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# Farmers' preference for adoption of Organic farming in Bihar

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## ABSTRACT

Social scientists pursue sincere efforts to identify the preferential variables of cultivators responsible for adoption of modern cultivation practices. The present paper attempts to identify the important variables of preference towards organic farming. The farmers were categorized on the basis of land holdings and their preferences for adoption were recorded. Different constraints in adopting organic farming were treated as attitude statement and their agreement with these statements were recorded on 5-point Likert scale. Differences in agreement towards various constraints as well as differences in ranks of criteria for adopting organic farming across different groups of farmers were assessed using Kruskal Wallis ANOVA followed by Wilcoxon's procedure to analyze pairwise differences .Factors like low yield, high labour requirement, unavailability of proper market were observed to play deterrent role in adoption. Some of the advantages associated with organic farming like less contamination of nutrients, environment friendly, value addition etc. were observed to be relatively less important motivating factors to adopt organic farming, specially by small and medium farmers which indicates that the profitability is of much higher concern for them to sustain organic farming as compared to its other environmental and health benefits.

**Keywords** : Farmers preference, Behaviour, Adoption, Organic farming

## INTRODUCTION

With fast changing agricultural technology from conventional methods to modern specific methods and techniques, one of the major problems is the inadequate transfer of technology in adoptable form at the correct time. Adoption of improved cultivation practices by the farmers varies from one farmer to another depending upon their situation (Sharma and Singh 2016). These adoption decisions have been of particular interest given their spill-over effects beyond the farm gate and their impacts on agricultural development (Howley *et al.*, 2012). Numerous studies have been carried out with particular emphasis on the factors that influence or more specifically constrain, adoption decisions. Viewed through a broad cross disciplinary lens, there is agreement that the adoption of agricultural technology depends on a range of personal, social, cultural and economic factors, as well as on the characteristics of the innovation itself (Pannell *et al.*, 2006).The importance of farmers' adoption of new agricultural technology has long been of interest to agricultural extension workers and economists (Ali, 2013). Agricultural economics literature on technology adoption has emphasized ther ole of fixed and variable costs and heterogeneity, whether in terms of structural farm factors such as size or land quality, or the characteristics of farmers in terms of human capital. There is a need to know more about the preferential behavior of farmers to understand the dynamics of various factors at play for adoption of new cultivation practices (Suman 2014). The fact that the farmers are diverse, have different motivations for farming and, therefore, behave differently when facing similar situations has given rise to several theories on farmers' decision making. Fulginiti and Perrin (1993) showed a positive relationship between past output prices and current productivity, while Miller and Tolley (1989) observed that market interventions such as price supports can speed up the adoption of new technologies.

Society's growing awareness for the health of people and the environment has sparked new interest in organic approach to agriculture with an aim to protect environment, plants, animals and people without polluting the soil, water or air. Currently, India ranks 33rd in terms of total land under organic cultivation and 88th in agricultural land under organic crops to total farming area (Reddy, 2010). There has been lot of debate in recent years about the feasibility of organic farming under Indian condition. The most often debated questions related to organic farming include its production potential, economic feasibility, possible environmental benefits like improved soil quality and health (Ramesh *et al.*, 2010). Organic farming is an intensive process, limited mostly to resource-rich farmers, and the export market and depends heavily on external support systems for price, market intelligence and certification of produce, among others (Sanghi, 2007).

Among several issues related with organic farming, its certification process constrain smallholders and resource-poor farmers to afford its cost; they are illiterate and unable to maintain necessary records, or may be using indigenous cultivation systems not recognized in organic certification systems. While extension activities have demonstrated organic farming techniques, such as vermi-composting and improved composting of farm yard manure, to some farming

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communities, still adoption by farmers has been limited and slow. Beyond extension service activities a more thorough understanding of farmer constraints to adopting organic farming needs to be achieved to determine incentives to motivate them. It requires improved understanding of the importance of attributes on farmer behaviour such as a) willingness to commit land to organic farming; b) access to higher organic crop prices through certification channels; c) farmers' willingness to act collectively to reduce certification transaction costs; d) input prices and e) increased labour effort (Reddy, 2010). In this backdrop, this study was undertaken to identify important constraints and motivating factors as perceived by farmers to adopt organic farming with an aim to help extension workers to develop more realistic and customized training module for different stakeholders at district and state level.

