

Socio-economic status and profitability of farmers adopting rice - mustard cropping system: A case study of Odisha

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Abstract

Agriculture in Odisha is the mainstay of majority of the populace and thus, holds the key to socio-economic development of the State. Although, the share of Agriculture Sector in the State's GSDP has been declining over the years but, still it plays a critical role in the economy of the state and livelihood of majority of its populace. Agriculture in the state to a considerable extent means growing rice. Present study was conducted to study the socio - economic status of farmers adopting rice-mustard cropping system. Further, their profitability was also estimated by using CACP costs concepts. Balasore district, known as Rice Bowl of Odisha, was selected purposively for the study. Primary data was collected from 60 farmers by using pre tested survey schedule for the period 2015-16. The study found 42.33 percent male falls under 18-35 year age group whereas, 49.50 percent female fall under 35-50 year age group. The study further revealed that 61.67 percent farm families were depended on agriculture and allied sector. The results further revealed that B:C ratio for mustard was more than rice as an individual enterprise but rice is the staple food of the sample area hence, the rice mustard cropping system was very popular in the study area. Further, the B:C ratio for rice-mustard cropping system over all the costs were estimated and found to be more than one which shows the feasibility of rice-mustard cropping system over the study area. The study suggested that policy makers and extension workers should take steps to encourage farmers to adopt rice-mustard cropping system in order to achieve maximum possible profit from their farming.

Key Words: Cropping system, socio-economic status, CACP costs concepts, B:C ratio

Introduction

The economy of Odisha is one of the fastest growing state economies in India. The state has registered a Gross State Domestic Product (GSDP) growth rate 7.94 percent in 2016-17 fiscal as against the national average of 7.1 percent. In Odisha, broad sectoral i.e. service, industry and agricultural share to GDP at current prices is 43.53, 36.56 and 19.91 percent respectively whereas, for India respective figures are 54.15, 28.81 and 17.04 percent. Agriculture with lowest share in GSDP, still remains a priority sector in the state in terms of high employability, inclusiveness and sustainability (Odisha, Economic Survey 2016-17). According to the 2011 Census, 61.8% of the working population are engaged in agricultural activities in Odisha.

Odisha is the coastal state of India where agricultural production showed upward trend in last few years with down swing in performance during the years that witnessed natural shocks like flash floods, & HUDHUD, drought etc. In Odisha, rice is synonymous with food. Agriculture in the state to a considerable extent means growing rice. Age-old social customs and festivals in Odisha have strong relevance to different phases of rice cultivation. It is the principal food crop of Odisha occupying about 10% of the total rice area of the country. Rice production constitutes about 92 percent of total food grains production in Odisha. Rice production was 89.02 lakh tone with a higher yield rate of more than 23 quintal per hectare in 2015-16. (Odisha

Economic survey- 2016-17).

Mustard is one of the major oil seed crops of Odisha occupying area of 7.3 thousand ha., production of 1.5 thousand tonne and yield 20.5 q/ha in 2015-16. The area, production and productivity of mustard in the state is showing declining trend as the respective figures in 2013-14 was 13.4 thousand ha, 3.6 thousand tonne and 26.9 q/ha (www.indiastat.com). Rice-mustard cropping system is mostly practiced as diversified cropping system in the coastal districts of Odisha. Rice- mustard cropping system followed is generally of two types. One is Sequence cropping in which rice is taken in kharif and mustard is taken in rabi season optimizing the resource use efficiency mainly in irrigated condition. Another system is Paira / Uttera cropping in which mustard is broadcasted as paira crop in maturing rice field which grows on residual moisture & nutrient and it saves time & money spent on land preparation and other operations mainly in rain fed condition which provides an additional income to farmer with less investment(www.agripedia.iitk.ac.in). All the farmers of coastal districts of Odisha mostly follow the paira cropping system of cultivation.

Efficient cropping systems for a particular farm depend on farm resources, farm enterprises and farm technology because farm is an organized economical unit. It should provide enough food for the family, fodder for cattle and generate sufficient cash income for domestic and cultivation expenses. With this background, present study is undertaken with two objectives viz; to study the socio economic status of the sample households adopting rice-mustard cropping system and to estimate the cost and return of rice – mustard cropping system.

