Landholding, Irrigation Sources and Area under Organic Farming: Insights from Practicing Farmers in Karnataka

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INTRODUCTION

Organic agriculture has been both a way of life and a means to livelihood since early days of civilization. Despite some differences between the different schools, the main aim of organic farming can be summarized as to create a sustainable agricultural production system. The term 'sustainable' is used in a wide sense, including environmental, economic and social sustainability (Susanne 2001). Among the alternative agriculture systems, organic agriculture has received much attention as the sector has been growing at double-digit rates. While it is still a very small fraction of total agriculture, the scope for organic agriculture to contribute to the Sustainable Development Goals is really quite significant. Organic agriculture has been shown to offer sustainable income earning opportunities for small holder farmers in developing countries (Setboonsarng2015).

India is endowed with various types of naturally available organic form of nutrients that helps in organic cultivation of crops substantially. The Ministry of Commerce and Industries (MOCI), Government of India came out with the National Programme on Organic Production (NPOP) in 2000, and the 'India Organic' logo in 2002. The NPOP described "Organic agriculture as a system of farm design and management to create an eco-system which can achieve sustainable productivity without the use of artificial external inputs such as chemical fertilizers and pesticides."

The National Project on Organic Farming (NPOF) was launched as a pilot project in 2004. Several states in India have state-specific organic policies which are driving the growth of organic farming within states. Sikkim became India's first fully organic state by implementing organic practices. In Karnataka, the High Power Committee on Farmers Suicide constituted in 2002 recommended the introduction of organic farming as an alternative to reduce production costs, as also to improve sustainability within agriculture. The Karnataka State Organic Farming Policy 2004 has driven the organic movement in the state since then. The policy was first launched as a pilot project, officially known as "Karnataka Organic Farming Project" and was introduced in one village in each district of the state. At the national level, the Paramparagat Krishi Vikas Yojana (PKVY) of Government of India is a comprehensive scheme under National Mission on Sustainable Agriculture (NMSA) to promote organic farming through a cluster approach along with Participatory Guarantee System of certification.

With nearly 2.66 million hectares cultivated as organic agriculture in 2021, India ranks sixth in terms of area and ranks first in terms of number of producers having 1.6 million farmers engaged in organic farming, (FIBL,2023; Kaur, 2023), constituting about 43.25% of total organic farmers in the world.

The growth of organic agriculture in India has three dimensions and is being adopted by farmers for different reasons. First category of organic farmers are those that are situated in no-input or low-input use zones, for them organic is a way of life and they are doing it as a tradition. Second category of farmers are those that have recently adopted the organic in the wake of ill effects of conventional agriculture, may be in the form of reduced soil fertility, food toxicity or increasing cost and diminishing returns. The third category comprised of farmers and enterprises which have

systematically adopted the commercial organic agriculture to capture emerging market opportunities and premium prices. While majority of farmers in first category are not certified, those in the second category were both certified and un-certified but majority of third category farmers are certified

(http://ncof.dacnet.nic.in/OrganicFarming-AnOverview/TheWorldofOrganicAgricultureinIndia%202010.pdf).

At this crucial phase of organic farming, strong institutional mechanisms and governmental support are essential to realize its sustained growth. Keeping in view the growing trends in organic farming and the impetus given to PKVY under MNSA, the study was undertaken in Karnataka state with the following objectives.

1. Understand the demographic and natural resource endowment characteristics of organic farmers
2. Analyse the implications for policy formulation on extent of conversion to organic farming and certification

METHODOLOGY

The study of farmers practising organic agriculture was conducted in the State of Karnataka through survey method of data collection. The farmers practising organic agriculture were identified through Krishi Vigyan Kendras (KVKs) located in all the districts of Karnataka. The farmers identified were practising organic agriculture under the guidance of Krishi Vigyan Kendras and thus ensured that the respondent farmers were practising organic agriculturists at the time of the survey, with or without organic certification. A structured interview schedule was used to collect the data from the farmers, during the year 2017.Data related to education of farmers were collected as the number of completed years of education. Farmers' age was taken as the completed years since their date of birth. Experience in organic farming was measured in terms of number of completed years since their first year of organic farming. Persons aged 18 years and above staying with the family and contributing in farming were considered for number of adults in the family. Two natural resource endowment parameters like farm size and irrigation were considered in the study. The prevailing standard unit of measurement for agricultural land in the state of Karnataka is acre (equivalent to 4000 sq.m area or 0.4 ha) and the same was used here. Responses received from 173 farmers practising organic agriculture in 19 districts of the state were used for the study. The districts represented coastal, hill, transitional, rainfed, irrigated agro-ecosystems and thus covered all agro-climatic zones of the state. Frequency, percentages, independent sample t test and ANOVA tests were carried out to facilitate interpretation and for assessing the statistical significance of the data.

