Agribusiness Management and Cooperative

Practical

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11/30/2020

Contents

1 Determination of optimum input use and maximization of profit using one input

Objectives

- To determine optimum input use and maximize profit using one input

Numerical

1. For the following hypothetical data showing input-output relationship between number of tractor plus driver units recruits and hectares of land ploughed, determine.

Table 1. Input-output relationship between number of tractor plus driver unit recruits and hectares of land ploughed.

tractor driver unit	field ploughed
1	2
2	4
5	10
6	12

  a. Which is input ?
  b. Which is output ?
  c. Marginal rate of returns at each level of input
  d. What is the relationship between input-output ?

2. For the following hypothetical data showing input-output relationship between wheat seed used per hectare and wheat production, determine.

Table 2. Marginal rate of return for hypothetical wheat production scenario.

wheat seed	marginal wheat seed	wheat production	marginal wheat production
10		1000	
15		1025	
20		1075	
25		1150	
30		1250	
35		1375	

  a. Which is input ?
  b. Which is output ?
  c. Marginal rate of returns at each level of input
  d. Trend of marginal rate of return

3. For the following hypothetical data showing input-output relationship between fertilizer use in wheat per hectare and wheat production, determine.

Table 3. Marginal rate of return for hypothetical wheat production scenario.

wheat fertilizer	marginal wheat fertilizer	wheat production	marginal wheat production
100		2000	
150		2600	
200		3100	
250		3500	
300		3800	
350		4000	

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a. Which is input ?
b. Which is output ?
c. Marginal rate of returns at each level of input
d. Trend of marginal rate of return

2 Determination of least cost combination of inputs using graphical and arithmetic method

Objectives

- To graphically represent cost combinations for two inputs
- To arithmetically determine the least cost combination of inputs

Numerical

1. For the following hypothetical data showing relationship between two fertilizers (Nitrogen and Phosphorus) used in Wheat crop to produce common yield of 2 tons per hectare, determine:

Yield	Nitrogen (X_2)	Phosphorus (X_1)	ΔX_2	ΔX_1	MRS ($\frac{\Delta X_2}{\Delta X_1}$)
2 tons	46	0			
2 tons	32	2	-14	2	7.0
2 tons	20	4	-12	2	6.0
2 tons	10	6	-10	2	5.0
2 tons	1	8	-9	2	4.5
2 tons	0	10	-1	2	0.5

a. Marginal rate of input substitution of nitrogen for phosphorus
b. Graph showing cost combination of inputs and the least cost combination point.
c. Calculate the least cost combination of input use using arithmetic method if the price of Phosphorus is Rs 40/kg and price of Nitrogen is Rs 20/kg.

3   Determination of optimum enterprise combination for revenue maximization

Objectives

- To maximize revenue through optimum enterprise combination

Numerical

For the given hypothetical data on alternative combinations of Rice and Wheat enterprise using same amount of resources, determine:

Table 4. Production possibility schedule

Alternative outputs	Rice (tons)	Wheat (tons)
A	0	20
B	2	18
C	5	14
D	9	6
E	10	0

1. Graphically show production possibility frontier.
2. Which type of product combination is indicated ?
3. Using arithmetic method determine optimum production with combination of enterprises. Assume that price of Rice is Rs 20/kg and price of Wheat is Rs 30/kg.

4   Farm record keeping and preparation of farm inventory

Objectives

- To understand usefulness and purpose of keeping farm record
- To be able to maintain farm inventory of an operating farm

Introduction

Farm accounting and record keeping is a science of recording farm business transaction. It helps to understand nature and the extent of the financial effects. Records are important in analyzing farm business to understand the fairness of business and its weakness and improvements needed.

