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Comparative economics of organic and inorganic redgram production in Karnataka

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Abstract

Redgram (*Cajanus cajan*) is one of the most important pulse crops in the tropics and sub-tropical regions of the world. Redgram occupies an area of 16 lakh ha with a production of 12 lakh tonnes during 2020-21 in Karnataka. The present study aims to analyse the cost and returns of organic and inorganic redgram production in Karnataka. The Kalaburagi and Bidar districts were selected for the study based on the highest area under redgram. The data was collected from 120 respondents constituting organic and inorganic redgram producing farmers. The findings of the study revealed that the per acre total cost of cultivation of organic production was ₹21499 and inorganic production was ₹23936, respectively. The variable and fixed costs constitute 73% and 27% in the case of organic production and 76% and 24% in inorganic production, respectively. The gross returns were realized marginally low in organic production (₹41796) compared to inorganic production (₹42359). The net returns obtained by organic farmers (₹20297) were found to be higher than that of inorganic farmers (₹18424). The returns per rupee of expenditure was also found to be high in organic redgram compared to inorganic redgram production.

Keywords: Organic, inorganic, production, redgram, pulses

Introduction

Pulses occupy an important place in the Indian agricultural economy as they are rich sources of proteins and constitute 10 to 15% of India's foodgrain diet. Redgram (*Cajanus cajan* (L) mill. sp.) is one of the major pulse crops of tropics and sub-tropics and is owed several unique characters. It ranks as the second most important pulse crop next to chickpea. India accounts for 90% of world output with an area of 4.72 million hectares and production of 4.31 million tonnes with average productivity of 914 kg per hectare of redgram during the year 2020-21 (Anon., 2021a)

In Karnataka, redgram is grown in an area of 16.6 lakh hectares with a production of 12.38 lakh tonnes and productivity of 759 kg/ha (Anon., 2021a). Redgram is largely grown in the northern parts of the state, especially in the Kalyana-Karnataka region where the Kalaburagi, Bidar, and Yadgir districts accounted for about 51.67% to the total production of the state (Vinayak, 2015) ^[19].

Over the years through intensive farming practices in redgram, the nutrient needs are being met by the application of chemical fertilizers. Though inorganic fertilization and chemical pest control along with improved varieties and hybrids increased productivity initially, yield levels were not sustained over the years. This adversely affected the farmers' income through the increased cost of cultivation (Kumar & Kumar, 2017, Suresh & Chandrakanth, 2014) ^[9, 18]. Therefore, most farmers in Karnataka State are pioneers in organic agriculture and have developed many different systems of cultivation through the indigenous knowledge base.

At present, food quality and safety are two vital factors that have attained constant attention from common people. Growing environmental awareness and several foods have substantially decreased consumers' trust towards food quality in the last decades. Intensive conventional farming can add contamination to the food chain (Hosamani, 2004, Verma *et al* 2013) ^[7]. For these reasons, consumers are questing for safer and better foods that are produced more ecologically and authentically by local systems. Organically grown food and food products are believed to meet these demands (Rembialsowska, 2007) ^[12].

Organically grown foods have become one of the best choices for both farmers and consumers in view of sustainability and also harvesting better yield in an eco-friendly environment. Organic farming is a production system that excludes the use of chemical fertilizers, pesticides, growth regulators, and livestock feed additives to the maximum extent possible and which promotes and enhances the health of the agro-ecosystem (Raju, 2015, Shiva pajar, 2018 and Suresh H, 2001) ^[17, 11].

Currently, 72.3 million hectares of organically managed land have been recorded globally. Whereas, India is bestowed with great potential to produce varieties of organic produce due to different agro-climatic regions. India ranks 8th in terms of the world's organic agricultural land with a total area of 4.3 million ha organic certified (Anon., 2021b). The Government of Karnataka has also initiated action to promote organic farming in the state. The total area under organic certification in Karnataka is 93,963 hectares and production is about 2,82,633 tonnes (Anon., 2021c). Though organic farming practices are traditional in India, little comprehensive research has been done in India in general and Karnataka in particular from farmers perspectives. Keeping in view of the above issues having importance in redgram production in the state and Kalyana-Karnataka in particular an attempt is made to estimate cost and returns of organic and inorganic redgram production.

