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AN ECONOMIC ANALYSIS OF ORGANIC FARMING SYSTEMS IN GADAG DISTRICT OF KARNATAKA (INDIA)

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ABSTRACT: *Mounting awareness of health and environmental issues in agriculture has demanded production of organic food which is emerging as an attractive source of rural income generation. India has traditionally been a country of organic agriculture, but the growth of modern scientific, input intensive agriculture has pushed it to wall. But with the rising awareness about the safety and quality of foods, long term sustainability of the system and accrue evidences of being equally productive, the organic farming has emerged as an alternative system of farming which not only address the quality and sustainability concerns, but also ensures a debt free, profitable livelihood option. The present study has analyzed the cost and returns of major identified organic farming systems Viz. organic farming system-I: Green gram+ Sorghum+ Dairy, organic farming System-II: Groundnut + Maize + Dairy and organic farming system-III : Cotton+ Chilli + Onion + Mango in Gadag district of Karnataka State by collecting primary data from 95 organic growers for the period 2011-12. The analysis of cost and returns in major identified organic farming systems in the study area revealed that, the net returns realized by the farmers was found to be maximum in organic farming system-III (Rs.97437) as compared to other farming systems identified in the study area. In addition to crop enterprises, Horticulture enterprise, Mango cultivation was found to be one of the important associated enterprises along with dairy enterprise practiced by the sample farmers and major income source in the study area. The analysis revealed that, the share of dairy alone in the major organic farming system-I and II contributed for 38.83 per cent and 34.77 per cent to the gross returns respectively. Among six identified farming systems in the study area FS-III of Gadag was found to be profitable based on the net returns obtained from the farming systems as whole enterprise. The suggests that, efforts should be made through Raitha Samparka Kendra and Krishi Vigyana Kendra to popularize these farming systems in the study area to utilize farm resources efficiently to enhance productivity and profitability.*

KEYWORDS: Gadag organic farming systems, Mango cultivation, Dairy

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INTRODUCTION

Organic farming is gaining gradual impetus across the world. While trends of rising consumer demand for organics are becoming apparent, sustainability in production of crops has become the major concern in agriculture development. In the green revolution era throughout the world, the use of plant protection chemicals including all pesticides like fungicides, insecticides, weedicides

were used extensively to protect plant from pest and diseases. The use of pesticide (kg/ha) in USA, Japan, Korea, China, India are 1.50, 10.80, 16.60, 2.25 and 0.38, respectively. The arguments behind using pesticide are that with the intensive agriculture, the problems of insect pests and disease are taking multifaceted shape and posing serious challenges. So the use of pesticides during last a few decades has emerged as one of the indispensable agro-inputs to increase and sustain crop yields. Excess and indiscriminate use of inorganic fertilizer has deteriorated soil poorly with deficiency of macro and micronutrient. There are 37 million hectares of organic agricultural land (including in-conversion areas). The total organic agricultural area in Asia is nearly 3.3 million hectares. This constitutes nine percent of the world's organic agricultural land. 400'000 producers were reported. The leading countries by area are China (1.9 million hectares) and India (1 million hectares). Timor Leste has the most organic agricultural area as a proportion of total agricultural land (seven percent). Organic wild collection areas play a major role in India and China, while Aquaculture is important in China, Bangladesh and Thailand (Yadav, 2013). The regions with the largest areas of organic agricultural land are Oceania (12.1 million hectares), Europe (10 million hectares), and Latin America (8.4 million hectares). The countries with the most organic agricultural land are Australia, Argentina, and the United States (Helga Willer *et al*, 2010).