Advantages of farm records and accounts

- Means to higher income
- Basis for diagnosis and planning
- Way to improve managerial skills of farmer
- Basis for credit acquisition and management
- Guide to better home management
- Basis for conducting research in agricultural and production economics
- Basis for government policies

General forms of farm record are:

1. Farm inventory
2. Farm cash accounts or farm financial accounts
3. Classified farm cash account and annual farm business analysis
4. Supplementary financial records (Capital assets sale register; cash sale register; credit sale/purchase register; wage register; funds borrowed, repayments register, farm expenses register, non-farm income record)

Farm inventory

It is a list of the whole physical property of a business along with their values at a specified date. It is the complete list of farmers' assets. It is the first step in farm accounting. For an illustration, see Table 5.

Table 5. Farm inventory of Betaaleshwor agro farm on Baisakh 2076 and Chaitra 2076

	Item	Beginning of 2076		End of 2076	
		Quantity	Value	Quantity	Value
Crop produce		0.0	0	0	0
	Seeds	0.0	0	0	0
	Urea (fertilizer)	5.0	200	2	80
	DAP (fertilizer)	2.0	120	1	60
	MoP (fertilizer)	0.0	0	1	55
	BHC 10% (Pesticide)	0.5	25	0	0
Supplies	Blitox (Pesticide)	2.0	240	0	0
	Malthion (Pesticide)	2.5	300	1	120

Non depreciable assets	Maize seed (Crop growing)		3.0	600	3	600
	Sugarcane setts (Crop growing)		100.0	1000	100	1000
	Marketable livestock		0.0	0	0	0
	Others		0.0	0	0	0
Depreciable assets	Farm machinery	Tractor	1.0	250000	1	200000
		Tiller, disc harrow	1.0	50000	1	45000
		Tubewell	1.0	20000	1	19000
		Trolley	1.0	25000	1	22500
		Wheat thresher	1.0	22600	1	20000
		Seed cum fertilizer drill	1.0	22500	1	20400
		Other implements and hand tools (bulk unit)	1.0	15000	1	12000
	Farm buildings		1.0	300000	1	280000
	Livestock (buffaloes, cattle) (number)		12.0	400000	12	300000
	Land (ha)		2.0	2400000	2	2400000
Cash assets	Cash in hand			15000		12500
	Small savings or bank deposits			120000		90000
	Shares in cooperatives			5000		5000
	Other properties			0		0

Table 6. Change in inventory

record date	value
Beginning of year 2076	3647585
End of year 2076	3428315
Change	219270

5 Calculation of depreciation of farm assets

Objectives

- To know different methods of calculation of depreciation

Decline in the value of an asset or capital equipment due to wear and tear of the asset, time, damages. Whenever any machines or equipment performs useful work, its wear and tear is bound to occur. Its efficiency reduces and becomes uneconomical to be used further and needs replacement by another new one.

Concepts of depreciation

- Original cost of asset: Bought price or purchasing cost of asset.
- Salvage value: The expected recovery of sales value of the asset at the end of useful life. (purchase value of asset/ expected life of that asset)
- Useful life: The expected time period for which the asset is to provide economic service i.e. the period for which the asset could be used for production.
- Depreciable cost: The original cost minus salvage value.
- Written down value: The value of asset at any point of time is the original cost less accumulated depreciation to date.

Methods of computing depreciation

1. Annual re-evaluation
2. Straight line method
3. Diminishing balance method
4. Sum of the year-digit method or reducing fraction method
5. Compound interest method

Numerical

1. (Using diminishing balance method) Calculate anual depreciation for a tractor costing Rs. 240000 at the rate of 20%.

Solution

We go on taking 20% of the remaining balance until salvage value is reached, as in this case this is about Rs. 40330.

