Exercise No. 1 **Date :**

STUDY OF LAWS OF RETURNS

Laws of returns refer to the amount of output secured by addition of variable input to fixed inputs. There are three types of laws of returns (Input-Output relationship) in the production of a commodity, where one input varies and the quantities of all other inputs are fixed. The relationship between input of a single variable factor and output of a single product can be either of one or the combinations of types given below.

1. Law of constant returns or constant marginal productivity.
2. Law of increasing returns or increasing marginal productivity.
3. Law of diminishing returns or decreasing marginal productivity.

A) Law of Constant returns

Here each additional unit of the variable input when applied to the fixed factor produces an equal amount of additional product i.e. the amount of total product increases by the same magnitude or at constant rate per unit of input.

Example: Response of yield to the seed rate of paddy (Hypothetical data)

Sr. No.	Input used (seed rate Kg/ha) 'X'	Total Product (q/ha) Y	Additional input ΔX	Additional Output ΔY	Ratio of Additional Output to additional input i.e. MP= ΔY/ΔX
1.	10	6			
2.	20	12			
3.	30	18			
4.	40	24			
5.	50	30			
6.	60	36			

(Draw the graph of the relationship)

From the data, it is seen that for every increase in input unit (10 Kg.), there is equal or constant increase in the level of output (6 q.) i.e. Marginal product (MP) increases at constant rate per unit of input.

Hence, this relationship is called as law of constant returns. This input output relationship gives total product curve which is a straight line (Linear curve) as shown in the graph. The slope of the curve is constant.

(The relationship can also be expressed as)

$$\frac{\Delta Y_1}{\Delta X_1} = \frac{\Delta Y_2}{\Delta X_2} = \frac{\Delta Y_3}{\Delta X_3} = \frac{\Delta Yn-1}{\Delta Xn-1} = \frac{\Delta Y_n}{\Delta X_n}$$

The law of constant returns is not very common in agriculture and it holds true only within a limited range

B) Law of increasing returns

The increasing returns to a single factor exist when every additional or marginal unit of input adds more to the total product at an increasing rate per unit of input.

Example : Response of paddy yields to the seed rate (Hypothetical data).

Sr. No.	Input used (seed rate Kg/ha) X	Total Product (q/ha) Y	Additional input ΔX	Additional Output ΔY	Ratio of Additional Output to additional input i.e. MP= ΔY/ΔX
1.	10	10			
2.	20	13			
3.	30	17			
4.	40	22			
5.	50	28			
6.	60	35			

(Draw the graph of the relationship)

From the table, it is seen that, for every 10 Kg. increase in seed input used, there is increase in the total output at an increasing rate i.e. marginal product (MP) increases at an increasing rate per unit of input. This input-output relationship gives total product curve which is convex to 'X' axis as shown in the graph. The slope of the curve becomes steeper and steeper with the use of additional units of input.

(The relationship can also be expressed as).

$$\frac{\Delta Y_1}{\Delta X_1} < \frac{\Delta Y_2}{\Delta X_2} < \frac{\Delta Y_3}{\Delta X_3} < \frac{\Delta Yn-1}{\Delta Xn-1} < \frac{\Delta Y_n}{\Delta X_n}$$

The law of increasing returns exists in agricultural production during initial stage for only over a short period, observed in very limited range. This type of returns are possible when the fixed factors of production are in excess capacity and addition of the small unit of various resource make more and more efficient use of fixed resources.

C) Law of decreasing returns

Here each additional unit of input adds less to the total product (TP) than the previous unit of input. T. P. increases at decreasing rate per unit of input.

Example : Response of paddy yield to the seed rate (Hypothetical data).

Sr. No.	Input used (seed rate Kg/ha) X	Total Product (q/ha) Y	Additional input ΔX	Additional Output ΔY	Ratio of Additional Output to additional input i.e. MP= ΔY/ΔX
1.	10	5.00			
2.	20	7.50			
3.	30	9.50			
4.	40	11.00			
5.	50	12.00			
6.	60	12.50			

(Draw the graph of the relationship)

The above example shows decreasing marginal productivity, where the first unit of 10 Kg. seed produces 5 q. of output, second 2.5 q., third 2.0 q., fourth 1.5 q., firth 1.0 q. and sixth 0.5 q.

The input output relationship gives a curve which is not a straight line due to fact that total product increases at diminishing rate. The shape of the curve is concave to the 'X' axis.

(The relationship can be expressed as)

$$\frac{\Delta Y_1}{\Delta X_1} > \frac{\Delta Y_2}{\Delta X_2} > \frac{\Delta Y_3}{\Delta X_3} > \frac{\Delta Y_{n-1}}{\Delta X_{n-1}} > \frac{\Delta Y_n}{\Delta X_n}$$

This is a technological law of biological response and is applicable in agricultural production under varied farm situations. This law exists in

almost all practical situations in agriculture where addition in the total product goes on decreasing with increase in input. Response to fertilizers, insecticides, seed, irrigation, feeds, etc. all show diminishing returns.

This law was first put forth by "**Alfred Marshall"**; "as an increase in labour and capital applied to the cultivation of land causes in general a less than proportionate increase in the amount of produce unless it happens to coincide with improvements in the art of agriculture".

In simple meaning it is stated as **"if increasing quantities of one input are added to the production process while quantity of all other inputs are held constant, the quantity of output added per unit of variable input will eventually start declining"**.

BASIC CONCEPTS

Total Product (TP)

An amount of product that results from use of different quantities of inputs is called total product (Y)

Marginal product (MP)

It refers to the product which an additional unit of input factor adds to the total product. It is the ratio of change in total product at a given point to the quantity of input changed.

$$\text{M.P. Per unit of variable input} = \frac{\text{Additional product}}{\text{Additional input}}$$

$$\text{Symbolically it is expressed as : MP} = \frac{\Delta Y}{\Delta X}$$

Average Product (AP)

It refers to the average productivity of the variable resource. It is the ratio of total product to the quantity of input used in producing that amount of product.

$$\text{A. P.} = \frac{\text{Total Product}}{\text{No. of units of inputs used in producing that products}}$$

$$\text{AP} = \frac{Y}{X}$$

Exercise No. 2 **Date :**

BASIC CONCEPTS AND TERMS

Farm : – A farm is defined as the smallest unit of agriculture which may consists of one or more plots cultivated by one farmer or a group of farmers in common for raising crop and livestock. It is both a producing as well as a consuming unit.

Family Farm: – A family holding (farm) may be defined briefly as being equivalent, according to the local conditions and under the existing conditions of technique either to a plough unit or a work unit for a family of average size.

Agriculture : - The sum of the practices of crop production and livestock raising on individual farm is called agriculture.

Farm firm :- It is a production unit under on management, is also known as an economic unit referring to an aggregation of resources for which costs and returns are worked out as a whole e.g. farm holding is an economic unit.

Technical unit : - Technical unit refers to a single, convenient unit in production for which technical coefficients are calculated e.g. an acre of land, a cow, a unit of poultry birds etc. It is a exact single unit in production.

Farm Plant: - It is a collection of technical units e.g. 5 ha mixed farm or a dairy farm.

Economic unit :- It is the sum of resources for which costs. returns and net income can be worked out.

Synonyms :-

i) Factors of production / resources / inputs.

ii) Factor-product relationship / input-output relationship / input responses.

Resources and Resource services

There are some inputs or resources such as fertilizers, water, insecticides which get consumed or transformed into products in the

process of production. There are certain resources of which only services are available which are transformed into a product e.g. labour, implements, buildings.

i) Stock and flow inputs.

ii) Combination of stock and flow services (continuous inputs and discontinuous inputs).

Fixed and variable resources

The resources such as farm building, machinery, implements are fixed over a planning period irrespective of the level of enterprises taken up. These are known as fixed farm resources.

The resources, of which use varies with the level of enterprises, are known as variable resources e.g. seed, feed etc. Some fixed resources also have variable use e.g. Bullock labour tractor services, etc.

Production in Transformation period

It is the interval of time between efforts and returns. It is a process of transformation of certain resources of services into products.

Production function

The relationship between inputs and outputs can be characterized as a production function. It is a technical and mathematical relationship describing the manner and extent to which a particular product depends upon the quantities of inputs or services of inputs used. Forms of Production function or ways of representing Preparation of Farm

1) Tabular form
2) Allegoric form
3) Graphic form

Exercise No. 3 **Date:**

DETERMINATION OF OPTIMUM INPUT AND OUTPUT AND LEAST COST COMBINATION OF INPUTS

The level of variable input and the most profitable level of production is decided with the law of diminishing returns. This simple, but powerful principle can be used to organize profitable farm business. The principle states that after a certain point has been reached, if increasing quantities of one variable input are added in crop or animal production process, while all other factors held constant, the amount of output added per unit of variable input will eventually start declining. The level of which one should push the yield per ha. milk per cow, marketing weight per animal or poultry bird, etc. revolves around the law of diminishing returns. It answers the problem how much to produce. The added quantity of a variable resource applied to a fixed factor such as land or given head of livestock add less and less to the yield or output. Examples are application of seed, fertilizers or irrigation to a hectare of land or feeding concentrates and fodder to animals. There are some farmers who looses sight of diminishing returns to variable factor and consider the highest yield per ha. or the highest milk yield per cow etc. always to be best in terms of gross profit. This way they think only in terms of physical yield and not in terms of costs and returns. But alongwith production they must also consider costs at same point. The profit rule is **keep adding variable resource to the fixed resource as long as added return is more than or equal to the added cost i.e. MR ≥ MC.**

Example

A farmer wants to know how much fertilizer should be added to one

ha. of paddy to maximize his profit. The price of paddy is Rs. 600/- per quintal and price of fertilizer (N) Rs. 10/- per kg.

