

Decisional factors driving farmers to adopt organic farming in India: a cross-sectional study

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Abstract

Purpose – The purpose of this paper is to carry out an empirical investigation of the role of various factors such as economics, social, marketing, cultivation and government in adoption of organic farming. Further, this study examines the factors that influence farmers' choice of adopting organic farming, based on their demographic classification such as education level, farm size, farming experiences and land ownership of the organic farmers.

Design/methodology/approach – To address the research objectives, the primary data were collected with the help of a structured questionnaire from 200 respondents. In this study, the QUAL–QUAN sequence of mixed method design was used. Four focus groups were conducted to identify the factors of organic farming adoption. Further, multinomial regression analysis was applied to analyze the differential impact of these factors in relation to the farmers' demographic classification.

Findings – The study found five major factors that affect the adoption of organic farming (economic, social, marketing, cultivation, government policy) in India. The study also observed that marketing and government policy factors were most crucial in influencing all types of farmers irrespective of their educational level. The farmers with more farming experience were more concerned about social factors. Similarly, the farmers using lease farms were found to be concerned about the economic viability of organic farming.

Social implications – This study suggests that without government support, the adoption of organic agriculture seems to be a highly challenging task in a situation, where majority of the farmers fall under the small and marginal category. Hence, to promote organic farming in a developing country like India, the government has to invest more in schemes where farmers should get exclusive training and support to strengthen their intention behind the adoption of the organic farming.

Originality/value – Based on the collective insights from the studies, the different stakeholders with interest in organic agriculture may frame necessary strategies to promote organic farming.

Keywords India, Demographic classification, Marketing challenges, Organic farming adoption, Types of farmers

Paper type Research paper

Introduction

After the green revolution, there is a constant increase of various chemical fertilizers and pesticide in agriculture production (Pimentel *et al.*, 2005; Carvalho, 2006), which has led to numerous challenges such as deterioration of human health, especially the reproduction and central nervous system (Duszeln, 1991; Singh, 2000; Bretveld *et al.*, 2006). The reliance of agriculture on synthetic chemical fertilizers and pesticides has emerged as a major factor, which affects public health and environment (Pimentel *et al.*, 2005). Moreover, previous studies have revealed that the excess use of chemicals degrades soil health and deteriorates environmental conditions (Taylor *et al.*, 2003; Arias-Estévez *et al.*, 2008; Fenner *et al.*, 2013).

For this reason, the inclination toward organic farming has increased over a period. Organic farming is considered as eco-friendly agriculture systems that largely avoid synthetic chemicals and fertilizers (Venkataraman and Shanmugasundaram, 1992; Roitner-Schobesberger *et al.*, 2008; Mahdi *et al.*, 2010; Suthar, 2010). Organic farming further refers to “sustainable agricultural production system.” The term sustainable largely includes environmental, economic, and social sustainability (Padel, 2001). The inclination toward organic farming has led to reduction in the overall damage to the environment (Pimentel *et al.*, 2005; Carvalho, 2006) and further improved public health. Moreover, the ecological and



environmental integrity could be enhanced by encouraging farmers to adopt organic farming practices. Past studies have revealed that organic agriculture and the demand for organic food is constantly growing world-wide (Lohr, 2001; Padel and Foster, 2005; Siderer *et al.*, 2005). The growing awareness of the health conscious middle-class population in India about the benefit of organic food (Chakrabarti, 2010; Gandhi and Zhou, 2014) is expected to bring additional opportunities in the domestic market (Kumar and Ali, 2011; Viswanadham, 2006; Garibay and Jyoti, 2003; Ramesh *et al.*, 2005).

India has the second largest agricultural land holding in the world with 157.35m hectares (Melkamu and Bannor, 2015; Kumar and Menakadevi, 2017). Further, India possesses 46 out of 60 soil types that are conducive for agriculture (Tyagi and Shastri, 2016). With the sizable acreage of cultivation, India has enough potential to produce organic crops and emerge as the leading supplier of organic food and drinks in the world organic market (Venkatashwarlu, 2008).

Historically, the Indian agriculture pattern was chemical free cultivation, i.e., organic farming, which changed during the British reign (Chandrashekar, 2010). Presently, Sikkim is the only state in India, which has attained fully organic farming (Tambe and Arrawatia, 2012; Chettri, 2015). In India, only 0.7 percent, i.e., around 11.8 lakh hectares of the total agricultural land is being used for organic farming presently (IFOAM, 2017). Despite several benefits of organic foods and drinks, the adoption of organic farming practices is a major challenge for the farmers in India and the reasons need to be explored.