Table 7. Computation of annual depreciation by Diminishing balance method

Year	Value at the beginning of year	Annual depreciation	Remaining balance
1	240000	48000	192000
2	192000	38400	153600
3	153600	30720	122880
4	122880	24576	98304
5	98304	19661	78643
6	78643	15729	62915
7	62915	12583	50332
8	50332	10066	40265
9	40265		

6   Preparation of Balance sheet of a farm

Objectives

- To prepare balance sheet of a farm

Introduction

The balance sheet, also called net worth or financial statement, is a summary of assets and liabilities of a business together with the statement of the owners' equity or net worth. This is a listing of all assets and liabilities of a farm at certain point of time. This reports the financial strength and progress of the business. The term balance here implies that the value of the assets must be equal to the value fo liabilities plus owner's equity or net worth.

- Net worth or equity or net assets or capital of a company/farm is calculated by calculating the difference between the Total Assets and the Total Liabilities.
- An example Net worth statement of MudnBrick Commercial Vegetable and Livestock Farm is presented in Table 8.

Table 8. Net worth statement

MudnBrick Commercial Vegetable and Livestock Farm			
Financial condition as of 2011-11-11			
Net Worth Statement			
Assets	Market value	Liabilities	Amount
Current		**Short-term**	
Cash in hand	450	Accounts payable	14000
Checking/savings	500	Unpaid taxes and interest	35000
Inventory	9000	Veterinary fees	0
Accounts receivables	8000	Other short term loan	9000
Cash at bank	5000		
Current total	**22950**	**Short-term total**	**58000**
Non-current/Fixed		Long term	
Farm real estate	150000	Farm real estate	90000
Tractor	1500	Automobile loan	20000
Farm equipments	13000	Building depreciation	400
Personal property	5000	Farm animal purchase loan	12000
Farm animals and livestocks	14000		
Non-current/Fixed total	183500	Long term total	122400
Investment/Long term			
Stocks	1000		
Bonds	100		
Goodwill	5000		
Cash value of livestock insurance	4000		
Investment/Long term total	10100		
Total assets	216550	Total liabilities	180400
Net worth	**36150**		

7 Preparation of Income statement of a farm

Objectives

- To be able to prepare an Income statement of a farm

Introduction

Balance sheet shows only the amount of wealth held by a business at one moment in time. Profit generated during a period is a main concern of many users of financial statements. P&L statement provides a picture of profitability of the farm – How much wealth (that is, profit) was generated, or lost, by the business over that period?

Profit (loss) is defined as the increase (decrease) in wealth arising from trading activities. This is more accurately done using an accrual statement, which further accounts for inventory, accounts payable, and receivables, as well as depreciation expense. The difference between the total revenue and total expenses will represent either profit (if revenue exceeds expenses) or loss (if expenses exceed revenue). The period over which profit or loss is normally measured is usually known as the "accounting period", or "financial period".

Table 9. Income statement

	Income statement	
	Particulars	**Amount (Rs./ropani/annum)**
1	Sales revenue of vegetables and dairy product	55000
2	Less cost of sales (Marketing, transport, etc.)	1200
	Gross profit	53800
1	Less salaries and wages payment of farm keepers	22514
2	Less heat and light cost	1200
3	Less insurance	5331.6
4	Less motor vehicle running expenses	2200
5	Less depreciation - fixtures and fittings	800
6	Less depreciation - Vehicles	400
	Operating profit	21354.4
1	Interest received from investments	2000
2	Less interest on borrowings	900
	Profit for the period	22454.4

8   Calculation of farm efficiency measures

Objectives

- Analyzing both physical and financial efficiency measures

Introduction

Efficiency ratios

1. Land use efficiency

$$\text{Production efficiency} = \frac{\text{Yield of the crop in a farm}}{\text{Average yield of the locality}}$$

$$\text{Cropping intensity} = \frac{\text{Area cropped}}{\text{Total cultivated area}}$$

$$\text{System index} = \frac{\text{Potential net income per hectare on farm}}{\text{Average standard net income per hectare in the area}} \times 100$$

2. Labor efficiency measures

- Crop acres per man or per man-year
- Livestock maintained per man or per man-year
- Gross profit per man or per man-year

3. Machinery efficiency

- Machinery and equipment cost per cropped acre
- Investment in machinery and equipment per crop acre

