# AN ECONOMIC ANALYSIS OF PADDY CULTIVATION AND ITS PROCESSING IN MAU DISTRICT OF EASTERN UTTAR PRADESH, INDIA

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## Abstract

In the present paper, an attempt has been made to examine variations of rice production in different categories of the farmers. A study on an economic analysis of paddy cultivation and its processing in Mau district of eastern Uttar Pradesh was conducted for analysis the cost of input output in paddy cultivation. The study covered five villages of Ghosi block in Mau district and data on paddy cultivation, farm structure, costs, returns, cropping intensity and cost-return aspects of rice cultivation were collected from 100 farmers. The study reveal that average holding size was 1.27 hectare and cropping intensity was 237.79 percent, Paddy occupied 37.74 per cent of gross cropped area. It offers overall net income of Rs. 13419.10 with an expenditure of Rs. 35892.77 as total cost per hectare. Cost of production per quintal was found to be 845.95 which should the positive relationship with the farm size holding. The total processing cost per quintal of coarse paddy amounted to Rs 96.72, 89.70, 96.05 and in fine rice Rs. 103.64, 111.85, and 89.75 in marginal, small and medium, respectively.

*Key words :* Rice production, farm structure, costs, returns, cropping intensity, processing cost, constraint and suggestions.

## Introduction

Paddy is one among the oldest cultivated crop as evident from Vedic literatures and Archeological excavation. Globally paddy is grown in more than 155 million hectare area with a production of about 596 million tones. Maximum area under rice is in Asia, About 90 per cent of all rice grown in the world is produced and consumed in the Asia region.

Paddy is grown on an area of 164.72 million hectares with an annual production of 745.71 million tonnes in the world with the productivity of 45.279 quintal per ha. during 2013(Anonymous, 2013). In the world, India ranks first in area but second in production after China. In India rice occupies an area of 43.95 million hectares with annual production 106.54 million tones with productivity of 24.249 quintal per ha. (Anonymous, 2009). While area, production, and productivity in Uttar Pradesh were 5.98 million hectare, 14.63 million tonnes and 24.479 quintal per hectare respectively (Directorate of Economics and Statistics, Department of Agriculture and cooperation 2013-14).

In Mau district, paddy is grown in 88319 hectare and production 190922 metric tons with 21.62 quintals per hectare (Arth Avam Sankhyiki, 2012-13).

## Methodology

**1. Sampling technique :** The purposive cum random sampling technique was used to select block, village and cultivators. The district Mau was selected purposively. The sampling technique was subdivided into following stages:

a.  Selection of block

b.  Selection of village

c.  Selection of farmers

**a.  Selection of block :** At first, a list of all 09 blocks of Mau district of Uttar Pradesh along with acreage in paddy cultivation were prepared and arranged in descending order. The block namely "Ghosi" having highest area in paddy was selected purposively for this study.

**b. Selection of village :** A list of all the villages falling under Ghosi block was prepared and arranged in ascending order to the area covered under paddy crop and 5 villages were selected randomly from this list.

**c. Selection of farmers :** A separate list of paddy growers of five selected villages was prepared along with their size of holding and stratified into three categories *i.e.*

| | | |
|---|---|---|
| 1. Marginal | – | (Below 1 ha) |
| 2. Small | – | (1-2 ha) |
| 3. Medium | – | (2-4 ha.) |

From this list a sample of 100 respondents were drawn following the proportionate random selection for different categories.

**2. Methods of enquiry :** The primary data were collected by survey method through personal interview with use of pre-structured and pre-tested schedule, while secondary data were collected from Vikash Bhawan, Agriculture Department, Block head quarter, journals, reports, books and internet etc.

**3. Period of enquiry:** The data pertained to agriculture year 2015-2016.

**4. Analytical tools:** Tabular analysis was used for analysis of data weighted average; Cropping intensity and Cost benefit ratio were worked out with the following formula:

a. Weight average (W. A.) = $\Sigma W_i X_i / \Sigma w_i$

b. Cropping Intensity (C.I.) = $\dfrac{\text{Total cropped area}}{\text{Net Cultivated area}} \times 100$

## Results and Discussion

**Structure of farms :** This section deals with the components of size of farms, structure of assets, cropping pattern and cropping intensity.

### 1.1 Average size of sample farms under different size of groups

Distribution of farm and their cultivated area under different size groups of farms are present table 1. It is clear from the table 1 that net cultivated area of sample farms constituted 27.71 per cent, 29.06 per cent and 43.21 per cent paddy under to marginal, small and medium farms, respectively.

The average size of holding of marginal small and medium farms comes to be 0.58, 1.54 and 3.44 hectare, respectively. On an average holding size was estimated to be 1.27hectare.