Sr. No.	N Kg/ha (X)	Yield q/ha (Y)	Total cost (TC)	Total revenue (TR)	Marginal cost (MC)	Marginal return (MR)	Profit (TR-TC)
1	0	10.0					
2	20	12.0					
3	40	15.0					
4	60	20.0					
5	80	22.0					
6	100	23.0					
7	120	23.5					
8	140	23.0					
9	160	22.0					
10	180	21.0					

In the above table compare the marginal or added costs and added return. A farmer should stop applying additional does of nitrogen where fertilizer cost is just balanced by the added returns from paddy. Thus, optimum level of fertilizer in this case is _____ kg/ha where the profit is maximum i.e. Rs. _____ Beyond this level marginal return is less than marginal cost and profit is declining.

Effect of change in prices

The effect of change in price of inputs and output also affect optimum level of input use.

1) Effect of change in price of input

i) Price of paddy is Rs. 600/- quintal

ii) Price of N – Rs. 8/- per kg. and Rs. 20/- per kg.

N g/ha X	Yield q/ha Y	Additional input ΔX	Additional output ΔY	Added cost at different input prices		Added returns (MR)
				Rs. 8/-	Rs. 20/-	
0	10.0					
20	12.0					
40	15.0					
60	20.0					
80	22.0					
100	23.0					
120	23.5					
140	23.0					
160	22.0					
180	21.0					

When price of paddy remaining constant at Rs. 600/- q. and price of N is Rs. 8/- per kg., then _____ kg. dose of N is most profitable. But, when price of N increase to Rs. 15/- per kg., the _____ kg. dose of N become most profitable, therefore when prices of input are lower, higher does are most profitable, but when prices of input increase, higher dose are not profitable, lower doses are profitable.

2) Effect of change in price of output

i) Price of paddy is Rs. 150/ q and Rs. 200/ q.

ii) Price of N=Rs. 4.50/- per kg.

N kg/ha X	Yield q/ha Y	Additional input ΔX	Additional output ΔY	Additional cost (MC)	Added returns at different output prices	
					Rs. /-	Rs. /-
0	10.0					
20	12.0					
40	15.0					
60	20.0					
80	22.0					
100	23.0					
120	23.5					
140	23.0					
160	22.0					
180	21.0					

When price of nitrogen remaining constant at Rs. 10/- per kg. And price of paddy is Rs. / q., the _____ kg of N is most profitable. But when price of paddy increase to Rs. / q., then _____ kg of N become most profitable. Therefore, when price of input remaining constant or unchanged and price of output low, lower dose are profitable than higher doses and when price increase higher doses become more profitable.

Thus, when output price increase or input price decrease the optimum level of input increases. Conversely, if the output price decrease or input price increase the optimum level of input decreases.

To summaries, a farmer can increase the dose of variable input so long as the added returns are greater than the added costs and stop at a point where the added returns are equal to added costs, i.e. MR=MC. **That is the**

maximum profit level or optimum level of input used is directly related to output price and inversely related to input price. Such simple exercise for taking day to day operational decisions can save the farmer from excessive use of inputs and increase his net returns from the farm business.

This principle should be helpful in making decisions of the following type.

1. The level of yield per acre, milk per cow should be pushed to secure maximum profit (i.e. how much to produce)
2. The size of farm one should operate with given resources of capital, labour and management
3. The amount of fertilizers, labour or type of machinery one should use and such other decisions.

Exercise No. 4 **Date:**

STUDY OF LAW OF SUBSTITUTION OR PRINCIPLE OF LEAST COST COMBINATION OF TWO INPUTS

The principle of substitution between two inputs states that if the quantity of output is constant, it is economical to substitute one factor of production for another factor of production, if the price of first input factor is less than the price of second input factor. This principle provides the logic in determining the least cost method of production. In agricultural Production it is possible to substitute one input factor for another because argil. Production is dependent on number of factors. e.g. farmer may faces a problem of deciding whether to prepare seed bed with wooden plough or iron plough or whether to apply chemical fertilizer or organic manures to produce a given output of crops. In each case a farmer is interested in selecting **least cost practice** or **least cost combination of resources** for producing given quantity of produce. Many practices or input factors can be used by the farmer, which allow large number of combinations of two practices or input factors to produce desired output. Another example is that, in feeding dairy cows, farmer can feed a large quantity of Berseem and small quantity of Concentrates or vice –versa to maintain a given production level of milk. In such situation a farmer should select such a unique combination for that the cost of two inputs combination be minimum.

To find out the Least Cost Combination of Besreem and Concentrates following steps are necessary.

1. Calculate the added quantity of Berseem and replaced quantity Concentrate taking into consideration the units of two successive levels.
2. Compute the Marginal Rate of Substitution (MRS) by dividing the number of units of replaced resources (i.e. Concentrate) by the number of units of added resource (i.e. Berseem) by using following formula.

$$MRS = \frac{\Delta x2}{\Delta x1} = \frac{\text{No. of units of replaced resource}}{\text{No. of units of added resource}}$$

3. Calculate the price ratio (PR) as follows

$$\text{Price Ratio} = \frac{\text{Cost per unit of added resource } (X_1)}{\text{Cost per unit of replaced resource } (X_2)}$$

$$PR = \frac{P_{X1}}{P_{X2}}$$

1. Work out the Least Cost Combination by equating MRS with price ratio (inverse)

$$LLC = \frac{\Delta x2}{\Delta x1} = \frac{PX1}{PX2}$$

Example: In the following table different combinations of Berseem (X_1) and Concentrate (X_2) producing 2800 liters of milk have been given. If the price of Berseem is Rs. 80/- per quintal and Concentrate is Rs. 800/- per quintal, work out the Least Cost Combination of Berseem and Concentrate.

Sr. No.	**Feed Required to produce 2800 Lit. of Milk**		**ΔX1**	**ΔX2**	**MRS $\frac{\Delta X2}{\Delta X1}$**	**Price Ratio PR = $\frac{PX1}{PX2}$**
	Berseem (kg) (X_1)	Concerntrate (Kg) (X_2)				
1.	7500	900				
2.	7700	850				
3.	7920	800				
4.	8170	750				
5.	8460	700				
6.	8880	650				
7.	9200	600				
8.	9670	550				
9.	10220	500				
10.	10860	450				
11.	11600	400				

Conclusions / Remarks

PROFIT RULE

1. If MRS is greater than PR go on using more of added resource to achieve LCC

$$\frac{\Delta x2}{\Delta x1} > \frac{Px1}{Px2}$$ Use more quantity of adder resource

2. If MRS is less than PR go on using more of replaced resource to achieve LCC

$$\frac{\Delta x2}{\Delta x1} < \frac{Px1}{Px2}$$ Use more quantity of replaced resource

3. When MRS is equal to PR, it is the point where cost of combination of two input is at lowest

$$\frac{\Delta x2}{\Delta x1} = \frac{Px1}{Px2}$$ It is LCC

ASSIGNMENT

1. Estimate cost of each combination given in the example on previous page and verify the combination of least cost with your results (Used tabular method).
2. Plot the graph of Iso-quant and Iso-cost line to find out L.C.C. and confirm your result (Used Graphic method).

Exercise No. 5 **Date:**

APPLICATION OF PRINCIPLE OF EQUI-MARGINAL RETURNS AND OPPORTUNITY COST

The Principle of diminishing returns helps in determining the most profitable level of resources use under conditions, where resources are available in unlimited quantities. Most of the farmers have limited resources. They have limited land, limited irrigation facilities and limited capital. Even the labour, which is considered surplus, becomes scare during the peak sowing and harvesting seasons. When all crops compete for resource availability, the main basic task of a farmer in organizing farm enterprises is to gain the maximum income or profit from the use of each unit of limited resource among the alternative uses.

The economic principle applicable under such circumstances is known as the **"Principle of Equi-marginal Returns or the Opportunity Cost Principle"**. It says that returns from limited resources will be maximized, if each unit of these resources is used, where it will add maximum to marginal returns and not the average returns. The farmer must use each piece of land, each day of human labour and bullock labour, each kilogram of fertilizer, each cubic centimeter of water in those enterprises in which they add maximum to the net returns. The principle sates that resources should be used where they bring not the greatest average returns, but the greatest marginal returns.

Example: A farmer has three plots of one hectare each for growing different varieties of paddy in the Kharif season. The plots are almost similar in soil type and natural fertility level. The yield and level of nitrogen application are given in the following table.

Nitrogen Per ha X	Added 'N' ΔX	Yield per hectare (Kg.)					
		Karjat - 184		Ratnagiri – 24		Panvel – 1	
		Total	Added	Total	Added	Total	Added
0	--	5870	--	4322	--	4331	--
20		6189		4708		4517	
40		6471		5018		4663	
60		6716		5249		4739	
80		6922		5402		4739	
100		7092		5476		4624	
120		7223		5473		4612	
140		7317		5392		4451	
160		7376		5232		4231	
180		7394		4994		3951	
200		7295		4679		3612	

Considering the price of nitrogen Rs. 10/kg. and price of paddy Rs. 6/kg. calculate the most profitable levels of nitrogen application for each variety. **Complete the table by working out added cost and added returns or marginal returns.**

Added N kg/ha	Added cost or marginal cost (Rs.)	Value of added yield of paddy or marginal returns (Rs.)		
		Karjat – 184	Ratnagiri – 24	Panvel – 1
20				
20				
20				
20				
20				
20				
20				
20				
20				
20				
Total				
Returns per Kg of Nitrogen				

Most profitable levels for each variety

Karjat – 184	=	Kg. of Nitrogen
Ratnagiri – 24	=	Kg. of Nitrogen
Panvel – 1	=	Kg. of Nitrogen
Total	=	Kg. of Nitrogen

Thus a farmer needs _____ kg. of nitrogen to apply for all the varieties at their most profitable level. However, the capital available with him provides to purchase only 200 kg. of nitrogen (Rs. 2000/-). How should he allocate this limited quantity of nitrogen (200 kg.) among the three varieties so as to get maximum net returns?