Cost ratios

1. Operating ratio: Represents the proportion absorbed by operating expenses out of the gross income.

$$\text{Operating cost ratio} = \frac{\text{Total operating cost or farm expenses}}{\text{Total profit or gross farm income}}$$

2. Fixed ratio

$$\text{Fixed ratio (aka. Overhead charges ratio)} = \frac{\text{Total fixed cost per year}}{\text{Gross income}}$$

3. Gross ratio

$$\text{Gross ratio} = \frac{\text{Total farm expenses}}{\text{Total cash expenses}}$$

4. Expense structure ratio

$$\text{Expense structure ratio} = \frac{\text{Fixed cash expenses}}{\text{Total cash expenses}}$$

Profitability ratios

1. Capital turnover ratio
2. Rate of return on debit and equity capital
3. Rate of return on equity capital

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9   Representation of production chain, market chain and supply chain in a value chain map of an agricultural commodity
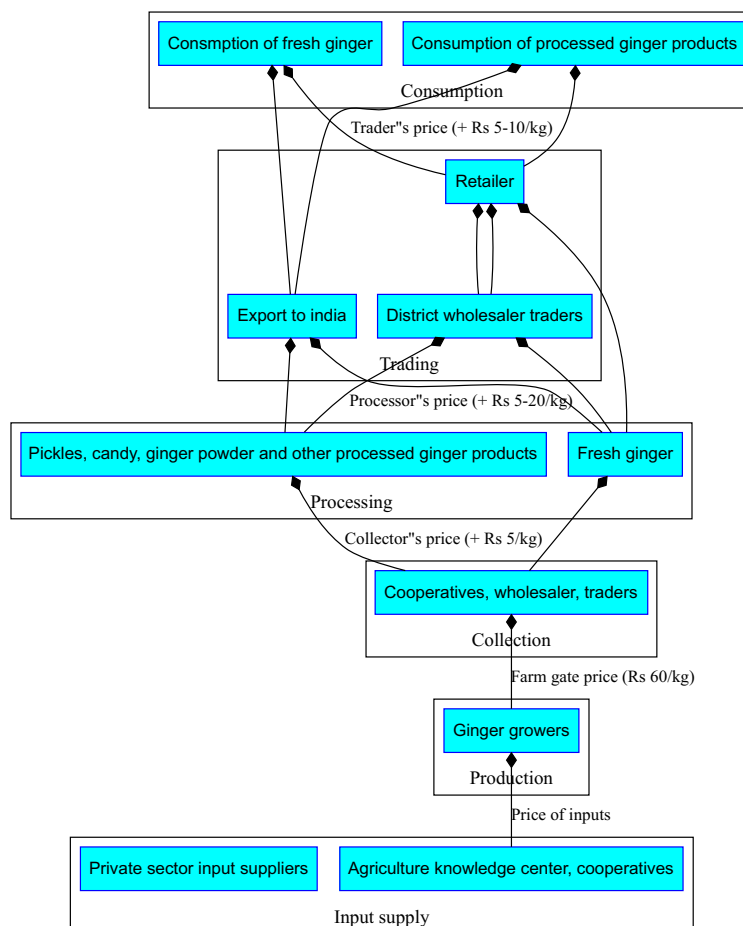
Objectives

- To represent graphically the production chain, market chain and supply chain in a value chain map of an agricultural commodity

Introduction

Porter (1985) defined value chain is a chain of activities. Products pass through all activities of the chain in order and at each activity the product gains some value. The value chain categorizes the generic value adding activities of an organization.

A value chain map graphically illustrates all of the components, and relationships between them. Value chain maps demonstrate how a product in an industry moves from raw material through production, processing, and other steps, until it eventually ends with the consumer.

Value chain map of ginger produced in Sindhuli district

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10   Determination of project worth using investment appraisal criteria

Objectives

- To determine projects' worth using investment appraisal criteria