Organic produce contains more vitamins, minerals, enzymes, trace elements and even cancer fighting antioxidants than conventionally grown food. Many studies conducted at Haryana Agricultural University in 2004 convey that, the average levels of minerals were much higher in the organically grown than in the conventionally grown food. Conventional agriculture based on concept of fertilizing the crop which is organic agriculture, it is for 'fertilizing the soil'. Regular addition of organic fertilizer improves the soil quality. The loss of nutrient in organic manure is less due to its slow release. Further, organic standard restricts the use of off-farm organic fertilizer as it may contain pollutants. It is always better to use on farm inputs. The concept of organic farming is not clear to many concerns (Palaniappan, 1999). Many people think that traditional agriculture, sustainable agriculture, Jaivik Krishi etc, are organic farming. Some people are of the idea that the use of organic manures and natural methods of plant protection instead of using synthetic fertilizers' /pesticides are organic farming. But this is not true. The organic farming in real sense imagines comprehensive management approach to improve the health of underlying productivity of the soil (Palaniappan, 1999). Earlier, Lampkin in 1999 mentioned that organic agriculture is a production system which avoids or largely excludes the use of synthetic compounded fertilizers, pesticides, growth regulators and livestock feed additives. It relies on crop rotation, crop residues, animal manure, legumes, green manure, off farming organic waste and aspects of biological pest control.

But organic production is near-term from farmers' movement and consumer choice which cannot be ignored. All facilities need to be extended to organic farmer's as they need appropriate package of practice, capacious amounts of organic inputs and good domestic as well as export market. Organic farming should not be discouraged under any circumstances. The National Centre of Organic Farming will act as facilitator for promoting organic agriculture in India. The immediate task is to arrange availability of organic inputs and inputs low cost certification process. There is already demand from farmers that there should be separate standard and certification for domestic market. Looking to the forward direction of organic market across the

world, there is no need of diluting the standards made for purely organic. But the demand for alternative standard has stemmed from the fact that the large proportion of organic farming either by default or by sustainable practice with use of negligible chemicals could not be certified as the existing standard does not permit it. As a result of it, many farmers in the country are not getting any advantage from view point of income generation. Looking to the need of alternative standard

Certification process, efforts may be made to promote organic green food or eco-friendly food (which allows the use of limited and specified agro-chemicals of safe level in the line of standard made by local Public Health Department) as being practiced by China on large scale. By this way many cultivated land can be used and transformed and environmental efficiency can be increased. But the whole process needs more study and it is ultimate choice of farmer and consumer who will finally dictate the policy for better agriculture in the country. Hence, with this background, the present paper makes an attempt to analyze the following objectives, as mentioned below

1. To identified existing organic farming systems and
2. To analyze study the cost incurred and returns realized in different organic farming systems in Gadag District of Karnataka State.

METHODOLOGY

The study was purposively restrained to Gadag district of Karnataka state during the year 2011-12. For selection of sample farmers, multistage random sampling procedure was adopted. At the first, Gadag district of North Karnataka was selected based on area of operation of organic village programme of Karnataka state government. At the second stage, five taluks from selected district was selected based on location of organic villages. At the third stage, one village from each selected taluk was selected. The selected organic villages were Kallur in Gadag taluk, Beedanal in Mundargi taluk, Jagapura in Naragund, Makeljeri in Ron taluk and Adarakatti in Shirhatti. In the final stage, 19 organic farmers were selected from each village. The Primary data on Cost and returns were collected by personal interview through a specially designed pre-tested questionnaire required for the study. The ultimate sample size was 95 in the study area for analysis. However, for only identification of organic farming systems in the study area the sample size of 120 respondents were taken for consideration in the study area. The tabular technique was followed to study the costs incurred and returns realized by the farmers in different organic farming systems of study area.

RESULT AND DISCUSSION

One of the objectives of the study was to identify major organic farming systems practiced in the study area. Based on the production activities taken up by the sample respondents, the existing organic farming systems were identified in Gadag district and results are presented in the Table.1. The number of organic farming systems followed by farmers was found to be six in Gadag district. The major farming systems identified in Gadag district were FS-I: Green gram+ Jowar+ Dairy, FS-II: Groundnut + Maize + Dairy and FS-III: Cotton+ Chilli + Onion + Mango. Now onwards these farming systems were mentioned as FS-I, FS-II and FS-III respectively in

