



Research Paper

Continuation of organic farming practice in Southern Karnataka : Farmers' socio-economic condition and their rationale

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ABSTRACT : In recent years, increasing concern about food safety, health hazards and environmental damage both among consumers and producers is leading to increased adoption of organic farming and production of organic foods in the State. But, some farmers are reluctant to convert because of the perceived high costs and risks involved in organic farming. Despite the attention which has been paid to organic farming over the last few years, very little accessible information exists on the impact of State sponsored organic farming scheme on benefits accrued to the farmers and also the extent of continuing these practices by the farmers after the withdrawal of assistances by the State. Hence, the present study is an attempt to analyze the factors influencing adoption of organic farming by the farmers after the withdrawal of project by the State. The study consists of face to face interaction with 120 randomly selected farmer respondents in Southern Karnataka. The important factors influencing the farmers to continue organic farming was analyzed through logistic regression model. The results indicated that number of trainings attended by the sample farmers on organic farming was the important factor that positively influenced farmers to continue as organic farmers while off-farm income and total land holdings were negatively contributed to continuation of organic farming.

KEY WORDS : Food safety, Health hazards, Environmental damage, Off-farm income

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INTRODUCTION :

The performance of agricultural sector significantly influences the growth of the Indian economy. Agriculture (including allied activities) accounted for 17.4 per cent of the gross domestic product (GDP at constant prices) in 2015-16 as compared to 21.7 per cent in 2003-04. Notwithstanding the fact that the share of this sector in GDP has been declining over the years, its role remains critical

as it accounts for about 49 per cent of the employment in the country. Agricultural sector also contributed 13.8 per cent of national exports in 2015-16 (Anonymous, 2015). Agriculture provides food for more than one billion people and supply raw materials for agro-based industries. Modernization of Indian agriculture began during the mid-sixties which resulted in the much acknowledged "Green Revolution" making the country self-sufficient in food grain production. But, modern agriculture had its own

negative fallouts apart from creating a very unsustainable system of agriculture for mankind. Cultivation of crops became more dependent on off-farm inputs purchased from the market and farmers began to sell a greater share of their produce in the market. The increasing costs of cultivation and uncertain output prices made the modern agriculture system non-viable.

The increasing concern about environmental, economic and social impact of chemical dependent modern technology development led many farmers and consumers to seek alternative practices that will make agriculture and rural development more sustainable and environmental friendly. According to the food and agriculture organization (FAO, 2009), “sustainable agriculture is the successful management of resources for agriculture to satisfy changing human needs while maintaining or enhancing the quality of environment and conserving natural resources”.

Organic farming is one of the several approaches to meet the objectives of sustainable and environmental friendly agriculture. Most of the technologies used in organic farming like recycling farm waste, inter-cropping, mulching and integration of crops and livestock mainly rely on the management of soil organic matter to enhance the chemical, biological and physical properties of the soil. Organic farming is a unique production management system which promotes healthy agro-ecosystem and enhances biodiversity, biological cycles and soil biological activity using on-farm agronomic, biological and mechanical methods in exclusion of all synthetic off-farm inputs (FAO, 1999).

In India, a steering group was setup in the year 2000-01 under the planning commission on agriculture which identified organic farming as National challenge and suggested to take up organic farming as major thrust area for tenth plan. In the meantime, the Ministry of Commerce launched the National Organic Programme in April 2000 and Agricultural and Processed Food Products Export Development Authority (APEDA) is implementing the National Programme for Organic Production (NPOP). In March 2004, the Cabinet has announced a policy to promote organic farming in the country. Besides, it was also decided to follow an integrated approach by pooling efforts of various departments such as Agriculture, Horticulture, Watershed Development, Animal Husbandry, Sericulture, Agricultural Universities, etc. along with the involvement of Non-Government Organizations (NGOs) operating in the area as key players to act as a facilitators.

Karnataka is blessed with varied climatic and soil types spread across ten agro-climatic zones with annual average rainfall of 1130 mm with moderate temperature provides ideal conditions to grow a variety of crops throughout the year. Therefore, Karnataka is often called as the State with “Cafeteria of Crops”. In addition, many farmers are pioneers in organic agriculture and have developed different systems of cultivation through indigenous knowledge base. The organic movement silently took place in Karnataka not because farmers foresaw a definite market for organically produced, but for production oriented reasons *viz.* reduction in the use of external inputs, improvement of soil fertility, biological pest control and protecting mother earth besides improving their economy.

