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Factors influencing a conversion to organic farming in Nepalese tea farms

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Abstract

Organic agriculture in developing countries has increased in past decades especially due to the high demand of organic products in developed countries. The rate of conversion to organic production in Nepal, however, is observed much slower than expected. This study investigates factors that determine the conversion to organic production using Nepalese tea producers as a case study. A survey of 181 farmers was conducted in the Ilam and Panchthar district of Nepal, among which 86 were organic farmers and 95 were conventional farmers. A discriminant analysis was used to identify socio-economic characteristics that distinguish conventional and organic farmers. Results from the estimated discriminant function suggest that farmers located in a distance from regional markets, older in age, better trained, affiliated with institutions and having larger farms are more likely to adopt organic production. Similarly, a factor analysis shows that environmental awareness, bright market prospects, observable economic benefit and health consciousness are the major factors influencing farmers' decisions on the conversion to organic production. While planning programs for the development of the organic tea sector in Nepal, policy makers should consider the support of farmers' institutions, provision of training to farmers and raise farmers' awareness about the environmental, economic and health benefits of organic farming.

Keywords: Organic farming, conversion, tea, Nepal

1 Introduction

Organic agriculture is rapidly growing in all parts of the world. From 2000 to 2009 the organically managed land area increased from nearly 15 million hectares to 37 million hectares of which roughly one third was located in developing countries (Willer, 2011).The growth of the organic land area in developing countries was mainly based on increasing exports of organic food to developed countries (Parrott *et al.*, 2006). The strong demand of European and North American consumers and their willingness to pay higher prices for organic compared to conventional foods enables exporters in developing countries to pay higher prices to organic farmers who have in fact lower yields in organic agriculture. Hence organic agriculture in developing countries is becoming a tool of socio-economic development and is therefore supported by various international and national development initiatives (Twarog, 2010; Kilcher & Echeverria, 2010). However, the growth rates of organic production depend on different factors and vary from country to country and from region to region (Brodt & Schug, 2008). While the organic land area throughout Asia increased by 24 % between 2007 and 2009, there was a slight decline in the Nepalese organic land area in the same period of time (Willer, 2011).

The present study is focussing on organic tea farming in Nepal where tea has got a great potential for employ-

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ment generation and export earnings. In 2006, the tea sector employed 105,000 Nepalese people, particularly women (ITC, 2007). Moreover, most of the Nepalese tea is grown by poor smallholder farmers (Heiss & Heiss, 2007) and tea cultivation and marketing can be an effective driving force for poverty alleviation (ITC, 2007). The Nepalese tea sector has experienced an average growth of 14 % per annum since 2000 and the area under cultivation has reached 15,168 hectares in 2007 (FAO, 2009a). In the same year more than 90 % of the orthodox tea produced in the hills of Nepal was exported to India and overseas markets (AEC/FNCCI, 2009). A total of 9,697 tons of Nepalese tea was exported in 2007 (FAO, 2009b).

In recent years, however, the export of Nepalese tea was affected by negative media reports on high pesticide residues found in exported tea (Koirala *et al.*, 2009); this was perceived as a real threat to the overall good image of Nepalese tea. Hence, the Himalayan Orthodox Tea Producers Association (HOTPA), an umbrella organisation of Nepalese tea producers, decided in 2007 to go fully organic by 2012 (AEC/FNCCI, 2007). However, certified organic tea was not gaining ground with the tea farmers in Nepal despite the support through HOTPA and its great potential for further expansion due to the world-wide raising demand for organic products. The organic tea movement which was initiated in 1995 has become more or less stagnant and thus the organic initiative of HOTPA is now considered a failure. A large percentage of Nepalese farmers is reluctant to adopt organic tea production (Chapagain, 2010). This situation calls for an investigation on the factors influencing the development of organic tea farming in Nepal.