Previous research in different countries has analyzed the factors influencing farmers to adopt organic farming (Wollni and Andersson, 2014; Hattam *et al.*, 2012; Laple and Van Rensburg, 2011; Musshoff and Hirschauer, 2008; Schmidtner *et al.*, 2011). The relevance of information accessed, especially, the role of informal information sources for organic farming (Burton *et al.*, 1999; Genius *et al.*, 2006; Morone *et al.*, 2006) and the importance of motivational factors such as environmental concerns for the adoption decision (Best, 2010; Mzoughi, 2011) has been studied. Further, past studies have focused on the impact of spatial effect in decision making while adopting organic farming (Nyblom *et al.*, 2003; Bichler *et al.*, 2005; Eades and Brown, 2006; Wollni and Andersson, 2014). Charyulu and Biswas (2010) stated that organic farming has the potential to provide benefits in terms of environmental protection, conservation of non-renewable resources, and improved food quality. However, the perception exists that organic agriculture contains solutions for issues at the vanguard of American policy related to environmental quality, food safety, the viability of rural communities and market concentration (Klonsky and Tourte, 1998).

Few studies have suggested that organic farmers are more likely to be women (Egri, 1999; Burton *et al.*, 1999; Jansen, 2000). Others have found the differences in organic and conventional farmers in their awareness level, environmental concern, animal welfare and food safety (McCann *et al.*, 1997; Fairweather and Campbell, 2003; Storstad and Bjørkhaug, 2003). The demand for organic produce is increasing, yet the conversion to organic farming has not got reflected through the diversification of this opportunity.

Critical success factors for organic farming

Delbridge *et al.* (2011) discussed that organic production often involves more complicated crop rotations than conventional production and may require more time on scouting fields and record keeping. Nemes (2009) opined that it is hard to affirm the profitability of both the systems, i.e., organic production and conventional production. It depends on the site and crop-specific factors, availability of marketing opportunities, labor availability, agronomic factors, etc. Wynen (2006) stated that the crucial factors for success in organic farming include scientific planning for conversion, ability to optimally use existing resources, financial viability, appropriate accounting for bringing changes in yields through

conversion and proper utilization of marketing opportunities. Ramesh *et al.* (2005) highlighted that the combination of lower input costs and favorable price premiums can counterbalance reduced yields and make organic farms equally and often more profitable than conventional farms. However, in countries like India, organic products do not command a vast price premium, therefore, lower yield due to organic farming could result in lower profitability if the produce is sold only domestically (IFOAM, 2017).

Asadollahpour *et al.* (2014) highlighted that there is a need for constant monitoring of products that have to undergo organic certification because the quality audit is a very stringent process. Joachim (2006) described that the building of the control systems for organic certification organizations need to be strengthened for standardizing the production, processing and marketing of organic products. Kshirsagar (2008) suggested that the government with the help of non-governmental organizations should assist in the certification process and provide training for the beginners to make them knowledgeable, skilled and efficient in the production, processing and marketing of their products. Demiryurek and Ceyhan (2008) stated that organic producers should be financially supported and assisted by research and extension services for producing and using their own inputs, instead of purchasing from outside. The researchers further opined that organic farmers should also be encouraged to establish associations and trade unions for increasing their marketing efficiency.

Challenges in adopting the organic farming practice in India

Despite the numerous benefits of organic food and farming, the adoption of the organic method of cultivation represents a tiny portion of total agricultural land in the world. In India, around 0.7 percent of the total arable agricultural land is used for organic farming (IFOAM, 2017), which poses a serious question on the policy perspectives and concern related to farmers' interest in organic agriculture. However, in several countries, agricultural policies are experiencing a strong trend to become more ecological friendly (Mzoughi, 2011), and farmers are being encouraged to adopt organic methods of farming through various conversion subsidies and financial incentives (Lohr and Salomonsson, 2000).

Normally, a conversion period of three years is required for transforming conventional method by adopting organic farming (FAO, 2015; Swezey *et al.*, 1998; Reynolds, 2000; Tranter *et al.*, 2009), and it is perceived that during the early conversion period the overall crop production significantly decreases (Meena, 2010; Lohr and Salomonsson, 2000; Pacini *et al.*, 2003) and adversely affects profit (Läpple and Van Rensburg, 2011). Therefore, the government supports and promotes organic farming by providing conversion subsidies (Rezvanfar and Olhan, 2011; Soltani *et al.*, 2014; McBride and Greene, 2007).

