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## Costs and returns of organic and inorganic paddy cultivation: An economic analysis in district Jabalpur of Madhya Pradesh

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### Abstract

This study has assessed the economics through the calculation of cost and returns of organic paddy cultivation and inorganic paddy cultivation in Madhya Pradesh by the collection the conducted in Madhya Pradesh by the collection of primary data with the help of interview scheduled. The data was collected from 75 organic paddy growers and 75 inorganic paddy grower spread over 3 villages namely Lhari, Pipariya and Samnapur in Patan block, Sihora block and Jabalpur block of Jabalpur district for the year of 2017-18. Result of present study shows that the total cost of organic paddy cultivation has been found 27.54 per cent less (29520.92 ₹/ha) than inorganic (₹/ha) while input cost of organic paddy cultivation has been found 51.22 per cent less (4836.51₹/ha) as compared to inorganic (9915.44 ₹/ha). The yield obtained from inorganic paddy has been found 36.03 per cent more (44.24 q/ha) than organic (28.3). The net returns received from the inorganic paddy cultivation has been found 45.67 per cent higher (18558.91₹/ha) than organic paddy cultivation (34162.18 ₹/ha).

**Keywords:** Organic paddy, inorganic paddy, cost and returns, sustainable agriculture, organic farming, PKVY and subsidy

### Introduction

Agriculture is the back bone of India and it plays an important role in India's economic development and to continuing the economic development, increase agricultural growth with sustainability of agricultural production will have to be maintained. For the maintaining sustainability, the organic farming is most sustainable measure. Due to high utilization of agro-chemical input in the present farming system results hazardous effect on Human beings, animals, birds etc. for to avoid this hazardous effect on living thing and natural resources, organic farming is important measure. The concept of organic farming was coined in the U.K. in 1930 and certified organic produced has been available since early 1970 (Browne *et al.*, 2000) [2]. To promote the organic farming government implementing a cluster-based programme to encourage the farmer for promoting organic farming under Paramparagat Krishi Vikas Yojana (PKVY). Paddy is the staple food crop and extensively cultivated in India and world also. Paddy crop is important kharif crop in Jabalpur district. India produced around 1.70 million MT (2017-18) of certified organic products which include all varieties of food products namely sugarcane, oilseeds, cereals & millets, cotton, pulses, medicinal plants, tea, fruits, spices, dry fruits, vegetables, coffee, etc. The production is not limited to the edible sector but also produces organic cotton fiber, functional food products, etc. (APEDA). The certified Organic agriculture in the world as per the currently available data, as of the end of the 2016 latest survey by the Research Institute of Organic Agriculture FiBL the data are available from 178 countries worldwide 57.8 million hectares of organic agricultural land in 178 countries including India till 2016.

### Material and Methods

This study was conducted in Jabalpur district of Madhya Pradesh because of Jabalpur is the one of six regional centres for organic farming in India. It is based on primary data and primary data pertaining to agricultural year 2017-18. The multistage sampling was used for collection of sample data. At first stage, Jabalpur district of Madhya Pradesh was selected as the district is predominantly cultivating the selected crop and then three blocks namely Sihora, Patan and Jabalpur. From selected block Sihora, Patan and Jabalpur, three villages namely

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Pipariya, Luhari and Samnapur were selected respectively. Then 25 farmers were selected as organic paddy grower and 25 farmers were selected as inorganic paddy grower from each selected village, it means 75 farmers were selected as organic paddy grower and 75 farmers were selected as inorganic grower from each selected village. The cost and return analysis, cost concept, benefit-cost ratio, mean, percentage etc. were applied for analysis of data.

Total cost = Variable cost + Fixed cost

Total return = Main product + by product

Net income = Gross income – Total cost

Benefit-cost ratio = Gross income / Gross expenses

Cost of cultivation = Total cost / Area

### Review literature

Harishilpa (1999) [3] analysed economics of organic farming systems in Hiriyur taluk of Chitradurga district, Karnataka. The results revealed that per acre cost of cultivation of organic paddy were lower than inorganic paddy and the net return received from organic paddy higher as compared to inorganic paddy.

Yeptommi (2016) [4] conducted a research study on organic and inorganic rice farming in Dimapur district, Nagaland. In this study, the researcher found the costs and returns of both organic and inorganic rice production. This study found that the cost incurred in the inorganic rice production is higher as compared to organic paddy and the inorganic rice cultivated

yielded higher than organic rice. The net income from inorganic was also higher than organic rice due to higher yield of inorganic rice and the price of organic rice was not better as organic product.