The Government of Karnataka was the first to frame the organic farming policy in India in the year 2004-05 with specific objectives: To reduce the debt burden of farmers, to enhance the soil fertility and productivity, to increase the food security by encouraging traditional crops, etc. Under organic farming policy, Government of Karnataka initiated a programme called ‘Organic Village’ with the involvement of NGO’s. Under this programme, an area of 100 ha in each district would be converted to Model Organic Farm. In this context, taking into consideration the importance and expansion of organic farming, the study focused on the impact of State sponsored organic farming programme on the benefits accrued by the farmers and also the extent of continuing these programmes by the farmers after the withdrawal of assistances by the state. Further, the important factors which govern continuation/discontinuation of organic farming practice by the farmers after the withdrawal of assistances by the state was studied and suggestions and policy recommendations were drawn from the study.

MATERIALS AND METHODS :

The present study was purposefully conducted in three locations *viz.*, Kolar, Mysuru and Ramanagara districts which represents Southern Karnataka. Purposive sampling method was employed to collect the required information for the study. A random sample of 40 respondents (which includes the farmers who are continuing and discontinued organic farming practice after the withdrawal of the project) in each selected district, who have adopted organic farming under the State sponsored programme during 2004-05 were interviewed.

Thus, a total of 120 farmers were chosen for the study.

Data on socio-economic status, demographic characteristics, various aspects of agriculture like size of land holding, asset position, cropping pattern and other related information was collected for the agricultural year 2015-16.

For the purpose of achieving the objectives of the study, the data collected were subjected to economic as well as statistical analysis. The technique of tabular presentation was used to study and compare the socio-economic profile of the sample respondents, details of land holdings and annual income of the respondents. The percentages and averages were computed to obtain meaningful results. Further, Logistic regression model was employed to study the factors influencing continuation of organic method of cultivation by the sample farmers in the study area. The dependent variable was measured as a dichotomous variable. If the farmer continued organic farming, value one was given otherwise zero. The independent variables considered were education level (years of schooling), total land holding (ha), converted land into organic farming (ha), trainings attended (number) and off-farm income (Rs.).

In Logit regression analysis, the dependent variable (Y_i) is continuing or discontinued organic farming by the sample respondents after the withdrawal of the State sponsored scheme. If Y_i is the random variable (dichotomous), it can be assumed that Y takes the values 0 or 1, where 0 represents discontinued organic farming and 1 denotes continuation of organic method of cultivation. If X_1, \dots, X_n are explanatory variables to be related to continuation of organic farming, then the logit model specifies that the conditional probability of event (*i.e.*, that $Y=1$) given the values of X_1, \dots, X_n is as follows.

$$P(Y_i) = 1 / [1 + \exp(-r + ds_i X_i)]$$

In order to linearize the right hand side, a logit transformation was applied by taking the logarithm of both sides, therefore we have:

$$\text{Logit } P(Y_i) = r + ds_i X_i + e$$

where,

$(Y_i) = 1$, if the farmers are continuing organic farming practices even after the withdrawal of the assistance from the state sponsored scheme

$(Y_i) = 0$, if the farmers have discontinued organic farming practices after the withdrawal of the assistance from the State sponsored scheme

α = Constant term

X_i = Independent variables (socio-economic factors

of the farmers)

β_i = Logistic c-coefficients for the i^{th} independent variables (log odds ratios)

e = error term.

The data was tabulated, coded and analyzed using GRETLL statistical computer programme. The depended variable (continuation of organic farming) was regressed on selected explanatory variables to identify the explanatory variables which highly influence the continuation of organic farming practice. The logistic regression co-efficient (β_i) can be used to estimate adjusted odds ratios for each of the independent variables in the model. If β_i is positive, it means that when the value of explanatory variables (X) increases, the odds that the continuation of organic farming by the sample farmers increases. If β_i is negative, the odds that the discontinuation of organic farming practices by the farmers as the value of explanatory variables (X) increase.

RESULTS AND DATA ANALYSIS :

General characteristics of sample farmers are expected to provide a bird's eye view of the general features and their socio-economic status in the study area. Therefore, an attempt has been made to analyze some of the important general characteristics of sample farmers selected from two groups namely, farmers who continued organic farming after withdrawal of assistance from the State and the farmers who discontinued organic farming immediately after the withdrawal of the project in Southern Karnataka.