The driving factors for farmers to adopt organic farming can be broadly classified into two groups: economic and non-economic factors (Kallas *et al.*, 2010). Past literature has largely investigated the economic factors and cited economic concern as the main driver of adoption (Sheeder and Lynne, 2011; Koesling *et al.*, 2008; Veisi *et al.*, 2013). Padel (2001) stated that financial reasons are one of the prominent factors for the adoption of organic production. As long as the organic sector provides a less protected economic environment than conventional farming, the conversion will remain problematic (Kerselaers *et al.*, 2007). Some literature have established that proper market demand and adequate price premium for organic food will lead to reasonable profit for farmers involved in organic farming (Argilés and Brown, 2010; Pimentel *et al.*, 2005; Van der Vossen, 2005; Klonsky and Tourte, 1998; Singh and Grover, 2011).

However, some studies have revealed that farmers practicing the organic method of cultivation from a long-term along with the proper crop rotation have been found to be in a more profitable position than conventional farming, even without any price premium (Delate *et al.*, 2003; Pimentel *et al.*, 2005; Sudheer, 2013). Contrary to this, several studies have

showed that farmers are not only driven by financial considerations for adopting organic farming, but it also depends on their behavior, attitude, lifestyle, opinions and objectives (Rigby *et al.*, 2001; Carlsson *et al.*, 2007). Kallas *et al.* (2010) revealed that farmers, who are risk loving, recently started managing farms and enthusiastic to preserve the environment and generate employment in their area are more prone to adopt organic farming. Koesling *et al.* (2008) described that farmer's environmental concern strongly influences and motivates them for adopting organic farming. Many farmers are also motivated toward organic farming for non-economic reasons such as social concern, environmental benefits, eco-friendly, chemical free food, quality food, health benefits, etc.

In India, more than 80 percent of farmers are small and marginal, who have less than 2 acres of land (Dev, 2014; Nandi *et al.*, 2015; Akhtar and Parveen, 2014). For these farmers, the financial constraints have been of major concern because the adoption requires conversion cost in the form of cost of certification and other initial investment (Parvathi and Waibel, 2016; Azam and Banumathi, 2015). In India, some of the studies related to organic farming are conducted by (Ramesh *et al.* (2010), Kumar *et al.* (2018) and Altenbuchner *et al.* (2018)). Ramesh *et al.* (2010) stated that proper market demand, price information and proper price premium for organic produce are required to get a reasonable profit for farmers involved in organic farming. Kumar *et al.* (2018) conducted their study on Sikkim, which is the only state in India with 100 percent organic, and stated that major barriers for the adoption of organic farming are the infrastructure facilities such as transportation, electricity, irrigation challenges, etc. Similarly, Altenbuchner *et al.* (2018) examined the influence of organic farming on the livelihood of small farmers in India and found that access to training by the government will strengthen their adoption level. They further examined the impact of social factors such as capacity building and support from the communities on the adoption level and also reported the environmental conditions and gender-related challenges.

The main objective of this paper is to empirically investigate the role of various factors such as economics, social, marketing, cultivation and government in adopting organic farming. Further, this study examines the influencing factors of farmers depending on their demographic classification such as education level, farm size, farming experiences and land ownership of organic farmers.

Methodology

Sampling design and data collection

To address the research objectives, we employed mixed methodologies, which is an emerging interest across several disciplines, especially in applied social research (Bazeley, 2003; Creswell, 2009; Mertens, 2005). Mixed method design is a process of collecting, analyzing and "mixing" or integrating both quantitative and qualitative data within a single study for the purpose of gaining a better understanding of the research problem (Tashakkori and Teddlie, 2003; Creswell, 2009). In this study, QUAL (qualitative) – QUAN (quantitative) sequence was utilized. The focus group technique with thematic analysis was employed to collect and analyze the qualitative data about the factors influencing farmers to adopt organic farming in India. Initially, a pilot study was conducted to understand the different factors influencing the farmers to adopt organic farming. The pilot study helps in analyzing the feasibility of the studies, which is a small-scale version or trials conducted prior to the study (Polit *et al.*, 2001). However, it can also be referred to as pre-testing or "trying out" of a particular research instrument (Baker, 1994). To explore the unexplored topic, the qualitative data collection through focus group discussion was taken into consideration (Tashakkori and Teddlie, 1998). Focus groups discussions include group conversation or interview between research participants and people, which is organized for exploring a specific set of issues such as people's opinion, arguments and experience (Morgan, 1996; Barker and Rich, 1992; Zimmerman *et al.*, 1990). Focus group discussion has

been organized with a series of open-ended questionnaire by highlighting factors inflecting farmers to adopt organic farming. In total, four focus group discussions have been conducted. The qualitative data collected from the focus groups have been transcribed and analyzed through thematic analysis. From the discussions, the five major factors influencing the adoption of organic farming in India were derived, which were discussed and validated with the participants of the focus groups. These factors are the economic, social, cultivation, marketing and government support.