Materials and Methods

The present study was conducted for the period 2015-16 and both primary and secondary data were used for analysis. Further, a multistage stratified sampling technique was followed to select the respondents. The Balasore district of Odisha was

purposely selected for the present study. Out of twelve development blocks in Balasore district, five blocks i.e. Basta, Remuna, Simula, Bahanaga, Soro were selected purposively. From these selected blocks, a list of villages were prepared out of which Manikapura, Bharda, Samalpur, Hatamaitpur, sergarh, Jagadapur, Rambindha, Hatuary, Gilajodi, Nuapur, Baniamari, Maitapur, Bartana, Dolapur, Kalasuni, Narasingapur, Ambakuchudi, Baniamari, Hatuary villages were selected purposively, as farmers of these villages were growing rice-mustard cropping system. From each selected village list of farmers adopting rice-mustard cropping system was prepared and then classified into marginal, small, medium and large farmer category separately. Total 60 farmers were selected by of which 13 were marginal farmers, 28 small farmers, 14 medium farmers, 5 large farmers respectively. Simple descriptive statistical tools were used to study the socio economic status of the farmers and CACP cost concept was used to examine the profitability of farmers adopting rice mustard cropping system in the study area.

Results and Discussion

The major socio-economic characteristics considered in this study were family size, age distribution, education level, occupation and size of land holdings of selected households. The distribution of population according to various age groups and family size is important in maintaining profitable operations of a farm business. The study found the average family size in the study area was eight i.e. three male, two female and three children. The age wise distribution of farmers' family was performed under four groups such as children (<18 years), young age (18-35 years), middle age (35-50 years) and old age (above 50 years) and are presented in table 1. The perusal of table shows that most of the male falls under 18-35 year age group (42.33%) whereas, female fall under 35-50 year age group (49.50%). On an average 37.5, 24.5, 26.87 and 11.13 percent of farm families fall under <18, 18-35,

Table 1: Age Wise Distribution of Sample Households

S. No.	Particulars	Age group (Years)						
		<18	18-35	%	35-50	%	>50	%
1	Male	-	1.27	42.33	1.16	38.67	0.57	19.00
2	Female	-	0.69	34.50	0.99	49.50	0.32	16.00
3	Children	3	-	-	-	-	-	-
	Total	3	1.96	-	2.15	-	0.89	-
	Percentage	37.50	24.50	-	26.87	-	11.13	-

Table 2: Educational Status of Sample Households

S. No.	Educational Level	Male	Female	Children	Total
1	Illiterate	0.29(9.67)	0.39(19.50)	-	0.68(8.49)
2	Primary (up to 5 th)	0.87(29.00)	0.88(44.00)	1.84(61.33)	3.59(44.87)
3	Secondary (up to 10 th)	1.01(33.67)	0.36(18.00)	0.78(26.00)	2.15(26.87)
4	Higher secondary	0.67(22.00)	0.27(13.50)	0.38(12.67)	1.32(16.50)
5	Graduation and above	0.17(5.67)	0.10(5.00)	-	0.27(3.37)

Figures in parenthesis indicate percentage

Table 3: Occupational Status of Sample Households

S. No.	Occupation	Number	%age
1	Agriculture and allied activity	37	61.67
2	Agriculture with business	14	23.33
3	Agriculture with other services	9	15.00

35-50 and >50 age groups respectively. Further, the literacy level of the farm families were classified into five groups as an illiterate, primary (up to 5th class), secondary (up to 10th class), higher secondary, graduation and above and results are presented in table 2. Table reveals that average numbers of illiterates were more in case of female than male. The result further shows that most of the female were primary educated (44 percent of total female) and most of the

Table 4: Cost of Cultivation of Rice and Mustard (Rs/ha)

S. No.	Particulars	RICE		MUSTARD	
		Amount (Rs)	% of total cost C3	Amount (Rs)	% of total cost C3
1	Human labour				
a.	Family labour (man days)	2321.36	6.96	3132.50	17.13
b.	Bullock labour (pair days)	2040.04	6.11	-	-
c.	Hired labour (man days)	3241.62	9.72	2029.30	11.10
2	Machine labour (Hrs.)	4042.50	12.12	1287.46	7.04
3	Seed (Kg) or Seedling	2400.21	7.19	240.00	1.31
4	FYM (tractors)	2149.50	6.44	-	-
5	Fertilizer (Kg)	1920.53	5.76	-	-
6	Plant Protection Chemical (ml)	472.15	1.42	323.25	1.77
7	Irrigation (Hrs.)	950.38	2.85	-	-
8	Harvesting & Threshing	1250.02	3.75	1437.04	7.86
9	Depreciation	200.04	0.59	200.00	0.59
	Sub Total	20988.35	62.91	8649.55	47.32
10	Interest on working capital	1259.30	3.77	518.97	2.84
11	Total working capital	22247.65	66.68	9168.52	50.16
12	Land revenue	16.00	0.05	16.00	0.08
13	Rental value of own land	7200.00	21.58	7200.00	39.39
14	Rental value of leased-in land	867.39	2.59	232.73	1.27
	Total cost	30331.04	90.91	16617.25	90.91
15	Cost A1	19942.29	59.77	5533.05	30.27
16	Cost A2	20809.68	62.37	5765.78	31.54
17	Cost B1	26862.72	80.51	11697.14	63.99
18	Cost B2	28009.68	83.95	13484.75	73.77
19	Cost C1	29184.08	87.47	14829.64	81.13
20	Cost C2	30331.04	90.91	16617.25	90.91
21	Managerial cost (10 % of cost C2)	3033.10	9.09	1661.72	9.09
22	Cost of cultivation (C3)	33364.14	100.00	18278.97	100.00

