraying @ 0.5 lit @ Rs.180 per liter and o.5 Kg fungicide @ Rs. 600 per kg; spraying charges: Rs.150 per spray.
8. Irrigation charges: 200 Kg of Paddy
9. Harvesting and thrashing: 3 hrs of combined harvester @ 1600 per hour
10. Yield: Grains 60 Quintals @ Rs.720 per Quintals; Straw 80 Qtls Rs. 50 per Quintal

Chapter No. 8

Objective: Estimation of Cost of Cultivation and Cost of Production of Perennial Crops / Horticultural Crops

Exercise No. 11

Problem 1: Estimate the Cost of Cultivation and Cost of Production of Casuarina from the given details.

S. No.	Particulars	Unit	Qty.	Unit Rate (Rs.)	1st Year	2nd Year	3rd Year	4th Year	Total
A.	**Cost of Planting**								
1	Cost of initial ploughing	Hrs	7	400	2800	0	0	0	
2	Alignment and Digging of pits	MD	100	100	10000	0	0	0	
3	Application of manure (Incl. cost	LS	2	1000	2000	2000	2000	0	
4	Cost of Casuarina clones	Nos	4500	3	13500	0	0	0	
5	Refilling of pits, planting and Channel formation	MD	100	100	10000	0	0	0	
6	Causality replacement	MD	4	100	400	0	0	0	
7	Seedling cost	Nos	225	3	675	0	0	0	
B.	**Cost of Maintenance**								
1	Irrigation and Protection expenses	Months	4 MDx12	1000	4800	4800	4800	3000	
2	Soil working and weeding	MD	50	100	5000	5000	0	0	
C.	**Fixed Expenses**								
1	Depreciation of farm implements and buildings				3938	3938	3938	3938	
2	Rental Value of owned Land				2500	2500	2500	2500	
3	Imputed value of family labour				3500	3500	3500	3500	
4	Interest on Fixed Capital other than Land				2357	2357	2357	2357	
D.	**Yield**	**Ton**						120	
	Price (Rs./ton)	**Ton**						**4000**	

Problem 2: Cost of Cultivation of Aonla (Rs/ha). Economic life Period is 25 years

	Item of expenditure	1st Year	2nd Year	3rd Year	4th Year	5th Year	6th Year	7th Year	8th Year	9th Year	10th Year
I	**Materials**										
1	Planting material including transport	40138	4014	0	0	0	0	0	0	0	0
2	Drip Irrigation	106210	0	0	0	0	0	0	0	0	0
3	Fencing	61302	0	0	0	0	0	0	0	0	0
4	Cost of FYM	9263	8892	8892	9386	9386	9386	9386	9386	9386	9386
5	Cost of fertilizers	1455	2464	3449	4434	5588	5588	5588	5588	5588	5588
6	Plant protection	2470	2717	2470	2470	2470	2470	2470	2470	2470	2470
II	**Operations (Man days)**										
1	Land preparation	8645	0	0	0	0	0	0	0	0	0
2	Peg Marking & Digging of pits	55575	0	0	0	0	0	0	0	0	0
3	Planting and staking	9263	0	0	0	0	0	0	0	0	0
4	Manures & fertilizers application	1482	1853	2223	2470	2470	2470	2470	2470	2470	2470
5	Irrigation	1482	1235	1235	618	618	618	618	618	618	618
6	Appl. of plant protection	371	618	618	618	618	618	618	618	618	618
7	Intercultural	1853	2223	2470	1235	1235	1235	1235	1235	1235	1235
8	Harvesting	0	0	0	0	600	700	800	1000	1000	1000
9	Inter cropping	1853	0	0	0	0	0	0	0	0	0
III	**Fixed Expenses**										
	Depreciation of farm implements and buildings	2938	2938	2938	2938	2938	2938	2938	2938	2938	2938
	Rental Value of owned Land	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500
	Imputed value of family labour	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500
	Interest on Fixed Capital other than Land	1350	1350	1350	1350	1350	1350	1350	1350	1350	1350
	Yield (Kg/Tree)					5	15	25	50	75	100
	Yield (Kg/ha)					3125	9375	15625	31250	46875	62500
	Price (Rs/Kg)					10	10	10	10	10	10