There has already been much research on the importance of different factors influencing farmers' decisions to convert to organic production. As most of this research was undertaken in developed countries, many of the elaborated factors do only apply for European countries, North America or Oceania. Subsidies paid to farmers for the conversion to organic agriculture are a major factor in EU countries and Switzerland (Dabbert *et al.*, 2004; Daugbjerg *et al.*, 2011; Flaten *et al.*, 2006; Hamm & Gronefeld, 2004; Lohr & Salomonsson, 2000; Offermann *et al.*, 2009; Padel, 2001; Pietola & Lansink, 2001; Schneeberger *et al.*, 2002; Zander *et al.*, 2008). Other important incentives in developed counties are market access and consumer demand in the country (Dabbert *et al.*, 2004; Hamm & Gronefeld, 2004; Lamine & Bellon, 2009; Sepannen & Helenius, 2004) or just higher profits with organic farming practices (Dabbert *et al.*, 2004; De Cock, 2005). Non-economic factors such as social (Mzoughi, 2011), health or environmental reasons (Best, 2010; Cranfield *et al.*, 2010; Koesling *et al.*, 2008; Läpple, 2010; Padel, 2001) also play a significant role, but there are less studies from developed countries determining these factors as important ones.

As Thamaga-Chitja & Hendriks (2008) state, the conditions favouring a conversion to organic agriculture in developing countries are very different from those in developed countries, especially with regard to the policy environment and in particular with regard to subsidies for a conversion to organic agriculture, access to markets, a strong domestic demand for organic products, farmers' financial resources, appropriate training facilities, and access to extension services. In recent years, a few research studies on important factors for the conversion to organic agriculture in developing countries have been published in international literature (e.g. Hattam & Holloway, 2005; Kisaka-Lwayo, 2008; Pastor *et al.*, 2011; Sarker *et al.*, 2010; Svotwa *et al.*, 2009; Tran, 2009). Most of the studies had a focus on farmers' personal and farm characteristics as determinants of conversion to organic production. To our knowledge the studies of Sarker *et al.* (2010) on farmers in Bangladesh and Pornpratansombat *et al.* (2011) on rice farmers in Thailand are the only ones published so far in international journals which included a broad range of farmers' attitudes and motives as well. Our study aims to increase and deepen the knowledge to understand the factors influencing conversion to organic production to answer the following questions: What are socio-economic characteristics of organic tea producers in Nepal? What are important factors motivating farmers to convert to organic tea farming practices? Therefore, quantitative surveys with organic and conventional tea farmers and additional qualitative interviews with different stakeholders in the Nepalese tea sector were conducted.

2 Materials and methods

2.1 Data collection

The data was obtained from a comprehensive survey of tea farmers in two districts of eastern Nepal, Ilam and Panchthar. These districts are the most popular ones for Nepalese tea production. Altogether nine villages were visited for the study. The survey, conducted from February to April 2010, used face-to-face interviews to gather all relevant information from organic and conventional farmers. Face-to-face-interviews were conducted in order to be able to gain a profound data base within the

time given. A mail or telephone survey could not be conducted in rural Nepal due to the infrastructure and level of education given.

A total of 181 farmers were interviewed, consisting of 86 organic farmers and 95 conventional farmers. Separate questionnaires were prepared for conventional and organic farmers. As there was not any complete address list of tea farmers available, the sampling could not be based entirely on a random selection. However address lists of tea farmers provided by farmer groups and cooperatives were used as a basis for a random sampling in the study. In the case of five villages where address lists were not available, farmer leaders who were selected in cooperation with local offices of GO´s and NGO´s, were asked to provide a list of all tea farmers.

The questionnaires were designed to capture basic information on farmers‘ socio-demographic characteristics such as household size, age, gender, experience, and education. In order to understand farmers' decision making, organic farmers were further asked about their motives for a conversion to organic production. Farmers‘ attitudes and motives towards organic farming were assessed through a series of statements which farmers were asked to score on a Likert scale from strongly disagree (1) to strongly agree (5). A pre-test was performed comprising 20 interviews of which 10 were conducted with conventional and 10 with organic farmers. After the pre-test, a few questions on the economic performance of the farms were omitted from the questionnaire, as they were too detailed and could not be answered by the majority of farmers. As the rest of the questionnaire was not affected, the interviews of the pre-test could be integrated into the analysis.

Furthermore, expert interviews with different stakeholders of the Nepalese tea sector were conducted between February and April 2010 in informal one-to-one meetings. The aim of conducting the expert interviews was to gain supplemental and deepened insights into social, economic and political issues of tea production and marketing in Nepal from the view of stakeholders. Due to time constraints, only few relevant organisations related to the organic tea sector in Nepal could be interviewed. However, this did not limit the research as the stakeholders from those organizations hold extensive experience and expertise in organic tea production. A total of ten tea experts was interviewed, consisting of members of governmental organizations (n = 2), non-governmental organizations (n = 2), farmers organizations (n = 3) as well as tea processors and exporters (n = 3). The organizations are located in the districts of Kathmandu (n = 2), Ilam (n = 4) and Panchthar (n = 4).

