Factors Affecting the Adoption of Organic Pepper Farming in India

Sita Rana, Priyanka Parvathi and Hermann Waibel

Leibniz Universität Hannover, Institute of Development and Agricultural Economics, Germany. Email: rana@ifgb.uni-hannover.de.

Introduction

Pepper is one of the important cash crops of India, which is mainly exported to the United States of America (USA), United Kingdom (UK), Italy, Canada, and Germany (Parthasarathy et al., 2011). Earlier, India was the leading producer in the world until 1999 with 76,000 metric tons (MT) of pepper but its production declined to 51,000 MT in 2010 and ranked fourth in the world (FAO, 2010). Several studies were done to find out the causes of the fall in pepper production. A study of Hema et al. (2007) found that the lower production was due to the pepper crisis during 2003-04. Hence, a volatile price of pepper in the international market made the small and marginal pepper farmers to switch to other high valued crops like vanilla and cardamom. Nevertheless, a poor cultivation practice of pepper, use of old, fragile and unproductive plants for the production, less fertile soil, and the outbreaks of diseases made the yield (267 kg/ha) of pepper in India far less than the yield in other countries like Vietnam or China (2000 kg/ha) (Gafoor et al., 2007; SBI, 2008; NRAA, 2009).

Hence, this research is carried out to address all these problems with an emerging farming concept of organic agriculture (OA). OA is promoting soil management using natural inputs, which are harmful neither to humans nor to the environment (FAO, 1999; Chandrashekar, 2010). Moreover, OA is an alternative means for farmers to have access to markets to achieve higher output prices for their produce (LaSalle and Hepperly, 2008). However, adoption of a new technology is not an easy process. The attributes of a new technology are compared with the attributes of the older one in terms of 1) relative advantage, 2) compatibility, 3) simplicity, and 4) observability. Hence, when comparisons are made, the new technology should be better than the

older one, which at the end, convinces an individual to decide for or against adoption (Rogers, 1995).

Material and Methods

This study was undertaken in Idukki district of Kerala in India. Kerala is the highest pepper producing state in India. Moreover, due to the suitable agro-climatic condition, pepper produced in this area is of good quality (ENVIS-Centre, 2009). The data for the analysis were collected between February and March 2011 for the year 2010. This research consists of 100 organic farmers and 100 conventional farmers, with a farm size below three hectares.

Adoption of organic farming and non-adoption of it follow the main idea of Rogers' "Diffusion of Innovation" (1995) and the factors that influence adoption decision are based on the empirical findings that have been carried out in several studies of an innovation adoption decision. Firstly, this study uses descriptive analysis to identify the similarities and differences of the households and secondly, econometric analysis to find the determinants of adoption decision. This study uses logit regression model to analyze the data.

$$\text{logit } [P \, (y = 1)] = \alpha + \beta_1 X_1 + \ldots\ldots + \beta_k X_k \ldots\ldots\ldots\ldots\ldots\ldots \text{ equation (1) (Peng et al., 2002)}$$

Results and Conclusion

The results found several distinguishable characteristics of the farmers as major drivers and constraints to the adoption decision. The drivers of the adoption decision are farming experience, agricultural area, assets, access to credit, and the perception of the household head towards organic farming. However, age and an access to the extension service were the major constraints to the adoption decision.

Dependent variable = Adoption of organic farming (Yes=1, otherwise = 0)	Odds ratio	Robust Significance
Household characteristics		
Age	-0.071	0.039**
Education	-0.040	0.603
Farming experience	0.085	0.008***
Log of total agricultural area	0.719	0.008***
Dependency ratio[1]	0.376	0.255
Log of assets	0.334	0.079*
Log of off-farm income	-0.027	0.347

[1] Dependency ratio is the ratio of number of dependent family members divided by number of active family members.

Community characteristics		
Access to credit	1.954	0.005***
Extension service	-1.572	0.004***
Access to market	0.067	0.245
Perception	0.199	0.088*

Summary of statistics

No. of observations = 200, Log-Likelihood = -106.50, Pearson Chi2(188) = 189.31, Prob > Chi2 = 0.459, Predicted percentage = 73.50%

The study showed that the age of the farmer was influencing on the adoption of a new technology. Specially, the younger farmers were more interested towards the adoption of organic farming than the older farmers, which may be due to the risk aversion nature of the older farmers. The estimated coefficient of age of this study was consistent with the study done by Hattam et al. (2012). The next driver for adoption was the farming experience of the household head. In the study area, the adopters were more experienced than their counterparts. This result corresponds to the results of Läpple (2010) and Ramesh et al. (2010). In their study, conversion of conventional land to organic land was due to the expected benefit from organic produce and an improvement in quality of soil.

Similarly, farm size is influencing the adoption decision. In the present study, the adopters possessed larger land area than the non-adopters, which was in line with the study of Musara et al. (2012) and Chouichom and Yamao (2010). Musara et al. (2012) found that adopters had more land and more diversified crops. They further mentioned that with more land, farmers have the possibility to utilize some part of their land for the new and more risky technology, which reduces the unknown risk of the new technology. Similarly, another barrier was an easy access to credit by the farmers. The empirical findings of Kallas et al. (2010) suggested that small farms need credit to go for adoption. The inability to access or receive credit made them less inclined to go for adoption. Therefore, if the small family farms receive credit, they are ultimately in favor of adoption.

In addition, this study found the perception of farmers towards organic farming as an important driver in the decision making process. On the other hand, the study found the extension service to be a constraint to adoption. One explanation for this fact could be the pepper crisis in India during 2003-04 when the pepper prices fell. During the pepper crisis, the production of pepper was low due to the emergence of diseases and the volatility of the international price of pepper. All this caused the small and marginal pepper farmers to shift to other crops. Thus, to promote the pepper

production, the Indian government gave subsidies and financial support to the farmers growing pepper but not targeting either of the two groups (organic and conventional pepper farmers). The farmers, who were supported by the governmental extension services, were found to be non-adopters. Therefore, this study found the lack of governmental extension support as a constraint to adoption. This study did not find any significant results of parameters influencing the adoption decision of farmers based on the variables education, dependency ratio of family members, off-farm income, and access to market.

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