In the second phase of the study, a survey questionnaire was developed. In the first section of the questionnaire, the demographic profile of the farmers was enquired. On the basis of the focus group discussion and existing literature, in the second section, we included 25 items on a five-point Likert scale (Likert, 1932; Allen and Seaman, 2007) that ranged from strongly disagree to strongly agree. The respondents were asked to rate their level of agreement and disagreement on the different indicators of the major factors (please refer to Table I for the different indicators under each factor). The questionnaire was administered to collect the primary data from 200 organic farmers located in the northern as well as southern part of India. These farmers were selected randomly from the two major national level farmer's conclaves held in north and south India, i.e., "Kisan Mela" organized by the Bihar Agriculture University, Bihar, which is in the northern part of India and

Factors influenced	Mean	SD	Rank
<i>Economic factor</i>			
Price premium	4.19	0.61	1
High yield/production	3.02	0.736	
Reduce input cost	2.86	0.777	
Overall profitability	3.42	0.621	
Less overall risk	2.65	0.700	
<i>Social factor</i>			
Quality food	4.12	0.536	2
Health benefits	3.89	0.616	6
Avoid chemicals	4.06	0.692	3
Environmental benefits	3.44	0.563	
Collective farming concept	3.68	0.939	
<i>Marketing factor</i>			
Certification benefits	3.80	0.682	8
Assured market/demand	3.63	0.629	
Increasing awareness	3.69	1.009	
Warehousing facility	3.73	0.874	10
Future prospects	4.03	0.746	4
<i>Cultivation factor</i>			
Less irrigation required	2.66	0.645	
Locally available inputs	2.69	0.759	
Less manpower needed	3.42	0.704	
Soil fertility improve	3.36	0.610	
Quality seeds and soil testing	3.74	0.865	9
<i>Govt. policy factor</i>			
Credit/loan facilities	3.61	0.708	
Conversion compensation	3.98	0.705	5
Manure/fertilizer subsidy	3.80	0.785	7
Export opportunity	3.57	0.964	
Technology and training	3.72	0.881	

Table I.
Factors influenced to
adopt organic farming

“Agri Intex” farmer meet in Coimbatore, Tamilnadu, a southern part of the country. Both the conclaves have a representation of farmers from pan India.

The demographic profile of the farmers were classified into four categories such as education level (illiterate, primary, high school, graduation and post-graduation), farm size (small, medium and large scale), farming experience (less, average and high), and land ownership (own land, leased land and both) of the farmers involved in organic farming. The farmers were classified depending on their farm size as per the guideline given by the government of India, i.e., large-scale farmers are those who cultivated land of approximately 10 hectares or above, medium scale farmers cultivated land between 2 and 10 hectares, and small farmers cultivated land of less than 2 hectares. Around 94 percent of the respondents were male, and majority of the respondents were in the age group 41–60 years. Approximately, 91 percent of respondents were married and about 47 percent of respondents were from the joint family type.

Analysis and results

To evaluate the extent of normality of the collected data, skewness and kurtosis values were calculated and the derived value of all the variables were within the recommended range of ± 2 (Cameron, 2004; Trochim and Donnelly, 2006). Reliability analysis was also performed to measure the internal consistency of scales and inter-relatedness of the items (Cortina, 1993; Santos, 1999; Tavakol and Dennick, 2011). Using parametric tools Cronbach's α value was calculated (Cronbach's $\alpha = 0.765$) which is significantly good considering that 0.70 is the cutoff value for being acceptable (Cronbach, 1951; Rosenthal and Rosnow, 1991; George and Mallery, 2003).

To analyze the result, the five factors and the indicators of these factors (i.e. the items pertaining to each factors) have been ranked based on mean and standard deviation. To understand the degree of relationship among the variables zero-order correlation has been used. Further, to analyze the mean difference of motivating factors based on demographic factors – education level, farm size, farming experience and land ownership of the organic farmers, analysis of variance has been applied and accordingly, *post hoc* multi-comparison (Duncan) test has been performed to compare and the major influencing factors within the demographic group.

Preliminary analysis

This section analyzed the factors which influenced farmers to adopt organic farming. Under the head of five major factors, i.e., economic, social, marketing, cultivation and government policy which consists total 25 variables has been Ranked based on mean and standard deviation to understand the influencing factors as below (refer to Table I).

The study found that the mean score of “price premium” (4.19) was high among all variables, as most of the farmers expecting higher returns in organic farming through the price premium of organic produce. Koesling *et al.* (2008) found in survey that organic adopter were attracted for financial reasons and the majority of the farmers might be inclined to convert if the economic benefits are more improved. However, farmers' social concern, including impact on quality food (4.12) and health benefits (3.89) and environmental concern, especially “chemical free farming” (4.06) and future prospects (4.03) of organic farming were also strong motives for them to adopt organic farming.