## MATERIALS AND METHODS

Pusa block of Samastipur district in Bihar was selected purposively. Two villages, Dighra and Pusa were selected randomly. A total of hundred farmers, 57 in Dighra and 43 in Pusa were interviewed. Predefining groups is appropriate when the primary interest is describing differentiated farmer types or farms (Byrne *et al.*, 2012). The farmers selected in sample were categorized in three groups based on their land holding size as small (< 1 ha), medium (1-2 ha) and large (> 2 ha). Different constraints in adopting organic farming were identified on the basis of preliminary round of discussion with farmers and other stakeholders. The criteria preferred by the farmers while adopting organic farming were assessed. Martin *et al.* (2015) Structured questionnaire was used to elicit responses of farmers towards each criteria as well as constraint. Each constraint was treated as attitude statement and to capture farmers' attitudes, they were asked the extent of their agreement with these statements. Attitude statements for the constraints were measured using a 5-point Likertscale , (Likert, 1932) with 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4= Agree and 5 = Strongly Agree. The attitudes are measured by asking people to respond to a series of statements about a topic, in terms of the extent to which they agree with them. It uses fixed choice response formats to measure attitudes or opinions. This kind of approach is widely used in the analysis of people's attitudes in psychometric studies (Mellor and Moore, 2014). The importance that farmers gave to different criteria (nine) while choosing organic farming was assessed by asking to rank predefined set of criteria 1 (most important) to 9 (least important). The criteria used were lower input cost, more economical, less dependence on money lenders, allows to use traditional knowledge, disease and pest resistance, drought resistance, added value, less nutrient contamination and environment friendly. The prioritization of constraints and the importance of different criteria for adopting organic farming were obtained by farmers ranking (Dao *et al.*, 2015).

The rank data violates the assumption of normality and hence non-parametric method Kruskal Wallis ANOVA (Martin *et al.*, 2015) is used to analyze the differences in agreement towards various constraints as well as differences in ranks of criteria for adopting organic farming across different groups of farmers. It is used to compare two or more independent samples and tests whether the mean ranks are same in all the groups. As post hoc test for Kruskal Wallis (KW) ANOVA, Wilcoxon procedure (Martin *et al.*, 2015), a non-parametric alternative to parametric t-test, is used for multiple comparisons to further investigate pair wise differences among groups of farmers.

## RESULTS AND DISCUSSION

All respondents were male farmers with mean age 46.5 years. More than half of the respondents were medium farmers with land holding size 1-2 hectares (Bharati *et al.*, 2014).The study indicated ten factors that constrain the farmers to adopt organic farming. Prioritization of the constraints was based on severity and frequency of occurrence of the constraint (Reddy, 2010).