Gadag district**.** A close observation farming systems in study area revealed that maize, sorghum and greengram were organic major crops grown in Gadag district

The dairy enterprise was found to be the most common in all the identified organic farming systems in the study area, except in Farming system-III where horticulture component mango was noticed. Majority of the sample respondents (28 per cent) in Gadag district have undertaken greengram + sorghum + dairy. The groundnut + maize + dairy farming system was practised by 25.83 per cent of sample farmers. The horticulture component was the major feature in farming system III which included cotton + chilli + onion + mango. It was practised by 25 per cent of sample respondents when compared to total sample of 120 respondents. The type of organic farming systems followed by farmers influenced by the availability of resources, technical knowhow, climate and other factors. The area selected for the study also exhibited the similar phenomenon and details are as follows. It was observed in the present study that from the Table.1, most of the farmers in the study area are practicing different crop enterprises along with dairy or mango cultivation. The farmers practicing other systems are negligible.

Organic Farming System-I

The details of Cost incurred and returns realized of organic farming system-I were given in Table.2. It could be observed that in organic farming system-I (Greengram+Sorghum + Dairy), the variable cost mainly comprises costs of human labour, organic manure, farm yard manure and biopesticides which were Rs.4242.16, Rs.1243, Rs.1991.38 and Rs.500 for Sorghum. Similarly for greengram it was Rs.3660, Rs.1007, Rs.1073 and Rs.400 respectively. It was observed that, the variable cost accounted for major share in dairy enterprise. The expense on human labour was maximum in dairy as compared to other components. The farmers of Gadag district have grown Sorghum mainly in *rabi* season as it is found to give good returns to the producers. In sorghum many farmers did not notice much pest problem and many farmers opined that infestation of pests and disease was less. Similar results were reported by Arjunprasad and Sam (1990). The gross return was highest in dairy component because of better market price. The B:C ratio of green gram was highest when compared to jowar and dairy components. However, the share of total cost in farming systems was more in dairy enterprise Rs. 25603.12 as compared to sorghum (Rs. 23018.79) and greengram (Rs. 20506.23).

The gross returns was more in case of dairy (38.83%) followed by greengram (34.48%) and sorghum (26.68%). But, greengram (Rs. 15013.77) was showing more net returns as compared to dairy (Rs. 14397.38) and sorghum (Rs. 4467.34). Hence, the benefit cost ratio was found to be highest in greengram (1.73) followed by dairy component (1.56) and sorghum (1.19). The farming systems as a whole shown benefit cost ratio of 1.49.

Organic Farming System-II

The organic farming systems II in Gadag district included mainly maize, groundnut and dairy components. The costs and returns of these components are presented in Table 3.The total cost of groundnut crop was found to be highest (Rs. 30375.92) as compared to dairy (Rs. 25603.12) and maize (Rs. 20348.32) components. Similarly, fixed cost component was maximum in groundnut crop (Rs. 8128.09) followed by maize (6116.65) and dairy (Rs. 1228.82). The total cost of

farming systems as a whole was accounted for Rs. 76327.36. The machine labour was less used when compared to other resource in the total variable cost. The non-availability of cash and higher charges on machine labour were the reasons for not using machine labour. The benefit cost ratio was found to be more in case of maize crop (1.74) followed by dairy (1.56) and groundnut (1.31). As such, the gross returns were maximum in dairy (34.77%) as compared to groundnut (34.46%) and maize (30.75%). But net returns were minimum in groundnut (23.94%) as compared to dairy and maize. The dairy components showed maximum total cost because of more expenses on inputs. The gross returns and net returns were highest in chilli crop because better price received by the sample farmers. Hence, the benefit cost ratio was highest in chilli crop. Ramasundaram *et al.* (2003), who reported that organic cotton cultivation decreased cost by 28 per cent with higher cost benefit ratio of 1:1.63 in organic cotton.