Karki *et al.* (2011) in his study highlighted that world-wide increasing demand for organic food and the increasing awareness of the environmental and health benefits of organic production are major factors to motivate farmers to adopt organic farming. Further, the present study also found that farmers' expectation from the government, such as conversion compensation (3.98) and organic fertilizer subsidies (3.80) were influenced farmers to adopt organic farming. Moreover, finding revealed that the training provided to

them were also the major driving factors in adopting organic farming. However, the gap between farmers' expectation which influenced them to adopt organic farming and their actual attainment could be a matter of further research.

Next, the five major factors have been ranked on the basis of its mean value to understand the most important and least important factors which influence the adoption of organic farming (refer to Table II).

The study revealed that all together social factors found to be major influencing factors followed by marketing and government policy to adopt organic farming. However, in the price premium among all the indicators was found to be the major driving factors which lead to adoption of organic farming.

Subsequent to this, zero-order correlation between the major factors was calculated. The result indicated a strong positive relationship between government policy with marketing factor ($r = 0.720$) and the moderate positive relationship between government policy with cultivation factor ($r = 0.520$) and social factor with marketing ($r = 0.543$). Further, result also revealed that there is no relationship between economic factors with social factor (refer to Table III).

Secondary analysis

To understand the difference between the demographic categories of the organic farmers and the major adoption factors that influenced the farmers to move toward organic farming, multinomial logistics regression analysis has been done. The four major categories based on demographic profile of the farmers education level, farm size, farming experience and land ownership are considered as dependent variable (please refer to Table IV) and the five major adoption factors are taken as independent variables.

Education level and adoption of organic farming

Educational attainment in this study region among the farmers was reported very less. Demographic table shows that around 40 percent farmers' educational qualification were below the high school, however, it is found that the training provided to the farmers play a very pivotal role in understanding the importance of organic food and farming and adopting new technologies. In this study, farmers based on their educational attainment were categorized into

Table II.
Major Factors
influenced to adopt
organic farming

Factors	Mean	SD	Rank	Major variables
Social	19.19	2.052	1	Quality food
Marketing	18.87	2.303	2	Future prospects
Govt. policy	18.66	2.337	3	Conversion compensation
Economic	16.15	1.656	4	Premium price
Cultivation	15.86	1.710	5	Quality seeds and soil testing

Table III.
Correlation between
factors influenced to
adopt organic farming

Factors	Economic	Social	Marketing	Cultivation	Govt. policy
Economic	1				
Social	0.100	1			
Marketing	0.253**	0.543**	1		
Cultivation	0.219**	0.332**	0.479**	1	
Govt. policy	0.305**	0.238**	0.720**	0.520**	1

Notes: $n = 200$. **Correlation is significant at the 0.01 level (two-tailed)

Demographic levels	Count	%
<i>Educational qualification</i>		
Illiterate	26	13.0
Primary	48	24.0
High school	81	40.5
Graduation	33	16.5
Post-graduation	12	6.0
<i>Scale of farmers (Land)</i>		
Small farmers	114	57.0
Medium farmers	64	32.0
Large farmers	22	11.0
<i>Farming experience</i>		
Less experience	54	27.0
Average experience	62	31.0
High experience	84	42.0
<i>Types of cultivating land</i>		
Own land	119	59.5
Leased land	18	9.0
Both own and lease	63	31.5

Table IV.
Demographic levels of the farmers

five different groups, i.e., illiterate, primary, high school, graduation and post-graduate. Multinomial logistic regression (MLR) has been applied with five major factors to understand the influence of farmers with different educational levels in adopting organic farming.

Following hypothesis has been framed based on educational attainment of the organic farmers and different factors influenced in adopting organic farming:

- H1.* There is a significant difference between education levels and adoption of organic farming with respect to the major factors of adoption.

The analysis through MLR revealed (refer to Table V) that farmers with primary level of education are less likely to influence by social ($\beta = -1.389$; $p < 0.10$) and government policy ($\beta = -2.320$; $p < 0.05$) factors than the illiterate farmers. Whereas, they are more likely to influence by marketing ($\beta = 2.763$; $p < 0.05$) factor. Similarly, farmers with high school education level, analysis shows that they are more likely to influence by marketing ($\beta = 1.503$; $p < 0.10$) factor, whereas, government policy ($\beta = -2.876$; $p < 0.05$) factor seems to be less influence for them while comparing with illiterate farmers.

Also, marketing ($\beta = 4.429$; $p < 0.05$) and cultivation ($\beta = 2.256$; $p < 0.05$) factors shows that graduate level farmers were more influenced, whereas, in case of the factor related to the government policy ($\beta = -5.499$; $p < 0.10$) it was found that illiterate farmers were more inclined toward adoption of organic farming than graduate level farmers.

