Problems of conversion to organic farming: A qualitative analysis

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ABSTRACT

The purpose of this study was to understand the problems farmers face in converting to organic farming. The arid, semi-arid, and drought-affected regions are emphasized for promotion of organic farming. The present work, hence, was done in a semi-arid drought-prone region of north-central India. It analyzed farmers' perception about organic farming and their experiences with it. The study was based on the narrative approach. Research participants were selected from such villages where organic farming was being promoted by a non-governmental organization. Two groups of farmers (adopters and non-adopters) were selected from five villages. Data was collected through direct interviews using a semi-structured survey schedule. Participants' narratives were coded using thematic analysis technique. Three themes were found to prevent organic conversion- economic vulnerability, scarcity of organic inputs, and lack of proper information. While the first two themes were critical for both groups of farmers, the non-adopters also experienced limited organic know-how. The study proposes following interventions for convenient adoption of organic farming- economic incentives for the transition period, more robust awareness campaigns, and suitable package of practices for growing organic crops.

Keywords: conversion, narratives, organic farming, qualitative research, thematic analysis.

INTRODUCTION

Organic farming is widely regarded as a sustainable agricultural strategy. The declining soil fertility, pollution of land & water resources and loss of biodiversity as a result of unbalanced use of chemical inputs in farming have caused heightened demand for adoption of organic practices. In India, organic farming is still at its infant stage. Only two percent of the country's total cropped area was organic in 2020 (Khurana and Kumar, 2020). Several programmes have been launched at the national level for promotion of organic farming, such as the National Programme for Organic Production (2004-05) and the *Paramparagat Krishi Vikas Yojna* (2015-16). However, except few Indian States, the adoption of organic farming has been insignificant, and far from becoming a mass movement in the country (Gupta et al., 2021; Khurana & Kumar, 2020). It is argued that top-down agricultural policies may experience setbacks as they might not consider local geographies such as bio-physical environment, social norms, etc. (Sandhu, 2021). Research has shown that organic farming is more likely to be adopted if promotional activities are conducted by raising issues relevant to the farmers' experiences and knowledge (Adebiyi et al., 2020). Argument is placed for more context-specific studies of farmers' experiences with organic farming so that local adoption factors can be understood and addressed. La¨pple & Kelley (2014) state that farmers' adoption decisions should not be assumed as uniform because they do not represent "homogeneous groups". The knowledge & perception of organic farming, and resources available to a farming community are critical to organic conversion

(Ashari et al., 2016; De cock, 2005; Herath & Wijekoon, 2013; Rezvanfar et al., 2011; Ullah et al., 2015). Besides, farmers of one region may have more impacts on the environment through agricultural activities than others, and thus, decisions to convert may be affected by "disproportionality of environmental problems" or differing "environmental sensitivity" (Reimer et al., 2012).

Qualitative research can act as a useful instrument for studying problems behind organic conversion in an in-depth manner, for finding crucial conversion factors and understanding the interrelationships among such factors.

