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Participatory model approach for organic agriculture in Karnataka India

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Abstract

Organic agriculture concept has played an important role in altering the patterns of agricultural development and has proven a feasible way to reduce natural resources degradation and to intensify sustainable agricultural production. It is a possible solution to meet the various objectives of sustainability and sustainable development. Organic agriculture It is potentially a way to reduce the externalities of current agricultural practices. In this paper a brief review on the models of organic agriculture is presented. This review is not exhaustive, but indicative on certain pertinent aspects of organic farming, which are often being debated, particularly with reference to its adoption among Indian farming communities. In the light of the above facts, our research study explores various aspects of organic cultivation and some of the issues have been examined at the micro level.

Keywords: Agriculture; Degradation; Environment; Organic farming; Participatory methods; Resources; Sustainability

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1. Introduction

The development of organic farming is considered as an approach to achieve the objectives of sustainability and sustainable development. It is potentially a way to reduce the externalities of current agricultural practices. One of the most significant expositions of the aims and principles of organic farming is outlined in the International Federation of Organic Agriculture Movements' (IFOAM) basic standards for production and processing (IFOAM, 2006). Organic agriculture could be a favorable model for the development of a sustainable agriculture in India. It provides various benefits and advantages including economical aspects such as high demand, price premiums, conservation of natural resource; and social benefits such as lower urban migration by increasing rural employment opportunities, enhanced local food security and household nutrition, and less dependence on external inputs.

In this paper a brief review on the models of organic agriculture is presented. This review is not exhaustive, but indicative on certain pertinent aspects of organic farming, which are often being debated, particularly with reference to its adoption among Indian farming communities. In the light of the above facts, our research study explores various aspects of organic cultivation and some of the issues have been examined at the micro level.

2. Models: A theoretical analysis

In order to serve the aim of making broad descriptions of the development in organic farming in across the world, the theoretical basis for the in-depth studies must include several aspects and cover more than one discipline of the social sciences. On the other hand, it seems impossible to make relevant comparisons if the detailed country studies are not based on a common theoretical framework. Hence, some theoretical considerations are necessary although they must leave room for substantial variation between the country studies.

A few multi faceted adoption studies on organic agriculture across the globe strongly advocated. The various empirical results from the studies can be summarized as follows:

- Padel (2001): "motives of the farmers" to convert to organic production;
- Darnhofer et al. (2005): barriers and deterrents to organic conversion;
- Sierra et al. (2008): barriers to adoption of organic agriculture;
- Parra López and Calatrava Requena (2005): factors of adoption.

Qualitative approaches considering conversion over a longer time period and from a wider point of view. The first series of studies use quantitative methods to analyze attitudes towards organic farming or food, such as Lik-ert scales, which offer contrasted items to which respondents are asked to agree or disagree. Such studies compare organic and conventional farmers' attitudes, "potential converters" and organic farmers, or recent and more experienced converters (Best, 2005; Koesling et al., 2005; Lockie and Halpin, 2005).

There has been a lot of debate in recent years about the feasibility of organic farming under Indian conditions The most often debated questions related to organic farming include its production potential, economic feasibility and the possible environmental benefits like improved soil quality and health. Unlike Europe and USA very few long-term organic farming experiments are available in India (these were initiated only recently by Indian Council of Agricultural Research (ICAR) in the last 4–5 years) which could answer our questions scientifically.

3. Methodology

Three taluks of Tumkur District, Karnataka, India, where a considerable number of farmers were pioneers in practicing organic agriculture for last 15 years, were purposively selected for the study. Identified farmers were then invited to take part in focus group discussion (FGD) and participatory approach. These farmers considered to be Pioneers and evolved *innovative models in the district*. Hence it was decided to take up in depth analysis of farm survey.

4. Results and discussions

Tumkur district is situated in the east-central part of the state and belongs to the physiographic division of Karnataka, called maiden. It is situated between $12^{0}20'$ and $77^{0}31'$ East longitudes. The climate of the district is semi-arid and subtropical. More than 50 percent of the rain fails is received during September- November and about 25 per during June-August. Spatial and temporal distribution of the rainfall is uncertain and erratic. Cyclic semi dry conditions are very common in this distracts. Red loam and red sandy loam are the major soil types in southern and western taluks of Tumkur distract. Shallow to deep black soils are prevalent in the northern taluks while sandy soil is common in the eastern tracks.