Further, the analysis also revealed that social ($\beta = 3.324$; $p < 0.10$) and marketing ($\beta = 7.944$; $p < 0.05$) factors were significantly more important for the post-graduate level farmers than the illiterates. However, there was no significant difference between illiterate and post graduate level farmers as far as economic, cultivation and government policy factors are concerned.

It is interesting to notice that the economic factors were not having different influence on the farmers toward adoption of organic farming among the different educational level of the farmers. The results also indicate that irrespective of any level of education, farmers are having similar opinions on economic aspect as far as adoption of organic farming concern. It was also observed that government policy factor was having more influence on illiterate farmers toward adoption than other categories of farmers.

Educational qualification ^a	OR	Coef.	SE	<i>p</i> > <i>z</i>
<i>Primary</i>				
Economic factor	0.604	-0.504	0.823	0.541
Social factor	0.249	-1.389	0.825	0.092
Marketing factor	15.850	2.763	0.996	0.006
Cultivation factor	0.767	-0.266	0.867	0.759
Govt. policy factor	0.098	-2.320	0.949	0.014
<i>High school</i>				
Economic factor	0.734	-0.309	0.767	0.687
Social factor	0.552	-0.593	0.744	0.425
Marketing factor	4.494	1.503	0.898	0.094
Cultivation factor	2.968	1.088	0.805	0.177
Govt. policy factor	0.056	-2.876	0.904	0.001
<i>Graduation</i>				
Economic factor	0.401	-0.913	0.949	0.336
Social factor	1.900	0.642	0.959	0.503
Marketing factor	83.820	4.429	1.205	0.000
Cultivation factor	9.546	2.256	1.121	0.044
Govt. policy factor	0.004	-5.499	1.170	0.000
<i>Post-graduation</i>				
Economic factor	0.126	-2.074	1.508	0.169
Social factor	27.762	3.324	1.770	0.060
Marketing factor	2,818.920	7.944	2.692	0.003
Cultivation factor	1.059	0.058	2.251	0.980
Govt. policy factor	0.095	-2.356	1.699	0.166

Notes: ^aThe reference category is: illiterate; number of obs. = 200, LR χ^2 (20) = 110.27, Log likelihood = 450.2, Prob. > χ^2 = 0.000, Pseudo R^2 = 0.449

Table V.
Coefficients in
multinomial logistic
regression for
educational
qualification

Farm size and adoption of organic farming

In this section, farmers have been classified into three different groups based on their land holding and MLR has been used to analyze the differences in adoption of organic farming with respect to the major adoption factors. Following hypothesis has been framed to examine the same:

H2. There is a significant difference between the levels farm size and adoption of organic farming with respect to the major factors of adoption.

The MLR table (refer to Table VI) revealed that the government policy ($\beta = 1.519$; $p < 0.10$) factor has influenced the adoption of organic farming of the small-scale farmers more than the large-scale farmers. Similarly, medium scale ($\beta = 1.793$; $p < 0.05$) farmers was also more likely to influence by the government policy factor. Whereas, with respect to the marketing factor ($\beta = -1.840$; $p < 0.10$), medium scale farmers were less influenced than the large-scale farmers. Other than these two factors there was no significant difference between small, medium and large-scale farmers with respect to the other three factors.

Farming experience and adoption of organic farming

In this section, farmers have been classified into three different categories based on their farming experiences (less, average and high) and MLR has been applied to understand the significant differences in the classified group with respect to the major adoption factors. Following hypothesis has been framed to examine the same:

H3. There is a significant difference between the levels of farming experience and adoption of organic farming with respect to the major factors of adoption.

Scale of farmers (Land) ^a	OR	Coef.	SE	$p > z$
<i>Small farmers</i>				
Economic factor	0.507	-0.680	0.758	0.370
Social factor	0.422	-0.863	0.739	0.243
Marketing factor	0.322	-1.132	0.934	0.226
Cultivation factor	0.480	-0.734	0.922	0.426
Govt. policy factor	4.568	1.519	0.850	0.074
<i>Medium farmers</i>				
Economic factor	0.587	-0.533	0.786	0.498
Social factor	1.169	0.156	0.781	0.842
Marketing factor	0.159	-1.840	0.992	0.064
Cultivation factor	1.102	0.097	0.973	0.921
Govt. policy factor	6.010	1.793	0.900	0.046

Notes: ^aThe reference category is: large farmers; number of obs.=200, LR χ^2 (10)=16.895, Log likelihood = 333.571, Prob. χ^2 = 0.07, Pseudo R^2 = 0.10