Review of Literature

Several studies in the past have dealt with problems of organic farming adoption. The factors which are found critical in this regard are bio-physical, socio-economic and behavioral in nature. Harris et al. (1997) concluded that the degree of intensification of the farming system affected organic farming adoption. Koner & Laha (2019) found that yield losses under organic system were greater in a high chemical-intensive district as compared to a low chemical-intensive district in the Indian State of West Bengal. Studies by the Indian Council of Agricultural Research between 2004 and 2019 at different agro-climatic zones across India gave favourable results for organic approaches in comparison to chemical-based farming (Khurana et al., 2022). The socio-economic factors of conversion have been considered in earlier studies. Majority of such works are based on quantitative research techniques. Farmers' education (S. Azam & Banumathi, 2015; Kerdsriserm et al., 2016; Peter Silas, 2008; Pradhan et al., 2017; Rahman & Yamao, 2007) training in organic farming (Métouolé Méda et al., 2018; Sapbamrer & Thammachai, 2021), social capital (Acs, 2006; Alotaibi et al., 2021; Rahman & Yamao, 2007) and availability of resources such as market (Beauchesne & Bryant, 1999; Bravo-Monroy et al., 2016; Offermann & Nieberg, 2000), farm size (Biswas et al., 2011; Khaledi et al., 2010; Läpple & Rensburg, 2011; Latruffe & Nauges, 2014), livestock units (Kisaka-Lwayo, 2007), organic materials (Harris et al., 1997; Sivaraj, 2017), labour (Eyhorn et al., 2007; Harris et al., 1997) are found as affecting organic conversion. However, it is noted in several review studies that many of the socio-economic factors have inconsistent relation with adoption of organic farming (Sapbamrer & Thammachai, 2021) and other sustainable farming practices (Knowler & Bradshaw, 2007; Prokopy et al., 2008). Behavioral factors such as favorable environmental attitudes are, however, found aiding in the conversion process generally. (Alotaibi et al., 2021; De Cock, 2005; Prokopy et al., 2008; Risgaard et al., 2007). Hence, researchers have also emphasized on the consideration of local conditions that may influence adoption (Knowler & Bradshaw, 2007; Reimer et al., 2012). Qualitative research allows us to incorporate the diverse perspectives of research participants, and to explore the complex interrelationships between factors that surround a research problem (Creswell & Creswell, 2018). Hence, this approach may be useful to understand the general and localized elements of organic conversion. There have been attempts at understanding organic farming conversion through qualitative approach (Alotaibi et al., 2021; Knowler & Bradshaw, 2007; Risgaard et al., 2007). However, such studies are fewer in number, and more case-specific accounts are required to solve conversion problems in different areas, such as drought-affected areas of India.

METHODOLOGY

Research Approach

The narrative approach is adopted for this study. Narrative research has been identified as a suitable method when the research problem is to "tell the *stories* of individual experiences" (Creswell & Poth, 2018). Reissman (2008) has classified narratives into two types- i) brief descriptions shared by participants for a single question asked and, ii) longer narrations of participants describing their entire lives or careers. For the present work, farmers' narratives obtained in response to a single focused question ("What are the problems of conversion to organic farming?") have served as the primary data source.

Study Area Selection

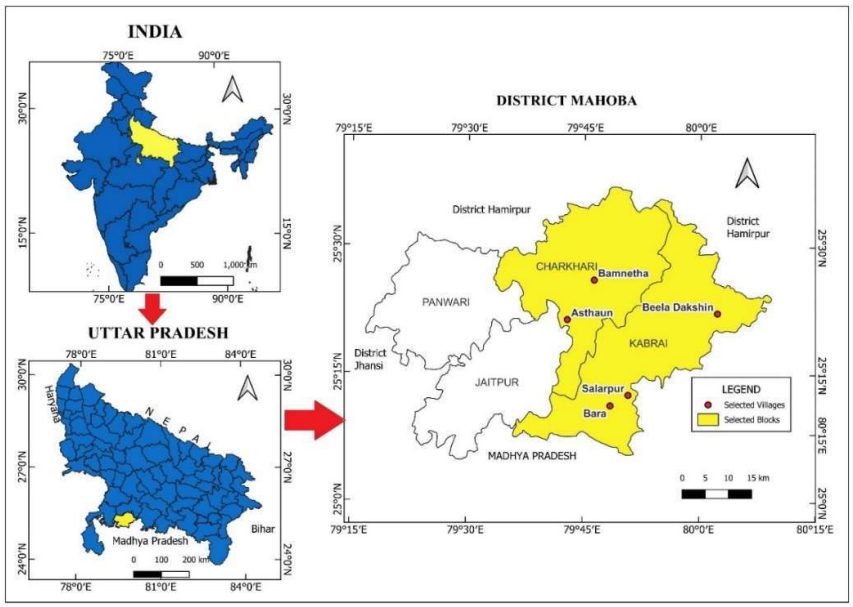
Regarding the conversion from conventional to organic farming, rainfed and drought-prone areas are often given priority (Reddy, A. A. 2010; Reddy, B.S. 2017). This is because crop yields in the drylands are higher under organic farming than chemical-based farming (Pimentel, 2006; Ramanjaneyulu et al., 2020). Organic agriculture can be particularly helpful for areas with poor land productivity (Gupta et al., 2021) as it helps to raise soil moisture and humus content, enhances natural soil fertility, and reduces the cultivation costs (Birkhofer et al., 2021; IFOAM, 2009; Kundel et al. 2020; Wani et al., 2013).