Allocation of each does of limited quantity of nitrogen (i.e. 200 kg.) on different varieties of paddy at a level, which is giving maximum marginal returns.

Dose of Nitrogen (each of 20 kg.)	**Variety**	**Additional income or marginal returns**
1st dose		
2nd dose		
3rd dose		
4th dose		
5th dose		
6th dose		
7th dose		
8th dose		
9th dose		
10th dose		

The allocation of nitrogen among the three varieties should be as follows

Variety of Paddy	**Quantity of Nitrogen (Kg)**	**Additional returns**
Karjat – 184		
Ratnagiri – 24		
Panvel – 1		
Total Profit		

It is seen in the above example that, added returns guides the farmer in allocation of limited resource and not the average returns per kg. of nitrogen. If the farmer considers average returns per kg. of nitrogen, he has to allocate whole quantity of nitrogen to _____ variety, because this variety gives the highest increase in income over the two varieties.

This principle is also called the **"Opportunity Cost Principle"** because it considers the value of one enterprise sacrificed as a cost in the production of another enterprise. In this example, the income which farmer will derive from the _____ variety and _____ variety have to sacrifice if he decides to apply all or part of his limited nitrogen to _____ variety alone, can be considered as the opportunity cost. The cost of nitrogen to Karjat – 184 alone includes the direct cost of nitrogen plus the value of produce from Ratnagiri- 24 and Panvel- 1 which would have to be sacrificed by not applying nitrogen to these varieties.

Now, if the total value of produce from Karjat- 184 exceeds the direct and opportunity cost of nitrogen, it will pay to apply all the nitrogen to Karjat- 184, otherwise, it will be profitable to use nitrogen for Ratnagiri – 24 and Panvel – 1 varieties.

The opportunity cost of an input to a farmer is the value in its best alternative use. If a bullock pair earns Rs. 100/ day on ploughing, but is can also earn Rs. 150/- per day in the another employment, say carting in Kharif season. In this case if the farmer carry out ploughing operation first, considering the urgency of farm operations, then the opportunity cost of using a resource (bullock pair) will be Rs. 150/- for ploughing.

Practical Utility

1. It guides the farmer to plan his budget for the preparation of his cropping scheme and fitting therein his livestock programme.
2. It enables him to determine enterprise combination- complementary or competitive in the budgeting of the farm.
3. It provides guidance to the adoption of diversified or specilised

farming, as there is a profitable limit for each enterprise as well as most profitable enterprise for each farm.

Exercise No.6 **Date:**

DEPRECIATION METHODS

Depreciation represents the amount by which a farm assets decrease in value as a result of cause other than a change in the general price of the item. In other words, **it is defined as the loss in the value of a given asset as a result of the use, wear and tear, accidental damage and time obsolescence** (i.e. becoming out of date due to new invention). The decline in value is gradual and takes place through wear and tear of implements, use of buildings, aging of animal, etc. Thus depreciation involves distribution of the original value or cost of an asset over its useful life. The amount of depreciation charges should therefore, correspond to the loss in the value of the asset over time. The computation of depreciation would not be necessary if all items purchased were completely worn out by the end of each year. However, the items such as buildings, machinery, equipments and livestock etc. are used up gradually over a long period of years and important question arises about the determination of value of such assets for one specific year. The value of the asset may become completely exhausted or reduced to its junk value.

Points to be considered in Computing Depreciation

1. Original value i.e. construction cost or purchase price
2. Estimated useful life in years
3. Value at the end of useful life (i.e. junk value or scrap value or residual value or salvage value).
4. Changes of obsolescence

Methods of Computing Depreciation

There are many methods of computation of depreciation, but none of

these methods can be considered the most appropriate under all circumstances. The methods of computing depreciation can be based on either of the following two assumptions.

1. Assets are used at a constant rate year after year, and
2. Assets are used at varying rates year after year.

The most common methods of Computing Depreciation are

1. Straight line method
2. Diminishing balance or value method
3. Sum of the year digits or Reducing fraction method
4. Compound interest method
5. Annual revaluation method
6. Machine hour basis method

1. Straight Line Method

This is the most commonly used method. It is easy, simple and usually very satisfactory for most purposes. This method assumes that assets are used more or less to the same extent every year and therefore, equal amount of costs on account of their use can be charged very year. This method consists of dividing the total anticipated depreciation by the number of years the particular asset is expected to lost. The total anticipated depreciation is the purchase price of the article minus junk value/salvage value/scrap value/residual value. By this method, amount of annual deprecation will be calculated by using following formula

$$\text{Amount of annual depreciation} = \frac{\text{Purchase price of the asset} - \text{junk value}}{\text{No. of useful years (expected life)}}$$

In this method, the fixed percentage on the original value of the asset is charged annually so as to reduce it to junk value at the end of the estimated useful life. This annual charge of a fixed amount is deducted from the value of asset, at the end of each year

Example 1: Calculate the value of a bullock cart at the end of the 5th year with the help of data given below

1. Original value of the Bullock cart Rs. 22000/-

2. Expected life 10 years

3. Junk value Rs. 2000/-

Solution

a) Total depreciation =

b) Amount of annual depreciation

c) Value of the bullock cart at the end of fifth years

Original price – (Annual depc. × Years used) =

Example 2: Calculate the value of a farm store in 2005 on the basis of following data

1. Original cost = Rs. 50000/-
2. Year of construction = 1990
3. Junk value = 10 % of the construction cost
4. Annual rate of depreciation = 2 %

Solution

1. Annual rate of depreciation =

2. Annul amount of depreciation =

3. Value of farm store in year 2005

2. Diminishing balance or value method

In this method a fixed rate of depreciation is used for every year and applied to the value of the asset at the beginning of the year. The original cost or value of an asset is divided by its estimated life to know the fixed percentage. This fixed rate is applied to the balance amount upto the salvage value is reached and no further depreciation in possible. Under this method, the amount of depreciation is higher in the earlier life of the article and lower in latter years.

Illustration

A machines is purchased for Rs. 1000/- and its expected life is 10 years. Calculated depreciated value of the machine at the end of each year.

Solution

Given : 1) Original value/purchase cost = Rs. 10000/-

2) Expected life = 10 years

3) Annual depreciation rate $= \frac{\text{Rs. 10000/-}}{\text{Expected life}}$

i.e. Rs. 1000/-

Rs. 1000/- is 10% of original value (10000/-). Therefore, the rate of fixed percentage of annual depreciation will be 10%.

With the help of given information calculate depreciation and residual values for each year.

(Values in Rs.)

Year	Value at beginning of year	Amount of annual depreciation	Diminishing or Residual value at then end of the year
1st	10000/-	1000/-	(10000 – 1000) = 9000
2nd	1000/-	900/-	(9000-900) = 8100
3rd			
4th			
5th			
6th			
7th			
8th			
9th			
10th			

3. Sum of the year digits or reducing fraction method

By this method the annual depreciation is calculated by multiplying fraction times the amount to be depreciated (i.e. original value minus scrap value). The fraction for any year can be determine by the following formula

$$\text{Fraction for any year} = \frac{\text{The year of life remaining at the beginning of accounting year}}{\text{The sum of the years of life of the asset}}$$

$$\text{Fraction for 1st year} = \frac{10}{1+2+3+4+5+6+7+8+9+10} = \frac{10}{55}$$

$$\text{Fraction for 2nd year} = \frac{9}{1+2+3+4+5+6+7+8+9+10} = \frac{9}{55}$$

Thus the sum of the year digits in case of an asset having expected life of ten years is 55. The total amount of depreciation (original value – scrap value) for the entire life of the asset is to be divided by 55 units. For the 1st year, the depreciation charges would be 10/55 of the total depreciation, for the second year 9/55 and so on.

Example : Calculate the value at the end of each year of an asset purchased at Rs. 12000/- with salvage value Rs. 1000/- and expected life 10 years.

1. Sum of the year digits = (1+2+3 ..... + 10 = 55 units)
2. Total amount of deprecation = 12000 – 1000 = Rs. 11000/-

Year	Value at beginning of year (Rs.)	Annual depreciation (Rs.)	Value of the end of the year (Rs.)
1st	12000/-	11000 × (10/ 55) = 2000	12000 – 2000 = 10000
2nd	10000	11000 × (9/ 55) = 1800	10000 – 1800 = 8200
3rd			
4th			
5th			
6th			
7th			
8th			
9th			
10th			

4. Compound interest method or depreciation fund or sinking fund method

Under this method a fixed amount is provided each year and invested outside the business in easily realizable (Convertible or changeable into money securities). The amount thus provided annually when accumulates at compound interest is sufficient to replace the asset at the end of its working life. However, the asset is allowed to stand in the books as its original cost. This system is suitable for industrial plants, machinery etc. but does not appear advisable for farm business.

5. Annual revaluation method

This method involves fixing of values of assets annually. The assets are valued consist with the market value of the asset at the end of each year. If the revaluation amount is less than the book value of the asset, the difference is depreciation (Loss) and if it is greater, the different is appreciation (Profit). This method is suitable and applied for calculating depreciation or appreciation of livestock.