Table VI.
Coefficients in multinomial logistic regression for scale of farmers

With respect to the different levels of farming experiences and the major factors influencing the adoption of organic farming, the result of MLR (refer to Table VII) suggest that the average experience farmers were more likely to get influenced by social ($\beta = 2.441$; $p < 0.01$) and government policy ($\beta = 1.543$; $p < 0.05$) factors than less experienced farmers, whereas, marketing ($\beta = -1.712$; $p < 0.05$) factor found to be highly influenced for farmers having less experience. In case of highly experienced farmers, government policy ($\beta = 1.310$; $p < 0.05$) factor has significantly influenced more toward adoption of organic farming than farmers having less experience, whereas, marketing ($\beta = -1.439$; $p < 0.05$) factors found to be more influencing for less experience farmers. It was also observed that economic and cultivation factors were not having significantly different influence to the different levels of experiences. It may be concluded that those who are new to the organic farming were influenced more by the marketing factor and less influenced by the government policy.

Land ownership and adoption of organic farming

In this last section, the farmers have been classified based on the ownership of the land (own, leased and both) to examine the significant differences with respect to major

Farming experience ^a	OR	Coef.	SE	$p > z$
<i>Average experience</i>				
Economic factor	1.224	0.202	0.622	0.745
Social factor	11.486	2.441	0.667	0.000
Marketing factor	0.181	-1.712	0.777	0.028
Cultivation factor	0.463	-0.770	0.714	0.281
Govt. policy factor	4.678	1.543	0.702	0.028
<i>High experience</i>				
Economic factor	1.598	0.469	0.573	0.413
Social factor	2.298	0.832	0.572	0.146
Marketing factor	0.237	-1.439	0.704	0.041
Cultivation factor	0.894	-0.112	0.635	0.861
Govt. policy factor	3.704	1.310	0.633	0.039

Notes: ^aThe reference category is: less experience; number of obs.=200, LR χ^2 (10)=21.930, Log likelihood = 381.566, Prob. χ^2 = 0.015, Pseudo R^2 = 0.117

Table VII.
Coefficients in multinomial logistic regression for farming experience

factors toward adoption of organic farming. Following hypothesis has been framed to test the same:

H4. There is a significant difference between the types of farmer's land ownership and adoption of organic farming with respect to the major factors of adoption.

The MLR analysis revealed (refer to Table VIII) that social ($\beta = 1.638$; $p < 0.05$) factors were influencing more to the farmers who are cultivating their own farm land, as well as leased land, whereas, economic ($\beta = -2.074$; $p < 0.05$) factor likely to influence less in adoption of organic farming for the farmers who were cultivating only the leased farm land. The other major factors were not found not having differential impact.

Discussion

The main purpose of this study was to empirically investigate the differential impact of economic, social, marketing, government policy and cultivation factors on the adoption of organic farming in India with respect to farmers belonging to different categories. The farmers were categorized into different types on the basis of four demographic factors – educational level, farm size, farming experience and land ownership. The results indicated that marketing factor and government policy have significant impact on the adoption of organic farming, irrespective of their levels of educational qualification. The findings are inconsistent with the findings of Rezvanfar and Olhan (2011), Soltani *et al.* (2014) and McBride and Greene (2007), who confirmed that the government supports in the form of conversion subsidies needed to promote organic farming. Similarly, the result obtained validates that marketing factors such as increasing awareness and market demand will enhance the production of organic produce (Chakrabarti, 2010; Gandhi and Zhou, 2014). Furthermore, the findings of this study even provide the magnitude of the differential impact of these factors on the farmers having different levels of education.

Further, the study provides an evidence-based result that medium and large-scale farmers are more aware of the marketing related factors such as market demands, warehouse facility, future prospects and certification benefits than the small-scale farmers. The result obtained justifies the suggestion provided by Kshirsagar (2008) that government should provide training to the farmers, who are small and new to make them knowledgeable, skilled and efficient in production, processing and marketing of their products.

Types of cultivating land ^a	OR	Coef.	SE	$p > z$
<i>Own land</i>				
Economic factor	0.278	-1.280	0.871	0.142
Social factor	2.431	0.888	0.749	0.236
Marketing factor	1.008	0.008	0.920	0.993
Cultivation factor	2.859	1.050	0.911	0.249
Govt. policy factor	1.488	0.397	0.895	0.657
<i>Both own and lease</i>				
Economic factor	0.126	-2.074	0.931	0.026
Social factor	5.143	1.638	0.822	0.046
Marketing factor	0.708	-0.345	0.988	0.727
Cultivation factor	2.341	0.851	0.973	0.382
Govt. policy factor	1.197	0.180	0.953	0.850

Notes: ^aThe reference category is: leased land; number of obs. = 200, LR χ^2 (10) = 16.163, Log likelihood = 322.538, Prob. χ^2 = 0.09, Pseudo R^2 = 0.10

Table VIII.
Coefficients in
multinomial logistic
regression for types
of cultivating land

Moreover, it was found that farmers with experience of more than ten years (i.e. average and highly experienced farmers) are more concerned about the social factors like quality of food, health benefits, environmental benefits and the benefits about collecting farming. The reasons for the same could be that they have received the required support and training from the government and other bodies and have gradually become more aware of the market opportunities. The present study is one of the preliminary studies that provide empirical evidence about farmers who are more experienced are more likely to move toward understanding the socio-environmental benefits of organic farming.

