Practical Manual B. Sc. (Hons.) Agriculture

Practical Crop Production–I (Kharif crops)

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Complied By

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Experiment No. 1 Date------

Crop Planning and Raising of Field Crops in Multiple Cropping Systems

1.1 Aim

- Selection Crop and variety is to be cultivated in a farm and the amount of area is allotted for a particular raising of field crop in multiple cropping systems

- The relative claim for acreage of the competitive crop with the scheme should have one leguminous crop in year in its rotation for the maintain of soil fertility and other physical chemical properties

- Utilization of inputs and other resources available on the farm without wastage. Selection of crops as per the facilities available for power, irrigation, inputs, labour transport and preparation of budget plan for each crop.

1.2 Selection of season

i) The *Summer* season (February to June)

ii) The *Kharif* (wet) season (July to October)

iii) The *Rabi* (cool) season (November to January)

1.3 Crop rotation: The practice of growing different crops in succession on the same land chiefly to preserve the productive capacity of the soil.

Example: Maize-Wheat, Paddy –Wheat- Mung

1.4 Rotational intensity (RI): This is calculated by counting the number of crops grown in a rotation and is multiplied by hundred and then divided by the duration of the rotation.

$$\textbf{Rotational intensity \%} = \frac{\textbf{No. of crop growth in rotation} \times 100}{\textbf{Duration of the rotation (in year)}}$$

1.5 Cropping intensity (CI): The ratio of total cropped area to net cultivated area which is multiplied by hundred and represent in percentage.

$$\textbf{Cropping intensity \%} = \frac{\textbf{Total cropped area}}{\textbf{Net cultivable area}} \times 100$$

1.6 Multiple cropping index (MCI): it measures the sum of areas under various crops raised in single year divided by net area available for that cropping pattern and expressed in percentage. It is generally calculated for each cropping pattern separately

$$\textbf{Multiple cropping index} = \frac{\sum_{i=0}^{n} ai}{\textbf{Area}} \times 100$$

Where, n = total number of crops, ai= area occupied by *i*th crop

Calculation

Problem

1. **Calculate the rotational intensity**
   Maize – early potato– mung =1 year
   Paddy – early potato – wheat – urd =1 year

2. **Calculate the cropping intensity**

   Cropping scheme

Plot No.	***Kharif* Crop**	**Per ha**	***Rabi* crop**	**Per ha**	***Summer Crops***	**Per ha**
1.	Paddy	2	Wheat	2	Maize	2
2.	Maize	2	Potato	2	M .p chari	2
3.	Groundnut	2	Chickpea	2	Napier	2
4.	Jowar	2	Berseem	2	Sesamum	2
5.	Blackgram	0.5	Pea	0.5	Moong	0.5
Total cropped area(ha)						

   Cropped area

   Problem 3.Calculate the multiple cropping index

Block	***Kharif***	***Rabi***	***Summer***	**Area/ha**
A	Rice	Wheat	Maize	5
B	Rice	Potato	M .p chari	2
C	Groundnut	Chickpea	Maize	3
D	Rice	Berseem	Maize	2
E	Blackgram	Groundnut	Moong	4

1.7 Conclusion

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Experiment No. 2 Date----------

Field layout preparation, Seed treatment, Nursery raising and Sowing

2.1 Aim

To know about the field layout preparation, seed treatment and sowing

2.2 Materials required

Tractor, ladder/plank, Spade, hand hoe, rake, measuring tape, rope, pegs, seed, fertilizers and water etc.

2.3 Measurement

The length and width of bed may be decided on the basis of row spacing.

2.4 Procedure

i). Soil inside bed should be mellow and friable.
ii). Demarcate the area from all four sides keeping corners at 900 angles.
iii). Demarcate the rows at 60 cm keeping first and last row at 30 cm in width of the bed and make shallow furrows with the help of hand hoe.
iv). Form the drainage channel of the plot and Prepare a channel 50 cm wide on both sides plots to drain out the excess amount of water.
v). Prepare a bund of 25 cm thickness in the middle of the row taking soil from both sides.
vi). Prepare plots of 25 m2 size.
vii). Pulverize the soil inside bed with the help of spade or khurpi to a desirable depth.
viii). Transplanting and sowing of seeds in row to row and plant to plant distance and irrigate with 1-2 days interval during rainless period. Seedlings are ready to transplant within 25- 30 days.
ix). The sufficient area to transplant the seedlings in 1ha field i.e. area of nursery required for 1 ha is 1/20 ha.
x). Direction of sowing or transplanting.