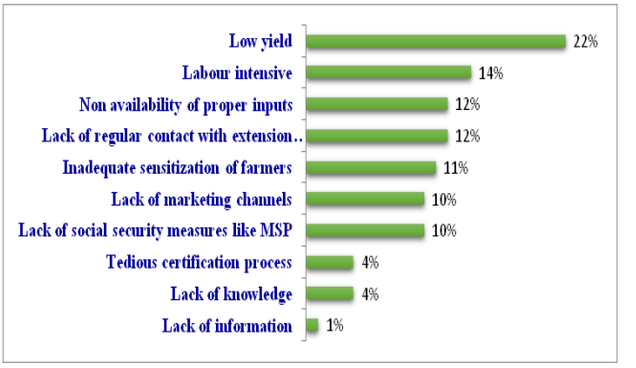


Fig 1: Prioritization of constraints for adopting organic farming

As per fig. 1, low yield was indicated as the most important deterrent factor by majority of farmers followed by it being labour intensive and non availability of inputs. Irregular contact with extension workers and inadequate sensitization of farmers was also observed as an important limiting factor for farmers to adopt organic farming. Lack of information and knowledge were observed to be a constraint by a handful of farmers only. Kruskal Wallis ANOVA showed small farmers to be more in agreement with lack of information as compared to other two groups. The differences in agreement across different groups of farmers for the constraints viz., low yield and lack of markets were found to be highly significant. Wilcoxon test further revealed that small and marginal farmers responded similarly with respect to these two constraints but differed significantly with that of large farmers. Farmers across different groups were observed to have similar level of agreement with the constraints like lack of social security measures and tedious certification process.

### Prioritization of Factors in favour of Organic Farming

Figure 2 describes the importance that the farmers gave to different criteria while adopting organic farming. The most preferred criteria for adopting organic farming were lower input cost followed by more economical and less dependence on money lenders. The farmers also think of organic farming as an opportunity to use their abundant traditional knowledge. The superiority of organic plants in terms of tolerance to drought and pest-insects is also considered to be

Table1: Farmers' attitudes towards constraints for adopting organic farming

| Constraints | All farmers | Farmer type | | | KW ANOVA |
|---|---|---|---|---|---|
| | | Marginal | Small | Large | p-value |
| Lack of information | 3.5 ± 0.05 | $4.5^{a}$ ± 0.06 | $3.9^{b}$ ± 0.07 | $2.5^{c}$ ± 0.08 | * |
| Lack of knowledge | 2.6 ± 0.04 | 4.2 ± 0.04 | 3.5 ± 0.07 | 3.7 ± 0.05 | 0.12 |
| Lack of marketing | 4.2 ± 0.05 | $3.7^{a}$ ± 0.03 | $3.5^{b}$ ± 0.04 | $3.9^{ac}$ ± 0.03 | ** |
| Low yield | 4.0 ± 0.05 | $4.5^{a}$ ± 0.06 | $4.0^{b}$ ± 0.04 | $3.9^{bc}$ ± 0.08 | ** |
| Labour intensive | 3.8 ± 0.03 | 3.9 ± 0.07 | 4.0 ± 0.08 | 3.5 ± 0.07 | 0.69 |
| Lack of regular contact with extension workers | 3.0 ± 0.06 | 4.5 ± 0.06 | 3.7 ± 0.05 | 3.5 ± 0.08 | 0.33 |
| Non availability of proper inputs | 3.5 ± 0.07 | $4.3^{a}$ ± 0.06 | $3.9^{ab}$ ± 0.07 | $2.5^{c}$ ± 0.08 | * |
| Inadequate sensitization of farmers | 4.5 ± 0.04 | $4.2^{a}$ ± 0.04 | $4.0^{b}$ ± 0.05 | $3.5^{c}$ ± 0.08 | * |
| Lack of social security measures like MSP | 4.6 ± 0.05 | 4.0 ± 0.06 | 4.3 ± 0.07 | 4.0 ± 0.05 | 0.21 |
| Tedious certification process | 3.5 ± 0.06 | 3.5 ± 0.06 | 3.9 ± 0.05 | 4.5 ± 0.08 | 0.13 |

**Note:** Means within a row with different subscripts differ according to Wilcoxon test. Mean agreement ±SE, measured with a Likert Scale from 1 (strongly disagree) to 5 (strongly agree); *p<0.05, **p<0.01