### Results and Discussion

#### Cost of paddy cultivation

The cost of cultivation was obtained after the analysis of collected data from samples farmers. The cost of cultivation presented in detail in Table 1. The table shows that the highest cost incurred of organic paddy cultivation as 'rental value of land' was 27.15 per cent (8014.98 ₹/ha) of total cost of cultivation followed by 'machine labour' was 19.75 per cent (5831.27 ₹/ha) followed by 'human labour (family + hired labour)' was 17.97 per cent (5304.38 ₹/ha) followed by 'managerial cost' was 9.09 per cent (2683.70 ₹/ha) followed by 'manure cost' was 8.47 per cent (2500.17 ₹/ha) followed by 'seed cost' was 3.40 per cent (1002.35 ₹/ha) followed by 'depreciation cost of farm equipment used in cultivation' was 3.30 per cent (973.90 ₹/ha) followed by 'cost of interest on fixed capital' was 3.07 per cent (906.29 ₹/ha) followed by 'cost of irrigation' was 2.62 per cent (773.63 ₹/ha) followed by 'bullock labour' was 1.89 per cent (557.26 ₹/ha) followed by 'bio-fertilizers cost' was 1.49 per cent (440.91 ₹/ha) followed by 'cost of interest on working capital' was 1.15 per cent (338.54 ₹/ha) followed by 'cost of bio-pesticide' was 0.40 per cent (119.45 ₹/ha) and lastly 'cost of land revenue' was 0.25 per cent (74.10 ₹/ha).

**Table 1:** Costs incurred in organic and inorganic cultivation of paddy (₹/ha)

S. No.	Particulars	Organic paddy	Inorganic paddy	% difference over inorganic paddy
<b>A</b>	<b>Operational Cost</b>			
1	Human labour			
	(a) Family labour	2757.41 (9.34)	2924.08 (7.18)	-5.70
	(b) Hired labour	2546.97 (8.63)	2141.39 (5.26)	18.94
2	Bullock labour	557.26 (1.89)	395.50 (0.97)	40.90
3	Machine Labour	5831.27 (19.75)	6486.57 (15.92)	-10.10
	Total operational cost	11692.91 (39.61)	11947.54 (29.33)	-2.13
<b>B</b>	<b>Input cost</b>			
1	Seeds	1002.35 (3.40)	888.36 (2.18)	12.83
2	Manures	2500.17 (8.47)	1163.77 (2.86)	114.83
3	Bio fertilizer / chemical fertilizer	440.91 (1.49)	4001.40 (9.82)	-88.98
4	Herbicide	-	1726.48 (4.24)	-100.00
5	Bio-pesticide / PPC	119.45 (0.40)	1165.74 (2.86)	-89.75
6	Irrigation charges	773.63 (2.62)	969.70 (2.38)	-20.22
	Total Input Cost	4836.51 (16.38)	9915.44 (24.34)	-51.22
	Interest on working capital (7%)	338.54 (1.15)	765.21 (1.88)	-55.76
	Total Variable Cost	16867.95 (57.14)	22628.19 (55.54)	-25.46
<b>C</b>	<b>Fixed cost</b>			
1	Rental value of land (1/6 of gross income)	8014.98 (27.15)	12483.01 (30.64)	-35.79
2	Land revenue	74.10 (0.25)	74.10 (0.18)	0.00
3	Depreciation	973.90 (3.30)	1224.50 (3.01)	-20.47
4	Interest on fixed capital (10%)	906.29 (3.07)	689.08 (1.69)	31.52
	Total Fixed cost	9969.27 (33.77)	14470.69 (35.52)	-31.11
	Managerial cost	2683.70 (9.09)	3640.98 (8.94)	-26.29
	Total cost of cultivation	29520.92 (100.00)	40739.86 (100.00)	-27.54

**Note:** Figures in parentheses are indicating percentage

**(Source:** Field survey)

The table also indicates that the highest cost incurred of inorganic paddy cultivation as 'rental value of land' was 30.64 per cent (12483.01 ₹/ha) of total cost of cultivation followed by 'machine labour' was 15.92 per cent (6486.57 ₹/ha) followed by 'human labour (family + hired labour)' was 12.43 per cent (5065.47 ₹/ha) followed by 'fertilizer cost' was 9.82 per cent (4001.40 ₹/ha) followed by 'managerial cost'

was 8.94 per cent (3640.98 ₹/ha) followed by 'cost of herbicide' was 4.24 per cent (1726.48 ₹/ha) followed by 'depreciation cost of farm equipment used in cultivation' was 3.01 per cent (1224.50 ₹/ha) followed by 'cost of plant protection chemical (PPC)' was 2.86 per cent (1165.74 ₹/ha) followed by 'manure cost' was 2.86 per cent (1163.77 ₹/ha) followed by 'cost of irrigation' was 2.38 per cent (969.70