Results and discussion

Landholding status of organic farmers

Categorisation of farmers based on land holding size presented in Table 1, reveals that all categories of landholders were practising organic farming and the proportion of organic farmers increased with the increase in landholding size. Among the four groups, large farmers with holding size of more than 10 acres were the majority (37.6%) compared to other three groups. Marginal farmers (less than 2.5 acres) accounted for 17.9% followed by 20.8% small farmers and 22.7% medium farmers (5 to 10 acres). These four groups differed significantly with respect to most of the demographic characteristics and natural resource endowment. Marginal landholders practicing organic agriculture were young in age (average 44 years) compared to organic farmers with large holding size whose average age was 52 years. While the marginal organic farmers had education up to secondary school level, the large organic farmers had education up to graduation level (more than 12 years of education). Marginal farmers also had fewer working adults in their family compared to large holder farmers who had about 5 adults in their family. The organic farming experience of the four groups brings out the fact that marginal farmers had started organic farming recently (less than six years ago) whereas the large holder farmers were

more experienced in organic farming (more than 12 years). The average landholding of marginal organic farmers was 1.9 acres compared to 3.92 acres among small farmers, 7.85 acres among medium farmers and about 28 acres among large holder farmers. These differences were statistically significant. The four groups of farmers also differed significantly in terms of area under irrigation (1.26 acres among marginal farmers as against 14.57 acres among large holder farmers) and area under organic farming (1.65 acres among marginal farmers compared to 14.97 acres among big farmers). Small holding may be blessing in disguise as marginal farmers had converted 85.44% of their land into organic farming as compared to 63% among large holder farmers.

Table 1
Profile of organic farmers having different holding size groups

Demographic and resource endowment	Land holding categories				F value	Sig.
	Marginal (n=31)	Small (n=36)	Medium (n=41)	Large (n=65)		
Age (years)	44.10	47.92	48.17	52.16	4.65**	0.00
Education (years)	10.35	10.92	11.66	12.77	3.67**	0.01
Adults in the family (No.)	3.03	3.11	3.77	5.02	6.10**	0.00
Organic farming experience (years)	5.87	7.67	10.15	12.46	10.36**	0.00
Land holding (acres)	1.90	3.92	7.85	28.06	58.92**	0.00
Area under organic farming (acre)	1.65	3.31	6.00	14.97	44.36**	0.00
Organic farming area (%)	85.44	81.93	74.65	63.01	3.75**	0.01
Area under irrigation (acre)	1.26	2.97	5.37	14.57	17.09**	0.00
Irrigated area (%)	60.62	62.03	66.08	50.69	1.38	0.25

** significant at 0.01 level

Landholding details of the organic farmers is not in conformity with the general picture of Indian landholding status. In India, medium to large farmers account for about 5 per cent of the total farmers in the country. However, in the present study of organic farmers, majority belonged to large category. The national average holding size for marginal farmers is just about 1.0 acre (GOI 2014), whereas the average for organic farmers in the study is almost double (1.90 acre). The national average for small farmers is 3.50 acres, whereas the average for small organic farmers is 3.92 acres. The data indicate that, within each category, organic farmers possessed higher land holdings compared to the national average. Larger holding may provide a psychological advantage and confidence-booster for farmers to experiment with organic agriculture. Shifting from normal agriculture to organic agriculture will have a transition period, usually 2-3 years, during which the productivity is likely to decline. This is more so in irrigated conditions than in rainfed conditions(Setboonsarng 2015). Past studies (Rigby *et. al.* 2001 and Flaten *et al.* 2006, as quoted in Doris 2012) have indicated that there has been a recent shift to larger and more commercially oriented farms converting to organic methods.