4.1. Socio economic profile

4.1.1. Classification of respondents

Table 1 gives the summary information of farmers and their size of holdings. The size of landholding is an important determinant of socio-economic status. The respondents were categorized into three groups viz., small farmers (owning less than 5 acres), medium farmers (owing 5 to 10 acres) and large farmers (having above 10 acres) based on the size of holdings. As could be seen in Table 1 the small farmers constitute 44 per cent of the sample, while medium farmers represent 36 per cent, and large farmers owning above 10 acres of land constitute 20 per cent. Thus the small farmers were deliberately chosen as the majority of the sample.

Table 1. Distribution of Respondents by land holding size

Category	Size of holding (In acres)	No. of Respondents	%
Small	Less than 5	11	44.0
Medium	5-10	9	36.0
Large	Above 10	5	20.0
	Total	25	100.0

Sources: Computed from field survey data

4.1.2. Age wise and category wise classification of sample farmers

Age of the respondents varied from 25 to 75 years. They were classified into distribution of the same is presented in Table- .2. A large section (32 per cent) was in the age group of 40-50 years. The share in the age groups of 55-65, 65-75, 35-45 and 25-35 is 24, 20, 16 and 8 percent, respectively. A majority of the sample farmers belonged to 45-55 age groups.

Table 2. Age wise and Category wise Classification of Respondents

Size of holing	*Age Groups (Years)*					Total
	25-35	35-45	45-55	55-65	65-75	
Small	1 (9.1)	2 (18.2)	5 (45.5)	1 (9.1)	2 (18.2)	11 (100)
Medium	1 (11.1)	2 (22.2)	1 (11.1)	3 (33.3)	2 (22.2)	9 (100)
Large	0	0	2 (40.2)	2 (40.0)	1 (20.0)	5 (100)
Total	2 (8.0)	4 (16.0)	8 (32.0)	6 (24.0)	5 (20.0)	25 (100)

Sources: Computed from field survey data
Note: Figures in parentheses are percentages

4.1.3. Size and type of family

As farming demands extensive labour force , size of family is considered as a significant factor in farming community . On the type of family and family size of the respondents are presented in the Tables 3. It is noted that 80 percent of the respondents belong to nuclear families while the rest live in joint families.

Table 3. Category wise size and Nature of sample Farmers

Type of Farmers	No of Nuclear Family	Joint	total
small	9 [81. 8]	2[18.2]	11[100]
Medium	[7 77.8]	2[22.2]	9[100]
large	4 80.0]	1[20.0]	5[100]
total	20 [80.0]	5[20.0]	25[100]

4.1.4. Size of landholdings

The average size of landholding for each category of respondents from rain fed and irrigated areas are shown in Table 4. The overall average size of dry and irrigated land per household was 2.4 and 4.9 acres, respectively. The combined average was about 7.3 acres. In the large farmer category, the village size of irrigated land (6.5) was less than the dry land average (7.8 areas). In the small and medium categories, the average size of irrigated land was found to be higher than their counterparts in dry land category.

Table 4. Average size of holdings (In acres)

Size of holding	Dry land	Irrigated Land	Total
Small	.7	3.2	3.9
Medium	1.4	6.2	7.6
Large	7.8	6.5	14.3
Overall	2.4	4.9	7.3

4.1.5. Livestock possession

Table 4 presented a livestock status of the sample farmers. Livestock plays a direct role in organic farming by providing organic manure; cattle shed residuals and drought power.

The livestock possessed by households across size of landholding is shown in Table 5. On the average, each household has 2.56 sheep or goats, followed by crossbred cows (1.44), buffaloes (1.32), bullocks (0.80) and local cows (0.76). It is desirable that the livestock serve as a backbone of farmers among the sample households.