Layout planning

2.6 Precautions:

(i.) Seed bed should be free from weeds, pebbles and clods.

(ii.) Seed bed should be thoroughly levelled.

2.5 Observations

Variety:

i) Plot size .----------

ii) Spaceing----------

iii) Total number of plants in a bed.----------

iv) Keeping the above crop geometry. One hectare planting how much plant requires for plants.----------

Formula:

$$\textbf{Plant Population} = \frac{\text{Area } (m^2) \times 100 \times 100}{\text{Row to row spacing (cm)} \times \text{Plant to plant spacing (cm)}}$$

1. **Calculate the plant population in 25 m^2 area, if sown at spacing of ----- cm × ----- cm for ---------- crops.**

2. **Calculate the plant population of maize in 25 m^2 area, if sown at spacing of 45 cm ×25 cm.**

2.7 Seed treatment

Seed treatment is a process of application of chemicals or protectants with fungicidal, insecticidal, or bactericidal properties to seeds that prevents the carriage of insects or disease causing pathogens in/on the seeds which protect the seed from any kind of damage. Seed treatment also enables the seed to overcome seedling infection by soil borne pathogens.

S.No.	Name of Crop	Pest/Disease	Seed Treatment

2.8 Sowing of seeds

Sowing is the process of planting. An area or object that has had seeds planted in it will be described as being sowed.

Crop Choice is according to season

The crops are: Irrigated puddle lowland rice / any irrigated dry crop (maize / sorghum / pearl millet / finger millet / cotton / groundnut / sunflower / sesame the student him/ herself is doing the cultivation practices.

Step of cultivation of crop

A. Transplanted crop

Selection of nursery area → Preparation of nursery → Application of manures to nursery→ seed treatment with fungicide and bio-fertilizers →seed soaking and incubation →forming nursery beds and sowing seeds → weed control and plant protection to nursery →preparation of main field → application of organic manures →basal application of fertilizers and bio-fertilizers → pulling out seedlings and transplanting → application of herbicides → after cultivation practices → top dressing of fertilizers, plant protection measures → harvesting, threshing, drying and cleaning the produce →working out cost of cultivation and economics.

B. Direct sown crop

Selection of main field → Preparation of main field → land configuration for sowing →application of manures and fertilizers →seed treatment with fungicide and biofertilizers→ sowing and irrigation → application of herbicides → after cultivation practices → top dressing of fertilizers, plant protection measures →harvesting, threshing, drying and cleaning the produce →working out cost of cultivation and economics

2.9 Depth of sowing

In sowing, little if any soil is placed over the seeds, as seeds can be generally sown into the soil by maintaining a planting depth of about 2-3 times the size of the seed.

Table 2.1 Effect of sowing depth for germination

Crop	Depth of sowing	Days taken for emergence

2.10 Sowing types and patterns

- Flat sowing
- Ridge sowing
- Raise bed sowing

Formula

$$\text{Seed rate (kg/ha)} = \frac{\text{Area (m}^2\text{)} \times \text{Test weight (g)} \times 100 \times 100}{\text{Spacing (m}^2\text{)} \times \text{Germination(\%)} \times \text{Purity(\%)} \times 1000 \times 1000}$$

$$\text{Seed rate (m}^2\text{)} = \frac{\text{Area (m}^2\text{)} \times \text{Test weight (g)} \times 100 \times 100}{\text{Spacing (m}^2\text{)} \times \text{Germination(\%)} \times \text{Purity(\%)} \times 1000}$$

Problem

3. A farmer has field of 5000m^2 area. The farmer want to sow direct seed rice crop at spacing of 20cm × 4cm .what will be seed rate required for sowing. If the test weight is 25 g and germination (%) = 90 & purity (%) = 90 respectively.

4. Find out the seed requirement of black gram/m2 from the following data Spacing= 30×10cm, test weight= 50g germination%=90 & purity (%) = 95 respectively.

2.11 Conclusion

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Experiment No. 3 Date----------

Nutrient Management

3.1 Aim

To know the method of application varies according to the spacing of crop, type of fertilizer material, time of application.

3.2 Materials required

Fertilizers, manure, weighing balance, note book and pen

Methods of application of solid fertilizer materials.

(a) Broadcasting: Evenly spreading of dry solid fertilizers over the entire field before or after sowing of the crop is termed as broadcasting. This method proves effective when the crops have a dense stand, when the plant roots absorb nutrient from whole volume of soil, when soil is rich in fertility, when large amount of material is to be used.