The study shows that the education level of the farmers plays critical role in organic farming. This is of significance when many young professionals from other fields are returning to agriculture as organic farmers. These professionals are binging to agriculture new energy, novel ideas, and above all, much needed investment into the sector. Organic farming is fast catching up with this group of neo-agriculturists (Chandre Gowda *et al.*, 2019).

Presence of more number of adults in a family means, labour is mainly supplied by family than through hired sources. This shows a general pattern of higher family labour utilization in organic agriculture. The fact that it is generally more labour-intensive than conventional agriculture can make organic agriculture an effective employment generation strategy. Organic agriculture allows for safe employment opportunities for women, i.e., no exposure to pesticides, and enables women to work within the village (Setboonsarng 2015).

Irrigation sources for organic farmers

Data in Table 2 provide details related to differences in the number and type of irrigation sources of the organic farmers. It is interesting to note that 13.29 per cent of the organic farmers had no source of irrigation and were totally dependent on rainfed farming. Majority of the organic farmers (67.63%) were dependent on ground water as source of irrigation. Very few farmers (8.09% had more than one source of irrigation like surface and ground water resources). None of the organic farmers in the present study had command area irrigation. The differences in the profile of the four categories of farmers with respect to irrigation sources reveals that farmers with more number of irrigation sources had higher experience in organic farming (more than 14 years) compared to farmers who were dependent on open well/farm pond as source of irrigation (7 years). The rainfed and groundwater dependent organic farmers had equal length of experience in organic farming with just above 9 years. Types of irrigation and number of irrigation sources did not differ significantly with respect to landholding size.

Table 2
Organic farming with different irrigation sources

Demographic and resource endowment	Sources of Irrigation				F value	Sig.
	Rainfed (n=23)	Open well (n=19)	Bore wells (n=117)	Multiple (n=14)		
Organic farming experience (years)	9.52	7.05	9.32	14.64	4.04**	0.01
Land holding (acres)	16.61	7.74	14.09	12.00	1.21	0.31
Area under organic farming (acre)	8.74	4.05	8.41	9.29	1.67	0.18
Organic farming area (%)	69.41	68.35	75.75	71.20	0.39	0.76
Area under irrigation (acre)	0.00	6.74	8.86	10.57	4.34**	0.01
Irrigated area (%)	0.00	65.47	66.33	79.42	26.73**	0.00

** significant at 0.01 level

Organic agriculture can benefit rainfed farms in several ways. Organic farming is associated with decreased irrigation needs by about 30-50 per cent. This becomes an important part of adaptation in drought conditions. Organic farming practices are compatible with drought management strategies, irregular rainfall events and rising temperatures, notes a recent technical paper from International Trade Center (WTO) and FiBL. This paper notes that soils under organic management retain significantly

more rainwater thanks to the "sponge properties" of organic matter. Water percolation is 15-20% more in organic systems. Water capture in organic plots was twice as high as conventional plots during torrential rains, which in turn reduces the risk of floods. Given both the mitigation and adaptation potential that organic farming presents in the context of climate change, it becomes important that more emphasis is placed in promoting such farming systems on a wider scale" (GOI 2015).

Extent of conversion to organic farming

Half of the respondent farmers were fully organic (100% of the land area under organic), while about 30 % were categorized as less-organic (less than 50% of the land area under organic) and the remaining 20 % were mostly organic (> 50 % of the land under organic). Extent of area converted to organic farming had nothing to do with age, education level and organic farming experience (Table 3). Fully organic farms were medium in size (average 8.88 acres), whereas large holders were only partially organic. Fully organic farms had higher percentage (70.4%) of land under irrigation (6.25 out of 8.88 acres), compared to less organic farmers (64.3% land under irrigation). Interesting finding is that of difference in the number of adults in a family of the three categories, where complete organic holdings had less number of adults than the other two categories.