For remaining years, the expenses and yield are same as that of 10th Year

Chapter No. 9

Objective: Estimation of Cost and Returns of Livestock Products

A. Farm mechanization: The cost of operating a machine includes both fixed and variable cost. The total annual fixed cost includes depreciation, interest on insurance. The variable cost comprises of the cost of fuel electricity, lubrication oil and wages for machinery operator.

i) Total annual fixed cost

1. Work out the annual depreciation for the machine (Original value – salvage value)/life period.

$$\text{Average annual depreciation} = \frac{Original\ value - salvage\ value}{Life\ Period}$$

   Work out the interest on the average value of the machine.
2. Estimate the cost of repairs and maintenance. It can be taken as 10 per cent of the average value of the machine.
3. Estimate the taxes and insurance premium paid/annum. It can be assumed as 2 per cent of the average of the machine.
4. Add the above four items to get total average annual fixed cost (TAFC)= 1+2+3+4
5. Work out the average fixed cost/hour by dividing the total annual fixed cost by the number of hours the machine is used /annum. (AFC = TAFC/ No. of hrs)

ii) Running cost/hour

1. Work all the value of fuel / electricity and lubricants consumed by the machine / hour.
2. Work out the wages/hour for the operator.

Exercise No. 12

Problem 1: From the data given below, work out the cost of production (COP) of milk and the net profit (NP) per year from a cow. Also calculate the BCR and break-even (BE) level of milk production. A dairy farmer rears 5 exotic cows, each one costing Rs.15000 each. The economic life period of cows is 10 years and after that it would be sold for Rs. 1000 for meat purpose. The insurance premium paid was 4% of the value of the cattle. The cattle shed was constructed at a cost of Rs. 50000 and the depreciation was calculated at 5 %of the value. The rate of interest was 10 % for long term loans and 12 %for short-term loans. Estimate COP, NP, BCR and BE for 12% increase in price of concentrate and 3% increase in Milk price. The variable expenses for maintaining a cow was as follows:

Lactation Period: The green fodder requirement 25 Kg per day @ of Rs. 0.50 per kg Concentrate 6 Kg per day @ of Rs. 6 per kg

Dry Period: The green fodder requirement 15 Kg per day @ of Rs. 0.50 per kg Concentrate 2 Kg per day @ of Rs. 6.00 per kg

Other expenses performance animal: The dry fodder requirement 5 Kg per day @ of Rs. 1.00 per kg Labour for maintenance 2 hrs @ of Rs. 12 per Hour.

Veterinary charges per year Rs. 300 Miscellaneous Expenses Rs. 300

The milk yield 8 liters @ Rs. 20 per Litre

The value of farmyard manure per annum Rs. 400 Net value of one-year-old calf is Rs. 600

Problem 2: Cost of performing an operation by machine

Estimate the cost of operating the machine per hour by adding the average fixed cost / hour with the running cost/hr and this amount should be multiplied by the number of hours for which the machinery is used to perform that particular operation. From the given data, work out the cost of spraying one ha of silk cotton with power sprayer. The total number of spraying given is 10 and the average time taken/spraying is 2 hours. Four labour hours are required / spraying and the cost of labour / hour is Rs.100. Cost of power sprayer: Rs.7000

Useful life period	:	2500 hours (10 years)
Salvage value	:	Rs.400
Fuel requirement	:	1 lit of petrol/hour
Lubricating oil	:	25ml/lit. of petrol Cost of petrol : Rs.70/- lit
Cost of lubricating oil	:	Rs.86.00/lit ,Hire charge : Rs.75/- hrs

Chapter No. 10

Objective: Preparation of Farm Plan and Budget

Farm Planning: Farm planning is a decision-making process in the farm business, which involves organization and management of limited resources to realize the specified goals continuously. Farm planning involves selecting the most profitable course of action from among all possible alternatives.

Exercise No. 13

Illustration: A farmer in Keshavpur block of Jhansi district is cultivating traditional irrigated Chillies. A new improved variety of Chillies has been released for adoption. The cost of cultivation and input requirements are supplied by Agricultural Development Officer of the block. The cost and returns for traditional varieties are available with the farmer from his previous experience. The farmer compares the traditional and improved variety with the partial budgeting technique as detailed below.

