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Economic analysis of paddy production and constraints in Ballia district of Uttar Pradesh

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Abstract

Rice is the most important staple food of the country. India is a second-largest producer and exporter country of rice after China. About 30 per cent area of the district is affected every year by flood due to Ganga river. District Ballia is highest producing district in the state which covered an area of 122943 thousand hectare and produced 2196240 metric tonnes with productivity17.86 quintal /hectare. The study was conducted Ballia district of Uttar Pradesh. Multi stages random sampling techniques were used to selected the farmers. Finally 100 farmers were selected randomly from selected villages. In this paper analysiszed the cropping intensity economic analysis of cost of cultivation and constraints using primary level data by interview method through questionnaire and schedule for the period June 2021to may 2022. The maximum cropping intensity was observed at marginal group of farms. The marginal farmers were cultivating for consumption purpose whereas small and medium farmers were grown for consumption as well as commercial purpose. The medium farmers are very awareness. They were using latest technology for increasing production, but small farmers have not self-resources of cultivation, they hired by others and paid maximum Rs/hour of cultivation of land. Overall average cost of cultivation was Rs. 58679.90 of all marginal small and medium agroups of farmers. Cost of production of per quintal of paddy was calculated on the C1, C2 and C3 basis. An overall average cost of production of input- output ratio of all size groups varies from 1:4.39 to1:2.09. Technical problems focused the low level of education and training. Marketing problems appeared higher percentage of home consumption and comparatively low marketable surplus.

Key words: Flood, Cost analysis Cropping Intensity, production farm income

Introduction

Rice is the most important staple food of the country consumed by about 65 per cent of the population (Singh and Singh, 2020). It contributes around 10 per cent of the agricultural GDP and its production generates 3.5 billion man days of employment (Ahmad, et al. 2017, Kumar et al., 2018). Presently, direct seeded rice is followed in America, Western Europe such as Italy and France, Russia, Japan, Cuba, India, Korea, Philippines and also in some parts of Iran, Due to high technology, high labour cost and shortage of skilled labour thereby shifting trend from transplanting method of cultivation (Akhgari, 2004) National post (2012), Organic farms need for more land is bad for earth study National Post, 26th April 2012 reported that organic farming seeks to limit the use of chemical pesticides and fertilizers of paddy crop. Although production of rice has increased due to technological changes in cultivation practices but increased instability in production also indicated distress in rice production across the states. Most of the States registered negative profitability in rice cultivation and only the farm business income was found to be positive. Rice is one of the chief grains of India and it has the rice area under rice cultivation .India is a second largest producer of rice and second largest exporter in the world. in 2020, world production of paddy rice was 756.7 million metric tons (843.1million short tons), led by china and India with a cobbined52 % of this total .India's Rice production increased from 53.60 million tonnes in FY1980 to 130 million tonnes FY 2021-22. Rice yield per hectare in 2021-

22 is 2809Kg/ hectare. Agriculture is the sole and backbone of Indian people's because of almost too now a day's approximately one-third population lives in rural area. It is major food grain in the world. India is a second-largest producer and exporter country of rice after China and. (Ministry of Agriculture). In out of Total production, the production of rice during 2021-22 is estimated as 127.93 million tonnes. It is higher by13.23 million tonnes than the last five years' average production of 116.43 million tonnes. The byproduct of rice milling are used different purposes such as bran is used as cattle, poultry feed, leather and textile industry, husk is used as fuel, Bran oil is used as edible oil and for the preparation of vanaspat oil. Rice straw can be used as well as litter during winter. Paddy husk is also utilized in brick making. In India ,all state of the country (2021-22), overall paddy production was 130290.60 thousand tons occurred whereas Uttar Pradesh is the first largest highest rice producing state in all state of country after was 16752.7 thousand to(nswww.nfsm.gov.in)during 2021-22 (NSO,2021-22), and it contributes of12.81 percent in national production. India is a major producer and exporter of rice, a vital food grain. Economic development is done by emphasizing the development of the rice production. There are several rice suppliers in India who have a major role in development of Indian economy. The economics of Uttar Pradesh is based mainly on Agriculture and round 65 % of the total population is dependent on Agriculture. Contribution of agriculture sector is significant in Economic development of the state. According to the survey of 2014-15, approximately 165.98 lac hectares (68.7%) land is used for cultivation. To maintain the annual growth rate of 5.1% in the financial year 2016-17, the department of agriculture has fixed the target of 659.49 lac metric tonnes production of total food grains against which expected production is 539.14 lac metric tonnes out of which food grain production was 180.25 lac metric tons in Kharif. In Rabi, expected production of food grains is 355.90 lac metric tonnes.

