



A comparative economic analysis of paddy production in irrigated, semi-irrigated and rainfed farming area of Chhattisgarh, India

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Abstract

The Present Study deals with a comparative study of the cost and return of paddy production in irrigated, semi-irrigated and rainfed farming area of Chhattisgarh. The irrigated, semi-irrigated and rainfed farming area of Chhattisgarh is purposely selected for this study because this area has different levels of the cost of production and returns of paddy in the Chhattisgarh state. The primary data were collected for the year 2019-2020. Primary data were collected from the sample respondents by conducting personal interview and pretested schedule. 300 farmers were selected randomly from three different farming area of Chhattisgarh, 100-100 farmers was irrigated, semi-irrigated and rainfed farming area. The total cost incurred in cultivation of Paddy at the overall farm level was Rs.50940 per hectare which was higher in irrigated farming area Rs.54959.45/ha followed by the semi-irrigated Rs. 50633.87/ha and minimum was rainfed farming area Rs. 47227.00/ha. The Net income was paddy in overall Rs.36234.59/ha. The highest Net income reserved by irrigated farming area Rs. 44615.43/ha followed by semi-irrigated farming area Rs.36912.38/ha and the lowest Net-income was rainfed farming area Rs. 27175.97/ha.

Keywords: Irrigated, semi-irrigated, comparative, benefit cost ratio, main product.

Introduction

Rice (*Oryza sativa*) production in India is an important part of the National economic. The world's most important staple crop & the primary source of food for more than half of the world's population. More than 90% of world's rice is grown and consumed in Asia, where 60% of the earth's people live. India is second largest producer after China and has an area of over 45.5 million hectares and production of 105.31 million tones with productivity level of 2393 kg/ha. India is one of the world's largest producer of white rice, brown rice, accounting for 20% of all world rice production. Rice is the main kharif crop of India. Rice accounts for 35 to 75% of the calories consumed by more than 3 billion Asians & is planted to about 11% of the total world's cultivated land. Chhattisgarh is popularly known as – "Rice bowl of India" because maximum area is under rice cultivation during *kharif* and contribute major share in National rice production. It has geographical area of 13.51 million ha. of which 5.9 million hectares is under cultivation. Rice occupies an area of 3.61 million ha. With annual production 5.48 million tones & productivity of 15.17 qu/ha. It is growing area of 3.48 million hectare with a production of 6.15 million tones and productivity of 1517 kg hectare during 2014-15 and area, production and productivity reduced in the subsequent year. In Chhattisgarh rice is grown in the area of about 16.62 lakhs hectare with production of 22.27 lakhs tonnes and productivity 14.15 q/ha (in the year 2014-15) which is far below than the average national productivity (2010 kg/ha).

Materials and Methods

Collection of data

The study is based on both primary and secondary data. The primary data was collected from the selected respondents with the help of pre-tested interview schedule by the personal interview method and secondary data was collected from Chhattisgarh agriculture statistics, land record office,

annual districts statistics and other published and unpublished reports.

Methodology

300 farmers were selected randomly from three different farming area of Chhattisgarh, 100-100 farmers was irrigated, semi-irrigated and rainfed farming area. A multistage simple random sampling technique (SRS) was adopted to select the block, villages and the respondents, market and different farmer involved in paddy production and marketing in irrigated, semi-irrigated and rainfed farming area. The details of the sampling techniques at various stages are given as under:

Profitability concept

Gross income = (Quantity of main product X price of main product) + (Quantity of by product X price of by product.)

Net income = Gross income - Cost C₂

Family labour income = Gross income - Cost B₂

Family business income = Gross income - Cost A₁

Benefit cost ratio = Gross income/Cost C₂

$$\text{Cost of Production} = \frac{\text{Total Cost}}{\text{Main Produced (q/ha)}}$$

Results and Discussion

Cost concept

All most every day in farm organization and operation cost consideration enters. It is an important tool for measuring farm business activities. The farm management specialists have specified cost of cultivation into cost A₁, A₂, B₁, B₂ cost C₁, C₂ and C₃. These cost concepts have already been taken up in the methodology chapter. In this section efforts have been made to discuss according to (various costs concepts) paddy cultivation of irrigated, semi-irrigated and rainfed farming area of Chhattisgarh state.

Results and Discussion

A comparative picture of use of various material costs (Rs./ha.) and yield obtained (q/ha.) of the paddy sampled farmers under irrigated, semi-irrigated and rainfed farming area has been presented in table 1.