Partial Budget showing change from traditional chillies (K2) to Improved Chillies cultivation

	Debit (A)		**Credit (B)**	
1.	**Added Cost**	**Amount (Rs)**	**Added return**	**Amount (Rs)**
i.	Human labour	1645	Gross return (Difference between the gross return of K2 chillies and improved chillies per hectare)	11703
ii	Bullock labour	1275		
iii	Manures and Fertilizers	1319		
iv.	Pesticide	1199		
v	Irrigation	124		
vi	Interest on working capital	50		
II	**Reduced return**	Nil	**Reduced Cost**	1580
	A. Total added cost and reduced return	5562	B. Total added return and reduced cost	13283

Net change in income: B - A = Rs.7721

Since cultivation of improved variety gives an additional income of Rs.7721 per hectare compared to traditional one the farmer decides to switch over to the improved one.

Exercise No. 14

Complete budgeting: It refers to making out a plan for the farm as a whole or for all decisions on one enterprise. In case the budgeting analysis involves complete reorganization of the farm business, it is called complete budgeting. Complete budgeting considers all the crops, and livestock, producing methods, estimates of costs and returns for the farm as a whole.

1. Assignment for Farm Planning:

Assignment: Prepare complete farm plan for a farmer in western zone having 1 ha of wet land, 2 ha garden land and 1 ha of dry land. Farm plan must include both cereals, pulses and other commercial crops like sugarcane and turmeric with the livestock component. A farmer is having a bore well which support for 3 ha and has no capital constraints.

Exercise No. 15

2. Assignment for Budgeting:

A. Partial Budgeting: Factor- Substitution- Hand weeding Vs herbicides application

Farmers growing Bhendi usually take up hand weeding employing women labour. The labour requirement per hectare is 60 women days. The Department of Agriculture recommends application of one litre of herbicides per acre followed by a hand weeding which required only 25 women days/ha. The wage rate /women day is Rs 200. The cost of application of herbicides is Rs

200. The cost of herbicides is Rs 800 per lit. There is a 200 kg of additional Bhendi yield in case of pre-emergent herbicide application to the crop. The sale price of Bhendi is Rs 12 per kg. Suggest the farmers the most economical method of weed control (a) with additional yield (b) without additional yield.

B. Using partial budgeting, suggest the farmer whether to go for hybrid Tomato in place of local variety. The costs and returns per ha for the variety and hybrid are furnished below.

S. No	Particulars	Variety Rs/ha	Hybrids Rs/ha
1	Seeds/planting material	6855	10857
2	Manures and Fertilizers	26939	32584
3	Plant Protection	8906	8572
4	Irrigation expenses	750	750
5	Value of machine labour	7410	7410
6	Value of human labour	48735	50726
7	Interest on Working Capital (7%)		
8	Yield (Ton/Ha)	20	25
9	Price / Kg	10	10

Chapter No. 11

Objective: Farm Records and Accounts: Usefulness, Types of Farm Records– Farm Production Records-Farm Financial Records

Management of a farm business requires a wide range of information on physical and financial performance. Farm book-keeping is known as a system of records written to furnish a history of the business transactions, with special reference to its financial side. Records and accounts help in evaluating the performance of the farm business, obtaining credit from financial institutions, filing tax returns, evaluation of investment alternatives etc.

Exercise No. 16

The Following are the farm records maintained by the co-operate farms and state farms.

1. Forecast register

Field	Area	Nature of work	Wage rates and labourers forecasted					
			Skilled labourers	Wage Rate (in Rs.)	Semi-Skilled Labourers	Wages Rate (in Rs.)	Unskilled labourers	Wage rate (in Rs.)

Skilled Labourers	Amount (in Rs.)	Semi-Skilled Labourers	Amount (in Rs.)	Unskilled labourers	Amount (in Rs.)

This is prepared a day in advance of the actual labour requirement on the farm. Keeping in view of the various operation to be performed for various crops, the requirements is forecasted. The labour units indicated in this register should not exceed the labour units given in DMS.

2. Daily memorandum sheet (DMS)

Field	Purpose of work	Allotment of labourers						
		Skilled	Wages (in Rs.)	Semi-skilled	Wages (in Rs.)	Unskilled	Wages (in Rs.)	Amount (in Rs.)

This deals with the distribution of work in a day along the labour units employed and the wages paid for various operations.

3. Muster Sheets

S. No	Name of the casual labourers	Sex	Nature of work	No. of days worked in a fortnight	No. of days	Wages (in Rate/ day Rs.)	Amount (in Rs.)
				1 2 3 …..15			

The particulars of the labour units employed including the number of days employed and the wage bills are posted in these sheets. These sheets give an idea of fortnightly expenditure incurred on the labour wages.