It is the monetary income on the farm of crop cultivation is the subject of quantum of different commodities saved as marketed for surplus result into greater monetary income on the farm. In Uttar Pradesh, District Ballia is highest producing district in which covered an area of122943 thousand hectare and produced2196240 metric tons with productivity17.86quintal /hectare (District profile, Report KVK Ballia. 2023). Ballia district comprises of three district regions according to topography, soil and climate and constraints like as water logging condition specially kharif food grains, this is very poor district due reason of flood of Ganga River in context of food grain production and challenges remain for food production every year. Ballia is a district in Uttar Pradesh .The district is bounded on the north by Ghaghara River and in south by Chhoti Sargu and Ganga River. It has contributed to Hindi literature immensely as prominent scholars like Hazari Prasad dwivedi, Amarkant, Parshuram chaturvedi belongs to the district. Ballia is a Holy city. About 30 per cent area of the district is affected every year by flood due to Ganga river which caused miseries to animals and human population. The productivity of this area is also affected adversely due to floods needs attention. The large area of the district is under wheat followed by Paddy, Lentil, Potato, pigeon, Chick pea, Field pea, Sugarcane and Maize. Very limited area is covered under Oil seeds and Zaid Urd and Moong. The cropping intensity of the district is only 160.6 percent needs attention to increase. The average holding size of semi marginal, marginal and small farmers are only 0.26,0.72 and 1.31 ha. So in views of the above fact the research work carried out on calculate the cropping intensity of sample farmers, input - output relationship of paddy production and identify constrains envisaged by the farmers in paddy cultivation.

Data and methodology

Data source

This paper is based on primary data collected from five villages namely Chhorhar, Patkhauli, Dharahara, Jirabasti, Shreepu of Hanumanganj block of Ballia district of Uttar Pradesh state were taken positively for the study. A procedure of multi stages random sampling techniques were used . At the first stage of sampling Ballia district was selected purposely therefore block and village were chosen at the second and third stage A list of villages growing paddy crop was obtained along with marginal, small and medium farms with the help of block official record. While the farmhouse hold was selected at fourth stage. A list of all the cultivators of each selected village was prepared along with their size of the agricultural holding and then it was arranged in ascending order on the basis of operational holding Finally, hundred, farmers were selected randomly from five selected villages with using pretested question

schedule. Secondary data were obtained farm book, journals, reports magazines and record of block and district profile. The data pertains to Agricultural years 2021-22

Methodology

Cropping Intensity:

Cropping intensity is an index of intensity of intensity of land use determined by number of crops grown in a particular field during a year .it has been workout by using the fallowing formula.

$$\text{Cropping Intensity} = \frac{\text{Total cropped area}}{\text{Net sown area}} \text{ X } 100$$

Estimation of Costs and Returns

The farm management, cost concept approach is widely used in India for evaluating crop profitability in production. The cost concepts in brief, are Cost A1, A2, B1, B2, C1, C2, and cost C3.

COST A1: This gives the total cash expenses incurred by the owner or operator. It includes the following terms of costs.

1. Value of hired human labour, 2. Value of bullock labour, 3. Value of machinery charges, 4. Value of fertilizers and manures, 5. Value of seeds. 6. Value of insecticides, pesticides and weedecide. 7. Irrigation charges. 8. Depreciation on farm implements 9. Interest on working capital. 10. Land revenue paid to government.

COST A2 = Cost A1+ Rent paid for leased in land, if any.

COST B1 = Cost A1 + Interest on value of owned fixed capital assets

COST B2 = Cost B1 + Rental value of owned land less land revenue

COST C1 = Cost B1 + Imputed value of family labour

COST C2 = Cost B2 + Imputed value of family labour

COST C3 = Cost C2 + 10% of Cost C2 on account of Managerial functions performed by the farmer.