The organic farming practices followed by the sample respondents in the study area is summarized in Table 1. In the study area, all farmers practiced farm bund as a soil and water conservation measure (100 %), animal husbandry (57 %) and compost preparation (61 %). Further, use of organic seeds, bio-fertilizers, liquid manures and bio pesticides was in the range of 26 to 35 per cent by the respondents. The practices like incorporation of green manure crop into soil (14 %) and application of manure cakes (16%) were neglected. It was surprising that none of the sample respondents had certified their farm as organic, though 35 per cent of the farmers were cultivating crops under organic method. It was observed from the results that majority of the sample farmers discontinued organic farming practices once financial assistance from the Government was stopped.

The information on socio-economic characteristics of the sample respondents in the study area is presented in Table 2. The average age of sample respondents, who continued organic farming was 51 years, while, it was 43 years in the case of discontinued organic farming indicating that continued organic farmers were aged people. The average family size was six in continued organic farmers but it was five members in discontinued organic farming family. With regard to education level across the groups, as high as 83 per cent of sample farmers were literates and the remaining 17 per cent were illiterates. Among continued organic farmers, only 14 per cent had attained higher studies upto college level while, 26 per cent completed upto high school level and a considerable proportion (43 %) completed education only upto primary school level.

In case of discontinued organic farmers, 8 per cent were illiterates, 20 per cent had attained college education, 38 per cent completed upto high school level and rest 31 per cent studied only primary school level indicating higher level of education status. The farming experience was higher (27 years) in continued organic farmers, while it was 19 years in discontinued organic farmers.

It was observed that, among sample farmers who adopted State sponsored organic farming programme in the study area, only 35 per cent had continued organic farming practices though the organic village programme was completed during 2009-10. This was mainly due to the fact that these farmers were convinced of the practices of organic farming which were eco-friendly and chemical free.

Land holding details of sample farmers in the study

Table 1: Status of organic farming practices followed by sample farmers in the study area

Sr. No.	Organic farming practices (OFP)*	Continuation of OFP by sample respondents (n=120)#	Per cent
1.	Planting forest tree seedlings	19	15.83
2.	Incorporation of green manure crops	17	14.17
3.	Compost preparation	73	60.83
4.	Vermi composting	33	27.50
5.	Use of bio fertilizers and liquid manures	37	30.83
6.	Application of neem and honge cake	19	15.83
7.	Organic seeds of cereals, pulses and oil seeds	42	35.00
8.	Fruit crop seedlings	25	20.83
9.	Fodder crop raising	37	30.83
10.	Organic certification	0	0.00
11.	Soil and water conservation	120	100.00
12.	Soil testing	1	0.83
13.	Animal husbandry	68	56.67
14.	Pest and disease management (Bio pesticides, tricho cards and traps)	31	25.83
15.	Training programmes and exposure visits	35	29.17

Note: *- OFP started during 2004-05, #- OFP followed during 2015-16

Table 2: Socio-economic and demographic profile of the sample farmers in the study area

Sr. No.	Particulars	Continued organic farming	Discontinued organic farming
1.	Number of farmers	42	78
2.	Age of the farmers (Years)	51	43
3.	Size of the family	6	5
4.	Education level		
	Illiterate	7 (16.66)	9 (11.53)
	Primary	18 (42.85)	24 (30.76)
	High School	11 (26.19)	30 (38.46)
	College level	6 (14.28)	15 (19.23)
5.	Experience in farming (Years)	27	19
6.	Year of adoption of organic farming practice	2004-05	2004-05
7.	Year of discontinuation of organic farming practice	-	2009-10

Note: Figures in parentheses indicate per cent to the respective total sample size

area is furnished in Table 3. Average size of the land holding was comparatively bigger in the case of discontinued organic farming (1.64 ha) compared to continued organic farmers (1.26 ha). This may be due to the fact that smaller land holding size was easy to the farmers in managing the resources in organic farming method. Among the groups, the proportion of irrigated land to total land holding was higher (27 %) in discontinued organic farmers than continued organic farmers (10 %). The proportion of marginal and small farmers was comparatively more in continued organic farming (71 %) and it was 55 per cent in discontinued organic farming. The proportion of farmers who leased in and leased out land was one per cent and eight per cent in discontinued organic farmers, while, continued organic farmers neither leased in nor leased out their farm land as they had strong attachment to their lands. The similar result was reported by Rude (1989), in which the average size of organic farm was significantly smaller than the conventional farm.