Table 5: Return from Rice and Mustard Cultivation

S. No.	Particulars	Rice	Mustard
1.	Yield (q/ha)		
a.	Main product	48.00	16.20
b.	By-product	24.50	30.50
2.	Market price (Rs/q)		
a.	Main product	1350	3000
b.	By-product	150	74
3.	Gross Income (Rs)	68475	50857
4.	Net Income over:		
a.	Cost A1 (Rs/ha)	48532.71	45323.95
b.	Cost A2 (Rs/ha)	47665.32	45091.22
c.	Cost B1 (Rs/ha)	41612.28	39159386
d.	Cost B2 (Rs/ha)	40465.32	37372.25
e.	Cost C1 (Rs/ha)	39290.92	36027.36
f.	Cost C2 (Rs/ha)	38143.96	34239.75
g.	Cost C3 (Rs/ha)	35110.86	32578.03
5.	Cost of production over:		
a.	Cost A1 (Rs/q)	415.46	341.55
b.	Cost A2 (Rs/q)	433.53	355.91
c.	Cost B1 (Rs/q)	559.64	722.04
d.	Cost B2 (Rs/q)	583.53	832.39
e.	Cost C1 (Rs/q)	608.00	915.41
f.	Cost C2 (Rs/q)	631.89	1025.75
g.	Cost C3 (Rs/q)	695.08	1128.33
6.	Input-Output or B-C ratio over:		
a.	Cost A1	2.43	8.19
b.	Cost A2	2.29	7.82
c.	Cost B1	1.54	3.34
d.	Cost B2	1.50	2.77
e.	Cost C1	1.34	2.43
f.	Cost C2	1.26	2.06
g.	Cost C3	1.05	1.78

male of the farm family were secondary educated (33.67 percent of total male). In total, most of the population (44.87 percent) were primary educated. Further, results of occupation of farm families are presented in table 3. The table discloses that 61.67 percent farm families depends on agriculture and allied sector whereas, 23.33 percent were engaged in small business like grocery shop and others along with farming and rest 15 percent farm families depend on agriculture along with other services in different shops and institutions in the nearby locality. In case of land holding small farmers were maximum having 46.67 percent followed by medium, marginal and large size group having 23.33 percent, 21.67 percent and 8.33 percent respectively. The average size of land holding was 3.15 ha with a range of maximum land holding of 11.30 ha to minimum of 0.4 ha.

The study further estimated cost and return of rice and mustard cultivation for one hectare and results are discussed in table 4. The study found that land preparation and intercultural operation cost for mustard cultivation are negligible for the sample farmers growing mustard as a paira crop. Table 4 indicates that per hectare cost of cultivation of rice (Rs. 33364.14) was more than the cost of cultivation of mustard (Rs. 18278.97). The amount spent on human labour including family labour for rice (Rs. 7603.02) was more than that of mustard (Rs. 5161.80), but the family labour expenses for rice (Rs. 2321.36) was less than that of mustard (Rs. 3132.50). Further, the seedling cost for rice (Rs. 2400.21) was more than that of seed cost of mustard (Rs. 240.00). It was so because in case of rice the seedlings were prepared separately on a raised bed and then they were transplanted in the field condition, but in case of mustard it was broadcasted in the maturing rice field and seed rate of mustard was about 4-6 kg/ha. There was no cost for FYM and fertilizer for mustard as mustard was supposed to grow on residual nutrient and moisture status and plant protection measures were taken for mustard if needed. The rental value of land i.e. Rs. 7200 was also an important component of cost of cultivation which was same for both the crop. The land revenue was sixteen rupees for one hectare of land according to the norms of state revenue department. The interest on working capital was worked out to be 6 percent of the total operating cost which was also high for rice (Rs. 1259.30) than that of mustard (Rs. 518.97). Table further shows that all the costs i.e. A1, A2, B1, B2, C2 and C3 were more for rice than that of mustard. Cost C3 was calculated by adding cost C2 with managerial cost (10 percent of cost C2). Cost C3 shows the actual cost of cultivation which was higher for rice (Rs. 33364.14) than that of mustard (Rs. 18278.97).