The defect of this method is that the amount of depreciation charged every year is in unequal sums though the asset performs the same service year after year.

6. Machine hour basis method

In this method, the rate of depreciation is calculated considering number of hours a machine runs in a year

$$\text{Depreciation per hour} = \frac{\text{Purchase value} - \text{Scrap value}}{\text{Life of Machine (Hrs.)}}$$

$$\text{Deprecation in particular year} = \text{Per hour depreciation} \times \text{Use of machine in particular year (Hrs.)}$$

Example

A machine is costing Rs. 15000/- and expected to run for 10 years, after which its scrap value will be Rs. 2000/-. The machine is expected to run 1000 hrs./year. Estimate the depreciation charges per hour of the machine.

Solution :

Exercise No. 7 **Date:**

SEVEN TYPES OF COSTS AND THEIR COMPUTATION

The relationship of costs of production and income is very important in farming. Producers have to give considerable importance to the cost of production while taking production decisions.

There are two accounting periods in farming i) Short-run and ii) Long-run period. Short-run period is a period in which desired changes in production can be made without altering or changing the size of farm or without making organizational changes. Such period may be one agril. year or one crop season. The long run period is generally the period which is sufficiently long for output level to be altered or changed by varying even the size of the farm or by changing organization.

As there are two time periods, there are two corresponding costs. I) Fixed costs or sunk costs or overhead costs (long-run-cost) II) Variable costs (Short-run-costs).

Fixed Costs

They do not change with the level of production. Those include the expenses on the farm which must be paid even if nothing is produced. Examples are land rent and taxes, depreciation, charges of permanent hired labour, maintenance of bullocks, milch animals and other animals, etc.

Variable Costs

Variable costs are the costs of using variable inputs. Variable costs are those which vary with the level of production. These include the cost of adding variable inputs. They do not occur, if nothing is produced. Example – Costs of seed, F.Y.M. fertilizers, daily paid labour, diesel or electricity charges, cost incurred in feed a fodder of milch animals, etc.

Total Costs

Fixed costs plus variable costs are equal to total cost. Net income is equal to total income (or gross income) minus total costs. A farmer will have to quite farming if total costs are more than total income in the long-run period.

Identification of fixed and variable costs helps in taking short-run and long-run decisions.

In the short-run, gross income must atleast cover variable costs and maximum net income is obtained when marginal cost (MC) is equal to marginal return (MR). If gross income is less than the total cost (Fixed and Variable costs) but are still greater than the variable costs then the guiding principle is to **"go on increasing production so long as MR are greater than MC"**, so that the loss is minimized. From the point of view regarding day to day management decisions variable costs are important.

In the long-run, gross income should necessarily be greater than the total costs (fixed and variable cost). For taking production decisions in such a situation, one should go on using resources as long as MR is greater than MC. Net returns are maximum when MR=MC, Here objectives is to maximize profits instead of minimizing the losses. In the long-run there are no fixed costs. All costs become variable costs.

Table 1: Illustration of fixed and variable costs on a two hectare farm.

Sr. No	Particulars	Level of production (Paddy)		
		30q	40q	50q
A)	**Fixed cost**			
	i) Land Revenue	100	100	100
	ii) Depreciation on building and equipment	500	500	500
	iii) Interest on fixed capital	750	750	750
	iv) Other fixed costs	250	250	250
	Total fixed costs			
	Average fixed costs / Q.			
B)	**Variable costs**			
	i) Hired labour charges	500	650	300
	ii) Seeds	300	375	550
	iii) Fertilizers	400	650	850
	iv) Electricity charges	500	750	950
	v) Pesticides	80	115	180
	vi) Others expenses	200	260	370
	Total variable costs			
	Average variable costs / Q.			
C)	**Total cost (Fixed + Variable)**			
	Average total cost / Q.			

Concepts and computation of different costs

To know the relationship between different types of costs we need to know AFC, AVC, ATC and MC

Average Fixed Cost (AFC)

It is worked out by dividing total fixed costs by the amount of output. It is a fixed costs per unit of output. It varies for each level of output. As output increase, AFC decreases. Thus, per unit fixed costs are estimated by using following formula.

$$AFC = \frac{\text{Total fixed costs}}{\text{Amount of output}} = \frac{TFC}{Y}$$

Average Variable Cost (AVC)

It is worked out by dividing total variable cost by the amount of output Average variable cost varies with the level of output. It will decrease in the beginning when the law of increasing returns operates and then increases when the law of diminishing returns operates. It is inversely proportional to average product i.e. when APP increases AVC decreases and as APP decreases AVC increases.

$$AVC = \frac{\text{Total variable cost}}{\text{Amount of output}} = \frac{TVC}{Y}$$

Average Total Cost (ATC)

It is the total cost per unit of output. It decreases in the beginning when the law of increasing returns operates and then increases when the law of diminishing returns operates.

$$ATC = \frac{\text{Total cost}}{\text{Amount of output}} = \frac{TC}{Y}$$

OR

$$ATC = AFC + AVC$$

Marginal Cost (MC)

Marginal cost or added cost is the cost incurred for producing additional unit of output. In other words, the cost of producing an additional unit of output. It is computed by dividing the change in total cost (Δ TC) by corresponding change in output (Δ Y) i.e.

$$MC = \frac{\Delta TC}{\Delta Y}$$

Relationship of Costs

1. As the output increases, the average fixed cost (AFC) goes on declining continuously, because the fixed cost is constant while the output (denominator) increases.
2. The average variable cost (AVC) first declines so long as the law of increasing returns hold good but after a certain point is reached, it starts increasing because of the operation of the law of diminishing returns.
3. The average total cost (ATC) first declines, reaches at minimum and then increases, (ATC curve is at a higher level of output than that of AVC curve)
4. The marginal cost (MC) which is defined as the change in total cost divided by change in output (Δ TC/ ΔY) declines first, reaches a minimum and then starts increasing.
5. So long as the AVC is declining, the MC is less than the AVC, when AVC starts increasing MC becomes grater than AVC. Naturally, when the AVC is minimum, it is equal to MC i.e. MC curve cuts AVC from below at its minimum.
6. The MC curve starts from below the AVC curve and cuts AVC curves at its minimum or lowest point and afterwards goes higher than AVC and ATC respectively.

Decision for profit maximization

Go on increasing the production as long as the marginal costs (MC) are less than or equal to marginal returns (MR) so that the profit is maximum. As soon as the MC exceed MR, the profit starts declining. One should stop production, where MC=MR. In the example given in Table No. 2, profit increases upto level of 60 Q. production, where MC is les than MR. After this level, MC is greater than MR and hence, profit is declining.

Assignment

The data regarding output, returns and cost is given in Table 2. Using this data estimate the different cost and complete the table. Also draw a graph of cost function (Different costs) and study their relationship.

Table 2: Relationship between different types of costs and returns

Output Qts/ha. (Y)	Total returns (@Rs. 90/q.) (Rs.)	Fixed costs FC (Rs.)	Variable cost VC (Rs.)	Total cost TC (FC+VC) (Rs.)	Average fixed cost AFC (FC/Y) (Rs.)	Average variable cost AVC (VC/Y) (Rs.)	Average total cost ATC (TC/Y) (Rs.)	Marginal cost ΔTC/ΔY (Rs.)	Marginal returns	Profit (TR -TC) (Rs.)
10	900	1100	320							
20	1800	1100	540							
30	2700	1100	630							
40	3600	1100	1040							
50	4500	1100	1600							
60	5400	1100	2460							
70	6300	1100	3640							

Exercise No. 8 **Date :**

FARM COST CONCEPTS AND THEIR IMPUTATION PROCEDURE

The cost of production of a crop is considered at three different levels viz. Cost-A, Cost-B and Cost-C. The concept of seven costs such as Cost-A_1 Cost-A_2, Cost-B_1, Cost-B_2 and Cost-C_1, Cost-C_2 and Cost-C_3 is followed by the Commission on Agricultural Costs and Prices (CACP), Government of India in their cost studies. The cost concepts generally followed in the studies of cost of cultivation as well as cost of production of crops are as under.

The items included under each category of cost are given below.

I) Cost – A : Actual paid-out costs by owner cultivator, inclusive of both cash and kind expenditure, which include cost of following items.

1. Hired human labour - a) Male b) Female
2. Bullock labour - a) Owned b) Hired
3. Machine labour - a) Owned b) Hired
4. Seeds - a) Owned b) Purchased
5. Manures a) Owned b) Purchased
6. Fertilizers
7. Insecticides and pesticides
8. Irrigation charges
9. Other purchased inputs (Bio-fertilizers, growth regulators, bio pesticides, etc.)
10. Land revenue, cesses and other taxes
11. Depreciation on capital assets (Hand tools, implements and machinery)
12. Interest on working capital

II) Cost – A_1: For the tenant cultivator, the rent paid by him to the land-lord is another item of actual cost. Cost on account of all the above cost items exclusive of land revenue and other taxes, but inclusive of the rent paid to leased in land is referred to as Cost A_1. So Cost- A_1 = Cost on account of all the above items of cost except land revenue and other taxes + rent paid by tenant cultivator.

Cost A_1 = Cost A (except land revenue and other taxes + Rent paid to leased in land.

III) Cost – B : Rental value of land and interest on fixed capital (considered as

opportunity cost) which are added to Cost A or Cost A_1 to give Cost B.

Cost B = Cost A (or Cost-A_1) + Imputed rental value of owned land + imputed interest on owned fixed capital.