It has been seen that farmers using leased land are more concerned about the economic factors such as price premium, high yields and overall profitability from the organic produce than farmers with own farming land. The reason could be that they are bound to pay the lease amount and hence are more concerned about price obtained and profits gained. The study suggests that more support and aid from government and other bodies are required to motivate and promote organic farming among farmers, who are not having their own land of cultivation, as it has been observed that most of the government benefits such as agriculture loan, Kisan credit cards and others are enjoyed by farmers with own farming land (DACFW, n.d.).

Implications and future research

Most of the farmers in India fall under the marginal and small categories with smaller income levels (Singh, 2000). The continuation of agriculture as a profession highly depends on the government's initiatives. The findings of our study are useful for policymakers such as government bodies and its associates and further suggest that more interventions and support are required by the government and policymakers to augment organic farming among small farmers, who do not have their own farming land. The findings also create a need to provide more training and awareness programs to new and less experienced farmers so that they get more accustomed to and are aware of the different marketing, economic and social factors.

In the rural areas of India, illiteracy is another major obstacle that has lowered the awareness levels among farmers on various issues such as negotiation, demand estimation, price determination. Proper training to the underprivileged and less educated farmers will help them to understand not only their legitimate rights in formidable circumstances, but will also make them less susceptible to the unfair trade practices followed by middlemen. Education and training to these marginalized groups will enable them to be open to newer avenues such as community-based farming, better leveraging of government policies and new initiatives and embracing alternative farming methods such as organic farming.

The study is limited to the empirical investigation of various factors, which influenced farmers to adopt organic farming in India. It can be extended to the barriers and challenges such as marketing challenges, price premium, certification issues, warehousing problems, proper training, development, etc., faced by farmers after adoption of organic farming; the analysis of these barriers will ensure their stability in pursuing organic farming. An exclusive study can also be conducted to explore the accessibility of various government supports for organic producers such as conversion compensation, organic manure subsidies, warehousing facility, certification supports, etc. The study will help the government to reconsider the issue of minimum support price for organic food and to establish green market (Organic Mandi) with the help of district agriculture officers in India. Further, the study can also be extended to the different types of crops for analyzing the productivity and profitability of organic and conventional farming in India.

Conclusion

Economic viability and sustainable livelihood of the farmers have been major concern in the study. Therefore, the adoption of organic farming was much dependent on the passage of government agencies. The government should encourage farmers by providing them conversion compensation to adopt organic agriculture, which normally takes three years to become fully certified organic farming. The government department dealing with environmental issues should collaborate with the agricultural sector to promote organic farming, as Läßle and Van Rensburg (2011) highlighted that environmental attitude is a vital characteristic for the adoption of organic farming; therefore, the aim of any further policy changes and strategies should focus on the positive impact of organic farming on the environment. Padel (2001) emphasized that organic farming should be focused on environmental benefit and motivate farmers to adopt organic farming for evaluating financial aspect. Rana *et al.* (2012) found that the incompetence to access a credit or loan from an institution made farmers less inclined toward organic farming and the lack of governmental support has become a major roadblock in adoption. The study further revealed that farmer's expectation of getting price premium and the future prospect seems to be crucial influenced factors. Therefore, the government should provide a separate market for organic products and advertisement through various media for the promotion of organic food so that farmers can easily get price premium. Thapa and Rattanasuteerakul (2011) stated that the expectation from farmers to adopt organic farming on large scale cannot be possible unless price incentive is offered for their organic produce.

The study concludes that without government support, the promotion and adoption of organic farming is a challenging task because majority of the farmers fall under the small and marginal categories. Knowledge-based training to the farmers, consumer awareness program, certification issues, availability of organic input, separate market for organic products, community-based farming and conversion compensation should be the primary focus for encouraging farmers to adopt organic farming. Further, the conversion to organic farming depends on productivity and profitability, which differs in various aspects such as soil condition, type of soil and crops cultivated, timely irrigation, climate differences, expertise in organic farming and market price. Therefore, the government should invest in research and development to carry extensive research in a different perspective related to organic farming for understanding the economic and sustainable viability.

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