(i) Basal application: Spreading of fertilizers before sowing or planting of the crops and mixing them by cultivating the soil during seed-bed preparation is termed as basal application through broadcasting.

(ii) Top-dressing: Spreading of fertilizer in standing crops is termed as top dressing without considering the crop rows but when the crop rows are taken into account and the material is dropped on the ground surface near the crop rows, then it is called as **side dressing.**

(b) Placement of solid fertilizers: This refers to applying fertilizers into the soil where the crop roots can take them easily and maximum portion of the material can be used by plants and losses through uptake by weeds, washing, run-off, volatilization etc. could be eliminated to the greatest extent. Placement can be done in following ways:

(ii) Band placement: This is a localized placement of fertilizers by the side of plants in the hill for widely spaced plants like maize (termed at discontinuous bands) or along the rows of the crop for closely spaced crops like cereals, minor millets (termed as continuous band placement). This method has a definite relationship of fertilizers with seedlings or seed, hence, this method gives very promising results when soil surface is dry.

(iii) Spot placement: When fertilizers are placed at a fixed spot by the help of a bamboo peg having a hole at the bottom in case of very widely spaced crops then the method is termed as spot placement method.

(iv) Fertilizer application through irrigation water: The required quantity of fertilizer material is dissolved in irrigation water and can be used in sprinkler or drip irrigation systems. It is also known as fertigation.

(v) Foliar spraying of nutrient solutions: In this method of fertilizer application, urea, micro-nutrients and other required materials are dissolved in water, filtered and sprayed over the crop foliage by the help of a suitable sprayer. This method is preferred to other methods because it needs very little quantity of materials, the crop plants respond within 24 hours of application, soil reaction, topography and soil textures have no adverse effect on the nutrient availability and fertility status of the soil.

$$\text{Amount of fertilizers (kg/ha)} = \frac{\text{Rate of nutrients (kg/ha)}}{\text{Nutrient content in fertilizers (\%)}} \times 100$$

If fertilizer content two or nutrient

$$\text{Amount of nutrient (kg)} = \text{Amount of Fertilizer} \times \frac{\text{Nutrient content (\%)}}{100}$$

$$\text{Amount of fertilizers (g/lt of water)} = \text{Fertilizer solution (\%) for spray} \times 10$$

Problem

1. **Calculation of amount of Urea, SSP and MOP to N-P_2O_5-K_2O @ 120-60-60 kg/ha in25 m^2 area.**

2. **Calculate the amount of Urea, DAP and MOP to N-P_2O_5-K_2O@ 60-30-40 kg/ha in 25 ha area.**

3. **How much zinc sulphate would be required, if 0.5% $ZnSo_4$ is to be sprayed on 1 ha rice crop and spray volume is 800 lt/ha**

4. **A student want to sulppy whole quantity of nitrogen through FYM in which nutrient content is 0.5% N and recommendation dose is 12 t/ha. calculate the amount of FYM for 25m^2 area plot.**

3.1 Observation

After application of fertilizer

(Data recorded after every 15 days intervals)				
Stage of crops	**Source of nutrients**	**Plant height (cm)**	**Dry matter (g)**	**No. of plants per m^2**

3.2 Conclusion

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Experiment No. 4 Date----------

Water Management

To study the method of irrigation to be used for different crop

4.1 Materials Required

Notebook and pen or pencil

The various methods of irrigation for different crops

1) Surface irrigation----------

2) Sub-surface irrigation----------

3) Over-head or sprinkler irrigation ----------

4) Drip or trickle irrigation----------

4.2 Observations

i) Irrigation scheduling for the allotted crop :

S.No	Stage	Duration after each
1		
2		
3		
4		
5		

Soil type :

Formula:

Volume of Irrigation water

Volume of irrigation water (lit) = Area to be irrigated (m^2) × Depth of water (m) ×1000

$$\text{Required duration of irrigation (hour)} = \frac{\text{Volume of irrigation water (lit)}}{\text{Discharge (lit/hour)}}$$

Problem

1 .Calculation the volume of water required to apply 10 cm water in an area of 100 m^2 plot.

2. Calculation the volume of water required to apply 6 cm water in an area of 2000 m^2 plot, gross irrigation and if the discharge of pump is 8000 lit/hour.