### 1.2 Investment of farm assets

Per farm investment by different categories of farms on farm assets like building, livestock, machinery irrigation structure are presented in table 2. It is revealed from the table that the average expenditure and farm assets on overall farm was Rs. 329193.97 major part of this expenditure was incurred on building i.e. 61.46 per cent, implement and machinery 27.40 per cent and livestock 9.79 per cent respectively. Total per farm value on farm assets was found to be Rs.229731.55, Rs. 316649.07 and 706502.55 corresponding to marginal, small and medium size group of farms. It can be concluded from the table that per farm investment on building and farm machineries had direct relationship with farm size; whereas trend to investment on livestock was vice-versa.

### 1.3 Cropping Intensity

Cropping intensity is an index of intensity of land use determined by the number of crops grown in a particular field, during a year. It has been worked-out by using the following formula.

Cropping intensity (C.I.) = $\dfrac{\text{Total cropped area}}{\text{Net sown area}} \times 100$

It has been computed for all size groups of farms. The maximum cropping intensity was observed to be 251.72 per cent in case of marginal farms, followed by small, medium farms corresponding to 233.11, 218.02 per cent, respectively with on an overall average of 237.79 per cent.

### 1.4 Structure of costs and returns

Per hectare costs on various input factor in paddy production was worked out and its details are presented in table 3. This table indicates that on an overall average per hectare cost of cultivation of paddy was Rs. 33334.67. The cost of cultivation was observed higher on marginal farms (Rs. 35435.77) followed by medium farms (Rs. 31995.02) and small farms (Rs. 31206.79), respectively.

The study further revealed that marginal farm incurred percent costs on human labour *i.e.* (22.79) followed by manure and fertilizer (16.07), machinery charges (15.40), rental value of land (14.11), interest on fixed capital (10.78) irrigation (10.03), seed (8.73), and plant protection (1.30). It is interesting to mention that all inputs factors showed positive relationship with the size farm while family labour showed inverse relationship.

It is also observed from the table that per hectare gross income was maximum to be Rs.36866.54 on medium farms followed by small and marginal farms, corresponding to Rs. 33505.12 and Rs.329686.70

**Table 1 :** Average size of holding on sample farms under different size group.

| S. no. | Size of Farms | No. of farms | Net Cultivated land (ha.) | Average size of holding (ha.) |
|---|---|---|---|---|
| 1 | Marginal(below - 1 ha) | 60 | 34.88(27.71) | 0.58 |
| 2 | Small (1-2 ha) | 24 | 37.08(29.06) | 1.54 |
| 3 | Medium (2- 4 ha) | 16 | 55.13(43.21) | 3.44 |
| 4 | Overall | 100 | 127.81(100) | 1.27 |

**Table 2 :** Per farms average Investment of assets on different size group of farms.　　　　**(Value in Rs.)**

| S. no. | Particular | Marginal(60) | Small(24) | Medium(16) | Overall average |
|---|---|---|---|---|---|
| 1 | Building(Residential & Cattle shed ) | 157720.16(68.66) | 204013.53(64.42) | 359234.37(50.84) | 202312.85(61.46) |
| 2 | Livestock(Buffalo & Cow) | 28276.66(12.30) | 28172.49(8.88) | 53250.62(7.53) | 32245.10(9.79) |
| 3 | Implement and machinery | 43734.73(19.01) | 84482.85(26.64) | 294009.41(41.59) | 94635.57(27.40) |
|  | Total | 229731.55(100) | 316649.07(100) | 706502.55(100) | 329193.97(100) |

Note: - Figures in parenthesis indicates percentage to the grand total.

**Table 3 :** Per hectare costs and returns of paddy cultivation.

| S. no. | Particular | Size group of sample farms | | | Overall average |
|---|---|---|---|---|---|
| | | Marginal | Small | Medium | |
| 1. | Labour | | | | |
| a. | Family labour | 5734.19(16.18) | 1712.25(5.48) | 442.8(0.13) | 2324.02(6.97) |
| b. | Hired labour | 2343.66(6.61) | 3662.33(11.73) | 4466.28(13.96) | 3657.24(10.97) |
| | Total human labour | 8077.85(22.79) | 5374.58(17.22) | 4909.08(15.34) | 5981.26(17.94) |
| 2 | Machinery | 5459.44(15.40) | 7138.24(22.87) | 7762.70(24.26) | 6978.93(20.93) |
| 3 | Seed | 3095.74(8.73) | 2821.87(9.04) | 3293.45(10.29) | 3120.78(9.36) |
| 4 | Manure & fertilizer | 5694.77(16.07) | 3712.77(11.90) | 3950.08(12.34) | 4904.12(14.71) |
| 5 | Irrigation | 3555.04(10.03) | 2430.13(7.79) | 2287.82(7.15) | 2705.90(8.12) |
| 6 | Plant Protection | 462.53(1.30) | 847.88(2.71) | 1071.23(3.35) | 839.87(2.52) |
| 7 | Interest on working capital | 270.20()0.76 | 250.80(0.80) | 240.20(0.75) | 253.73(0.76) |
| 8 | Rental value of owned land | 5000(14.11) | 5000(16.02) | 5000(15.63) | 5000(14.99) |
| 9 | Interest on fixed capital | 3820.20(10.78) | 3630.52(11.63) | 3480.46(10.88) | 3550.08(10.65) |
| | Grand total | 35435.77(100) | 31206.79(100) | 31995.02(100) | 33334.67(100) |
| B | Income | | | | |
| 10 | Gross income | 32686.70 | 33505.12 | 36866.54 | 35892.77 |
| 11 | Net income | 11135.61 | 14365.18 | 13106.67 | 13419.10 |
| 12 | Family labour income | 2985.12 | 4010.58 | 5314.32 | 4882.12 |
| 13 | Farm investment income | 19955.81 | 22992.70 | 21587.13 | 21969.13 |
| 14 | Farm business income | 11805.32 | 12641.10 | 13794.78 | 13432.20 |
| 15 | Cost of production (Rs./Qtl.) | 774.36 | 808.32 | 918.38 | 845.95 |
| 16 | Yield (q./ha) | 23.01 | 25.93 | 25.87 | 25.08 |
| 17 | Input-output ratio(on cost C3) | 1:0.84 | 1:0.97 | 1:1.05 | 1:0.97 |