It is observed from the table 1 that the total cost incurred in cultivation of Paddy at the overall farm level was Rs.50940 per hectare which was higher in irrigated farming area Rs.54959.45/ha followed by the semi-irrigated Rs. 50633.87/ha and minimum was rainfed farming area Rs. 47227.00/ha. The observed form table that overall input cost was Rs.29233.77 and 60.25 percent of the total cost. The

higher material cost was irrigated farming area in Rs.34946.27/ha and 63.59 percent followed by the semi-irrigated area was Rs. 32853.92/ha and 64.89 per cent and minimum was rainfed farming area Rs. 31654.10/ha and 67.03 per cent.

The fixed cost of paddy in overall was accounted for Rs.17788.69, around 34.92 percent of the total cost. The highest fixed cost of paddy was found in the irrigated farming area 20013.17 Rs./ha and 36.41 per cent followed by semi-irrigated farming area Rs.17779.95/ha and 35.11 percent and lowest fixed cost was rainfed farming area was 15573.00 Rs./ha and 32.97 percent.

Table 1: The Cost of cultivation on Paddy crop in different farming area (Rs/ha)

Particular	Irrigated		Semi irrigated		Rainfed		Overall	
	Rs./ha	%	Rs./ha	%	Rs./ha	%	Rs./ha	%
A. Variable costs								
1. Human labour								
a. Family labour	4161.4	7.64	4191.96	8.44	4487.76	9.65	4280.37	8.52
b. Hired labour	6792.7	12.47	5910.14	11.9	6099.16	13.12	6267.33	12.48
Total human labour	10954.1	20.11	10102.1	20.34	10586.92	22.77	10547.71	21.01
2. Bullock and Machine power								
a. Bullock power	72.65	0.13	72.65	0.15	195.08	0.42	113.46	0.23
b. Machine power	4391.4	8.06	4376.34	8.81	4059.13	8.73	4275.62	8.51
Total Bullock and Machine power	4464.05	8.19	4449	8.96	4254.2	9.15	4389.08	8.74
3. Seed	3851.2	7.07	3926.83	7.91	3896.76	8.38	3891.60	7.75
4. Manure and fertilizer	7468.55	13.71	6861.53	13.81	5510.84	11.85	6613.64	13.17
5. Plant protection	5548.3	10.18	5008.41	10.08	5397.91	11.61	5318.21	10.59
6. Irrigation	758.95	1.39	238.5	0.48	0	0	332.48	0.66
7. Interest on working capital	1429.05	2.62	1306.87	2.63	1269.62	2.73	1335.18	2.66
Total variable cost	34474.2	63.28	31893.23	64.21	30916.26	66.5	32427.90	64.58
B. Fixed cost								
1. Land revenue	10	0.02	10	0.02	10	0.02	10.00	0.02
2. Rental value of land	18500	33.96	16500	33.22	14500	31.19	16500.00	32.86
3. Depreciation	432.67	0.79	326.95	0.66	326.95	0.7	362.19	0.72
4. Interest on fixed capital	1064.87	1.95	943.33	1.9	736	1.58	914.73	1.82
Total fixed cost	20007.55	36.72	17780.28	35.79	15572.95	33.5	17786.92	35.42
Total cost (A+B)	54481.75	100	49673.51	100	46489.21	100	50214.82	100.00