In the present study, the rent paid for leased in land was zero, as none of the sample farmers took land on lease basis. Hence, cost A1 and cost A2 are similar.

Rates of Returns over Different Cost Concepts

Gross Income: Yield of main product (in qt./kg) × their

Prices (`Rs.)

Net Income: Gross Income – Cost C.

Farm Business Income: Gross Income – Cost A2

Farm Investment Income: Farm business income-Wages of family labour

Family Labour Income: Gross Income – Cost B

Cost of production: The cost of production was worked by the following formula-

$$\text{Cost of production/qt} = \frac{\text{Cost of cultivation/ha}}{\text{Quantity of main product/ha}}$$

Results and discussion

Cropping intensity-The cropping intensity of the all-size sample farms groups is presented in the Table-1,the maximum cropping intensity was observed at marginal group of farms as 217.5 per cent fallowed by small group farm 185.00 per cent and medium group farm180.00 per cent respectively with an overall average of 186.00 percent cropping intensity was observed.

It is concluded the marginal farmers were cultivating for consumption purpose whereas small and medium farmers were grown for consumption as well as commercial purpose.

Table1. Cropping Intensity of the selected farmers in Ballia

S.No	Size of farms (ha)	Net Cultivated area (ha)	Gross Cropped area (ha)	Cropping Intensity (%)
1	Marginal (Below 1ha)	0.75	1.63	217.50
2	Small (1-2ha)	1.65	3.05	185.00
3	Medium (2-4ha)	3.25	5.85	180.00
All Farms		5.65	10.53	186.37

Table 2 Cost of cultivation of Paddy on different size group of farms (Rs./ha) in the study area.

S.No.	Items	Size group of farms			
		Marginal Farms	Small Farms	Medium Farms	Over all farms
		Value (Rs)	Value (Rs)	Value (Rs)	Value (Rs)
1	Family labour	6750.0 (11.79)	6284.20 (10.64)	3406.72 (5.48)	5955.57 (10.14)
2	Hired labour	2250.7 (3.93)	4123.6 (6.98)	1492.24 (2.40)	2604.69 (4.43)
3	Total	9000.70 (15.72)	2160.60 (3.65)	4898.97 (7.89)	6333.15 (10.79)
4	Tractor/cultivation Charges	6298.10 (11.00)	8444.80 (14.30)	8305.69 (13.38)	7279.22 (12.40)
5	Seed	4000.40 (6.99)	6525.40 (11.05)	8164.16 (13.15)	5514.90 (9.39)
6	Irrigation Charges	7200.50 (12.58)	6890.44 (11.67)	6982.69 (11.25)	7073.22 (12.05)
7	Manure & Fertilizer	6000.00 (10.48)	5828.80 (9.87)	5904.46 (9.51)	5934.66 (10.11)
8	Plant Protection	1800.60 (3.14)	3318.26 (5.62)	3513.26 (5.66)	2552.90 (4.35)
9	Total Working Capital	34300.30 (59.93)	31007.70 (52.52)	31812.1 (51.26)	32913.65 (56.09)
10	Interest on working Capital (3%)	1029.01 (1.79)	930.23 (1.57)	954.30 (1.53)	987.397 (1.68)
11	Total	35329.01 (61.73)	31937.99 (54.10)	32766.43 (52.80)	33900.91 (57.77)
12	Rental Value on land	8000.00 (13.97)	8000.00 (813.55)	8000.00 (12.89)	8000.00 (13.63)
13	Interest on fixed capital	8694.49 (15.19)	13729.31 (23.25)	15645.76 (25.21)	11444.14 (19.50)
14	Sub Total	52023.8 (90.91)	53667.30 (90.90)	56412.19 (90.90)	53345.22 (90.90)
15	10% Marginal of Sub Total	52023.8 (9.09)	5366.730 (9.09)	5641.23 (9.09)	5334.68 (9.09)
16	Grand Total	57225.38 (100)	59034.03 (100)	62053.42 (100)	58679.9 (100)

(Figures in parenthesis indicate percentage of cost of cultivation of paddy.)