Mahoba District, lying in the semi-arid Bundelkhand region in the Indian state of Uttar Pradesh, was selected for the study. The district is identified as severely vulnerable to drought (Gupta et al. 2014). The average foodgrain productivity in this region is the lowest in Uttar Pradesh (Economics and Statistics Division, Uttar Pradesh, 2020). The data was collected from ten farmers from two Blocks of Mahoba District during January-February 2022. The steps of study area selection are shown in Table 1.

Table 1: Steps of Study Area Selection

Spatial Unit	Basis of Selection	Location
Region ↓	Drought-prone region	Bundelkhand, north-Central India
District ↓	Least productive district (as per productivity of total foodgrains)	Mahoba district, Uttar Pradesh State
Blocks ↓	Least net irrigated area and lowest cropping intensity	Charkhari and Kabrai blocks
Villages	NGO activity	Bamnetha, Asthaun, Salarpur, Beela-Dakshin, Bara

Figure 1: Location Map of Study Area



Research Setting & Sampling Process

Due to the scarcity of irrigation facilities, the use of chemical fertilizers was low in the study area and it depended on the crops grown (details in Nature of Organic Practices section). Promotional activities of a local NGO made some farmers to prepare and use organic fertilizers & pest-controls in farming, apart from the traditional farmyard manure which was utilized before. However, organic adoption was also selective and not all the crops could be grown fully organic. The names of farmers who had partially adopted the prescribed organic techniques (*adopters*) were sought from the NGO. In addition, farmers who did not participate in training sessions and were farming conventionally (*non-adopters*) were also included in the sample. From each village one adopter and one non-adopter farmer was chosen, and thus a total of ten interviews were conducted in five villages.

Data Collection Tools

The data collection was done using the interview method. Information was gathered in two stages. The first stage involved field visits in which direct interviews were conducted using a semi-structured survey schedule. In the second stage, data collection occurred while the qualitative analysis was being done. Farmers were contacted over telephone to provide missing data (if any) and explanations for the concepts emerging from concurrent data analysis. This was done to enhance the density of the descriptions. Farmers' voice recordings, the schedule responses, and survey notes were used as raw data.

Research Questions

The central research question guiding this study was : *"What are the problems faced in conversion to organic farming?"* The sub-questions were as follows:

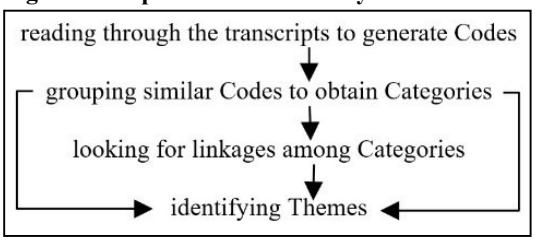
- How do the problems of organic conversion differ in case of a drought-prone area ?
- Are such problems varying between the adopting farmers and non-adopting farmers ?

- Do different factors of conversion interrelate? And if a relation exists, how do they interact to constrain the organic conversion process ?
- What are the broad underlying themes that, if addressed, can aid the farmers to convert to organic farming in the studied context ?

Data Analysis

Data was processed using the technique of thematic analysis. The audio recordings were transcribed verbatim, translated from Hindi to English and organized in New NVivo software. Next, all the transcripts were read thoroughly and codes were marked based on the research question. The steps for coding were derived from Saldaña (2013). Similar codes were grouped to form categories on the basis of the meaning conveyed. A few broad themes were obtained after careful aggregation of the identified categories. This process was followed separately for the two groups of farmers. The coding steps are simplified in Figure 2:

Figure 2: Steps of Thematic Analysis



Demographic Context

Except two participants who owned land area of more than four hectares, all the other participants were small and marginal farmers. One-third of them were illiterate and only one had a graduate degree. All the respondents were male, the mean age of whom was fifty-one years, and the average family size was six. The livestock reared included cattle, buffalo and goats. Weightage was assigned to each animal- type following the Manual on Cost of Cultivation Surveys (Central Statistical Organisation, 2008) and livestock equivalents were calculated (Table 2). More than half of the studied farmers had taken credit from a bank or private lending sources for agricultural purpose. Local NGO, officials of the government's agriculture department and the farm science center (*Krishi Vigyan Kendra*) were contacted for getting farming-related information. Three farmers said that they obtained information from fellow farmers only. Table 2 shows some characteristics of the surveyed population.