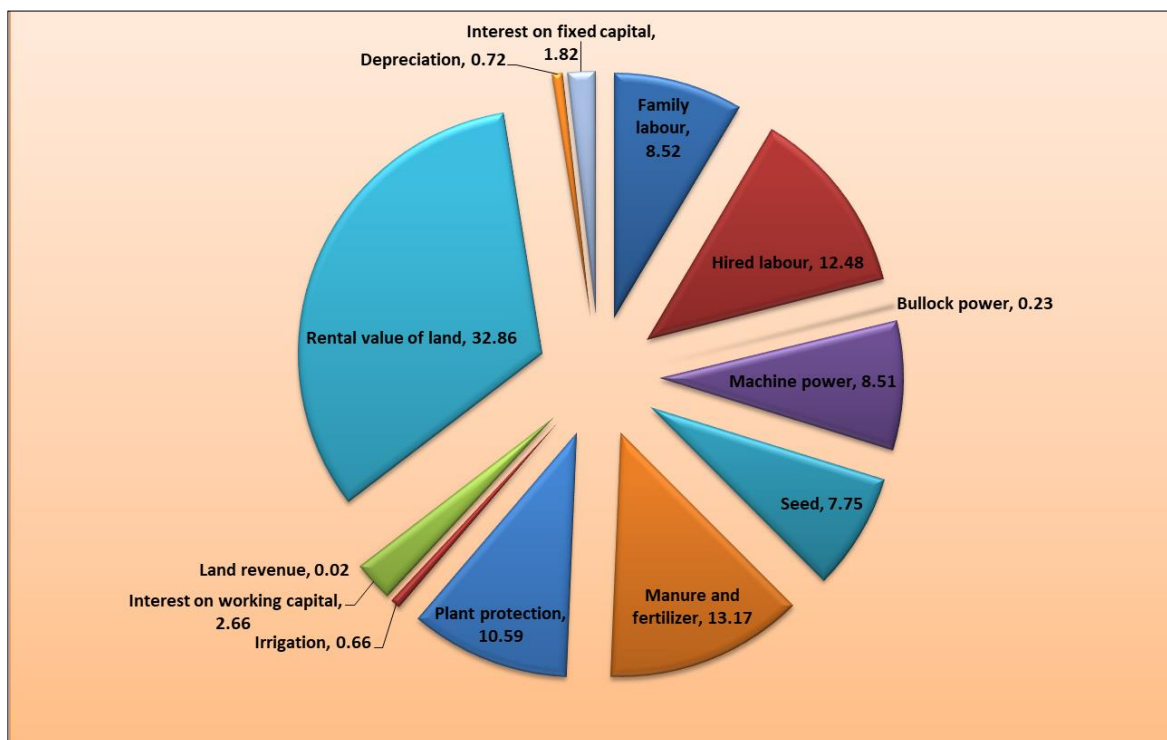


Fig 1: Overall cost of paddy cultivation of sampled household in different farming area (Rs/ha)

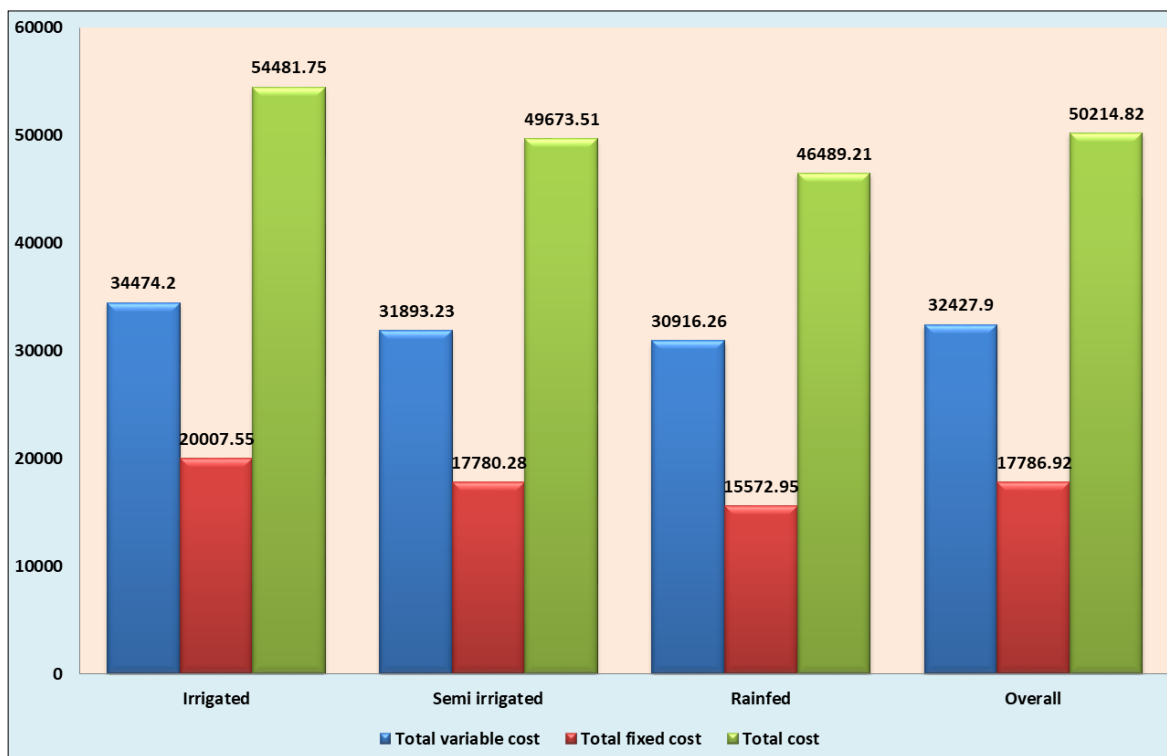


Fig 2: Total Costs of paddy cultivation for different size group of sampled household in different farming area (Rs/ha)