IV) Cost C: It is the total cost of production, which includes all cost items. Actual as well as imputed. The value of family labour is to be imputed and added to Cost – B to work out Cost – C. Also managerial or supervision charges are added in Cost-B @ 10% of Cost-A. Therefore **Cost – C** = Cost B + Imputed value of family human labour + Supervision charges (@ 10 % of cost-A)

Estimation of per unit cost

a) Per hectare cost of cultivation = $\frac{\text{Total cost (Cost-C)} - \text{Value of by produce}}{\text{Area under the crop in ha.}}$

b) Per quintal/ton cost of production = $\frac{\text{Total Cost (Cost-C)} - \text{Value of by produce}}{\text{Quantity of main produce in quintals/tones}}$

c) Cost benefit ratio $\frac{\text{Gross returns (Rs.)}}{\text{Total expenses (Cost C)}}$ =

Valuation of costs of individual item

1. Inputs:

Cost of inputs such as seeds, manures, fertilizers and pesticides which are directly purchased by the cultivator are valued at the actual price paid by him. Home produced seed and manure are valued at the prevailing prices in the village or in the locality.

2. Human Labour:

Hired human labour employed on farm are valued at the actual wage paid both in the cash and in kind. Family labour is also valued at the prevailing wages paid to the hired or casual labour in the locality.

3. Bullock labour :

Bullock labour, both owned and hired is valued as per rate of hiring bullocks paid in the locality or a village.

4. Land revenue :

Actual land revenue and other cesses paid to the Government and Zilla

Parishad are taken as total land revenue. The revenue is spread proportionately on different crops grown on the basis of Gross Cropped area (GCA).

$$\text{Land revenue for particular crop} = \frac{\text{Total land revenue}}{\text{Gross cropped area (ha.)}} \times \text{Area under particular crop in (ha.)}$$

5. Rental value of owned land or land rent paid to leased in land:

The rent actually paid by the tanent cultivator who leased in some land is taken as such as rent paid to leasedin land. In case of owned land, rental value is computed as **one sixth of the gross value of the produce net of land revenue and other taxes.**

6. Interest on capital:

a) Interest on working capital : It is charged at prevailing rate of interest on crop loan for period of crop life.

b) Interest on fixed capital: It is charged at 10 per cent on the fixed investment made on the farm and apportioned on the total area under different crop (GCA).

$$\text{Interest on fixed capital for particular crop} = \frac{\text{Total interest on fixed capital}}{\text{Gross cropped area (ha.)}} \times \text{Area under particular crop in (ha.)}$$

7. Depreciation:

Depreciation on implements and machinery is calculated by straight line method and is apportioned on different crops according to the are under each crop. Repairing charges of implements and machinery if any are also apportioned by following same criteria used in land revenue or internet on fixed capital.

8. Supervision charges:

Supervision charges are worked out @ 10 per cent of Cost – A as managerial charges of the cultivator for his overall supervision and management on the own farm for particular crop.

Measures of farm income

1. Farm business income = Gross income – Cost A
2. Farm investment income = Gross income – (Cost A + Value of family human labour)

OR

Farm investment income = Farm business income - value of family labour

3. Family labour income = Gross income – Cost B
4. Net income = Gross income – Cost

Exercise No. 9 **Date**

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

Estimate per hectare cost of cultivation and per quintal cost of production of kharif rice with the help of following given data. Also estimate different measures of farm income.

- Total gross cropped area = 2.50 ha.
- Area under paddy = 0.4 ha.
- Variety grown = Jaya

Inputs Used

1) Male labour – Family – 25 days
   - Hired – 20 days
2) Female labour – Family – 20 days
   - Hired – 18 days
3) Bullock labour – 8 pair days
4) Machine Hours – 4 hrs.
5) Seed – 20 kg
6) Manures – 4 q.
7) Urea - 30 kg
8) S.S.P. – 10 kg
9) M.O.P. – 10 kg
10) Plant protection chemicals – Rs. 180
11) Total depreciation charges – Rs. 2000/-
12) Total land revenue = Rs. 180/-
13) Total interest on fixed capital investment – Rs. 1250/-
14) Yield received –
    - Grain – 20 quintal
    - Straw – 25 quintal
15) Market prices, rates and wage rates.

- Male – Rs. 80/ day
- Female – Rs. 60/ day
- Bullock pair – 125/ day
- Machine charges – 250/ hrs
- Seed – Rs. 12/ kg
- Manures – Rs. 80/ q.
- Urea – 5.25/ kg
- S.S.P. – 3.25/ kg
- M.O.P. - 4.20/ kg
- Market price of paddy – Rs. 900/ q
- Market price of straw – Rs. 100/ q.

Solution

Estimation of item wise cost of cultivation of Kharif rice

Variety : Jaya Area : 0.40 ha.

Sr. No.	Item of cost	Unit	Rate (Rs.)	Amount (Rs.)
1.	Hired Human labour Male Female			
2.	Bullock labour			
3.	Machine labour			
4.	Seed			
5.	Manures			
6.	Urea			
7.	S.S.P.			
8.	M.O.P.			
9.	Plant protection charges			
10.	Depreciation charges			
11.	Land revenue and other cesses			
12.	Interest on working capital (@ 6 % for six months)			
	COST - A			
13.	Rental value of owned land			
14.	Interest on fixed capital			
	COST - B			
15.	Family labour Male Female			
16.	Supervision charges (@ 10% of cost A)			
	COST - C			

Conclusions

1. Per ha. cost of cultivation

2. Per quintal cost of production

3. **Measures of farm income**

   a. Farm business income

   b. Farm investment income

   c. Family labour income

   d. Net income

4. **Cost benefit ratio**

Exercise No. 10 **Date :**

PREPARATION OF FARM PLANS

Planning is the deliberate and conscious effort on the part of the farmer to think about the farm programmers in advance and adjust them according to new knowledge on technological developments, changes in physical and economic situations, price structures, etc.

Scientific planning is situations and written based on the best information available and aimed at achieving the maximum of satisfaction for the farmer and his family out of their resources.

What is Farm Planning?

Farm planning implies the adoption of business method in every phase of farm activity. It is a decision making process. Farm planning approach is an integrated, co-ordinate and advance Programme of actions, which seek to present an opportunity to cultivators to improve his level of income

Farm planning is an approach which introduces desirable changes in farm organization and operations and makes the farm a viable unit. Farm planning is a process of making decisions regarding the organization and operation of a farm business, so that it results in a continuous maximization of net returns of a farm business.

Why Farm Planning?

On majority of our farms, there is under-utilization as well as overutilisation of the existing farm resources. Due to this our farmers fail to get optimum and maximum net gains. There is immediate necessity to reorganize the farm structure and for proper allocation of resources to obtain maximum net income and optimum production. This calls for proper farm planning and budgeting.

The main objective of farm planning is to maximize net income and it involves "Planning Horizon". The length of the planning period on the basis of the farmer's situation has to be therefore decided. The main objective is to maximize the annual net income sustained over a long period of time.

Types of Farm Planning

1) Simple farm planning
2) Complete or full farm planning

1) Simple farm planning is adopted either for a part of land, for one enterprise, or to substitute one resource by another. This is very simple and easy to understand as well as to implement. The process of change should always begin with the simple farm planning.
2) Complete farm planning envisages farm planning for the whole farm, i.e. for all enterprises on the farm, for a change in the farm structure and organization. Complete farm planning aims for a complete change in cropping Programme, more towards specialized farming, more income and market orientation.

Essential Elements of Farm Planning

Economic planning involves the manipulation of limited resources among alternative opportunities, in order to satisfy the set objective of maximizing profit. It follows that any planning procedure must contain three essential elements:

(1) an objective, (2) scarce resources and (3) the enterprise for using the resources to attain the objective (alternative ways).

The main aim or objective in planning the allocation of resources is to maximize profit. However, farmers commonly have other objectives as well, which must be taken into account in practical planning. In any form of planning, the principle of profit-maximization cannot be abandoned. The resources available to the farmer act as a framework, within which he must plan his farm activities. The concern is with those resources that are relatively scarce. although it is frequently impossible to decide in advance which resources will prove to be limiting, so that is becomes part of the planning process, to detect them. The resources available to the farmer distinguish the feasible from the unfeasible enterprises. Fixed resources place a limit on the maximum level of production; from individual enterprise fixed resources influence the level of input, both of other fixed resources and of variable resources. The limitations of resources determine the most suitable organization to be added within individual enterprises.

The enterprises are the third element, representing alternative ways of using the fixed resources in seeking to attain the objective. The information that is required about the enterprises before planning are :

1) Financial returns
2) Requirements of variable inputs
3) Requirements of fixed resources

Without information on the financial return to be expected in the enterprises, it would be impossible to attain the set objective of maximizing net income because there would be no criterion on which to base their selection. Variable inputs are items such as, fertilizers, feed stuffs, etc., the use of which alters in direct proportion to changes in the balance of individual enterprises, within a given framework of fixed resources. Many factors affect the level of variable inputs. They include the quality of fixed resources, the intensity of production, the methods adopted and the efficiency with which they are applied. The financial returns and the variable costs have one feature in common, namely they both vary together with changes in the size of enterprises. Deducting the variable costs from the output of an enterprise leaves the gross margin and it is the latter that becomes the guide, as to which enterprises to select in seeking to maximize net income. The fixed resources available at any particular point of time constitute a planning framework; the unit requirements of fixed resources vary with the production methods adopted and the relative efficiency with which they are applied. It is possible to raise the limits imposed on an enterprise, both by lowering fixed resource requirements and by acquiring more fixed resources. Knowledge of fixed resource requirements is also needed to enable the return (gross margin) to the resource used in different enterprises to be calculated.