It was observed that in both the groups, farmers had different sources of income in addition to agriculture such as livestock and off-farm income (Table 4). In case of continued organic farming situation, about 46 per cent of income was from livestock source followed by agriculture (34%) and off-farm income (20%). This was mainly due to the fact that animal husbandry was

integrated along with the crop enterprise which is sustaining the farming community in continued organic farmers, as majority of the cultivable land is completely under dry land situation with limited water source. In discontinued organic farming group, income did not vary much between agriculture (36 %) and livestock (38 %) followed by off-farm source (26 %).

In order to identify important variables that influenced continuation of organic farming by the farmers, logit regression analysis was used (Table 5). The number of trainings attended by the sample farmers on organic farming was the important factor that positively influenced farmers to continue as organic farmers. It was noticed that unit increase in training programme resulted an increase in the probability of continuing organic farming by 0.608, which is significant at one per cent level. Further, off-farm income and total land holdings were negatively contributed to continuation of organic farming. As, one hectare increase of land holding and increase of off-farm income by 1000 rupees resulted an probability of discontinuation of organic farming by 0.198 and 0.50 levels, respectively. The increase in farm area may put increased burden on the farmers in organizing and manage organic input resources. Further, an increase in income other than agriculture (off-farm income) favours the farmers to lose interest in organic farming. The results

Table 3: Details of land holding among the sample farmers in the study area

Sr. No.	Particulars	Continued organic farming	Discontinued organic farming
1.	Average land holding (ha)	1.26	1.64
2.	Dry land (ha)	1.14	1.20
3.	Irrigated land (ha)	0.12	0.44
4.	No. of marginal and small farmers	30 (71.42)	43 (55.12)
5.	No. of medium farmers	11 (26.19)	30 (38.46)
6.	No. of large farmers	1 (2.38)	5 (6.41)
7.	No. of farmers leasing in land	0	1 (1.28)
8.	Total leased in land (ha)	0	0.54
9.	No. of farmers leasing out their land	0	6 (7.69)
10.	Total leased out land (ha)	0	2.36

Table 4 : Annual income of sample farmers in the study area

Income source	(in Rs./ household/ year)			
	Continued organic farmers	Per cent	Discontinued organic farmers	Per cent
Farm	34501	33.73	39268	36.41
Livestock	47164	46.11	40518	37.57
Off-farm	20611	20.15	28069	26.03
Total	102276	100	107855	100

Note: Off-farm income (goods carrier, commission agent, tailoring, petty shop, etc.)

Table 5 : Factors influencing continuation of organic farming by sample farmers in the study area

Variables	Co-efficient	Slope probability	Standard error	P value
Constant	4.8624**	0.9923	1.9348	0.0120
Years of schooling	-0.1633	0.4593	0.1178	0.1657
Total land holdings	-1.3944**	0.1987	0.6517	0.0324
Converted land into organic	1.2168	0.7715	0.9111	0.1817
Trainings attended	0.4400***	0.6083	0.1646	0.0075
Off-farm income	-0.0002***	0.5000	6.27256e-05	0.0002
Log-likelihood		-24.98		
Log likelihood ratio test		105.40		
Akaike criterion		61.97		
Schwarz criterion		78.70		
Correct prediction (%)		90.00		

Note: *** and ** indicate significance of values at P=0.01 and 0.05, respectively



Fig. 1: Face to face interaction with respondents by researcher

were in conformity with the findings of Binod Kafle (2011) Khaledi *et al.* (2011) and Azam (2015) who reported that farmers' participation in organic farming related trainings and visits helped the farmers to get relevant and timely information to take up organic farming. Further, increase in farm area resulted in higher chances of not following complete adoption of organic practice due to labour factor, as it furthermore limits the complete adoption of organic practice when farmers' wage increases. Another reason could be economies of scale that can be achieved more effectively in large conventional farms and therefore, farmers were less likely to switch over to organic farming.

Conclusion and policy recommendation:

Majority of farmers discontinued the practice of organic farming immediately after the financial assistance was stopped by the Government. Therefore, extension efforts play a crucial role in educating and motivating farmers about the importance and subsistence nature of organic farming. Further, Government needs to arrange facilities for the supply of critical organic inputs and manures through Raitha Samparka Kendra at subsidized rates. The study also revealed that the farmers' participation in organic farming related trainings and visits helped farmers to get relevant and timely information to continue organic farming in the study area. Hence, special

attention has to be give on educational training programmes and visits to model organic farms.

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