A Study on Production and Marketing of Rice Cultivation in Vizianagaram District of Andhra Pradesh, India

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Authors' contributions

This work was carried out in collaboration among all authors. Authors SS and GSKB designed the study. Author SS performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors RA and AP managed the analyses of the study, managed the literature searches. All authors read and approved the final manuscript.

Original Research Article

ABSTRACT

The production and marketing of rice cultivation have been studied in Vizianagaram district of Andhra Pradesh during 2018-19. Tools such as costs and returns, marketing margins, input use efficiency, marketing margins and price spread were used for the study. The results have shown that the Benefit-Cost ratiois 1.05. The input use efficiency has shown a negative significance for chemical fertilizers,pesticides and seed rate. The price spread analysis has shown that the producers receive 27% of the consumer price. Marketing margin for the adopted marketing channel was worked out by comparing the prices prevailing at each stage of marketing. Since used prices were related to a particular point of time and as small concurrent margins were also worked out.

Keywords: Rice cultivation; rice production; rice marketing; benefit-cost; Vizianagaram.

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1. INTRODUCTION

In India, Rice (*Oryza sativa)* is one of the most important crops. Andhra Pradesh (AP) ranks 4th in Rice production and produces about 80.51 lakh tons [1,2,3]. AP is a leading rice producer with a production of 12 percent of the total rice produced in the country (Indiastat.com 2017-18) [4,5]. In Andhra Pradesh, Vizianagaram district has a rice production of 571000 tons in 1.25 thousand hectares [6]. The present study was carried out to the production and marketing situation of rice with the following objectives:

1. To work out costs and returns in the cultivation of rice,
2. To analyse the input use efficiency of rice
3. To identify the price spread of rice cultivation.

2. MATERIALS AND METHODS

A multi-stagee sampling technique was adopted for selecting sampling units at various levels. Andhra Pradesh, Vizianagaram district was selected as it has the production of rice in 1.25 thousand hectares. Vizianagaram, Gatyada mandal was selected for the study and from this mandal, three villages namely Buradapadu, Ramavaram and Narava were selected. from each village, 30 respondents were selected making a total sample size of 90 respondents.

2.1 Analytical Framework

1) Costsandreturns

The different cost concepts used in this study are A1, A2, B1, B2, and C based on these cost concepts the production cost of rice was calculated. The Cobb-Douglas type of production function was fitted for the estimation of elasticities of important variables contributing to the yield of rice.

2) Resource efficiency

The production function was used to find out the productivity of resources used in paddy cultivation. For this purpose, the Cobb-Dougl as production function was employed. The single most advantage of this production function was that the input coefficients constituted the respective elasticities. The function was modified to include dummy variables.

$$Y= a + X_1^{b1}X_2^{b2}X_3^{b3}X_4^{b4}X_5^{b5}X_6^{b6}X_7^{b7}X_8^{b8}$$

Where,

Y= Total returns from paddy cultivation (Rs)
X_1=Area under paddy cultivation (ha)
X_2=Value of seed (Rs)
X_3=Tractor charges (Rs)
X_4=Cost of human labour used in paddy cultivation (Rs) X_5=Cost on chemical fertilizers (Rs)
X_6=Cost on farm yard manure (FYM) (Rs)
X_7=Cost on plant protection chemicals (PPC) (Rs) X_8=Amount of water applied (ha cm)

This Cobb-Douglas function was estimated using ordinary least square (OLS) approach after converting it into log-linear form. The estimable form of the equation is given below:

ln Y= ln $a+b_1$ ln X_1+b_2ln X_2+b_3ln X_3+b_4ln X_4+b_5ln X_5+b_6ln X_6+b_7ln $X_7+ b_8X_8+b_{10}$

Coefficients were tested for statistical significance by using 't' test.

3) a. Producer's share in Consumer's price:

It is the price received by the farmers expressed as a percentage to the retail price (i.e. price paid by the consumer). If P_r is the retail price and P_f is the producer price then the producer's share in consumer's rupee P_S may be expressed as:

$$P_S = \frac{P_f}{P_r} * 100$$

b. Marketing Margin of Middlemen:

The total payment (cost + purchase price) and receipts (sale price) of middlemen (ith agency)

Percentage margin of i^{th}middleman =

$$\frac{P_{R_i} - (P_{P_i} + C_{m_i})}{P_{R_i}} *100$$

Where,

P_{Ri}= Total Value of receipts per unit
P_{Pi}= Purchase value of goods per unit
C_{mi}= Cost incurred on marketing per unit.

c. Total Cost of Marketing:

The total cost incurred on the marketing of rice by the farmers and intermediaries involved in the process of marketing was computed as:

$$C = C_F + C_{M1} + C_{M2} + C_{M3} + \ldots\ldots\ldots + C_{Mn}$$

Where,

C = Total cost of marketing
C_F= Cost incurred by producer in the marketing of rice
C_{M1}= Cost incurred by the middlemen in the market of rice

Marketing margin for the adopted marketing channel was worked out by comparing the prices prevailing at each stage of marketing. Since used prices were related to a particular point of time and as small concurrent margins were worked out.

3. RESULTS AND DISCUSSION

3.1 Costs and Returns in Rice Production

Per hectare cost of cultivation of rice for a period of 2018-2019 is presented in Table 1.

The operational cost is Rs. 60001.95/ha and the total cost of cultivation is Rs. 80994.99/ha. Among the variable costs, the cost of human labour is the highest accounting 37 per cent of the total cost and followed by manures and fertilizers accounting 13.27 per cent. Among the fixed costs, the rental value of the owned land is the highest accounting 18.51 per cent of the total cost. The yield of the rice is 4640 (kgs/ha). The gross income and net income of producers is Rs. 85260/ha and Rs. 14928.18/ha, respectively.