Stages of Farm Planning

Stage 1 : Adoption of package of practices (selected enterprises) – envisages no change in the cropping pattern.

Stage 2 : Extension of stage 1to all crop enterprises on the farm. Here also

no major change is envisaged. The farmer has to use all the recommended practices on all the major enterprises simultaneously.

Stage 3 : Final stage full farm plan. Major change is envisaged in farm structure and organization. It requires considerable training in farm management. Detailed farm plans are to be prepared to get maximum income from resources.

Principal Characteristics of a Good Farm Plan

1) It should provide for efficient use of farm resources, such as labour, power and equipment.
2) The crop plan should have balanced combination of enterprises, i.e. it should do the following :
a) Provide for given minimum production of different food, cash and fodder crops.
b) Help to maintain and improve soil fertility.
c) Help to raise and stabilize farm earnings
d) Improve distribution and use of labour, power and water requirements throughout the year
e) Avoid excessive risks
f) Provide flexibility
g) Utilize, the farmers knowledge, training, experience and take into account of the farmers likes and dislikes
h) Give considerations to efficient marketing facilities
i) Provide Programme of obtaining, using and repaying the credit
j) Provide for all of up-to date modern agricultural methods and practices.

Basis Steps of Farm Planning and Budgeting

1) Assessment of resources- survey of actual conditions of the farm and the availability or resources and use
2) Analysis of the existing plan operations
3) Identification the problems, detection of loop-holes and defects of the present plans.
4) Discussion with the farmers and other specialists to examine the possibilities for improvement through alternative plan operations
5) Preparation of alternative plans on the basis of existing co-efficient and discussion with the farmer
6) Selection of final plan for implementation.

Exercise No. 11 **Date :**

FARM INVENTORY ANALYSIS

Farm Inventory

It is a list of all the physical property of a business along with their values at a specified date. It is the complete list of farmer's assets.

The best time to take a farm inventory on most farms is at the beginning of the agricultural year, on or near 1st July, usually, at this time of the year, the crop concern is finished and work for the next season has not yet began. Also, stored crops and feed supplies on hand are originally low at this time, which makes the inventory jobs of physical measurement of these items and estimates of value relatively easy.

Process of taking farm inventory

Taking an inventory involves two processes: (i) Physical counting and (ii) Valuation of physical assets. The farmer, with a critical eye, should walk over his farm and through the buildings to make a general inspection of the land, buildings, fences, equipment, livestock and supplies. The physical count is necessary to verify numbers weights and measurements. Losses, wastages or shrinkages are always occurring and can cause considerable error if the inventory is not made carefully.

Next the farmer should place value on each item using an appropriate valuation method. Valuation of farm assets presents a most perplexing problem because an error in the valuation of an inventory may render the accounting results misleading. Suppose, for example, a farmer has 200 qtls of wheat and the values Rs. 82 instead of Rs.80 per quintal, resulting in an over valuation by Rs.400/-. If this is an end year inventory, it will inflate the net worth by the amount of over

valuation.

The closing inventory for a year is the opening inventory for the next year. The inflated opening inventory may reduce the income in the next year by the same amount. The inflated inventory, therefore, has the effect of shifting the amount of apparent profit from the following year to the current one. If the inventory is undervalued it will have the opposite effect.

The errors in valuation, therefore, violate two major purposes of the records that of showing net worth of the business and that of comparing relative profits made in different accounting periods.

METHODS OF VALUATION

There are many methods of valuation. Every method has its own merits and demerits. The use of a particular method of valuation will depend upon the purpose of the valuation and nature of the assets being valuated. As far as possible valuation should be appropriate because in appropriate valuation can lead to unsound business decisions.

Following are the commonly used valuation methods:

1. Cost minus depreciation.

2. Cost or market prices which ever is lower.

3 Net selling price.

4. Replacement cost minus depreciation.

5. Income capitalization.

Valuation at cost minus depreciation:

With cost as the basis of valuation, the inventories how the total of sums actually put into the business and count depreciated over time. This method is commonly used such working assets as machinery and breeding livestock is method assumes that the purchase price was an approximation of the value of the asset and its value in subsequent its can be determined by subtracting a depreciation allowance an its cost.

Valuation at cost of market price (Whichever is lower):

In this method valuation is estimated at the cost or the market price,

whichever is lower. This method is commonly user for valuing purchased farm supplies.

Valuation at net selling price:

This means the price which could probably be obtained for the assets it marketed, less the cost of marketing. This confirms most closely to the present worth.

This method may be usefully applied to crops or the livestock produced for the market, it has little meaning when applied to such tings as buildings or machines for which no actual market may exist.

Valuation by replacement cost minus depreciation:

This method is to evaluate the assets at what it would cost to reproduce them at present prices and under present methods or production.

This method is best suited for long-lived assets such as building particularly where wide changes in the price level occur.

Valuation by income capitalization method:

This method is appropriate for the farm assets whose contribution to the income of the farm business can be measure and which have a long life. The capitalization formula V= R/r Can be used for this purpose. Where 'V' is the value in rupee 'R' refers to the constant income over infinite number of year in future, and 'r' is the rate of interest. This method can be used to valuate the assets like land. In practice neither the annual income nor the interest rate in future is known with accuracy. As a result, this method is generally used in combination with other methods such as the market price.

Selection of the method of valuation:

Following are some of the suggesting which can be useful in valuation of the farm assets:

1. All assets that will be sold within the year can be valued at the net selling price.
2. All supplies can be valued at the cost or the market price (whichever is lower).

3. Working capital assets such as machinery and equipment can be valued by use of cost minus depreciation method.
4. The farm buildings that have been constructed a long time ago can be valued by replacement cost minus depreciation method. The farm buildings that have been constructed only a short time ago may be valued at cost minus depreciation.
5. Farm land may be valued with capitalization formula in combination with market price.

We have discussed different methods of valuation where concept of depreciation is involved. It is, therefore, necessary to understand the various methods of calculating depreciation.

Exercise No. 12 **Date :**

PREPARATION AND ANALYSIS OF BALANCE SHEET

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

position of a farm business at a particular time, showing its assets, liabilities and equity. If the assets are more than liabilities it is called net worth or equity and its converse is known as net deficit. The typical balance sheet (Table 5.1) shows assets on the left side and liabilities and equity on the right side. Both sides are always in balance hence the name balance sheet. Net worth is placed on the right side, along with liabilities, in order to indicate that like any other creditor the farmer has a claim against the farm business equal to the equity amount. The balance sheet can be easily prepared by the farmer in the presence of farm records. It can be prepared at any point of time to know the financial position of the farm business. It can also be prepared to study the performance of a business over years by preparing the same number of balance sheets. If the net worth increases over the different periods, it indicates efficient performance of the business. To prepare a balance sheet the prime requisites are total assets and total liabilities of the farm.

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

Liabilities: These refer to all things which are owed to others by the farmer. Assets are of three types, viz. current, intermediate or working and long-term of fixed. So also the liabilities. This classification of assets facilitates the analysis of liquidity of the farm business.

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

Intermediate or working assets: These assets take two to five years to convert into cash form. Examples: Machinery, equipment, livestock, tractors, trucks, etc.

TABLE 5.1
Balance Sheet of a Hypothetical Farm

Assets	Amount (in Rs)	Liabilities	Amount (in Rs)
Current assets		*Current liabilities*	
Cash on hand	10,000	Crop loans to be repaid to institutional agencies	8,000
Savings in bank	8,000		
Value of grains ready for disposal	38,500	Cost of cultivation (excluding loans)	6,000
Livestock products (eggs, birds, etc.)	60,000	Other loans (unsecured loans due for immediate repayment)	5,000

Fruits, Vegetables, fodder and feed ready for sale	8,000	Cost of maintenance of cattle	3,600 25,000
Value of bonds and shares to be realized in the same year	2,000	Costs in poultry enterprise Annual installments	19,000
Sub-total	1,26,500	Sub-total	66,600
Intermediate assets		*Intermediate liabilities*	
Dairy cattle	10,000	Livestock loans	8,000
Bullocks	9,000	Machinery loan	15,000
Poultry birds	15,000	Unsecured loans	10,000
Tractor	1,75,000		
Sub-total	2,24,000	Sub-total	33,000
Long-term assets		*Long-term liabilities*	
Land (book value)	60,00,000	Tractor loan	1,20,000
Farm buildings	25,000	Orchard loan	25,000
		Unsecured loans	10,000
Sub-total	6,25,000	Sub-total	1,55,000
Total of assets	9,75,500	Total of liabilities	2,54,600
		New worth or equity =	7,20,900

Long-term assets or fixed assets: An assets that is permanent or will be used continuously for several years is called a long-term assets. It takes linger time to convert into cash due to verification of records, legal transactions, etc. Examples: Land, Farm buildings, etc.

Current liabilities: Debts that must be paid in the short term or in very near future. Examples: Crop loans, other loans, cost of maintenance of cattle, etc.

Intermediate liabilities: These loans are due for the repayment within a period of two to five years. Examples: livestock loans, machinery loans, etc.

Long-term liabilities: The duration of loan repayment is five of more years. Example: Tractor loan, orchard loan, land development loan, etc.

Precautions in Preparing the Balance Sheet of a Business Farm (Firm)

(1) Accuracy with regard to valuation of assets is difficult in the absence of records, hence approximations to such valuations need to be defined with reference to a given time period. All farm products say, paddy, pulses, oilseeds, jowar, livestock and livestock products, etc., should be valued based on the market price. Land and other non-liquid assets should be valued based on prevailing sale

value for similar type of land at the same time period.