Organic Farming System-III

The costs and returns of different enterprises under organic FS-III in Gadag district is presented in Table 4. The share of variable and fixed cost in farming systems as a whole was Rs. 74573.10 (70.18%) and Rs. 31693.46 (29.82) to the total cost (Rs. 106266.60). The share of fixed cost in farming systems was minimum in chilli (19.82%). The total cost was found to be maximum in mango (Rs. 39767.22) followed by cotton (Rs. 24700.60), chilli (Rs. 22412.54) and onion (Rs. 19386.22).

The total cost of groundnut crop was found to be highest as compared to dairy and maize components. The expenses incurred on inputs were maximum in groundnut. The net return available with the farmers was minimum in groundnut crop. But the gross return was maximum in dairy enterprise as this enterprise was found to be profitable. The human labour in mango was high accounted for 48.65 per cent in terms of value when compared to Chilli (11.34), Cotton (21.30) and Onion (18.71) in the total human labour requirements for farming system as a whole. The operations like ploughing, harrowing, transportation and spreading of farm yard manure and harvesting all these operations required more labour. The gross returns was highest in mango accounting for 32.23 per cent followed by chilli (29.45%), cotton (21.81%) and onion (16.39%). As such, net returns was found to be more in chilli (38.57%) as compared to mango (26.77), cotton (20.26%) and onion (14.38%). The returns were higher because of premium price and lower cost of cultivation. The finding are in conformity with the study conducted by Bharadwaj *et al* (2000). The benefit cost ratio of chilli (2.68) was found to be highest as compared to other enterprises.

CONCLUSION

Based on the analysis of data, the results of the study revealed that, majority of sample farmers in different locations, included dairy and mango cultivation as one of the component of the organic farming systems. In the study area, among 6 identified organic farming systems in the Gadag district of Karnataka state, the major organic farming systems are FS-I: Green gram+ Jowar+ Dairy, FS-II: Groundnut + Maize + Dairy and FS-III: Cotton+ Chilli + Onion + Mango. The results also revealed that, in the study area FS-III was considered as the most profitable among farming systems studied, as these contributed higher returns to the farmers. The climatic factors and soil were most suited for the production of crops like Cotton, Chilli, Onion and Mango. The

other crop combinations tried by other farmers in the same locality were found to be yielding lower returns. Hence, diversification of enterprise, especially inclusion of plantation crops in the farming system not helps to increase farm income but also generate employment in farming sector. However, the farmers may be advised to expand their area under cultivation with these farming systems to get more returns.

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Table 1: Cost incurred and Returns realized in major organic farming systems in Gadag district

Sl. No	Particulars	Farming Sytem-I										
		Units	Jowar			Green gram			Dairy			value of Farming system as whole
			Qty.	Value	% of Value to farming system as a whole	Qty.	Value	% of Value to farming system as a whole	Qty.	Value	% of Value to farming system as a whole	
1	Seed	Kg	6.47	525	34.89	37.28	979.66	65.11	-	-		1504.66
2	Dry fodder	Cartloads	-	-		-	-		3.27	1776.26	100	1776.26
3	Green fodder	Cartloads	-	-		-	-		2.51	4623.16	100	4623.16
4	Concentrates	Kg	-	-		-	-		2.36	2156.19	100	2156.19
5	FYM	Ton	7.51	1991.38	64.97	8.43	1073.78	35.03	-	-		3065.16
6	Human labour	Man days	42.67	4242.16	19.80	40.09	3660.53	17.08	115.4	13523.16	63.12	21425.85
7	Bullock labour	Pair days	6.94	1954	60.39	7.21	1281.65	39.61	-	-		3235.65
8	Machine labour	Hours	3.92	3564.33	45.85	3.08	4210.2	54.15	-	-		7774.53
9	Bio-pesticide	Lit	21.43	500.1	55.54	22.4	400.33	44.46	-	-		900.43
10	Organic manure	Ton	2.62	1243	55.24	2.96	1007	44.76	-	-		2250
11	Miscellaneous	-	-	-		-	-		-	490.03	100	490.03
12	Interest on working capital (8%)	-	-	1121.59	28.49	-	1009.05	25.64	-	1805.5	45.87	3936.14
13	Total variable cost	-	-	15141.58	28.49	-	13622.23	25.64	-	24374.3	45.87	53138.11
14	Land revenue	-	-	35	50.00	-	35	50.00	-			70
15	Depreciation	-	-	997.69	31.47	-	1075	33.91	-	1097.16	34.61	3169.85
16	Rental value of land	-	-	6000.53	54.37	-	5036.43	45.63	-			11036.96
17	Interest on fixed capital (12%)	-	-	843.98	49.26	-	737.57	43.05	-	131.66	7.68	1713.21
18	Total fixed cost	-	-	7877.2	49.26	-	6884	43.05	-	1228.82	7.68	15990.02
19	Total cost of production	-	-	23018.79	33.30	-	20506.23	29.66	-	25603.12	37.04	69128.14