Table 2: Characteristics of the Participants

	Land area owned (ha.)	**Age (years)**	**Education**	**Family size**	**Animal Equivalents per family**	**Obtained credit**	**Obtained training**	**Contact with expert**
Farmer 1	1.83	38	Higher Secondary	4	1.1	Yes	Yes	Agriculture Dept., NGO
Farmer 2	0.33	45	Illiterate	7	0	No	Yes	*Krishi Vigyan Kendra*, NGO

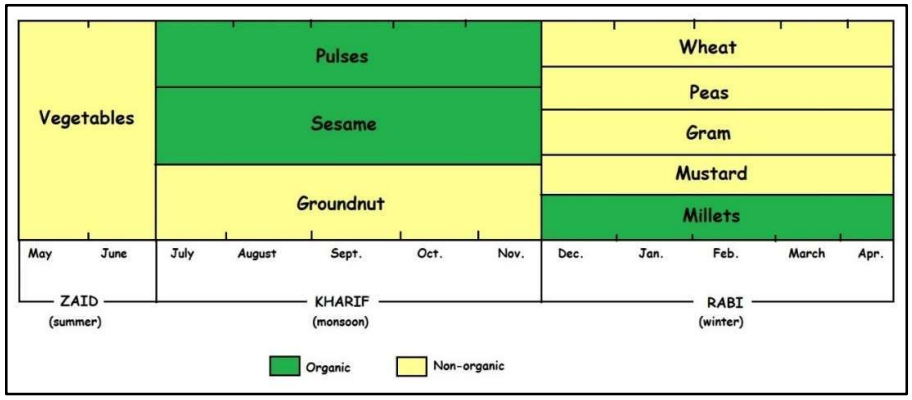
Farmer 3	1.17	62	Primary	7	0.5	Yes	Yes	NGO
Farmer 4	0.5	50	Primary	6	1.7	No	Yes	Agriculture Dept., NGO
Farmer 5	0.42	33	Graduate	5	1.5	Yes	Yes	NGO, Agriculture Dept.
Farmer 6	2.0	72	Illiterate	5	2.9	Yes	No	*Krishi Vigyan Kendra*
Farmer 7	1.17	58	Primary	7	0.6	Yes	No	------(Fellow farmers only)
Farmer 8	1.0	45	Illiterate	5	0	No	No	*Krishi Vigyan Kendra*
Farmer 9	5.83	55	Primary	6	3.3	Yes	No	------(Fellow farmers only)
Farmer 10	4.17	58	Primary	7	0.8	Yes	No	------(Fellow farmers only)

Source:- Primary Survey

Nature of organic practices

In the study area, the farmers mainly practiced double-cropping (Figure 3). The main crops grown in the *kharif* season were black gram, green gram, pigeon pea, sesame and groundnut. Wheat, peas, mustard, gram, lentil, barley and linseed were the *rabi* season crops. Only a few farmers grew vegetables for market sale during the *zaid* season.. The use of chemical fertilizers depended upon the crops sown. Pulses (black gram, green gram, pigeon pea and lentil), sesame, linseed and barley were grown in rain-fed conditions, without the use of any chemical fertilizers or pesticides. In groundnut farming, chemical treatment was done only for weed control. Wheat, pea, gram and mustard were grown using chemical inputs, mainly nitrogen and phosphate fertilizers. There was minimal application of chemical pesticides, mostly used by the vegetable growers. Tube-well was the main source of irrigation.

Figure 3: Crop Cycle followed in the Study Area



Source: Primary Survey

RESULTS AND DISCUSSION

This section describes the categories and themes influencing organic farming conversion. The categories that emerged from data analysis have been presented first. It should be noted that all the listed categories are not mutually exclusive but are often strongly related. Thus, they should be examined with respect to their interactions and cumulative influence on the studied phenomenon (organic conversion). Next, themes emerging from summarization and aggregation of categories have been explained.