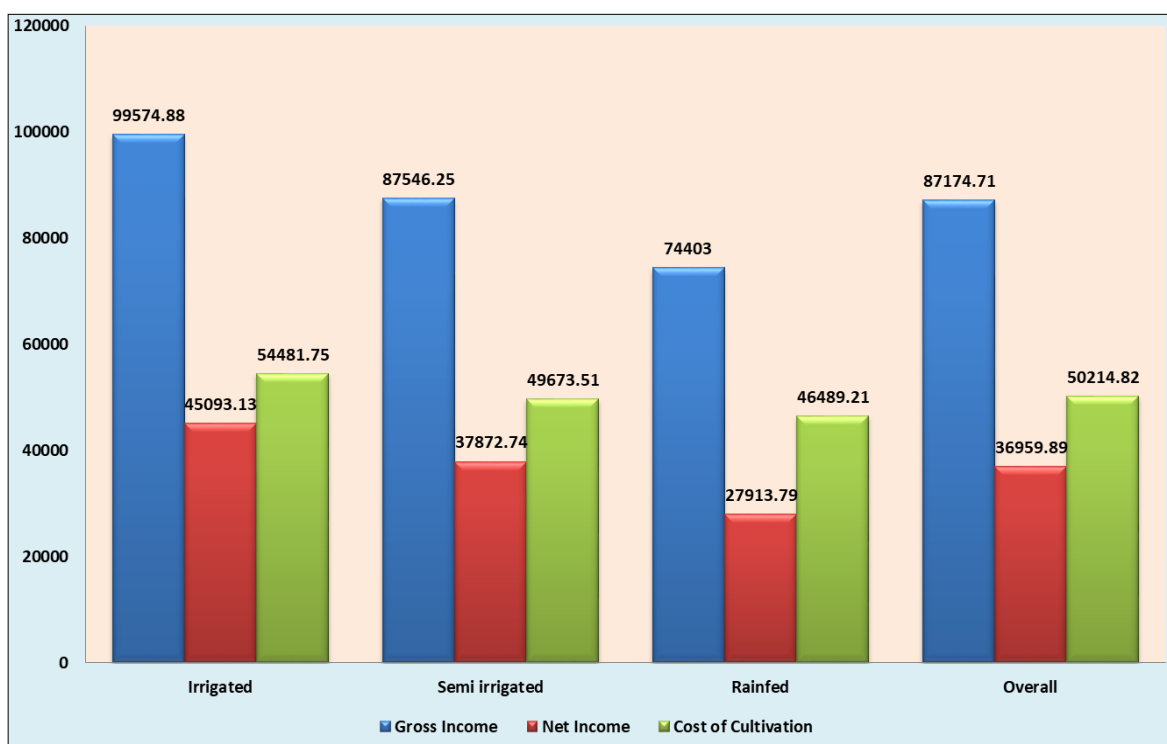


Fig 3: Measures of farm profit in paddy in different farming area (Rs/ha)

Cost obtain on the basis of different cost concept of paddy crop in different farming area

The comparative picture of returns and probability concepts of paddy crop in irrigated, semi-irrigated and rainfed farming area has been presented in table 2.

In the table 2 observed from the overall yield of paddy main product was 33.25 quintal/ ha than highest main product production of irrigated farming area was 38.54 quintal/ha followed semi-irrigated area 32.96 quintal/ha and lowest was rainfed area 28.26 quintal/ha.

The Gross income of the paddy overall was Rs. 87174.71/ha. The highest Gross income irrigated farming area Rs. 99574.88 /ha followed by semi-irrigated area Rs. 87546.25/ha and the lowest Gross income was rainfed farming area Rs. 74403/ha. The Net income was paddy in overall Rs.36234.59/ha. The highest Net income reserved by irrigated farming area Rs. 44615.43/ha followed by semi-irrigated farming area Rs.36912.38/ha and the lowest Net-income was rainfed farming area Rs. 27175.97/ha. Input output Ratio is the relationship which shows the return

From one rupee investment in production process. In this Study shows that the input output ratio in the paddy crop that overall 1:1.71. The highest input output ratio in

irrigated farming area 1:1.81, followed by semi-irrigated farming area 1:1.73 and lowest input output ratio was rainfed farming area 1:1.58.