All interviews were conducted in the interviewees' offices so that they could talk freely about controversial issues. The interviews were semi-structured. Topics addressed were challenges and opportunities of organic tea production and marketing in Nepal, technical and financial support for farmers and efforts to promote the conversion to organic tea production. The interviews were analysed with the narrative analysis method. Narrative accounts follow courses of information and the phenomena under consideration, gather scattered information and explain why certain actions have taken place or how certain interactions happened (Richards, 1989). The method was chosen because of its capacity to understand how people perceive and conceptualise actions. The results of the expert interviews are integrated in Chapter 4 and supplement the findings of the farmers' interviews.

2.2 Statistical analysis

Statistical analysis of the farmers' interviews was undertaken by using the Statistical Package for Social Scientists (SPSS 18). For analysing key characteristics of organic and conventional farmers, simple descriptive statistics were used. Two different methods of multivariate data analysis were applied to identify differences between organic and conventional farmers. A principle component factor analysis was performed to pool and reduce the number of variables to a smaller number of factors which display farmers' motives for conversion to organic production methods (Hair *et al.*, 2010). A discriminant analysis was conducted in order to identify the most important variables explaining the dependent variable (Hair *et al.*, 2010), i.e. farmers' decision for the conversion to organic production methods.

3 Results

3.1 Descriptive statistics

Several socio-demographic data and data on farm size and basic conditions for farming and marketing were collected from the interviewed tea farmers as they are seen as explanatory variables for the question why some farmers have converted their farms to organic agriculture and others did not. Apart from few exceptions, the interviewed tea farmers were male. On average, conventional farmers are nearly four years younger than organic farmers (see Table 1). 20 % of the conventional farmers are below 35 years old whereas only 14 % of the organic farmers are in this age group. Accordingly, 39 % of the conventional and 49 % of the organic farmers are aged between 46 and 60 years. The big majority

Table 1: *Characteristics of organic and conventional tea farmers*

Socio-economic variables	*Conventional farmers (n=95)*		*Organic farmers (n=86)*	
	Mean (Std. deviation)	(%)	Mean (Std. deviation)	(%)
Personal data				
Gender of household head 1= male, 0= female	0.99 (0.10)	–	0.99 (0.11)	–
Age (years)	44.75 (9.64)	–	48.42 (11.14)	–
Less than 35 years	–	20.00	–	13.95
36 to 45 years	–	36.84	–	29.07
46 to 60 years	–	38.95	–	48.84
61 years and above	–	4.21	–	8.14
Educational level 1= illiterate, 2= literate only, 3= school level, 4= college and university	2.15 (0.44)	–	2.21 (0.56)	–
Illiterate	–	0	–	2.33
Literate only (without formal education)	–	88.42	–	79.07
School level (up to 10th class)	–	8.42	–	13.95
College and university	–	3.16	–	4.65
Ethnicity 1= ethnic group, 0= no ethnic group	0.55 (0.50)	–	0.80 (0.40)	–
Family size (no. of household members)	5.65 (1.66)	–	6.09 (1.71)	–
Experience in tea farming (years)	12.32 (4.46)	–	13.44 (4.09)	–
Farm data				
Land covered with tea (ha)	0.49 (0.30)	–	0.95 (0.52)	–
Farm size (land cropped with tea) (ha)	0.49 (0.30)	–	0.95 (0.51)	–
Less than 0.5 ha	–	70.5	–	20.9
0.6 to 1 ha	–	18.9	–	33.7
1.1 to 1.5 ha	–	10.5	–	41.9
1.6 to 2 ha	–	0.0	–	0.0
More than 2 ha	–	0.0		3.5
Affiliation with institutions 1 = affiliation 0 = no affiliation	0.32 (0.47)	–	0.99 (0.11)	-
Loan 1= access to loan 0= no access	0.05 (0.22)	–	0.01 (0.11)	–
Access to agricultural technicians 1 = access to agricultural technicians 0 = no access to agricultural technicians	0.05 (0.22)	–	0.14 (0.35)	–
Training participation 0 = no participation 1 = participation	0.01 (0.10)	–	0.19 (0.39)	–
Transportation time to selling point (hours)	1.08 (0.46)	–	2.74 (0.93)	–