4.3 Conclusion

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Experiment No. 5 Date----------

Weed Management

5.1 AIM

To identify the weeds and their proper management

5.2 Materials Required

Quadrant, notebook and pen or pencil

Table 5.1. Identification of weeds (Each 5 weeds)

Crops	Common name	Scientific name	Management
Rice			
Maize			
Groundnut			
Blackgram			

5.3 Calibratation of sprayers

Spray is the most common method of application of herbicide. Calibratation of a sprayer is pre-re quisite for safe and effective control of weeds.

Formula

$$\text{Spray volume (lit or m}^2\text{)} = \frac{\text{Volume of water (lit or m}^2\text{)} \times \text{Area} \times 100}{\text{Active ingredient (a.i) in herbicide}}$$

5.4 Herbicide requirement

On the container or packet of the commercial available herbicide, concentration of active ingredients is mentioned.

Formula

$$\text{Spray volume (lit or m}^2\text{)} = \frac{\text{Volume of water (lit or m}^2\text{)} \times \text{Area} \times 100}{\text{Active ingredient (a.i) in herbicide}}$$

5.4.1 Calculate the volume of water required to spray herbicide in 2 ha land from the following details. a) Distance sprayed=50m b) Width of spray=1.4m c) Water required= 2lts

5.4.2 Calculate the amount of hiltachlor 50EC to apply butachlor @ 1.5kg/ha in 5000m^2 land area.

5.5 Observation

Crop	Herbicide	Weed population

5.6 Conclusion

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Experiment No. 6 Date----------

Management of Insect Pests and Diseases of Crops

6.1 Aim

To study about insect pests and diseases and their management in field crops

6.2 Materials Required

Pesticide, notebook and pen or pencil

A) Pest management

Table 6.1 Nursery

S. No	Crop	Insect pest observed	Chemical Management	Biological managements

Table 6.2 Main field

S. No	Crop	Insect pest observed	Chemical Management	Biological managements

Table 6.3 Diseases management

S. No.	Crop	Disease observed	Chemical Management	Biological managements

6.3 Conclusion

Signature of Faculty In-charge

Experiment No. 7 Date----------

Harvesting

7.1 Aim

To know the harvesting of different crops and their yield of crops
To get ready for next crop

7.2 Materials Required

Harvester, Combine harvester, Mower, Potato digger, Cutting knife, Sicklethasuas, Pickaxe, Spade, Baskets, Bags, Ropes, Carting facility, Threshing floor, note book, pen ,pencil and weight balance.

7.3 Procedure

A. Cereals and small millets

- Cut the crop with the help of a sickle.
- Cut the plants as close to the ground as possible.
- Keep the few handfuls of the crop harvested in one place.
- Collect this harvest at various places.
- Simultaneously, make small, easily lifted bundles, by tying up with ropes or any other material.
- Collect these bundles in one place.
- Transport these bundles to the clean threshing floor.
- Keep it for sun drying.
- Make thatch of suitable size when the harvest is large.
- Dry them in the sun for 2 more days for removing of grains from the plants
- Note down the weight of the separated grain along with the area harvested

B. Pulse crops

Pluck the dry and mature. Repeat 2-3 times after every 5-7 days. Spread every picking on pucca threshing floor for sun drying. Harvest the entire crop with a sickle when 80-90 % of the plants are completely dried.

C. Oil seed crops

Harvest soybean, sesame and other oilseed crops as indicated in the above mentioned crops. Groundnut is use to pull up the individual plant by hand, by holding the haulms of the bunch type groundnut in an upright position. Undertake digging with the help of small pickaxes (kudali), in the spreading types. A deshi plough can also be used. Collect the pods which are left

here and there in the plot. Collect the pulled plants at one place. Keep the plants in such a way that the pod bearing ends are in one direction. Pluck the pods by hand. Remove the soil lump from the pods, if any. Transport the pods to the proper place. Keep the pods for sun drying, till moisture is reduced to 10 to 12%.

D. Fibre crops

- Cut the plant individual plants with sicklesthasuas at the ground level.
- Spread the plants on the ground in lines systematically
- Tie-up some plants into a bundle of about 6-8 cm tedious.
- Make the bundles standing slantingly in some places in the field, to remove leaves (to be spread later on the surface of soil, for maintaining soil fertility).
- Remove the bundles to the source of water for steeping.
- Prepare the jak (accumulated jute - bundles in water)
- Remove the bundles after about 3 weeks, for stripping fibres.
- Strip the fibre, individually from each plant.
- Dry the fibre and form the lachhi, after adequate drying.