The study further estimated the return from rice and mustard and results are presented in table 5. Table reveals that gross income from rice was Rs. 68475 whereas in case of mustard it was Rs. 50857. Table shows that market price of main product of mustard is more than that of rice whereas the market price of bi-product of rice is more than that of mustard. The yield of rice is almost three times to that of mustard which also attributed to their difference in gross income.

Further, the benefit-cost ratio for rice cultivation over cost A1, cost A2, cost B1, cost B2, cost C1, cost

Table 6: Cost and Net Income of Rice-Mustard Cropping System

S.No.	Costs	Cost	Net Income over Costs	B:C ratio
1	Cost A1	25475.34	93856.66	3.68
2	Cost A2	26575.46	92756.54	3.49
3	Cost B1	38559.86	80772.14	2.09
4	Cost B2	41494.43	77837.57	1.87
5	Cost C1	44013.72	75318.28	1.71
6	Cost C2	46948.29	72383.71	1.54
7	Cost C3	51643.11	67688.89	1.31

C2 and cost C3 is 2.43, 2.29, 7.82, 1.54, 1.50, 1.34, 1.26 and 1.05 respectively. Whereas, in case of mustard cultivation these figures are 8.19, 7.82, 3.34, 2.77, 2.43, 2.06 and 1.78 respectively. It is evident from the analysis that the benefit-cost ratio for mustard was more than rice.

The study further examined the cost and net return of rice-mustard cropping system and results are presented in table 6. The costs for rice-mustard cropping system were calculated by adding the calculated cost of cultivation of rice and mustard. Table reveals that total cost of cultivation of rice-mustard cropping system is Rs. 51643.11 and the gross return is Rs. 119332 resulting to a net income of Rs. 67688.89. The Input-Output or B-C ratio for rice-mustard cropping system over cost A1, cost A2, cost B1, cost B2, cost C1, cost C2 and cost C3 is 3.68, 3.49, 2.09, 1.87, 1.71, 1.54 and 1.31 respectively. All the values of benefit-cost ratio were more than one which shows the feasibility of rice-mustard cropping system over the study area.

References

Ahmed, M. S. Elias M., Ahmed J. (1998). Results of Farm level Socio-economic study of Mustard Production in Bangladesh. Bangladesh journal of Agricultural Research, 13(1): 20-30.

Das, S. R. (2012). Rice in Odisha: Technical Bulletin No. 16. Manila, Philippines. IRRI:

Durdana, B.(2009). A study on Alternate Rice and Mustard production in Tangail District of Bangladesh. (MS Thesis): 13-15. Retrieved from www.saulibrary.edu.bd/daat_j/public/index.php/.../BAU200901_16-aec_5.pdf

Gangwar B. and. Singh A. K (2011). Efficient Alternative Cropping System. Modipuram, Meerut, India. Project Directorate of Farming System. 241-248.

Kumar, M., Singh S. R., Jha S. K, Shamna A., Mazumdar, S. P., Singh A., Kundu, D. K. and Mohapatra, B. S. (2014). System productivity, profitability and resource use efficiency of jute (*Corchorusolitorius*) based cropping systems in the eastern Indo-gangetic plain. The Indian Journal of Agricultural Science, 84(2): 210-216.

Odisha, Economics survey: 2016-17. Planning and Convergence Department, Government of Odisha.

Prasad, D., Yadav, M. S. and Singh, C. S. (2013). Diversification of rice (*Oryzasativa*) based cropping systems for higher productivity, profitability and resource use efficiency under irrigated ecosystem of Jharkhand. Indian Journal of Agronomy, 58: 264-270.

Raghav, S. and Sen, C. (2014). Socio- economic Status of Framers and Their Perception about Technology Adoption: A Case study. EPRA International Journal of Economic and Business Review, 2(3): 7-13.

2011 Census: Odisha - Executive Summary retrieved from http://www.censusindia.gov.in /2011census/PCA/PCA_Highlights/pca_highlights_file/Odisha/Executive_Summary.pdf

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