(Source: Own data, 2010)

of all farmers are just literate, but they do not have any formal education. About 88 % of the conventional farmers and 79 % of the organic farmers fall under the "literate only" category. Only 3 % of the conventional farmers and 5 % of the organic farmers have got a college or university degree. The major tea farming caste group in the study area belongs to ethnic groups. One way to classify the Nepalese population is by hierarchical caste structured groups (Jats) and the egalitarian ethnic group (Janjatis). The ethnic groups are a minority population which is severely disadvantaged, while the dominant caste groups lead governance structures because they have proficiency in Nepali language. In this study, the belonging to ethnic groups was included to see if they

Table 2: *Standardized discriminant functions distinguishing between organic and conventional farmers (n = 180)*

Discriminating Variable	*Std. Coefficients*	*Discrim. Loadings*	*Wilk's Lambda*	*Univ. F-Value*
Household size (number)	0.089	0.082	0.982	3.245
Education (1 = illiterate, 2 = just literate, 3 = school level, 4 = university)	- 0.118	0.047	0.994	1.085
Affiliation with institutions * (1 = yes, 0 = no)	0.698	0.587	0.515	167.831
Age * (years)	0.120	0.110	0.968	5.906
Experience in tea farming (years)	0.035	0.082	0.982	3.313
Farm size (land cropped with tea) * (ha)	0.141	0.337	0.763	55.247
Gender (1 = male, 0 = female)	0.030	- 0.004	1.000	0.006
Contact with agricultural technicians (1 = yes, 0 = no)	- 0.038	0.082	0.982	3.289
Participation in training * (1 = yes, 0 = no)	0.423	0.192	0.908	18.042
Loan (1 = borrowed, 0 = no loan borrowed)	- 0.145	- 0.069	0.987	2.329
Ethnicity * (1 = ethnic group, 0 = no ethnic group)	0.128	0.168	0.928	13.723
Time required to reach the market * (hours)	0.667	0.623	0.484	189.485

Canonical relation value: 0.856, Wilk´s lambda: 0.267, χ^2= 220.585, p=0,000,
Group centroids: Organic: 1.74, Conventional farmers: -1.557, * $p = 0.01$

(Source: own data, 2010)

differ from caste groups regarding the production of organic tea. More than 80 % of the organic farmers come from ethnic groups as compared to only 55 % of the conventional farmers. The number of family members is 5.6 at conventional farm households, and therewith slightly smaller than in organic farm families (6.0). The average size of the organic tea farms (0.95 ha) is found to be nearly twice as large as the conventional tea farms (0.49 ha). The majority of the conventional farms (71 %) comprise less than 0.5 ha farm land (cropped with tea), whereas the majority of the organic farms (42 %) own between 1.1 and 1.5 ha farm land.

3.2 Characteristics of organic tea farmers

A discriminant analysis was conducted in order to analyse those variables which discriminate the two farmer groups. The results are shown in Table 2. The canonical relation value is considerably high (0.856), which means that the discriminant scores and the levels of the dependent variable correlate highly. The linear discriminant function (LDF) discriminates well between the two groups analysed. Wilk's Lambda value is 0.267 and statistically significant at 1 % level which holds for a good differentiation between the groups. The F-test of the individual discriminant variables shows significance for the affiliation to institutions, for age, ethnicity, farm size, training and for the time to reach the market to sell green tea leaves. The LDF shows that the most important variables that distinguish the organic tea farmers from the conventional farmers are "affiliation to the institutions", "training" and "time to reach the market". The coefficient of farmers´ affiliation to institutions is high and positive indicating a vital role of the affiliation to institutions in conversion to organic farming. Similarly, the participation in the training coefficient is positive showing that more trained farmers have greater propensity to adopt organic farming. The estimated parameter for age is positive indicating that older farmers are more likely to convert their farm to organic agriculture. The coefficient of the time required to reach the market is highly positive showing that farmers residing far away from the market tend to be organic. Interestingly, the coefficient of ethnicity is also positive indicating that ethnic groups are more interested in organic adoption than the other caste groups. In addition, this study could not identify any effect of the factors education, experience in tea farming, contact with agricultural technicians, gender, loan and household size on the conversion to organic farming.