D. Sugar crops

- Cut the plant individual plants with sicklesthasuas at the ground level.
- Spread the plants on the ground in lines systematically
- Tie-up some plants into a bundle of about 6-8 cm tedious.
- To remove leaves from the cane and also the top portion with leaves.

7.4 Observations

Table 7.1 Record the following observations in the given below:

S.No.	Name of the crop	Area in sq.m	Grain Yield (t/ha)	Straw Yield (t/ha)

$$\text{Harvest index (\%)} = \frac{\text{Biological yield}}{\text{Economics yield}} \times 100$$

Problem 1: Calculate harvest index from above observations.

7.5 Conclusion

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Experiment No. 8 Date----------

Threshing, Drying, Winnowing and Storage

8.1 Aim

To know the threshing, drying, winnowing and storage of different crop

8.2 Materials Required

Threshing machine, winnowing machine, Grain moisture meter, storing jar, bags, note book and pen

8.3 Threshing

- Threshing is the process of beating plants in order to separate the seeds or grains from the straw.
- To maintain the high quality of the harvested grains, it should be threshed immediately after harvesting.
- Avoid field drying and stacking for several days as it affects grain quality due to over drying. Stacked grains of high moisture content results in discoloration or yellowing.

8.4 Winnowing

This is an agricultural method developed by ancient cultures for separating grain from chaff. It is also used to remove weevils or other pests from stored grain. Threshing, the loosening of grain or seeds from the husks and straw is the step in the chaff-removal process that comes before winnowing.

8.5 Storing the grains

- Storage in bags and also find out the moisture percentage present in the grain through grain moisture meter before storage
- Loose storage
- Storage in bags is convenient for short term storage, where grain is intended for very early onward movement.
- For short term storage, no control measures against insects are needed.
- In loose/bulk storage method, large quantity of grains can be stored in per unit volume of space and the infestation of insects/pests is lower.
- The basic requirements of a good storage practice are: a healthy, clean, and uniformly dried grain, and a structure that will maintain a suitable environment that will prevent pests.

Formula

$$\text{Grain yield at } x \text{ \% moisture} = \frac{100-y}{100-x} \times \text{grain yield at } y \text{ \% moisture}$$

8.6 Observation

Name of the crop	Threshing method	Temperature for store grain	Moisture percent in grain yield	Final weight of the grain

Problem 1. If the weight of 4 ton rice grain just after harvest contains 19% moisture, calculate the weight at 12% moisture.

8.7 Conclusion

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Experiment No. 9 Date----------

Marketing of produce

9.1 Aim

To know the marketing of produce of different crop

Farmers producing agricultural produce are scattered in remote villages while consumers are in semi-urban and urban areas. This produce has to reach consumers for its final use and consumption. There are different agencies and functionaries through which this produce passes and reaches the consumer thus marketing channel can be defined as the intermediaries through which agricultural produce is moved from producer level to consumer level.

9.2 Factors affecting channels: There are several channels of distribution depending upon type of produce or commodity. Each commodity group has slightly different channel. The factors are :

1. Perishable nature of produce .e.g. fruits, vegetables, flowers, milk, meat, etc.
2. Bulk and weight–cotton, fodders are bulky but light in weight.
3. Storage facilities.
4. Weak or strong marketing agency.
5. Distance between producer and consumer. Whether local market or distant market.
6. Standardization and grading problems.

9.3 Types of Market Channels: Some of the typical marketing channels for different product groups are given below:

A. Channels of rice:

1. Producer–miller->consumer (village sale)
2. Producer–miller->retailer–consumer (local sale)
3. Producer–wholesaler->miller–retailer–consumer
4. Producer–miller–cum-wholesaler-retailer-consumer
5. Producer–village merchant–miller–retailer–consumer
6. Producer–govt. procurement–miller–retailer–consumer

B. Channel of other food grains:

1. Producer – consumer (village sale)
2. Producer–village merchant–consumer (local sale)
3. Producer–wholesaler-cum-commission agent retailer–consumer
4. Producer–primary wholesaler–secondary wholesaler– retailer– Consumer
5. Producer–Primary wholesaler–miller–consumer (Bakers).
6. Producer-govt.procurement–retailer–consumer.
7. Producer–government–miller–retailer–consumer.

C. Channels of cotton:

1. Producer–village merchant–wholesaler or ginning factory– wholesaler in lint– textile mill (consumer)
2. Producer–Primary wholesaler–ginning factory–secondary wholesaler–consumer (Textile mill)
3. Producer– Trader– ginning factory– wholesaler in lint– consumer (Textile mill)
4. Producer–govt. agency–ginning factory–consumer (Textile mill).
5. Producer–Trader–ginning factory–wholesaler–retailer– consumer (non-textile use).