4. Permanent Dead Stock Register

Date	Particulars	Receipts	Issues	Balance

5. Temporary Dead Stock Register

Date	Particulars	Receipts	Issues	Balance

This register gives the managements an idea of the stock issued and balance available so that future requirements can be assessed and undertake the purchase as and when required.

6. Fertilizer and chemicals register

S. No	Date	Particulars	Receipts	Issues	Balance

The details of the different fertilizer purchased along with the purpose for which they are issued are posted here. This register presents the position of the stock of fertilizers and chemicals available at any given point of time.

7. Seed stock register (grams/kgs/nos.)

Date	Particulars	Receipts	Issues	Balance

This register gives the details of the purchases, issues and balance of the seeds of different varieties of crops grown on the farm.

8. FYM and cattle feed register (kgs/tonnes)

S. No	Date	Particulars	Receipts	Issues	Balance

This register deals with the particulars of receipts, issues and balance of FYM and cattle feed.

9. Tractor expenditure register(Rs)

Date	Particulars	Receipts	Issues	Balance

This register contains the information pertaining to the purchase of items like diesel, spare parts, etc and their use as per the requirements. The stock position of the same is also available in this register.

10. Livestock Register

Date of purchase	From whom purchased/received	Description of the animal	Date of birth	Book value (in Rs)

The description of the animal along with the source of obtaining the same and date of birth of the animal and value are entered here.

11. Farm produce stock register

S. No	Dry land/ Wet land	Season crop variety	Main product (Qtls/ tonnes)	Entered in page no. of produce stock register	Signature of the store keeper	Signature of the farm superintendent

The details of crop wise and variety wise main product and by product are entered here. This gives an account of the total product obtained from the farm.

12. Produce stock register

Date	Issue/sale	Receipts	Issues	Balance

The information posted in the farm produce stock register is brought over here. Under the column "receipts" the quantity recorded in the farm produce stock register is entered here. The issue column indicates the details as to whether the produce was issued to the farm or sold.

13. Indent register

Indent No.	Date	Particulars	Quantity	Purpose	Receiver	Indent	Signature of the store keeper	Signature of the farm superintendent

The register presents the indents that are made. Under the column “purpose”, if the input indented is fertilizers, the crop to which it is proposed to be applied is entered here. This register holds good for all farm supplies.

14. Sales price register

S. No.	Name of the product	Quantity for proposed sale	Rates furnished by the secretary, Regulated market committee (Rs)	Rate per unit in the local market (Rs)	Rate at which disposed (Rs)

Sales particulars of the produce obtained on the farm are found in this register. The rates furnished by the agricultural market committee and that of local markets are obtained and then the rates at which produce was disposed is entered. This type of information is mostly seen in the Government farms.

15. Sanction Register

S. No.	Date	Particulars cum purpose of expenditure	Quantity	Rate (unit price Rs.)	Amt to be Sanctioned (Rs.)	Head of the Account	Signature of farm manager	Signature of sanctioning authority

It provides the details of the items of expenditure along with the rate per unit and amount to be sanctioned. The proposed items are purchased after due sanction from the concerned authorities.

16. Auction Register

S. No	Name of the bidder	Address of the bidder	Amount (Rs.)	Signature of the bidder	Amount deposited (Rs.)	Signature of the successful bidder

The information of those items, which are auctioned, can be known from the auction register.

17. Cash book

Date	Opening Balance	Sales No.	Bill Amount (Rs.)	Amount remitted to the Bank (Rs.)	Cash in hand (Rs.)

The details of cash remittances and cash on hand are shown here.

Thus, the main objectivity of maintaining the records is to control the farm business, guide future

decisions and provide data required for sound farm planning.

Exercise No. 17

Assignment: Observe the types of records maintained in central farm and give brief note on it.

Chapter No. 12

Objective: Collection and Analysis of Data on Various Resources in India

Some of the important Natural Resources available in India are:- 1. Water Resources; 2. Forest Resources; and 3. Land Resources.

Exercise No. 18

Problem 1: Collect the land use pattern for India and Uttar Pradesh between 2000-01 and 2018-19 and calculate the % change in the land use pattern and offer your comments.

Problem 2. Collect source wise net irrigated area for India and Uttar Pradesh in 2000-01 and 2018-19 and calculate the % change in the land use pattern and offer your comments.