20	Gross returns	-	-	27486.13	26.68	-	35520	34.48	-	40000.5	38.83	103006.63
21	Net returns	-	-	4467.34	13.19	-	15013.77	44.32	-	14397.38	42.50	33878.49
22	B:C ratio	-	-	1.19		-	1.73		-	1.56		1.49

Table 1: Identification of farming systems in the study area

(N =95 samples)

Sl. No.	Farming Systems	Enterprises	Number of Farmers Practicing the farming system
Gadag district			
1.	Farming System-I*	Green gram+ Sorghum+ Dairy	34
2.	Farming System-II*	Groundnut + Maize + Dairy	31
3.	Farming System-III*	Cotton+ Chilli + Onion + Mango	30
4.	Farming System-IV	Sesamum + Sorghum	10
5	Farming System-V	Red gram followed by wheat + Dairy	6
6	Farming System-VI	*Kharif* Sorghum + Tur+ Dairy	9
		Total	**120**

*Indicates major farming systems accounting for 95 sample farmers considered for analysis.

Table 3: Cost incurred and Returns realized in major organic farming systems in Gadag district

Sl. No	Particulars	Units	FS-II									
			Maize			Groundnut			Dairy			value of Farming system as whole
			Qty.	Value	% of Value to farming system as a whole	Qty.	Value	% of Value to farming system as a whole	Qty.	Value	% of Value to farming system as a whole	
1	Seed	Kg	13.46	888.97	15.49006	61.2	4850	84.50994	-	-		5738.97
2	Dry fodder	Cartloads	-	-		-	-		3.61	1776.26	100	1776.26
3	Green fodder	Cartloads	-	-		-	-		2.04	4623.16	100	4623.16
4	Concentrates	Kg	-	-		-	-		1.94	2156.19	100	2156.19
5	FYM	Ton	5.15	1711.29	45.80798	6.1	2024.5	54.19202	-	-		3735.79
6	Human labour	Man days	50.43	4203	18.52971	55.77	4956.33	21.85091	117.3	13523.16	59.61938	22682.49
7	Bullock labour	Pair days	3.4	914.33	32.13441	5.43	1931	67.86559	-	-		2845.33
8	Machine labour	Hours	3.5	1066.28	27.09774	4.26	2868.66	72.90226	-	-		3934.94
9	Bio-pesticide	Lit	20.7	804.19	48.53728	21.03	852.66	51.46272	-	-		1656.85
10	Organic manure	Ton	2.94	3589.4	53.52472	3.46	3116.66	46.47528	-	-		6706.06
11	Miscellaneous	-	-	-		-	-		-	490.03	100	490.03
12	Interest on working capital (8%)	-	-	1054.197	23.3867	-	1647.98	36.55941	-	1805.5	40.05389	4507.677
13	Total variable cost	-	-	14231.66	23.38665	-	22247.82	36.55947	-	24374.3	40.05388	60853.78
14	Land revenue	-	-	35	50	-	35	50	-		0	70
15	Depreciation	-	-	926.3	29.78754	-	1086.23	34.93049	-	1097.16	35.28197	3109.69
16	Rental value of land	-	-	4500	42.30914	-	6136	57.69086	-		0	10636
17	Interest on fixed capital (12%)	-	-	655.35	39.52964	-	870.86	52.52885	-	131.66	7.941515	1657.87
18	Total fixed cost	-	-	6116.65	39.52969	-	8128.09	52.52889	-	1228.82	7.941417	15473.56
19	Total cost of production	-	-	20348.32	26.65927	-	30375.92	39.7969	-	25603.12	33.54383	76327.36
20	Gross returns	-	-	35376.58	30.75743	-	39640.93	34.46498	-	40000.5	34.7776	115018
21	Net returns	-	-	15028.26	38.8421	-	9265.01	23.94638	-	14397.38	37.21152	38690.65
22	B:C ratio	-	-	1.74		-	1.31		-	1.56		1.53