These channels have great influence on marketing costs such as transport, commission charges, etc. and market margins received by the intermediaries such as trader, commission agent, wholesaler and retailer. Finally this decides the price to be paid by the consumer and share of it received by the farmer producer. That channel is considered as good or efficient which makes the produce available to the consumer at the cheapest price also ensures the highest share to the producer.

9.4 Observation

Table 9.1. Agricultural Marketing Schemes

Agency	Marketing	Storage	Processing	Grades Standards	Agricultural Exports

Table 9.2.Observation of marketing of produce

Crop	Last year (Rs/q)	Current year (Rs/q)	Yield (q/ha)	Minimum support price (MSP) per quintal

9.5. Conclusion

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Experiment No. 10 Date----------

Seed Production, Mechanization, Resource Conservation and Integrated Nutrient Management.

10.1 Aim

To study about seed production, mechanization, resource conservation and integrated nutrient management

10.2 Materials Required

Seed, harvester, weight balance, Bags, Ropes, Threshing floor, note book, pen or pencil

10.3 Observation

Hybrid Seed Production

1	**Source of planting material**	
2	**Type of planting material**	
3	**Germination percent**	
4	**Purity percent**	
5	**Isolation distance**	
6	**Spacing**	
7	**Fertilizer and manure**	
8	**Roguing**	
9	**Seed Treatment**	
10	**Harvesting**	
11	**Precaution measures**	
12	**Off-type identification**	
13	**Eradication**	
14	**Moisture percent of seed before storage**	
15	**Storage**	

10.4 Conclusion

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Experiment No. 11 Date----------

Insect pests and Diseases Management Technology

11.1 Aim

To study about insect pests and diseases and their management in store grain

Table 11. 1 Store grain pest management

S.No.	Crop	Insect pest observed	Symptom	Management

Table11. 2 Diseases management

S.No.	Crop	Name Disease observed	Causal organism	Management

11.2 Conclusion

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Experiment No. 12 Date----------

Preparation of Balance Sheet Including Cost of Cultivation, NetReturns Per Student as well as Per Team of a Group of Students

12.1 Aim

To study the economics is an important component of all agricultural experiment.

12.2 Materials Required

Notebook and pen or pencil

12.3 Procedure

12.4 Cost of cultivation (Rs ha^{-1})

The prices of the inputs that were prevailing at the time of their utilized for determining the cost of cultivation which was given in rupees per hectare.

12.5 Gross return (Rs ha^{-1})

The model prices of crops prevailing in the market immediately after its harvest were used for the calculation of gross returns.

Gross return= Yield (q/ha) × Market price (Rs/q)

12.6 Net returns (Rs ha^{-1})

The net return per hectare was worked out by deducting the cost of cultivation from the gross return and expressed in rupees per hectare.

Net return= Gross return- Cost of cultivation

12.7 Benefit cost ratio

In order to find out the economics of rice cultivation, the cost of cultivation and the gross return of all the treatments were worked out separately, from which the net return was obtained. Dividing this net return by cost of cultivation, we obtained the benefit cost ratio.

$$\text{Benefit cost ratio} = \frac{\text{Net return}}{\text{Cost of cultivation}}$$

12.8 Return per repuee invested

$$\text{Return per repuee invested} = \frac{\text{Gross return}}{\text{Cost of cultivation}}$$

Problem 1. Calculate the cost of cultivation, net return, gross return and Return per repuee invested of 1ha rice, respectively.

S. No.	Items	Inputs per Unit	Inputs per hectare	Total cost per ha (Rs.)
1.	Hired male labours			
2.	Hired female labours			
3.	Bullocks			
4.	Machinery charges			
5.	Seed			
6.	Manure			
7.	Fertilizers			
8.	Irrigations			
9.	Insecticide/Fungicides			
10.	Family male labours			
11.	Harvesting and threshing			
Total Cost per ha				

Yield per ha.....quintals Grain.....quintals Straw

Price

Grain @ Rs ---------- per quintal,

Straw @ Rs…..... per quintal

Problem 2. If gross return and cost of cultivation of 2 ha rice is Rs 52000/- and Rs 24000, respectively, calculate the Benefit cost ratio.

12.9 Conclusion

Signature of Faculty In-charge

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