Table 5. Different Livestock Possession across size of Landholding

Size of landholding	Bullocks	Crossbred Cows	Buffaloes	Local Cows	Sheep/Goats
Small	0.54	.82	.82	0.73	1.91
Medium	1.11	2.11	1.33	1.00	3.11
Large	0.80	1.60	2.40	0.40	3.00
Overall	0.80	1.44	1.32	0.76	2.56

Table 6. Responses of the Respondents on number of Livestock

Livestock	Numbers	Frequency of Respondents	Percentages
Bullocks	a) Nil	15	60.00
	b) A pair	10	40.00
	Total	25	100.00
Local cows	Nil	10	40.00
	One	11	44.00
	Tow	4	16.0
	Total	25	100.0
Crossbred cows	Nil	5	20.00
	One	10	40.00
	Two	6	24.00
	Three	2	8.00
	Four	2	8.00
	Total	25	100.00
Buffaloes	Nil	9	36.00
	One	7	28.00
	Two	6	24.00
	Three	2	8.00
	Eight	1	4.00
	Total	25	100.0
Sheep/Goat	Nil	15	60.00
	Two	2	8.00
	Five	4	16.00
	Eight	1	4.00
	Ten	2	8.00
	Eleven	1	4.00
	Total	25	100.00

4.1.6. Agricultural implements

The details regarding agricultural implements owned by farmers are presented in Table 6. About 40 per cent of the households own a tractor. All the households also won implements like pump set, wooden/iron plough etc. As figures reveal, a majority of the sample farmers have pump sets (64%) while a few have more one pump sets too.

Table 7. Agricultural Implements in the sample

Agricultural Asset	***No. Possessed***					**Total**
	0	1	2	3	4 & above	
Tractor	15 (60.0)	10 (40.0)	0	0	0	25
Sprayers	20 (80.0)	2 (8.0)	3 (12.0)	0	0	25
Pump set	0	16 (64.0)	4 (16.0)	2 (8.0)	2 (8.0)	25
Wooden/Iron plough	0	3 (12.0)	15 (60.0)	7 (28.0)	0	25

4.1.7. Annual income

As could be seen from the Table 8, that the average annual income of small farmers is very low (1.54 lakhs) as compared to medium and large with 3.46 and 17.57 lakhs, respectively.

Table 8. Distribution of Average Annual Income of farmer

Size of Holding	**Average Annual Income (In lakhs)**
Small	1.54
Medium	3.46
Large	17.57

In the small farmers category, cultivation of areca nut has a major share (33.6%) with an average household area of 3.91acres followed by coconut , ragi paddy and mixed crops in that order having a share of 32.5 16.3, 11.9 and 5.7 percent respectively. Around 66 percent of the total area is occupied by horticultural crops and the rest by food crops. This shows that small farmers have given priority to horticulture crops.

The average holding size for medium farmers was 7.61 acres and food horticultural crops accounted for 53.7 and 46.3 percent, respectively. in terms of total area. The operational average area of mixes crops was

1.43 acres (18.28 percent) which is higher than the cultivation of paddy (0.82 acres) or ragi (1.28). A possible reason is that this category has more livestock than others. Mixed crops generate by products such as fodder and also a source of income generating activities through animal husbandry. Further it enriches the soil humus content and fertility sustained for the long run. Thus mixed crops also occupy a major share in the cropping scenario.

Table 9. Cropping pattern versus Size of holdings (Percentages in parentheses)

Size of holding	Total Area	Cropping Pattern				
	(Acres)	Paddy	Ragi	Coconut	Areca nut	Mixed crop
Small farmers (N=11)	3.91 (100)	0.46 (11.9)	0.65 (16.3)	1.27 (32.5)	1.32 (33.6)	0.23 (5.7)
Medium Farmers (N=9)	7.61 (100)	0.82 (10.7)	1.28 (16.7)	1.83 (24.0)	2.27 (29.7)	1.43 (18.8)
Large Farmers (N=5)	14.30 (100)	1.60 (11.2)	6.60 (46.2)	2.70 (18.9)	2.10 (14.7)	1.30 (9.1)
Total (N=25)	7.32 (100)	0.84 (11.5)	1.96 (26.9)	1.86 (25.7)	1.78 (24.4)	0.84 (11.5)

In the large farmers' category, Ragi has a major share (6.6 acres) which accounts for about 46 percent with an average area of 14.30 acres. The large farmers also cultivate food crops, as they have more land and economic sustainability via horticultural crops besides dry land is better suited for growing Ragi.