Categories

(A) Farmers who attended trainings

(i) Being alone in Farming:- One of the categories explaining the problems faced by adopters is *being alone in farming.* It implies a scenario where the farmer struggles to carry out cultivation owing to a scarcity of time - time which is divided between labor work and farm work. The necessity to do off-farm casual labor in construction sites or wherever work may be found emerges from poor incomes in farming. Casual labor acts as a livelihood source for the marginal farmers and provides the money needed for investing in their traditional occupation, i.e., farming. The adopting farmers used organic fertilizers and pest controls on some portion of their land area. For example: Farmers 2 and 5 grew organic vegetables for family consumption; Farmer 4 grew organic *kathiya* wheat (an indigenous wheat variety) for home. However, the prospect of extending such practice for commercial cultivation was perceived as extremely dim: "*organic fertilizers can be made at home, we can bring materials…, But what happens is... if we are making only that for the whole year, then there is so much expense that if we do not do some work…labour… outside … then it may happen that there are obstacles in home's other expenses. Like.. there is 2 bigha land. So, in decorating 2 bigha land, all time will be spent.*" [Farmer 2].

The state of *being alone* constitutes as well the condition where older farmers are the sole caretakers of the family-land, while the younger members have taken up non-farm jobs. Apart from the economic compulsions behind such migration, the older generation perceives that the young are "not interested in farming". A 60-year-old farmer states: "*Two of my sons drive handcarts, and one is an e-rickshaw driver. Like if our crops are standing on the field, they do not even go to harvest it, how will they make compost?*" The tone of the adopters indicated more helplessness than a conscious decision to devote less time for organic.

(ii) Small landholdings:- While the phenomenon of *being alone* leaves the farmer to carry on cultivation with less time and limited family labour, thereby making organic farming difficult, landholding-size is a crucial determiner particularly for the small and marginal adopters. Limited land necessitates sharecropping and off-farm work. Juggling between on-farm and off-farm occupations creates conditions which are explained previously, and in this way, there exists relationship between these two categories (refer to Figure 4).

Type of land tenure determines the quantity of chemical inputs that are used in cultivation. While farmers remain aware about the demerits of synthetic fertilizers on soil fertility, sharecropping is utilized principally

for income-generation. This is evident from the avoidance of heavy doses of chemicals on owned land, and higher applications of the same on hired land. Farmer 2, a sharecropper, explains this in following words: "*…it's like, we make [organic fertilizers] for ourselves. What happens in lease is that... You see … from our (labour) the compost is made, the physical work has to be ours, and in next year, I don't know if he gives the land (lease) to some other person. The elements which I have put in that , its benefit will be taken by other one. For this reason, the land which is taken on lease from others, in that… nobody applies organic*." Insecurity of land tenure, thus, disregards choosing organic on rented land. Small holdings also reduce the scope of growing fodder crops adequately. This causes scarcity of green fodder and low productivity of the livestock.

(iii) Scarcity of organic inputs:- Scarcity of organic inputs was explained particularly with respect to livestock manure and indigenous seeds. Cattle manure is regarded as a highly beneficial and long-lasting traditional fertilizer by all farmers, and pit-composting has been an old practice in the area. However, the *inability to keep more livestock* in present time has caused significant manure shortage for use in organic farming. Scarcity of fodder and low farm-incomes make livestock rearing costly for the farmers. Besides, the milk productivity of cattle is also low in the region (Rathod & Dixit, 2020). The study area has been suffering from *Anna Pratha*[1]- the tradition of leaving infertile, dry cows and male cattle to roam free for grazing after the winter harvest season (Rathod et al., 2020). Increasing farm mechanization has made animal-labour redundant to farming. The dissociation of livestock from the farm restricts organic conversion.