Table 3
Extent of conversion to organic farming

Demographic and resource endowment	Extent of conversion to organic farming			F value	Sig
	Partially organic	Mostly organic	Fully organic		
Age (years)	50.14	47.61	48.64	0.65	0.53
Education (years)	11.38	12.06	11.72	0.33	0.72
Organic farming experience (years)	9.19	9.42	10.20	0.45	0.64
Adults in the family (No.)	5.08	3.83	3.39	6.50**	0.00
Land holding (acres)	21.98	12.44	8.88	12.33**	0.00
Irrigated area (%)	13.50	8.17	6.25	5.59**	0.00

**significance at 0.01 level

Converting small farms to fully organic is relatively easier than converting large farms. As small farmers often have uncontaminated lands with minimal exposure to agrochemicals, organic agriculture turns their comparative disadvantage to their benefit (Setboonsarng 2015). Converting large farms to organic agriculture also requires enormous support from the supply side. The requisite input, when not sourced within the farm or the village, may not be easily accessible in rural India. Therefore large farms are likely to remain partially organic. Large farms with larger area under irrigation may induce farmers is to do high external input intensive agriculture, thereby limiting the extent of conversion to organic agriculture.

CONCLUSION

The study shows that the farmers having relatively higher holding sizes are more likely to take up organic farming than the ones who own smaller holdings. This is not to undermine the interest and enthusiasm of small holders who also are embracing organic farming. Organic farming is seen as cost saving option by smallholder farmers, as it reduces dependence on external inputs by laying emphasis on recycling of farm resources. There is however, a risk of small farmers not being able to sustain their initial interest in organic farming due to poor returns in the early phases of organic farming, unless supported institutionally in the beginning. As more number of small holder farmers take to

organic farming, it will bring down the cost of ecosystem services leading to cleaner air, use of lesser water etc. Governments can reap the benefits of ecological services rendered by smallholder farmers.

It is also interesting to note that the chief source of irrigation for organic farming is groundwater which is finite and needs to be used judiciously. Under the organic farming regime, farmers often tend to keep their water requirement low thereby improving its use efficiency. Many states have highly subsidized the use of water saving irrigation devices. These incentives can be linked to organic farming. Additional incentives can be thought of, if the farmer is reducing water use by improving water holding capacity of soils through organic farming practices. The study has also shown that farmers under canal irrigation, where flood irrigation is the norm, were not practicing organic farming. Canal irrigated farmers are trying to maximize individual profits at high environmental costs. Non-judicious use of canal water has already created havoc in many command areas where the soils have gone out of cultivation due to high salinity / alkalinity. By making mandatory the use of water by water saving devices and incentivizing low external input agricultural practices, large tracts of lands can be prevented from becoming uncultivable in the years to come.

Governments needs to set up local bodies at district level to hasten the process of organic certification. Efforts must be also made to create niche markets for organic agricultural produce. These will go a long way in promoting organic agriculture and help farmers to return to what was once the natural way of farming.

REFERENCES

Chandre Gowda M.J., Randhir S., Sreenath D. and Srinivasa Reddy D.V. 2019. Resources, demography and motives driving organic farming. Indian Journal of Agricultural Sciences, 89(12):2048-52.

Doris L. 2012. Comparing attitudes and characteristics of organic, former organic and conventional farmers: Evidence from Ireland, Renewable Agriculture and Food Systems 28(4):329–337.

Flaten O., Lien G.,Ebbesvik M.,KoeslingM.andValle S. P. 2006. Do the new organic producers differ from the 'old guard'? Empirical results from Norwegian dairy farming. Renewable Agriculture and Food Systems 21 (3):174– 182.

GOI. 2014. Agriculture Census 2010-11, All India Report on Number and area of operational holdings, Agricultural Census division, Department of Agriculture and Cooperation, Ministry of Agriculture, Government of India, http://agcensus.nic.in/document/agcensus2010/completereport.pdf

GOI. 2015. National Project on Organic Farming, Committee on Estimates 2015-16, Ninth Report, http://www.indiaenvironmentportal.org.in/files/file/national%20project%20on%20organic%20farming.pdf

Kaur A, 2023. Organic farming in India: The present scenario. Journal of Emerging Technologies and Innovative Research, 10(6): 463-472.

Rigby D., Young T. and Burton M. 2001. The development of and prospects for organic farming in the UK. Food Policy 26:599–613.

Setboonsarng S. 2015. Organic Agriculture, Poverty Reduction, Climate Change, and the Millennium Development Goals. In Organic agriculture and post-2015 development goals - Building on the comparative advantage of poor farmers, ed.Setboonsarng S and Markandya A.ADB, Metro Manila, Philippines, pp 378.

Susanne P. 2001. Conversion to Organic Farming: A Typical Example of the Diffusion of an Innovation? SociologiaRuralis, European Society for Rural Sociology. 41(1).