Methodology

In this present study, Kalaburagi and Bidar districts of the Kalyana-Karnataka region were purposively selected based on the highest area under redgram crop and these are major organic redgram growing districts of Kalyan-Karnataka region. The primary data relating to cost structure, yield, the market price received, and returns obtained under organic

and inorganic redgram production were obtained using a pre-tested schedule. Random sampling technique was adopted for selecting appropriate sample respondents based on redgram production. Two taluks from each district were selected based on the highest area under redgram production. About thirty farmers practicing organic cultivation and thirty farmers practicing inorganic redgram cultivation were selected randomly from the taluks of selected districts. Since the area under organic redgram cultivation is limited snowball technique was employed and interviewed using pre-determined questionnaires. In total, 120 samples constituting 60 farmers practicing organic cultivation, and 60 farmers practicing inorganic redgram cultivation were selected for the study.

Analytical technique

Tabular presentation was employed to compile the data collected related to cost and returns from sample farmers. It is observed at the time of data collection that farmers of this region are more familiar with acre as the unit of measuring the land area instead of a hectare. Hence, in this study, all calculations pertaining to the cost and returns of organic and inorganic redgram production were calculated on per acre basis (2.47106 acres = 1 hectare). The costs were classified into variable and fixed costs. Variable cost includes the cost of inputs seed (kg), biofertilizer (g), FYM (cart load), vermicompost (tonnes), fertilizer (kg), plant protection chemicals (°), growth hormones (°), biopesticide (°), human labour (man days), bullock labour (pair days), machine labour (Hrs.) and interest on working capital (°). Fixed cost includes depreciation on farm implements (°), the rental value of land (°), and interest on fixed farm implements (°). The collected data was summarised into frequency and percentage aiding statistical tools.

Table 1: Cost structure of organic and inorganic redgram production in the study area (Per acre)

Sl. No.	Particulars	Unit	Organic farmers (n = 60)			Inorganic farmers(n = 60)		
			Quantity	Value (Rs)	Percent	Quantity	Value (Rs)	Percent
A	Variable cost							
1	Human labour	MD	17.49	5328	24.78	22.25	7175	29.97
2	Bullock labour	PD	2.17	2171	10.09	1.28	642	2.68
3	Machine labour	Hrs.	4.71	3302	15.35	6.06	4466	18.65
4	Seeds	Kg	5.68	419	1.94	5.48	520	2.17
5	Farm yard manure	Cart load	2.51	2100	9.76	1.04	1250	5.22
6	Fertilizers	Kg	-	-	-	99.80	1616	6.75
7	Vermicompost	tonnes	6.09	765	3.55	-	-	-
8	Biofertilizer application	g	4.40	300	1.39	-	-	-
9	Vermiwash	Liter	-	45	0.20	-	-	-
8	Biopesticide	Liter	-	100	0.46	-	-	-
9	Growth hormones	`	-	50	0.23	-	-	-
10	Plant protection chemicals	`	-	-	-	1.57	1156	4.82
11	Interest on working capital @ 7.5%	`	-	1093	5.08	-	1262	5.27
	Subtotal	`	-	15673	72.90	-	18086	75.57
B	Fixed cost							
1	Land revenue	`	-	63	0.29	-	63	0.26
2	Depreciation	`	-	520	2.41	-	520	2.17
3	Land rent	`	-	4762	22.14	-	4783	19.98
4	Interest on fixed capital @ 9%	`	-	481	2.23	-	483	2.01
	Subtotal	`	-	5826	27.09	-	5849	24.43
C	Total cost of cultivation (A+B)	`	-	21499	100.00	-	23936	100.00
D	Cost of production (C/q)	`	-	3720	-	-	3855	-

Note: 1. Percentages are the total cost of cultivation of respective farm

2. Decimal values are rounded up to its nearest value.

Table 2: Returns of organic and inorganic redgram production in the study area

Sl. No.	Particulars	Unit	Organic farmers (n = 60)			Inorganic farmers (n = 60)		
1	Yield (q/acre)	q	-	5.80	-	-	6.21	-
2	Price (₹/q)	₹	-	7750	-	-	7500	-
3	Gross returns (₹)	₹	-	41796	-	-	42359	-
4	Net returns	₹	-	20297	-	-	18424	-
5	Returns per rupee of investment	₹	-	1.94	-	-	1.72	-

Results and Discussion

Table 1 indicates the cost and returns structure of organic and inorganic redgram production per acre in the study area. The cost concepts such as variable cost and fixed cost are used to explain the cost borne by the sample respondents.

The study revealed that per acre the total cost of cultivation in redgram was lower in the case of organic farmers (₹21499) than inorganic farmers (₹23936). The variable costs accounted for 72.90% and 75.57% under organic and inorganic farmers, respectively. Among the variable costs, human labour accounted for 24.78% to the total cost which was the highest under organic farmers. Conversely, in the case of inorganic production of redgram the cost incurred on human labour was higher than organic farmers to the tune of 29.97% to the total cost. The next important cost among the variable cost was machine labour and bullock labour contributed 15.35% and 10.09% to the total cost in case of organic redgram production. However, the cost incurred on machine labour in the case of inorganic was high than inorganic farmers (18.65%) rest of the other inputs among variable costs were less than 10% when compared to organic farmers.