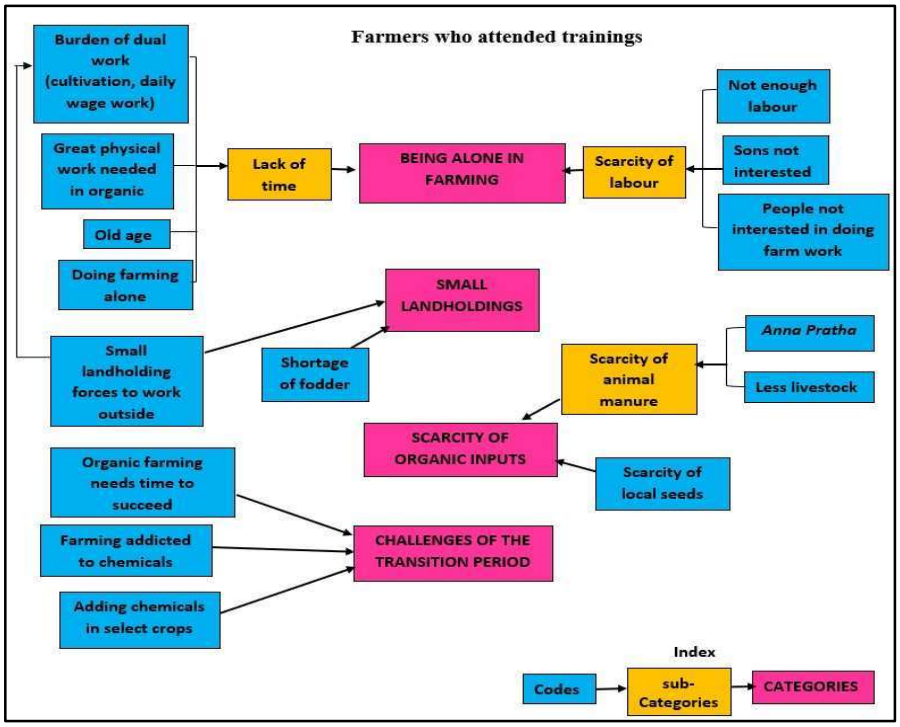
The manure that is available is still not entirely utilized for farming, as much of it is used for making cow-dung cakes- an important source of domestic fuel in the rural areas.
Indigenous seed varieties, another crucial input for adopting organic farming, have become rare. For greater production, the high-yielding hybrid varieties are sown which demand chemical fertilizers for proper growth.

(iv) Challenges of the transition period:- One of the problems underlying organic conversion was the perceived yield loss during the transition from conventional to organic farming. While several crops were grown chemical-free by default, difficulties were seen particularly in respect of the winter crops of wheat and peas- main commercial crops grown in the area. In order to avoid the risk of reduced yields in such crops, farmers used chemical fertilizers compulsorily. The reason ascribed for such practice was the *farming being addicted to chemicals*, and that the *soil needs time.* It is notable that these concerns were raised for the winter crops and not the monsoon crops. The farmers repeated statements as : "*hybrid wheat seeds need that intense [chemical] fertilizer*". However, all the adopters believed that such challenges were limited to the initial years of conversion, i.e., if organic practices were adopted continuously on the land for starting three

[1] *Anna Pratha* or *Chhooth Pratha* is a serious problem in the Bundelkhand region of Uttar Pradesh. (Rathod & Dixit, 2020). It is estimated that the practice destroys 25-35 percent of the monsoon crop in the region every year (NITI Aayog, 2015) thus forcing farmers to resort to monocropping (Rathod et al., 2020).

to four years, the soil shall regain fertility and provide comparable or even higher yields than chemical-based farming. Figure 4. explains the conversion problems faced by adopters.

Figure 4: Problems faced by adopters



(B) Farmers who did not attend trainings

(i) Lack of knowledge about organic alternatives:- The participants who did not attend organic trainings sensed organic farming as 'chemical-less farming'. However, they did not know about the modern organic methods and practices meant for nutrient management, disease control or weed management. Organic farming was viewed as the old cultivation when chemical inputs had not been introduced or known by the cultivators, ample amounts of farmyard manure were applied in the land, and incidence of crop pests & diseases was rare owing to no usage of synthetic fertilizers or pesticides. Thus, on being asked about organic agriculture, the various difficulties, mainly related to yield, crop diseases and weeds, were expressed if chemical inputs are avoided *altogether*. Scarcity of information about alternate techniques led to continuation of the conventional farming practice.