3.3 Farmers motivations for organic farming practices

A principle component factor analysis was performed in order to group farmers' motivations to convert to organic production methods (cp. Table 3). It was possible to summarize 70.43 % of the variance in 11 motivational statements. The result of Kaiser-Meyer-Olkin (KMO) test shows a value of 0.595 bordering to the mediocre.

Table 3: *Rotated factor matrices of the eleven variables along with the factor loadings*

Variables	*Percentage of variance explained*	*Factor loading*
I decided to produce organic tea because of…		
Factor 1 Environmental awareness	23.37	–
…environmental protection.	–	0.929
…reduction of soil erosion.	–	0.896
…better soil fertility.	–	0.839
Factor 2 Bright market prospects	19.44	–
…good image of Nepalese tea in the international markets.	–	0.916
…satisfying the need of the processors.	–	0.798
…sustainability in production.	–	0.614
Factor 3 Observable economic benefit	14.08	–
…better profitability.	–	0.821
…subsidies for production.	–	0.743
…easy and better marketing.	–	0.518
Factor 4 Health consciousness	13.53	–
…healthy product for the consumers.	–	0.834
…maximum utilization of farm internal resources.	–	0.821

Kaiser-Meyer-Olkin (KMO) 0.595, Principle Component Method, Varimax Rotation

(Source: own data, 2010)

That means if a factor analysis is conducted, the factors extracted will account for a mediocre amount of variance.

The results show that four different motivational factors for the conversion can be found. Factor 1 consists of motivating reasons dealing with environmental awareness of the farmers. Factor named “bright market prospects” comprises the positive view of farmers with regard to the demand of organic tea and the sustainability of production which is a promising communication argument for consumers in developed countries. Not surprisingly another important factor that has a motivational effect on farmers is “observable economic benefit” of organic tea production plays a role for the conversion to organic farming. The factor ”health consciousness” contains two variables: “healthy product for the consumers” and “maximum utilization of farm internal resources”. Maximizing internal farm resources means that farmers are not using external resources such as pesticides and chemicals which are harmful for human health and the environment.

4 Discussion

Results of this study show that tea producers with larger farms are more likely to adopt organic farming. This result is in line with the cases of organic rice farmers in the Philippines (Rubinos *et al.*, 2007) coffee farmers in Uganda (Bolwig *et al.*, 2009) and farmers in Bangladesh (Sarker & Itohara, 2008) where organic farms are larger than conventional ones. Other authors could not find any significant differences in farm size as Isin *et al.* (2007) regarding organic fig farms in Turkey, Kisaka-Lwayo (2008) analysing smallholder farmers in south Africa and Hattam & Holloway (2005) with avocado farmers in Mexico. In Nepal as well as in Bangladesh, land ownership determines the economic prosperity of an individual (Karki & Dhakal, 2009; Sarker & Itohara, 2008) and only farmers having larger farms have enough capital and can take risks of adapting a new production method and spend the money for the first extensive certification as organic producers. Hence, large farmers are more likely to adopt organic production under these circumstances.

Education can play an important role in the adoption of new technologies by reducing learning cost (Holloway *et al.*, 2002). In contrary to the results of Isin *et al.* (2007), but in line with the findings of Kisaka-Lwayo (2008) this study shows a non-significant relationship of education with the adoption of organic farming. In developing countries, where the majority of farmers is less educated, this kind of result should be considered an encouraging result for the adoption of organic farming, as it shows that organic farming is not kept back from less educated farmers (Hattam & Holloway, 2005). In Nepal about 85 % of the tea farmers have not received formal education and it is often argued that due to the low level of education organic farmers might face difficulties, as e.g. in record keeping of organic farming practices necessary for the certification and in using various sources of information such as booklets necessary to understand organic farming.

However, training motivates farmers to adopt new technologies. There was a significant relationship between the participation in training programs and the adoption of organic production. Training is very important in the Nepalese context and in developing countries in general, as less educated or even illiterate farmers cannot make use of most information material without support of educated persons. The interviewed experts also expressed the view that more farmers are likely to adopt organic tea production if they get appropriate training. However, they mentioned as well that there is a lack of support by the Nepalese government.