Table 4: Cost incurred and Returns realized in major organic farming systems in Gadag district

Sl. No	Particulars	Unit	Farming System-III												
			Chilli			Onion			Cotton			Mango			value of Farming system as whole
			Qty.	Value	% of Value to farming system as a whole	Qty.	Value	% of Value to farming system as a whole	Qty.	Value	% of Value to farming system as a whole	Qty.	Value	% of Value to farming system as a whole	
1	Seed/Seedling	Kg/No	0.28	1242.13	19.05	10.65	1222.26	18.75	3	555.66	8.52	100	3500	53.68	6520.05
2	FYM	Ton	5.43	2589.16	23.43	4.13	2063.76	18.68	6.09	1711.28	15.49	8.67	4685	42.40	11049.2
3	Human labour	Man days	81.76	2713.42	11.34	61.6	4478.13	18.71	67.74	5098.03	21.30	181.42	11643	48.65	23932.58
4	Bullock labour	Pair days	9.16	1013.42	18.12	4.3	1252.42	22.40	2.96	2370.43	42.39	-	956	17.10	5592.27
5	Machine labour	Hours	4.67	5446.21	52.70	2.91	1012.13	9.79	2.82	3130.83	30.30	-	745	7.21	10334.17
6	Bio-pesticide	Lit	19.3	763.15	30.64	18.73	612.84	24.61	21.07	365.33	14.67	0.12	749	30.08	2490.32
7	Organic manure	Ton	1.9	1168.12	12.79	2.06	1047.43	11.47	2.78	1612	17.66	2.42	5303	58.08	9130.55
8	Interest on working capital (8%)	-	-	1194.84	21.63	-	935.11	16.93	-	1187.48	21.50	-	2206.48	39.94	5523.91
9	Total variable cost	-	-	16130.46	21.63	-	12624.09	16.93	-	16031.07	21.50	-	29787.48	39.94	74573.1
10	Land revenue	-	-	35	25.00	-	35	25.00	-	35	25.00	-	35	25.00	140
11	Depreciation	-	-	1123.5	24.18	-	1002.5	21.57	-	1205.6	25.94	-	1315.48	28.31	4647.08
12	Rental value of land	-	-	4450.5	18.93	-	5000.12	21.27	-	6500.05	27.65	-	7560	32.16	23510.67
13	Interest on fixed capital (12%)	-	-	673.08	19.82	-	724.51	21.34	-	928.87	27.35	-	1069.25	31.49	3395.71
14	Total fixed cost	-	-	6282.08	19.82	-	6762.13	21.34	-	8669.52	27.35	-	9979.73	31.49	31693.46
15	Total cost of production	-	-	22412.54	21.09	-	19386.22	18.24	-	24700.6	23.24	-	39767.22	37.42	106266.6
16	Gross returns	-	-	60000.73	29.45	-	33403.53	16.40	-	44443.33	21.82	-	65856	32.33	203703.6
17	Net returns	-	-	37588.19	38.58	-	14017.31	14.39	-	19742.73	20.26	-	26088.78	26.78	97437.01
18	B:C ratio	-	-	2.68		-	1.72		-	1.8		-	1.66		1.96