(ii) Risk-averse:- A lack of information causes a feeling of risk and uncertainty regarding organic crop yields. Notably, chemical inputs were used for the winter crops in the study area since a long time, and provided higher yields to the farmers. The scope of old composting practices in providing such yields in present times was perceived doubtful by the non-adopters. This is linked to the problem of declining soil fertility that was also highlighted by the previous group of farmers. Hence, those non-adopters who were aware about organic promotion in their village and the activities of their adopting fellow farmers, still expressed distrust and lack of confidence in it, as organic adoption had been only partial: "*Yeah…. It's true that in our village, there are one-two persons who are doing something. on their own... trying to make*

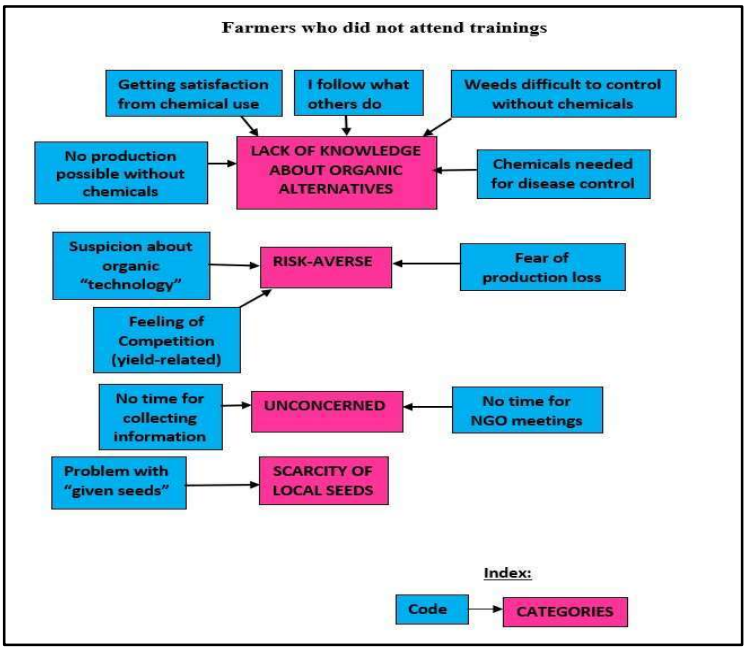
[organic] fertilizer, but they have not become capable in that. If they are capable, then they should not use DAP, urea. But they use DAP, urea and this[organic] technology [as well]…" [Farmer 8].

Apparent risks in productivity combined with a tendency of competition with others may also discourage organic adoption, as the following excerpt shows : "*if in the neighbour's field, higher yield is there… and in mine it's a little lesser… There is satisfaction to the inner self that I have added chemical fertilizer*" [Farmer 10].

(iii) Unconcerned:- Because of the dependency on agriculture, water-stressed conditions, general low crop productivity, the main concern of farmers was solving the problems of productivity, irrigation, crop diseases and stray animals. In other words, the concern was less on the type of practices (conventional or organic), and more on the results of the methods, as one farmer stated: "…*in whichever way I will get more profit and obtain good crops, I will do only that work*". Engagement in casual labor, problems of conventional farming, and the general hardships of poverty also lead to a negative attitude towards adoption of new farming practices. Examples: "*I have not taken part [in NGO meetings] because I do not have information... like… because of this guarding [guarding of the field from stray animals], I am not getting time…* [Farmer 8]; "*I don't go to the [NGO] meetings. What to do… I don't have that much time.*" [Farmer 10].

(iv) Scarcity of Local Seeds:- Scarcity of local seeds was identified as a problem by both the non-adopters and the adopting farmers alike. The local or *desi* seed varieties are more resistant to drought, pests and diseases, and are low resource-intensive as they require less water and fertilizers for growth. Also, they are considered more nutritious, such as the special liking for *kathiya* wheat among the farmers. However, the yields offered by the indigenous seeds are lower than the conventional hybrid seeds. Yield concerns have led to increased adoption of hybrid seeds and thereby the rising application of chemical fertilizers. Figure 5. illustrates the conversion problems of the non-adopters.