In this context, it is not surprising that extension services also play an important role for the adoption of organic farming practices (Pornpratansombat *et al.*, 2011; Sarker *et al.*, 2010; Thamaga-Chitja & Hendriks, 2008), especially for farmers with poor education and illiterate farmers. This study, however, reveals a non-significant relationship between the contact of tea farmers with agricultural technicians and the adoption of organic agriculture. Extension offices of the Department of Agriculture of the Nepalese government do not provide services to tea farmers, as a separate body of Nepal Tea and Coffee Development Board (NTCDB) has been established to provide an extension service to their farmers. But according to the experts' views, NTCDB is troubled by insufficient manpower and poor road facilities due to which only a very few tea farmers are receiving extension service, especially in the mountainous areas of Nepal.

A significant relationship between the membership in a producer association or similar institutions and the adoption of organic farming is another interesting result of this study. This finding supports the fact that new channels of extension are developing and that traditional extension services become less important (Hattam & Holloway, 2005). Affiliation with producer cooperatives or groups eases farmers' problems with respect to group certification and group marketing. Besides, affiliation with the producer institutions can increase bargaining power of the farmers (Lyons & Burch, 2008) against processors and the government. In the case of organic tea in Nepal, it is not feasible for individual organic farmers to take only small amounts of green tea leaves every day to the few organic factories located at faraway locations. Hence, affiliation to institutions is more important for organic farmers than for conventional farmers; this finding is supported by the interviewed experts, as well. Especially, the cooperation along the whole supply chain was regarded as essential to overcome marketing problems of organic farmers. This study points out that older farmers are more likely to convert to organic tea production in Nepal as age has a significant and positive relation to the adoption of organic production. Therewith, this study supports the findings of Svotwa *et al.* (2009) in Zimbabwe. In the Nepalese context, it is worth to mention that only a very small percentage of young people is engaged in farming at all. Many other jobs, especially in bigger towns are more attractive for the youth.

In Nepal, ethnic groups are considered backward groups compared to the upper caste groups. However, this study unexpectedly showed that the members of ethnic caste groups are more likely to become an organic tea producer. This is probably due to the fact that the members of ethnic groups have more sense of unity than the other castes and therefore cooperation with regard to group certification or common marketing efforts are easier to apply.

The analysis of the interviews with the farmers resulted in a significant negative relationship between the time to reach customers and the adoption of organic farming. In Nepal, organic farmers live mostly in isolated locations with poor infrastructure, especially roads. As transportation of fertilizers, pesticides and tea leaves would be difficult and costly for conventional farmers, organic farmers who need less inputs have a comparative advantage. Additionally, organic tea leaves are higher in price so that transport costs as part of the total costs per unit of output are not as dominant for organic producers as for conventional farmers. However, it is essential for organic tea farmers to find customers for their organic produce in the region which is not given in many districts of Nepal.

This study has revealed a non-significant relationship between the access to loan and the conversion to organic production by tea farmers of Nepal. This result is against the findings of Sarker et al. (2010) who found that the access to credit plays an important role for conversion to organic production in Bangladesh. Because of the low access to loan by both the conventional (5 %) and the organic farmers (1 %), it is comprehensible that a non-significant relationship was displayed. Most of the tea famers mentioned during the interviews that loan is very important to them and that financial institutions of Nepal do not provide loan as they perceive small farmers as a risky or unprofitable clientele. It was also mentioned by the interviewed experts that the Agriculture Development Bank of Nepal (ADBL), a government owned financial institution for farmers, has stopped lending on tea farming because of the high amount of non-performing loan in the tea sector. This goes in line with the above mentioned finding that the conversion tends to be easier for larger, wealthier farms.

The study suggests that the different reasons for conversion to organic production by Nepalese tea farmers can be summarized into four factors: "environmental awareness", "bright market prospects", "observable economic benefit" and "health consciousness". Interestingly, these extracted factors are very similar to the findings of Sarker & Itohara (2008) who identified awareness regarding environmental issues, creation of health awareness, simplicity of organic farming and availability of basic production factors as the major factors influencing the conversion to organic farming practice in Bangladesh. Furthermore, Pornpratansombat *et al.* (2011) came to quite similar results as well, when regarding the factors of Thai rice farmers for the adoption of organic farming. They identified that especially the factors "human and animal health", "demand for healthy food", "gaining a higher price" and "low cost of production" and furthermore the aspect of "gaining independence in farming" affect the decision to adopt organic farming.