Table 2: Returns and profitability of paddy crop in different farming area

Particular	Irrigated	Semi Irrigated	Rainfed	Overall
Yield Main Product	38.54	32.96	28.26	33.25
Main Product @1650 Rs/qlt	2949.38	0	0	983.13
Main Product @2500 Rs/qlt	91875	82406.25	70650	83133.33
Total Main Product (Rs./ha)	94824.38	82406.25	70650	84116.46
By Product (200Rs/Qtl)	4750.5	5140	3753	4547.83
Gross Income (Rs./ha)	99574.88	87546.25	74403	87174.71
Input Output Ratio	1.83	1.76	1.60	1.73
Cost of Production (Rs/Qtl)	1413.73	1506.97	1645.05	1521.92
Net Income (Rs./ha)	45093.13	37872.74	27913.79	36959.89
Cost of Cultivation (Rs./ha)	54481.75	49673.51	46489.21	50214.82

Table 3: Break-up of obtained over different cost of Paddy Crop (Rs./ha)

Category	Irrigated	Semi Irrigated	Rainfed	Overall
Cost A1	30633.55	28628.96	26753.43	28671.98
Cost A2	30633.55	28628.96	26753.43	28671.98
Cost B1	31698.05	29571.96	27489.43	29586.48
Cost B2	50198.05	46071.96	41989.43	46086.48
Cost C1	36459.45	34133.87	32727.04	34440.12
Cost C2	54959.45	50633.87	47227.04	50940.12
Cost C3	60455.40	55697.26	51949.74	56034.13

Return obtained over different cost of paddy crop indifferent farming area

Table 4 shows returns over the Cost A₁, Cost A₂, Cost B₁, Cost B₂, Cost C₁, Cost C₂, and Cost C₃ was obtained to be Rs 58655, 58655, 57740.26, 53459.89, 36959.89 and 31938.41 hectare, respectively.

Table 4: Return obtained over different costs (Rs /ha.)

Particulars	Irrigated	Semi Irrigated	Rainfed	Overall
Return over cost A ₁	68819.4	59508.03	47637.55	58655.00
Return over cost A ₂	68819.4	59508.03	47637.55	58655.00
Return over cost B ₁	67754.53	58564.7	46901.55	57740.26
Return over cost B ₂	49254.53	42064.7	32401.55	41240.26
Return over cost C ₁	63593.13	54372.74	42413.79	53459.89
Return over cost C ₂	45093.13	37872.74	27913.79	36959.89
Return over cost C ₃	39644.95	32905.39	23264.87	31938.41

References

1. Bhattacharya P, Majid A. Impact of Green Revolution on Output, Cost and Income of Small and Big Farmers. *Economic and Political Weekly*,1976;11(52):147-150.
2. Kumar D, Kumar N, Punendra. A Comparative economic analysis of System of Rice Intensification (SRI) and conventional practices of rice producer in Dhamtari district of Chhattisgarh state. *Journal of Pharmacognosy and Phytochemistry*,2020;Sp9(2):35-37.
3. Sahu D, Kumar N, Dohare T. Benefit-cost analysis of hybrid rice producer in Dhamtari district of Chhattisgarh state. *Journal of Pharmacognosy and Phytochemistry*,2019;8(6):928-931.
4. Sahu D, Dohare T, Kumar N. Economic performance of Sri Method of paddy cultivation in Bhalaghat district of Madhya Pradesh. *Journal of Pharmacognosy and Phytochemistry*,2020;Sp9(2):50-53.

5. Ohajianya DO, On yenweaku CE. Analysis of costs and returns in rice farming by farm size in Ebony! State. *Journal of Agriculture and Social Research*, (JASR),2003;23(1):29-39.
6. Ohen, Ajah SB, EA. Cost and return analysis in small scale rice production in Cross River State, Nigeria. *International Research Journal of Agricultural Science and Soil Science*,2015;5(1):22-27. 21.
7. Santha AM. A comparative analysis of cost and returns of paddy cultivation for different seasons in Trichur, Kerala. *Madras Agricultural Journal*,2002;80(2):41-44.
8. Thiyagarajan, Ranganathan TM, Bhaskaran CR, Mathan A, Karivaradaraaju KK, TV. Trends in rice area, production and productivity in the different agro-climatic zones of Tamil Nadu. *Madras Agricultural Journal*,2001;87(4/6):287-290.
9. Visalakshi, Sirees M. Evaluation of rice production technologies for higher monetary returns and water use efficiency. *research Journal of Research ANGRAU*,2014;42(2):51-53.
10. Yogananda, Reddy SB, VC. Influence of urban compost and inorganic fertilizers on nutrient use efficiency, economics and sustainability of rice production. *Journal of Ecobiology*, 2004.