Cost of production per hectare of paddy crop on various input factor workout and presented in table 2, this table illustrated an overall average cost of cultivation was Rs. 58679.90. The cost of cultivation was higher on medium farms as Rs.62053.42 fallowed by small Rs.59034.03 and marginal Rs.57225.38 respectively. It was observed per hectare cost was maximum on medium farm due to heavy expenditure of tractor charged for cultivation, verity of seed and resources of irrigation. Table 3 Measurement of cost and return selected farmers in Ballia

Per hectare cost and return of paddy crop was measured on different categories of farms were out and presented in table 2.it is illustrated from table that an overall average cost of cultivation cost C3 is Rs. 58679.59 and per hectare was maximum at Rs.62053.43 in medium size of farms fallowed by small and marginal farms at Rs.5903.03 and Rs.57225.88 respectively it observed that cost of cultivation was maximum on medium size of farms due to more investment variety of seed at Rs.8164.16 and irrigation Rs.6982.69, whereas in small size farms maximum investment was on tractor charges at Rs. 8444.8.00 and also be observed that in marginal farms, maximum expenditure on family labours, irrigation, manure and fertilizer at Rs.6750.00, Rs.7200 and Rs. 6000 respectively.

It was observed from the table that per hectare cost of cultivation has been observed in positive relation with increasing size of farm. It is concluded that medium farmers are very awareness. They were using latest technology for increasing production, but small farmers have not self-resources of cultivation, they hired by others and paid maximum Rs/hour of cultivation of land, also observed in marginal farmers that more family members engaged in agriculture due to lack of employment and they have not self-resources of cultivation. As well as in the context of income measure observed from the table that an overall gross income was calculated to Rs.1211003.48 of all size of farms. Gross income per hectare was maximum to Rs.119125.0 in marginal size of farms fallowed by small and medium farms corresponding to Rs.125136.00and Rs.129782.00 respectively. And also, other income measures such as net income, farm business income, and family income farm investment income were also calculated and presented in the table. It is revealed from the table marginal farmers were much aware regarding use of improved technologies in order to found more yield from their scare holding.

Table-3 Measure of Cost and returns of Paddy crop in the study area. (Rs/ha)

S.No.	Items	Size group of farms			
		Marginal	Small	Medium	Average
1	Cost A_1 /A_2	28579.01	25653.79	29359.73	27945.34
2	Cost B_1	37273.50	39383.1	45005.49	39389.49
3	Cost B_2	45273.5	47383.1	53005.49	47389.49
4	Cost C_1	44023.80	45007.3	48412.21	45167.02
5	Cost C_2	52023.5	53667.3	56412.21	53354.06
6	Cost C_3	57225.88	59034.03	62053.43	58679.59
7	Yield in Quintal (M.P.)	38.50	39.60	40.50	39.197
8	Yield in Quintal (B.P.)	57.5	59.4	60.25	5856.3
9	Price /q (M.P.)	1750.00	1810.00	1940.00	1804.20
10	Totalincome (M.P.)	67375.00	71676.00	78570.00	70775.27
11	Price /q (B.P.)	900.00	900.00	850.00	890.00
12	Total income (B.P.)	51750.00	53460.00	51212.00	52104.1
13	Gross Income	119125.0	125136.00	129782.00	122879.37
14	Net Income	61899.12	66101.97	67728.57	64199.77
15	Farm business income	90545.99	99482.21	100422.27	94934.02
16	Family labour income	73851.50	77752.90	76776.51	75489.88
17	Farm investmentincome	83795.99	93234.01	97015.55	88988.16
18	Input-Output Ratio				
(i)	On the Cost 'A_1/A_2' basis	1:4.17	1:4.88	1:4.42	1:4.39

(ii)	On the Cost 'B_1' basis	1:3.19	1:3.17	1:2.88	1:3.11
(iii)	On the Cost 'B_2' basis	1:2.63	1:2.64	1:2.44	1:2.59
(iv)	On the Cost 'C_1' basis	1:2.70	1:2.78	1:2.68	1:2.72
(v)	On the Cost 'C_2' basis	1:2.28	1:2.33	1:2.30	1:2.30
(vi)	On the Cost 'C_3' basis	1:2.08	1:2.11	1:2.09	1:2.09