Table 2: Mean Rank Values for Preferred Criteria for Adopting Organic Farming

| Criteria | All farmers | Farmer type | | | KW ANOVA |
|---|---|---|---|---|---|
| | | Marginal | Small | Large | p-value |
| Lower input cost | 3.5 ± 0.72 | **$2.2^{c}$ ± 0.97** | $3.2^{ab}$ ± 0.45 | $5.2^{a}$ ± 0.84 | * |
| More economical | 4.2 ± 0.65 | 3.5 ± 0.56 | 4.6 ± 0.75 | 4.0 ± 0.45 | 0.45 |
| Less dependence on money lenders | 3.8 ± 0.74 | $3.8^{ab}$ ± 0.93 | **$2.9^{a}$ ± 0.66** | $7.1^{c}$ ± 0.95 | * |
| Allows to use traditional knowledge | 4.2 ± 0.05 | $4.1^{a}$ ± 0.78 | $3.9^{ab}$ ± 0.95 | $7.0^{c}$ ± 0.83 | ** |
| Disease and Pest Resistance | 5.0 ± 0.65 | 6.9 ± 0.38 | 5.7 ± 0.54 | 2.5 ± 0.53 | 0.19 |
| Drought Resistance | 5.8 ± 0.86 | $6.7^{c}$ ± 0.94 | $5.3^{a}$ ± 0.64 | $3.5^{b}$ ± 0.69 | * |
| Added Value | 6.8 ± 0.59 | $7.1^{b}$ ± 0.76 | $5.5^{b}$ ± 0.85 | $6.4^{a}$ ± 0.72 | * |
| Less nutrient contamination | 5.7 ± 0.96 | 8.1 ± 0.86 | 7.2 ± 0.86 | 2.5 ± 0.78 | 0.26 |
| Environment Friendly | 4.9 ± 0.96 | 6.9 ± 0.88 | 6.9 ± 0.53 | **2.2 ± 0.58** | 0.31 |

**Note:** Means within a row with different subscripts differ according to Wilcoxon test. Mean agreement ±SE, measured with a Likert Scale from 1 (strongly disagree) to 5 (strongly agree); *p<0.05, **p<0.01

quite important factor for adoption. Very less number of farmer's perceives less nutrient contamination and environment friendly as important criteria to adopt organic farming. Overall the mean rank of lower input cost was observed to be the lowest thus indicating it to be the most important criteria as perceived by farmers for adopting organic farming. Kruskal-Wallis ANOVA showed no difference in ranking across different groups (Martin et al., 2015).

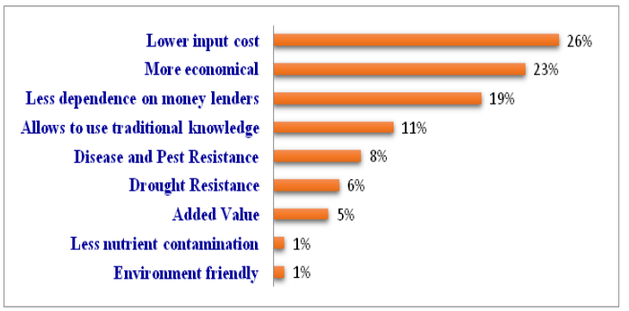


Fig 2: Prioritization of factors in favour of organic farming

The results of Kruskal Wallis ANOVA have been summarized in Table 2. The preferences for criteria like more economical, less dependence on money lenders, use of traditional knowledge, value addition and environment friendly were observed to differ across different groups. The Wilcoxon test revealed difference in the pattern of responses was same for marginal farmers and small farmers whereas both differed significantly from that of large farmers.

The constraints that the farmers face were observed to be homogeneous across the different groups of farmers whereas there were some visible patterns with respect to their opinion about the factors that may motivate them to adopt organic farming. Factors such as farm size were expected to explain some of the variability in farmers' attitude towards organic farming and some of the motivating criteria were observed to have significant differences across different groups. Other socio-cultural factors, such as education and income, have been found to influence farmer attitudes, preferences and decision making (Ogunsumi and Omobolanle, 2011; Singha and Devi, 2013). These factors were not included in this study

because they were initially thought to be of reduced importance in view of the fact that organic farming is still not popular in Bihar irrespective of farmers' background. However, further study may be undertaken considering wider farmer sociocultural features.

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