There are other techniques available to improve the soil. For example, organic management techniques like stubble mulch farming and residue incorporation in rows could be helpful in improving the physical, chemical and biological soil properties, leading to improvement in the rate of organic matter decomposition.. Therefore farmers need technical and educational support to assist them in selecting material and techniques that quickly ensure the benefits of the strategy are realized. Currently Use of plant species with insecticidal and repellent properties could substantially reduce the amount of pesticides in the environment and subsequently retard land degradation. However, the volumes of such biological insecticides required could also be so big that demand for the insecticidal species could result in its overexploitation. Generally, the organic crop-growing farmers concurred that their success in organic farming was a result of the self invented innovative methods.

5. Conclusions

The study area, predominately constituted by the Small and medium farmers. The majority of these farmers were above fifty years of age. Most of the farmers possessed below 5 acres of land. A high proportion of the

organic farmers were elderly people in the age group of 45-55 and these were generally regarded as most resourceful and majority of them are small farmers. Further it was found that Crops produced through organic farming in Tumkur district included Ragi, Paddy, Coconut , Areca nut followed by maize, cow peas, vegetables, groundnuts, Bengal gram and sunflower.

Over a period of time the farmers have formulated and standardized a few novel indigenous farming practices .it was observed that, majority of farmers have designed and developed innovative techniques of soil , water and pest management.

Pest control strategies were varied ranging from intercropping with repellent crops to spraying plant juice extracted from repellent plants. Quite a number of problems were faced in trying to adopt organic farming. Among them was labor intensity, slow organic matter decomposition, bulky nature of organic manures, thus incurring high costs of transportation and the general unavailability of organic fertilizer sources. Majority of the farmers created their own manure management methods such as farm yard manure, vermin compost ,dried leaves ,other agricultural waste etc, Organic farmers in study area perceived quality improvement, yield increase, and reduced cost of production among others, as the main advantages of adopting organic farming. Most farmers viewed organic farming as a cheap and convenient means of growing crops. The perceptions shared by farmers are that organic crops do not spread diseases. The benefits of organic farming were not well pronounced by farmers, who noted that some of them were not performing so well and that success or progress deteriorated as farm visits and problem-solving aspects had decreased. Farmers were lamenting failure to secure markets for some of the crops like herbs which the population in the locality was not yet familiar with. As a relatively new agricultural strategy in the area, there is lack of technical backup and those sponsoring the program should look into the need for training of extension staff that work directly with the farmers. Another problem was the association between increase in weed population and the use of organic manures, a problem that could easily be solved by the adoption of integrated pest management techniques.

6. Recommendations

The few farmers in the area who have adopted organic farming techniques could be used to spread the perceived advantages of the farming practice. Since the practice is Intensive it could be very useful in similar areas of Tumkur district where farmers' have small land holdings. Generally, organic farming could be successful through increased visits by technical persons, holding workshops or short courses for farmers and supplying farmers with inputs like seed for organic agriculture. Farmers should get adequate training on preparation and post emergence application of organic fertilizer. Markets for organic crops should be opened to encourage farmers to appreciate the benefits of organic farming. The returns from organic farming should also be quantified for easy comparison with returns from conventional crops. To counteract the problem of shortage of organic material, the application of organic fertilizers by foliar methods could reduce the quantities required per unit area, especially during the vegetative phase. In addition, research is needed to compare efficiencies of organic fertilizers that are developed from different kinds of living organisms.

Farmers also felt that their innovative indigenous organic farming practices should be scientifically tested and approved by the Agricultural scientists as Standardized techniques of the farming.

As organic agriculture takes center stage to overcome farming-related environmental pollution, the adoption of organic agriculture is expected to remain an important area of empirical study in the near future.

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