₹/ha) followed by 'seed cost' was 2.18 per cent (888.36 ₹/ha) followed by 'cost of interest on working capital' was 1.88 per cent (765.21 ₹/ha) followed by 'cost of interest on fixed

capital' was 1.69 per cent (689.08 ₹/ha) followed by 'bullock labour' was 0.97 per cent (395.50 ₹/ha) and lastly, 'cost of land revenue' was 0.18 per cent (74.10 ₹/ha).

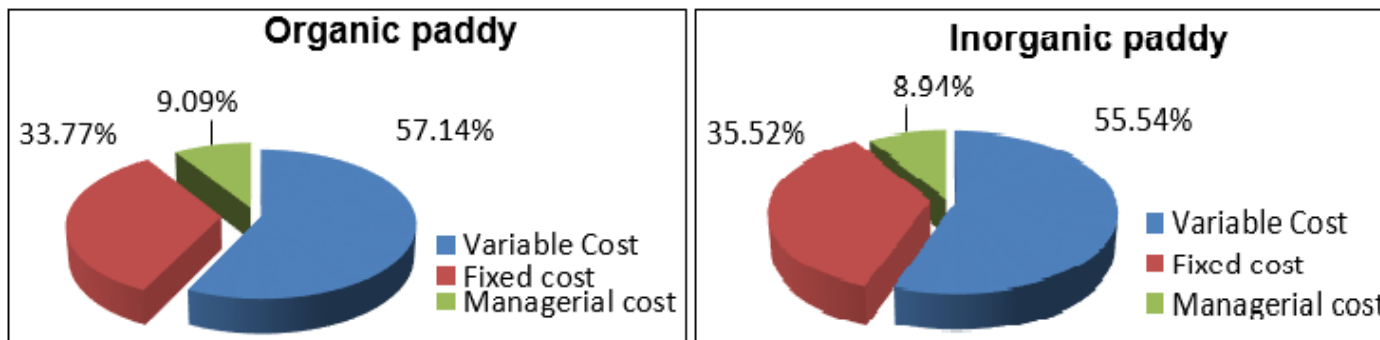


Fig 1: Different cost incurred in organic and inorganic paddy cultivation

From this study it was observed that the cost of cultivation of organic paddy was less as compared to inorganic paddy. Due to chemical input cost, the variable cost of inorganic paddy was higher. So, cost of cultivation of inorganic paddy was higher than organic paddy and this result supported by Harishilpa (1999)<sup>[3]</sup> and Yepthomi (2016)<sup>[4]</sup>.

**Returns**

The gross returns are the value of main and by products calculated at the rate which farmers get prices. Whereas net returns was the profit at cost C3 i.e. difference between total cost and gross return. The data presented in the Table 2 shows

that the yield of inorganic paddy crop was 36.03 per cent higher (44.24 q/ ha) as compared to organic paddy (28.30 q/ ha). The price received by the inorganic paddy growers was 0.48 per cent higher (1647.92 ₹/q) than the organic paddy growers (1640.03 ₹/q). The gross return obtained by the inorganic paddy growers was 35.81 per cent higher (74902.04 ₹/ha) than the organic paddy growers (48079.83 ₹/ha). The value of main product received by the inorganic paddy growers was higher (72903.98 ₹/ha) than the organic paddy growers (46412.85 ₹/ha) and returns obtained from by product was ₹ 1998.06 per hectare and ₹ 1666.98 per hectare respectively.

Table 2: Total returns from organic and inorganic paddy cultivation

S. No.	Particular	Organic paddy	Inorganic paddy	% difference over inorganic paddy
1	Quantity of main product (q/ ha)	28.3	44.24	-36.03
2	Price (₹/q)	1640.03	1647.92	-0.48
3	Value of main product (₹/ha)	46412.85 (96.53)	72903.98 (97.33)	-36.34
4	Value of by product (₹/ha)	1666.98 (3.47)	1998.06 (2.67)	-16.57
5	Gross income (₹/ha)	48079.83 (100.00)	74902.04 (100.00)	-35.81

Note: Figures in parentheses are indicating percentage to gross income (Source: Field survey)

It was observed that the productivity of inorganic paddy was more as compared to organic paddy due to the use of chemical fertilizers because of chemical fertilizers are provides more effective nutrient to crop than manure. So, productivity of inorganic paddy was more than the organic paddy. Due to the lack of market in the study area for organic paddy, the farmers did not get the premium price of paddy as organic. Hence, the gross income received from organic

paddy production was less because low price and low productivity of organic paddy and this result contradicted with Harishilpa (1999)<sup>[3]</sup>.