(2) While valuing the durable assets, book value method* (valuing at cost) is no doubt a good procedure but subject to criticism. For example, a farmer bought his farm lands in different time periods say, 1960 and 1970, book value of these lands should be determined after giving an allowance for depreciation and improvements made on the land and

(3)In periods of inflation, the values for durable assets rise. Under such situations, it is desirable to make adjustments in the values of the assets, while entering the same in the balance sheet.

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*Book value refers to the realistic value of an assets giving due allowance for depreciation and improvement. Hence, book value is neither the market price nor purchase price, but value at cost.

Test Ratios

The test ratios, viz. current ratio, intermediate ratio, net capital ratio, quick ratio, current liability ratio, debt-equity ratio and equity-value ratio can be derived from the balance sheet.

$$1.\ \text{Current ratio} = \frac{\text{Total current assets}}{\text{Total current liabilities}}$$

$$= \frac{1,26,500}{66,600} = 1.90$$

This ratio indicates the capacity of the farmer to meet immediate financial obligations (liquidity). If current assets are more than current liabilities and if the borrower fails to repay the loan, his is a case of willful-default in spite of his position being solvent. This type of willful-default is more common in respect of large farmer-borrowers of financial institutions. If by chance the ratio falls less than one due to certain unforeseen contingencies, his case for further lending's cannot be ruled out by the institutional agencies, as it is a temporary setback and he may be given a chance to prove his credit-worthiness. A ratio of more than on indicates a favorable run of the farm business. Current ratio reflects liquidity within on years' time.

$$2.\ \text{Intermediate ratio or working ratio} = \frac{\text{Total current assets + Total intermediate assets}}{\text{Total current liabilities + Total intermediate liabilities}}$$

$$= \frac{1,26,500 + 2,24,000}{66,600 + 33,000} = \frac{3,50,500}{99,600} = 3.52$$

This indicates the liquidity position of the farm business over an intermediate period of time, ranging from 2 to 5 years. Here certain time is allowed for the farmer to build up the farm business to improve his liquidity position. This ratio should also be more than one to indicate sound running of the farm business. The progressive intermediate ratio observed for giving farm business over time implies, the increase in the value of current and intermediate assets due to minimal physical loss and price decline. The steady growth of this ratio over a period is a healthy sign of the business.

$$\text{3. Net capital ratio} = \frac{\text{Total current assets}}{\text{Total current liabilities}}$$

$$= \frac{9,75,500}{2,54,600}$$

$$= 3.83$$

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

4. Acid test ration or quick ratio

$$\frac{\text{Cash receipts + accounts receivable + marketable securities (bonds, shares, etc.) Available in more than one year}}{\text{Total current liabilities}}$$

This reflects adequacy of cash and income surpluses to cover all current liabilities during the period of one to two years. If there is no difference in income position of a farmer within that period, current ratio and acid test ratio reflect the same position.

$$\text{5. Current liability ratio} = \frac{\text{Current liability}}{\text{Owner's equity}}$$

$$= \frac{66,600}{7,20,900} = 0.09$$

This ratio indicates the farmer's immediate financial obligations against the net worth. A ratio of less than one indicates a healthy performance of the farm

business and over the years the ratio should become smaller and smaller to reflect a consistently good performance.

6. Debt-equity ratio (Leverage ratio) $= \frac{\text{Total debts}}{\text{Owner's equity}}$

$$= \frac{2,54,600}{7,20,900} = 0.35$$

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

Equity value ratio $= \frac{\text{Owner's equity}}{\text{Value of assets}}$

$$= \frac{7,20,900}{9,75,500} = 0.74$$

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

Exercise No. 13 **Date :**

PREPARATION AND ANALYSIS OF PROFIT AND LOSS STATEMENT

Income Statement or Profit and Loss Statement

This is entirely different from a balance sheet in the sense that in a balance sheet, we considered assets and liabilities and did not consider operational efficiency in terms of receipts and expenses. In income statement the items included are receipts, expenses, gains and losses. It could be defined as a summary of receipts and gains minus expenses and losses during a specified period. It is prepared for the entire farm for one agricultural year. In income statement monetary values are assigned to inputs and output. It is also prepared over time. The advantages of this statement are that it indicates the trend in various cost items and whether there has been any over expenditure on the farm. Thus, it helps to know the success or failure of a business farm over time. Income statement basically constitutes three items. viz., receipts, expenses and net income. Income statement of a hypothetical farm is presented in Table 5.2.

Receipts: They mean the return s obtained from the sale of crop produce and other supplementary products like milk and eggs, wages, gifts, etc. Gain in the form of appreciation in the value of assets is also included in the receipts. However, returns from the sale of capital assets, such as livestock, machinery, farm buildings, etc. are not included because such return/income are not really obtained during the period.

Expenses: Operating and fixed costs are recorded here. Losses in the form of depreciation on the asset value fall under the expenditure item. However, the amounts incurred on the purchase of capital assets are not considered.

Net income: It constitutes ne cash income, net operating income and net farm income.

Net cash income: It gives the position of cash receipts minus cash expenses only during the period for which income statement is prepared.

Net operating income: It is arrived at by deducting operating expenses from the gross income. Fixed costs are not given any consideration. Operating expenses include crop loans.

Net farm income: Net farm income equals net operating income less fixed costs. Compared to net cash income and net operating income, it is relatively a better measure of assessing the performance of a farm. It is the return accrued to owned

capital and family labour employed.

Income statement prepared for a given farm for a given year may present a very bright picture of the farm. The same position cannot be taken for granted as the actual position of the farm, since the said year might have been a good agricultural year with respect to weather, yields, prices, etc. A realistic position on the performance of a farm can be gauged by preparing income statements over years to show the actual situation, as the parameters influencing farm business are subject to fluctuations.

TABLE 5.2
Income Statement of a Hypothetical Farm

Particulars		Amount (In Rs.)
I.	*Receipts*	
A.	Returns from the sale of crop output (paddy + pulse)	52,000
B.	Revenue from milk and milk products	5,000
	Return from poultry enterprise	12,000
	Returns from supplementary enterprises	17,000
C.	Gifts	2,000
D.	Gross cash income	7,000
E.	Appreciation on the value of assets	3,000
F.	Gross income	74,000
II	*Expenses*	
	Operating expenses or costs	
A.	Hired human labour	10,500
B.	Bullock labour	900
C.	Machine labour	1,500
D.	Seeds	1,100
E.	Feeds	5,000
F.	Manures & fertilisers	3,000
G.	Plant protection measures	1,550
H.	Veterinary aid	500
I.	Irrigation	250
J.	Miscellaneous	2,000
K.	Interest on working capital	2,100
	Total operating expenses	28,400
Fixed expenses or costs		
A.	Depreciation	3,000
B.	Land revenue	200
C.	Interest on fixed capital (includes interest of Rs 1500 paid towards term loan)	3,200
D.	Rental value of owned land	10,000
E.	Total fixed costs	16,400
III.	Net cash income	71,000 – 28,400 = 42,600

IV.	Net operating income	74,000 – 28,400 = 45,600
V.	Net farm income	45,600 – 16,400 = 29,200

Financial Test Ratios

The performance of farm business as indicated in Table 5.2 can be assessed through the income analysis by gainfully using two important parameters, viz. costs and returns. Still, some additional information is left untouched if we do not regard financial test rations, as they supplement new information. These help the farmers themselves as well as lending institutions, and help in developing standard norms. Two sets of income ratios can be developed. One is directly from the income and expenditure pattern, and another by taking one component from income statement i.e., income levels and comparing against capital investment made on the farm business. The former ratios are called expenses-income ratios and the latter, investment-income ratios.

Following are the ratios which can be obtained directly from the income statement.

$$\text{Operating ratio} = \frac{\text{Total operating expenses}}{\text{Gross income}}$$

$$= \frac{28,400}{74,000} = 0.38$$

As the very name reveals, the ratio explains the relationship of operating costs to gross income. This ratio underlines the magnitude of working expenditure incurred for a rupee of gross income. This is a direct ratio which works out to 0.38.

$$\text{Fixed ratio} = \frac{\text{Fixed expenses}}{\text{Gross income}}$$

$$= \frac{16,400}{74,000} = 0.22$$

This ratio indicates the relationship between fixed expenses and gross income. This particular ratio is 0.22. It depicts the amount of fixed expenses incurred to realize a rupee of gross income. This is an indirect ratio, since fixed costs are indirect costs.

$$\text{Gross ratio} = \frac{\text{Total expenses}}{\text{Gross income}}$$

$$= \frac{44,800}{74,000} = 0.61$$

This is the ratio which is obtained when both operating expenses and fixed expenses are totaled up and compared with gross income. This can be called input-output ratio, which amounted to 0.61.

All these ratios should be less than one to indicate the profitable run of the farm business. When these ratios are estimated over a period of time, a healthy trend of farm business is reflected by the descending ratios.

Investment-Income Ratios: Following two are the ratios which fall under this category.

$$\text{Capital turnover ratio} = \frac{\text{Gross income}}{\text{Average capital investment}}$$

$$= \frac{74,000}{3,00,000} = 0.25$$

This is also a self-explanatory ratio as explained earlier. Here, average capital investment is arrived at by adding the value of assets at the beginning of the agricultural year and at the end of the agricultural year and then averaging the two values. Suppose it is Rs. 3,00,000, then the capital turnover ratio is 0.25. This ratio given the gross income obtained for each rupee of capital invested over the year.

$$\text{Rate of return on investment} = \frac{\text{Net return to capital}}{\text{Average capital investment}}$$

$$= \frac{27,800}{3,00,000} = 0.09$$

Net return to capital is obtained by adding bank interest paid (interest on borrowed funds + interest paid on term loans) to the net farm income and then deducting unpaid family labour for farm and livestock operations and management.