Cost of production of per quintal of paddy was calculated on the C1, C2 and C3 basis it is displayed in the table that per quintal cost of production on the basis of C1similarly input –output analysis was done on the basis of Cost A1 to cost C3. An overall average cost of production of input- output ratio of all size groups varies from 1:4.39 to1:2.09. And also seen that the ratio of input and output in case of marginal farms is varies from 1:4.17 to1:2.08, small farms 1:4.88 to1:2.11 and medium farms 1:4.42 to 1:2.09 respectively. It is concluded that in the study area marginal small and medium farmers more spent for cultivation of paddy crop distinguish on resources but at the last yield and income analysis shows not much differences at varying size of farms in the regarding of economics of paddy production. **Table 4 Constraints of paddy production of sample farms:**

During the farmers' survey and collection of the data, it was observed that farmers were suffering from various numbers of problems related to paddy production and marketing. The various problems categorized in four groups and presented in the table 4 which are as fallows.

Technical Problems- These constraints were related to knowledge and quality and variety of seed, method of sowing, dose of fertilizer, method of application and plant protection etc.

Managerial Problems-Its included knowledge and experience such as decision taking, timely use of plant protection measure, preparation of work schedule day to day operation, arrangement of irrigation facilities and timely disposal of produce etc.

Financial Problems- These are the more important at present situation. Without it agricultural farms cannot be operate sufficiently and cannot increase production. It's related as the arrangement of credits or funds at cheapest rate of interest at appropriate time.

Marketing Problems- Its included problems such as low price, forced sale, storage, transportation, Procurement center etc.

The actual picture of the various problems presented in the table 3.0 it had been seen in the table that the problems concerned with technical knowledge was stand first rank (55.00 per cent) and realized that majority of the sample farmers were not aware today yet. The problems related with marketing of the surplus produce were emphasized by 44.00 per cent of the farmers, which were observed stand second rank. Whereas in financial problems were focused more as 44.00 per cent as comparatively technical problems. And also seen the problems were concerned to managerial found 4thrank, approximately 35.00percent sample farmers accepted it .

Hence various problems regarding as technical, marketing, financial and managerial appearances to place on rank Ist,IInd, IIIrd and IVth respectively.

It is concluded that technical problems are very important to sample farmers because it's focused the low level of education and training. Marketing problems appeared higher percentage of home consumption and comparatively low marketable surplus. And included of financial and managerial problems on paddy production focused the importance of institution credit facilities and better experience of the farmers.

Table 4 Major Constraints Found in different size group of sample farms in Ballia

S. No.	Particular	Marginal	Small	Medium	Total Farmers	Rank
		Number of the Formers				
1	Technical problem	31 (58.49)	13 (48.14)	11 (55.00)	55 (55.00)	1st
2	Marketing problem	19 (54.71)	9 (33.33)	6 (30.00)	34 (44.00)	2nd
3	Financial problem	36 (52.83)	11 (40.74)	5 (25.00)	52 (44.00)	3rd

4	Managerial problem	27 (43.39)	6 (22.22)	6 (30.00)	41 (35.00)	4th
Total sample from		53 (100.00)	27 (100.00)	20 (100.00)	100 (100.00)	

(Figure in the parenthesis show the percentage of constraints)

Conclusion

Cost of cultivation and constraints in Ballia district of Uttar Pradesh using primary level data by interview method through questionnaire and schedule for the period June 2021to may 2022, the maximum cropping intensity was observed at marginal group of farms. it is concluded the marginal farmers were cultivating for consumption purpose whereas small and medium farmers were grown for consumption as well as commercial purpose that medium farmers are very awareness. They were using latest technology for increasing production, but small farmers have not self-resources of cultivation, they hired by others and paid maximum Rs/hour of cultivation of land. The marginal small and medium farmers more spent for cultivation of paddy crop distinguish on resources but at the last yield and income analysis shows not much difference at varying size of farms in the regarding of economics of paddy production. Technical problems are very important to sample farmers because it's focused the low level of education and training. Marketing problems appeared higher percentage of home consumption and comparatively low marketable surplus. And included of financial and managerial problems on paddy production focused the importance of institution credit facilities and better experience of the farmers.

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