**Economics of paddy cultivation**

Economics of cultivation refers to the cost and returns analysis of paddy crop, the detail information of cost and returns analysis presented in Table 3.

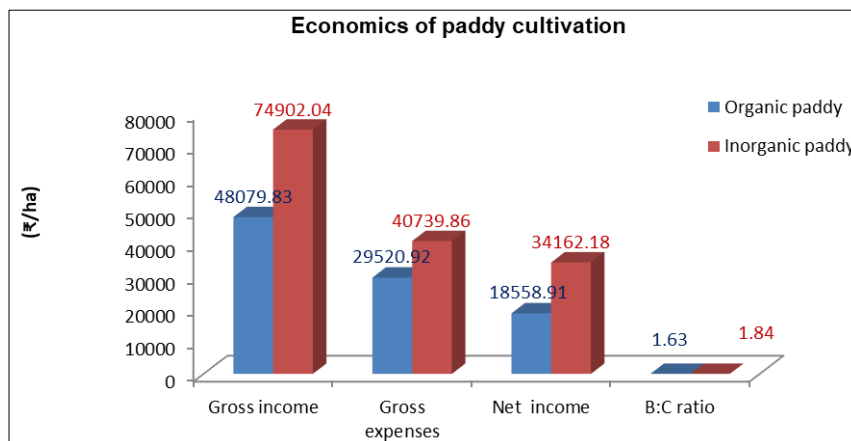


Fig 2: Economics of organic and inorganic paddy cultivation

**Table 3:** Economics of organic and inorganic paddy cultivation (₹/ha)

S.N.	Particular	Organic paddy	Inorganic paddy	% difference over inorganic paddy
1	Gross income	48079.83	74902.04	-35.81
2	Gross expenses	29520.92	40739.86	-27.54
3	Net income	18558.91	34162.18	-45.67
7	B:C ratio	1.63	1.84	-11.41

(Source: Field survey)

The Table 3 depicted that the gross income received by inorganic paddy growers was 35.81 per cent more (74902.04 ₹/ha) as compared to organic paddy growers (48079.83 ₹/ha) and the gross expenses incurred on the farm of inorganic paddy growers was 27.54 per higher (40739.86 ₹/ha) than the organic paddy growers (29520.92 ₹/ha). The net income received by inorganic paddy growers was 45.67 per cent more (34162.18 ₹/ha) than the organic paddy growers (18558.91 ₹/ha). It was observed that the return per rupee was higher under inorganic paddy (1.84) as compared to organic paddy (1.63). The results of this study are supported by Yephthomi (2016) [4], that the returns from organic farming are less than the inorganic farming and it was due to lack of premium price of organic paddy. There were no minimum support prices existing for organic paddy, and in other hand the productivity of inorganic paddy was higher than organic paddy and minimum support price announces by government for inorganic paddy. Actual these are the reason behind the less returns from organic paddy as compared to inorganic paddy.

### Conclusion

This study concludes that cost of organic paddy cultivation was significantly lower (27.54%) as compared to inorganic paddy cultivation. The cost of inorganic cultivation was high because of the chemical fertilizers, herbicide, insecticide and pesticide inputs were used in inorganic paddy cultivation and such chemical inputs were not applied in organic paddy cultivation. The prices of these chemical inputs was higher, so input cost of inorganic paddy cultivation was high which results higher total cost of inorganic paddy cultivation than organic paddy. This also shows that the yield obtained from inorganic paddy was significantly higher (36.03%) than organic paddy and the net return received from inorganic paddy was higher (45%) as compared to organic paddy. The net returns received from organic paddy were less because of the prices of organic paddy was not at premium rate. The organic paddy was not sold at higher prices as organic paddy. Hence, the organic paddy cultivation was not economically profitable to farmers in normal case but organic paddy cultivation was profitable under PKVY scheme because of subsidy given under PKVY and if subsidy was deducted from cost of paddy cultivation then the actual cost was reduced and B: C ratio was increase then in such case organic paddy cultivation was profitable than inorganic.

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