Net farm income (in Rs.)	= 29,200
Interest paid during the year (in Rs.)	= + 3,600
	32,800
Unpaid family labour wages (in Rs.)	= - 5,000
Net return to total capital (in Rs.)	= 27,800

This ratio (0.09) gives the net return on capital for every rupee of average capital invested. These above two ratios relate to the income generating capacity

of the investment and are hence called income-investment ratios.

Exercise No. 14 **Date :**

PREPARATION OF ENTERPRISE BUDGET AND PARTIAL BUDGET

FARM BUDGETING

Farm plan is a Programme of total farm activity drawn up by the farmer in advance. The expression of farm plan in monetary terms is called farm budgeting. Farm budgets are classified into enterprise budget, partial budget and complete budget or whole farm budget. Farm budgeting is a method of examining the profitability of alternative farm plans.

FARM ENTERPRISE BUDGET

A commodity that is being produced on the farm is called farm enterprise Farm budgets can be developed for each potential enterprise. Enterprise budgets are prepared in terms of a common unit i.e., acre, hectare, for a crop, one head of livestock, etc. This facilitates easy comparison between the enterprises. Enterprise budget is the estimation of expected income, costs and profit for an enterprise.

ORGANIZATION OF ENTERPRISE BUDGET

It consists of three elements uiz., income, costs and profitability. Income is computed by estimating the expected output and expected price (Table 27.1). The estimated output is the average yield under normal weather conditions. Output price should be the average price expected in future. In order to estimate the variable costs we need information on quantity of inputs used and the prices at which they are purchased. Fixed costs to be included in enterprise budget are land revenue, depreciation, interest on fixed capital and rental value of owned land.

	Item	Particulars	Rs./ha
A)	Yield 9.54 quintal @ Rs. 1332		12,707.28
B)	i) Variable costs	Human labour	1,843.93
		Bullock labour	920.05
		Machine labour	516.96
		Seeds	2,352.78
		Manures and fertilizers	1,724.27
		Plant protection chemicals	189.10
		Repairs	91.59
		Interest on working capital	229.16
		Total variable costs	7,867.19
	ii) Fixed costs		
		Land revenue	15.00
		Rental value of owned land	2,430.54
		Depreciation	137.47
		Interest on fixed capital	178.19
		Total fixed costs	2,761.20
	iii) Total costs	(i + ii)	10,629.04
	Estimated profit	12,707.28 – 10,629.04 = 2,078.24	

Partial Budget

Partial budgeting is the method of making a comparative study of cost and returns analysis resulting from change in a part of farm business organization. This change may be made through a careful selection of alternative methods of production or practices or activities, the choice of which is based on opportunity cost or relative profitability and does not affect the total farm organization vitally. The partial budgeting technique helps in the decision making process, whenever small changes in the existing farm organization are contemplated as to which method to adopt which practices to follow or which activity to substitute for the other to reduce the unit cost and make higher profits.

The following four aspects are important in partial budget.

A) Income increasing aspects

1. Additional returns that would accrue from the change, i.e. from the increased productivity of the same activity or from the production of the new activity to be introduced.
2. The saving in costs which will not have to be incurred at the change or from the reduced level of an input items.

B) Income decreasing aspects

1. The decrease in returns that might occur due to reduction in yield or loss of

production from the activity which has been replaced in the change.

2. The increase in costs due to increased use of the inputs which are being used already or on the new inputs suggested in the change.

Examples of partial budget

Example 1:

Proposed change : Use of Mechanical weeding equipments instead of hand weeding for 0.40 ha. of area.

Debit	Rs.	Credit	Rs.
A) Income decreasing		**B) Income increasing**	
1. Additional Cost • Labour for mechanical weeding (10 × 80 • Machine cost **2. Reduced returns**	 800/- 50/- **Nil**	**3. Additional returns** **4. Reduced cost** • Labour for hand weeding (30 × 80)	Nil 2400/-
Total (A)	**850**	**Total (B)**	**2400/-**

Net income due to change in practice of weeding Rs. (B – A) = 2400 – 850 = Rs. 1550.00

Conclusions

Go ahead with using mechanical weeding equipment instead of hand weeding.

Example 2 : Mango production with paclabutrozol (cultar) (Per tree)

Debit	Rs.	Credit	Rs.
A) Income decreasing		**B) Income increasing**	
1. Additional Cost • Fertilizer cost • Cost of paclobutrozol • Cost of pesticide • Additional labour cost **2. Reduced returns**	 30/- 120/- 10/- 40/- **Nil**	3. Additional yield • 20 kg @ 20/- **4. Reduced cost**	 400/- Nil
Total (A)	**200/-**	**Total (B)**	**400/-**

Net income due to use of Paclobutrozol (B – A) = 400 – 200 = Rs. 200/tree.

Conclusions

Go ahead with using Paclobutrozol for increasing yield and net returns from mango crop.

Ex.No. 15

FARM HOLDING SURVEY

1) Information of cultivator : (Reference year :)

i. Name: _____ ii. Age: _____

iii. Education: _____ iv. Village: _____

v. Occupation:

a) Main: _____

b) Subsidiary: _____

vi. Size of family:

Sr. No.	Age Group	Male	Female	Total
a)	Up to 14 years			
b)	Above 14 years			
c)	Members working on farm			

2) Operational holding:

Sr. No.	Particulars	Area (ha)	Land revenue and other cessses (Rs.)	Per ha. Value (Rs.)
1.	Cultivated a) Irrigated b) Unirrigated			
2.	Uncultivated			
3.	Barren land			
	Total			

3) Cropping Pattern: (2007-08)

Sr. No.	Crops	Variety	Area (ha)	
			Irrigated	Unirrigated
A)	Kharif Season 1. 2.			
B)	Rabi/ Summer Season 1. 2.			
C)	Perennial 1. Mango 2. cashew 3. Coconut 4. Areca nut 5. Others			
	Total			

4) Sources of irrigation:

1) Well	2) Canal	3) River	4) Bore well	5) Other
Total area irrigated:				

5) Irrigation Structure:

Type of irrigation	Year of construction	Purchase value (Rs.)	Present value (Rs.)	Area irrigated (ha)	Expenses on maintenance and repairs (Rs.)
Well a) Open b) Bore					
Electric motor with pump					
Pipe line					
Other					

6) Expenses incurred on irrigation Fuel/ Electricity and Water charges/ taxes

Diesel oil		Fuel oil/ Grease		Electricity charges	Water taxes	No. of irrigations
Qty (lit.)	(Rs.)	Qty (lit.)	(Rs.)	(Rs.)	(Rs.)	

7) Inventory of implements and farm machinery:

Sr No	Type	No.	Purchase price / unit (Rs.)	Present Value / Unit (Rs.)	Remaining life	Repairing charges
I.	Implements					
	a)Wooden Plough					
	b) Iron plough					
	c)harrow					
II.	Bullock cart					
III.	Machinery					
	a) Oil engine					
	b) Electric motor					
	c) Sprayer					
	d) Duster					
IV.	Others Hand Tools					
	a) Sickle					
	b) Axe					
	c) Spade					
	d) Koyta					
	e) Iron Basket					
	f) Plastic crates					
	g) Wooden barrel					
	h) Pick axe					
	i) Bucket					
	j) Others					

8) Inventory of building and other farm structure:

Particulars	Area (ha)	Year of Construction	Cost of Construction (Rs.)	Present value (Rs.)	Expected life (years)	Repairing cost (Rs.)
Residential Building						
Engine house						

Store house						
Cattle other						
Any other						

9) Inventory of livestock:

Sr. No.	Type	No.	Breed	Age (Years)	Owned/ Purchased	Present value (Rs.)
1)	Draft					
	a) Bullock					
	b) He-buffalo					
2)	Cow					
	a) In milk					
	b) Dry					
3)	Buffalo					
	a) In milk					
	b) Dry					
4)	Young stock (below 3 yrs.)					
	a) Cow					
	b) Buffalo					
5)	Sheep					
6)	Goats					
7)	Poultry					
8)	Others					

(D*raft manual)*

VASANTRAONAIK MARATHWADA KRISHI VIDYAPEETH,
PARBHANI

PRACTICAL MANUAL

Farm Management, Production and Resource Management

Course No. : ECON – 365 **Credit:** 2= (1+ 1)

Class : T. Y. B.Sc. (Hons.) Agri. **Semester:** VI

Department of Agricultural Economics
College of Agriculture,
VNMKV, Parb

Sr. No.	Date	Name of Exercise	Page No.	Sign. of Instructor
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3.		Determination of optimum input and output and least cost combination of inputs	7	
4.		Study of law of substitution or principle of least cost combination of two inputs	12	
5.		Application of principle of equi-marginal returns and opportunity cost	15	
6.		Depreciation methods	19	
7.		Seven types of costs and their computation	26	
8.		Farm cost concepts and their imputation procedure	32	
9.		Estimation of cost of cultivation and farm income measures of major crops	35	
10.		Preparation of farm plans	37	
11.		Farm inventory analysis	40	
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13.		Preparation and analysis of profit and loss statement	48	
14.		Preparation of enterprise budget and partial budget	52	
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16.		Assignment- Study of farm management aspects related to Agriculture College farm- Visit to Agril. College farm & Study of Map	-	