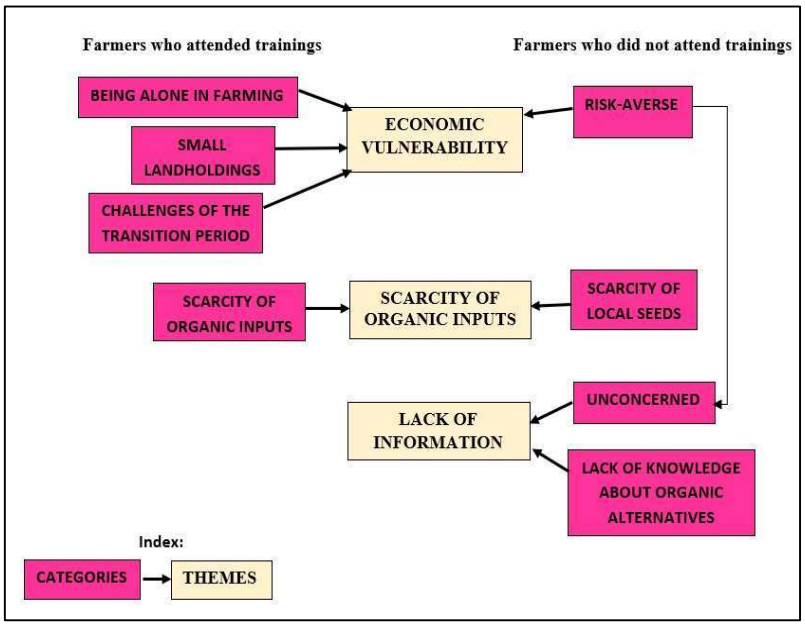
Figure 5: Problems faced by non-adopters



Themes

According to Saldaña (2013), "a theme is an outcome of coding, categorization, and analytic reflection, not something that is, in itself, coded." An analysis of the categories explains that economic vulnerability originating from small land-holdings, risk-aversiveness, scarcity of labour and, low yields in transition period are the underlying factors affecting both groups of farmers. However, for the second group who did not have contact with the NGO, lack of knowledge about organic alternatives also posed as a constraint in conversion. Scarcity of organic inputs, especially animal manure and local seeds, was also noted as limiting organic adoption. Hence, economic vulnerability, scarcity of organic inputs and lack of knowledge about organic alternatives affected the conversion to organic farming in the study area (Figure 6).

Figure 6: Themes explaining conversion problems



Conclusion

The study area has high potential for organic farming due to the low chemical-intensive agricultural system. Pulses and groundnut, which are important *kharif* crops of the area, are expected to perform better in rain-fed conditions (Kar et al., 2004); they act as nitrogen enhancers in soil, and thus can be promoted for organic cultivation.

The adopting farmers used organic fertilizers and pest controls on limited land area in case of vegetable and indigenous wheat crops (for family consumption). However, expansion of such practices was restricted due to yield concerns. Productivity-related risk was the common problem stated by adopters as well as non-adopters. Hence, an intervention which is crucial to increase organic farming is enhancing the farmers' conversion capacity. Economic incentives during the transition-phase can greatly assist the adopting farmers.

The dissociation of livestock from farming as a result of increasing mechanization, and the inability to rear livestock amidst poor farm incomes, has created manure shortage that restricts organic adoption. The

solutions to the problem of *Anna Pratha* can potentially address manure scarcity. The state government of Uttar Pradesh has launched a policy in 2019 (Samad, 2019) to provide monetary aid to farmers for upkeep of stray cattle. Future research shall illustrate the efficacy of such decisions. The conservation and multiplication of local seeds can reduce the cultivation costs for the farmers.

It is seen that the participants had a fair level of contact with the agriculture department and *Krishi Vigyan Kendra*; still there was a lack of sufficient information about organic practices from these sources. Thus, development of a strong extension network is needed. Robust awareness campaigns, especially for the non-adopting farmers, can help to increase their awareness and thereby conversion to organic farming.

It can be concluded that the problems of organic conversion are similar for both adopters and non-adopters in the study area. High economic vulnerability poses greater risks of conversion and limits the adoption of a new agricultural system. It is important that future research is conducted showing the difference between organic and conventional yields in this region. Also, since the problem of lower yields are experienced in wheat and peas particularly, prescription of appropriate package of practices can help in confident application of organic methods in these crops.

Acknowledgements

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Conflict of interests

The authors declare that no competing interests exist.

Author's contributions

The first author conducted the review of literature, collected the primary data, performed qualitative data analysis in NVivo, and prepared the manuscript. The second author analyzed the categories and themes during data processing, contributed in theoretical development of the study, and finalized the method of presentation of findings.

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