It is also important to note that the expenditure made towards vermiwash was only 0.2% to the total cost of cultivation followed by plant growth hormones where the input cost is less than 1%. Whereas in the case of inorganics none of the input costs were found less than 1% (Poornima *et al.*, 2010, Satpute *et al.*, 2009) ^[13].

The study also notices that the interest on working capital worked out to be marginally lower in organic (₹1093/acre) compared to inorganic farmers (₹1262/acre). The results of the study are in line with Govindappa (2010) ^[6] who conducted a study on the economics of organic farming in redgram in the Gulbarga district.

The fixed costs can be explained using land revenue, depreciation, land rent and interest on fixed capital. The fixed cost incurred by organic and inorganic farmers accounted for 27.09% and 24.43% to the total cost respectively. In the case of organic farmers land rent accounted for 22.14% to total cost of cultivation which secures the highest share to the total cost. However, depreciation and interest on fixed capital accounted for 2.41% and 2.23% respectively. The least cost was on land revenue which was 0.29% to the total cost.

Whereas the land rent in the case of inorganic farmers was 19.98% which was less when compared to organic redgram production. The rest of the other items were more or less the same even in the case of inorganic redgram production.

The study concluded that there was a considerable difference in the cost of cultivation between organic and inorganic farmers. As such, the total cost incurred by inorganic farmers on human labour was considerably higher than those of organic farmers. This was mainly because of the intensive application of high value synthetic chemicals and the cultivation practices by inorganic farmers. On the other hand, we could see that under organic farmers the cost

of human labour was less because most of the family labour was involved in carrying out their own farm operations.

It is noteworthy to see that although organic farmers have used slightly more quantity of seeds than inorganic farmers, the cost incurred on seeds was marginally lower for organic farmers. This phenomenon was related to the usage of locally accessible and on farm seeds. Even though there was a significant difference in the amount of organic manures used between organic and inorganic farmers, the cost appears to be proportionately higher in the case of inorganic farmers because inorganic farmers purchased the organic manures from outside while organic farmers prepared the organic manures themselves with locally available on-farm resources. On the other hand, inorganic farmers have realized a higher cost of chemical fertilizers and chemical pesticides as they applied them intensively which was totally absent in the case of organic farmers. Since maintenance of long-term soil fertility was one of the guiding principles in organic farming. Therefore, most of the organic farmers used green manures and growth hormones in the cultivation of redgram.

From Table 2, it is interesting to note that the organic farmers realized a lower yield (5.80 q/acre) compared to inorganic (6.21 q/acre) farmers. On the other hand, the average price received for organic redgram (₹7750/q) production was marginally higher compared to inorganic redgram (₹7500/q) production. Hence, the gross returns obtained by organic farmers (₹41796/acre) were found to be marginally lower than those of inorganic farmers (₹42359/acre). Since the cost of cultivation under organic farmers (₹21499/acre) was considerably lower than that of inorganic farmers (₹23936/acre), the net returns obtained by organic farmers (₹20297/acre) were found to be higher than that of inorganic farmers (₹18424/acre). Similarly, the returns per rupee of expenditure were high in organic (1.94) than inorganic (1.72) farmers.

Though the gross returns realized were marginally lower in the case of organic farmers when compared to inorganic farmers, the net returns realized were considerably higher in organic farmers due to the lesser cost of cultivation realized by them. This leads to higher rupees per investment in organic farmers as compared to inorganic farmers. Similar findings were reported in paddy and sugarcane by Suresh (2001) ^[17], in sugarcane by Kshirsagar (2006) ^[8], and in cotton by Satpute *et al.* (2009) ^[13].

Conclusion

Since maintenance of long-term soil fertility was one of the guiding principles in organic farming. Therefore, most of the organic farmers used green manures and growth hormones in the cultivation of redgram. The returns per rupee of expenditure were higher in the case of organic farming compared to inorganic farming, indicating that organic farming is now an expanding economic sector as a result of the profit incurred by organic produce is more than inorganic farming and thereby leading to a growing

inclination towards organic agriculture by the farmers. Presently, growing concern about health and nutrition aspects among the growing population has brought space for organic produce in the different spheres of marketing as well as earning from it. This transformation in production has given many farmers new initiatives in the way of producing products chemical free in the food chain.

Conflict of interest

The authors declare that they have no conflict of interest.

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