"Environmental awareness" is an important factor responsible for conversion to organic production. Farmers with a high environmental awareness are willing to run their farm in an environmentally friendly way (Sarker *et al.*, 2010). Those farmers are also concerned with increasing soil fertility without harming environment and reducing soil erosion that have negative impact on the environment. Nepalese organic tea farmers are aware of environmental protection and are concerned with the negative impacts of conventional production methods on the environment. This awareness is encouraging, in particular, for a developing country like Nepal where farmers only have a low level of formal education. Pornpratansombat *et al.* (2011) found that Thai farmers were motivated to surrender the application of agro-chemicals. Here, the motivation was rather to avoid or overcome problems arising from the application of conventional production methods, such as soil erosion.

"Bright market prospects" is another important factor for conversion to organic production. Farmers produce organic tea for satisfying the need of organic tea processors and the underlying demand of tea importers in Europe and North America. In organic tea production, farmers groups or cooperatives are contracted by a tea processing factory which commits to buying the entire production of organic tea farmers whereas conventional tea processors in Nepal purchase tea leaves in a spot market per requirement of factory. Organic farmers in Nepal, however, are bonded in long term contracts with tea processors which guarantee the purchase of the organic tea leaves. As unstable markets for agricultural products are one of the major obstacles for farmers in developing countries, this is a remarkable advantage for tea farmers in remote areas. Further, the overall good image of the Nepalese tea in the international market assists in the positive development of the international demand for organic tea from Nepal and also supports the stability in organic tea market of Nepal.

The factor "observable economic benefit" elaborated in this study includes the reasons: better profitability, subsidies for organic production and an easier and better marketing. If farmers realize a direct economic benefit, the probability of a conversion to organic production is high. This study therewith supports the results of Sarker & Itohara (2008) who identified a direct economic benefit to be an important factor for a conversion to organic farming in Bangladesh and the results of Pornpratansombat *et al.* (2011) for Thai farmers.

"Health consciousness" is another motivational factor for the conversion to organic production, as it has been found by Sarker & Itohara (2008) in Bangladesh and Pornpratansombat *et al.* (2011) in Thailand. Farmers who consider their own health and the one of their families are more likely to be concerned about consumers' health as well and therefore display a higher probability to adapt to organic farming practises. Especially in developing countries, where many farmers are not able to read or understand the instructions for proper use of pesticides, the abandonment of chemical pesticides significantly reduces the risk of health problems caused by these chemical inputs.

5 Conclusions

Before this research was conducted only few studies had been published on key factors that affect farmers' decisions to adopt organic farming in developing countries. The few empirical studies that exist from different developing countries illustrate that it is also difficult to conclude from the results in one particular country to the results in other countries with different economic, political, environmental or cultural conditions. An interesting result of the present study was that many socio-demographic data and the main factors on the organic farmers' motivations in Nepal were very similar to those elaborated by Sarker & Itohara (2008) in Bangladesh and Pornpratansombat *et al.* (2011) in Thailand, thus indicating that there might be some commonality, at least in Asian countries. However, to support the development of organic agriculture in developing countries in an efficient way, much more research is needed on the key factors that stimulate and hinder farmers to adopt organic agriculture in developing countries.

The present study from Nepal showed that local institutions and training play a vital role for conversion to organic production. The Nepalese government and developing aid agencies should therefore consider measures for developing and strengthening local institutions. Another striking result was that the huge majority of Nepalese tea farmers has no access to loans and cannot afford additional investments required for organic production methods e.g. the fee for the first extensive organic certification of their farms and land. That explains why they act risk-averse regarding the adoption of new production methods. Without government aid to facilitate the access of tea farmers to loans, this problem can only be diminished through the promotion and support of so-called saving and credit groups in which farmers deposit some of their income for future investments. However, saving and credit groups are no option for poor farmers struggling for existence.

As this study also showed, more information on the world-wide increasing demand for organic food and the creation of awareness on the environmental, economic and health benefits of organic production are important factors to motivate farmers to practice organic farming. Information on these benefits can be spread by governmental and non-governmental organizations as well as by development aid organizations from abroad. Since these traditional channels of information were not very successful in Nepal and other countries in the past (Hattam & Holloway, 2005), alternative information channels should be supported. One important message should be given by organic tea processors in Nepal who spread the information that they look for additional suppliers and offer long-term contracts for organic farmers. Another promising strategy is to engage successful organic farmers as multipliers and supporters in training courses and workshops on organic farming practices. Farmers tend to have higher trust in experienced-based knowledge of other farmers than in information given by governmental agencies or professional buyers of their produce.

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