Note:- Figures in parenthesis indicates percentage to the grand total.

respectively. In respect of all farms, average gross income came to Rs. 35892.77 however, other income measures like farm income, family labour income were assessed and trend was showing positive relationship and farm investment income and net income were also assessed and trend was showing negative relationship in the contest of various measurers of income with size of forms.

## 2.1 Per quintal processing cost by different mode of processing unit (huller/miller)

Total processing cost per quintal of coarse paddy amounted to Rs 96.72, 89.70 and 96.05 in marginal, small and medium, respectively. In fine rice, the processing cost per quintal amounted to Rs. 103.64, 111.85 and 89.75 in marginal, small and medium, respectively. Fixed cost

**Table 4 :** Per quintal processing cost by different size group under different mode of processing (huller/miller)**.**

| S. no. | Particular | Marginal | | Small | | Medium | |
|---|---|---|---|---|---|---|---|
| | | Coarse Rice | Fine Rice | Coarse Rice | Fine Rice | Coarse Rice | Fine Rice |
| A | Expenses incurred during processing | | | | | | |
| 1 | Loading/Unloading | 5.25 | 5.47 | 5.16 | 4.89 | 6.32 | 5.18 |
| 2 | Transport cost | 18.72 | 17.08 | 12.46 | 15.80 | 12.75 | 9.16 |
| 3 | Refreshment | 5.50 | 6.25 | 6.00 | 7.25 | 10.00 | 13.00 |
| 4 | Cleaning/Grading | 18.78 | 18.51 | 19.37 | 14.74 | 16.81 | 16.67 |
| 5 | Processing cost | 48.38 | 56.33 | 46.71 | 68.97 | 50.17 | 45.74 |
| | Total expanses | 96.72 | 103.64 | 89.70 | 111.85 | 96.05 | 89.75 |

estimation excludes investment on machines (seed cost) for the present study. However, the variable cost consists of labour cost, electricity, packaging charges, maintenance and storage charges, etc. This cost varies as production changes (increase or decrease).

## 2.2 Constraints and suggestion in the processing of paddy

The various constraints in the proper processing of rice have also been identified during the course of constitution by the selected rice processor respondents. Irregular electricity supply, irregular cuts, voltage fluctuation, lack of skilled labour, lack of good quality roads for transportation, lack of adequate finances were the other constraints in the processing of rice as reported by 73.33%, 60%, 50% and 33.33% of respondents respectively in the study area.

## Conclusion

The overall average size of holding in the study area was 0.58, 1.54 and 3.44 hectare in marginal, small and medium size of farms respectively. It was found that medium farmers were cultivating maximum area followed by small and marginal categories of farms.

The cropping intensity was 237.79 per cent on an overall average. The cropping intensity decreased with the increase in the size of holding.

Per farm average investment came to be Rs. 229731.55, Rs. 316649.07 and 706502.55 corresponding to marginal, small and medium size group of farms. It may be able to be concluded that per farm investment on farm assets was having direct relationship with size of holdings.

Gross income, net income, farm business income, family labour income and farm investment income shows the positive relationship with the size of farms.

The per quintal cost of production of paddy over all farm are Rs. 824.00 whereas cost of production (Rs./ Qtl.) Rs. 774.36, Rs. 808.32, and Rs. 918.38 of marginal,

small and medium farms, respectively.

The total processing cost per quintal of coarse paddy amounted to Rs. 96.72, 89.70, 96.05 and in fine rice Rs. 103.64, 111.85 and 89.75 in marginal, small and medium, respectively.

Irregular supply of electricity, irregular cut off and voltage fluctuation was the most important constraints in the proper processing of rice milling as reported by the cent per cent respondents of the study area.

The rice milers opined that uninterrupted power supply, proper training to be organized for creating skilled labour /technical persons and Wide attention to brought in the knowledge of public representative for good quality of roads and sufficient mode of transportation to be launched.

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