3.2 Input Use Efficiency of Rice

The Cobb-Douglas type of production function was fitted for the estimation of elasticities of important variables contributing to the yield of rice (Table 2). The value of the coefficient of multiple determinations (R^2) was found 74.48 which means the total variation of the inputs(X_i) are explaining 74.48% of the variation of the output (Y).

Table 1. Cost of cultivation of rice in 2018-19(Rs/ha)

Particulars	Plant	Percentage contribution
1. Hired human labour	30327.00	37.44
2. Imputed value of family labour	3300.00	4.07
3. Seed cost	4500.00	5.50
4. Human labour (1+2)	36327.00	44.85
5. Animal power	0.00	0.00
6. Machine power	4500.00	5.50
7. Manures and fertilizers	10750.00	13.27
8. Plant protection	2062.50	2.54
9. Irrigation	1000.00	1.23
10. Total (3 to 9)	59139.50	73.01
11. Interest on working capital	862.45	1.06
12. Total operational cost	60001.95	74.08
13. Land revenue	600.00	0.74
14. Rental value of owned land	15000.00	18.51
15. Depreciation	233.78	0.28
16. Interest on fixed capital	1583.37	1.95
17. Total fixed capital	17417.15	21.50
18. Grand total	77419.10	95.58
19. Cost A1	70585.32	87.14
20. Cost A2	66198.03	81.73
21. Cost B1	66431.81	82.01
22. Cost B2	67031.81	82.70
23. Cost C1	70331.81	86.83
24. Cost C2	73631.81	90.90
25. Cost C3	80994.99	
YIELD (kgs per ha.)	4640.00	
Gross income	85260.00	
Net income	14928.18	
Benefit cost ratio on total cost	1.05	

Source: primary data

Table 2. Estimated cobb-Douglas production function

Variables	Parameter	Coefficients
Constant	A	2.467
Human labour (human-days)	x_1	0.155**(0.0974)
Manure (kg.)	x_2	0.0079**(0.049)
Chemical Fertilizers and pesticides (kg.)	x_3	-0.1200*(0.0627)
Irrigation	x_4	0.43(0.27)
Seed rate (kg.)	x_5	-0.2815*(0.0912)
R^2	74.48	

*Note: * and ** indicate significance at 5 per cent and 1 per cent, respectively. Figures within the parentheses are standard errors for the respective regression coefficients*

Table 3. Price spread per quintal of rice in Vizianagaram district

S.No.	Particulars	Quintal per ha	Share in consumer's rupee (%)
1.	**Producer**		
	Net price received by producer	1455	27.00
	Marketing cost	198	3.75
	Gross price received by producer	1653	31.30
2.	**Miller**		
	Net price received by miller	2800	53.03
	Processing cost	1100	20.80
	Polishing cost	600	11.36
	Gross price received by miller	4500	85.22
3.	**Wholesaler**		
	Transportation	120	2.27
	Packing	40	0.75
	Loading and unloading	65	1.23
	Wholesaler margin	225	4.26
4.	**Retailer**		
	Transportation	50	0.94
	Labour	80	1.51
	Packing	30	0.56
	Total margins	180	3.40
5	**Consumers Price**	5280	100.00
	Marketing cost	2283	

Source: Primary data

Regression coefficient associated with human labour and manures were positive and statistically significant at 10% and 5% significance, indicating that these resources contributed positively to the returns of this crop. Raufu [7] stated that the cost of human labour was positively significant to rice yield. The of The seed rate and the plant protection chemicals and fertilizers showed negative and statistically significant (at 10% significance) coefficients indicating that these farmsare using this input in excess quantity. Rao [8] reported that seed rate and Phosphorus were negatively significant to rice yield.

The results showing that for every unit increase in human labour and manure the yield increased by 0.15 and 0.0079, respectively andfor a unit increase in plant protection chemicals and fertilizers and seed rate, the yield will be decreased by 0.12 and 0.28, respectively.

3.3 Marketing Margins and Price Spread of Rice Cultivation

The marketing margins of producers and other marketing intermediaries are quantified along the existing marketing channel for rice.

Channel: Producer- Miller- Wholesaler- Retailer- Consumer

Producers share in consumer rupee was 27 per cent (Table 3). Producer incurred marketing cost of Rs. 198. The total net sale price for producer is Rs. 1455 and gross price is Rs. 1653/q. The rice miller gross and net price is Rs. 4500 and

Rs. 2800, respectively and the processing cost and polishing cost is Rs. 1100 and Rs. 600, respectively. The wholesaler got a margin of Rs. 225 and cost incurred by wholesaler for transportation, packing and loading and un loading is Rs. 120, 40 and 65, respectively. The retailer got a margin of Rs. 180 and he incurred a cost for transportation, labour and packing is Rs. 50, 80 and 30 respectively. The consumer's price is Rs. 5280.

4. CONCLUSION

From the analysis, the total cost of cultivation of rice Rs. 80994.99 per hectare and from variable costs human labour accounted more cost followed by manures and fertilizers and rental value of the land. The Benefit-cost ratio of the total cost is 1.05. The total operational cost is Rs. 60001.95. From the analysis of input use efficiency, human labour and manures were positively contributed to the returns of the crop and seed rate and chemicals and fertilizers shown that there is excessive quantity in usage. The producer share in consumer rupee is 27%.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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