

What happens between technico-institutional support and adoption of organic farming? A case study from Benin

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Abstract Current debate about organic farming emphasizes on the sustainability of farming systems, rural livelihood, and food quality on the technical and economic factors influencing the conversion to organic farming. The paper aims at describing the psychosocial adoption factors associated with institutional and technical support systems set up for the promotion of organic farming, based on a case study in Benin. We carried out this study in Djidja District in South Benin. We conducted semi-structured interviews with two leaders and five agricultural advisers from the Benin Organisation for Promoting Organic Agriculture and structured interviews with 100 farmers selected randomly among 255 organic farmers, 50 non-adopters to record why they did not adopt organic farming, and 25 farmers who reverted to conventional farming to understand their rationales. We used descriptive statistics

and correlation for quantitative data analysis and discourse analysis for qualitative data analysis. We found that important factors that affected the adoption of organic farming were their perceptions of the characteristics of the technology, the economic factors, the institutional support for socio-technical learning networks, and the credit gained by the nongovernmental organization promoting organic farming. Farmers' needs for technical competence, social relatedness, and farm income safety acted as psychosocial mediators between the technical and institutional supports and their motivation to convert to organic farming. Alongside their technical abilities, the capacity of agricultural advisers to cope with psychosocial factors associated with the institutional support systems appears to be crucial in motivating farmers to adopt innovation.

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Introduction

Current debate about organic farming emphasizes on the sustainability of farming systems, rural livelihood, and food quality (Dima and Odera 1997; Crucefix 1998; Rigby and Cáceres 2001; Heaton 2001; Ferrigno et al. 2005; Hole et al. 2005; Bengtsson et al. 2005) and on the factors influencing the conversion to organic farming (Padel 2001; Darnhofer et al. 2005). The findings are in

line with the three dominant paradigms employed to explain the decision of small farmers to adopt new technology (Negatu and Parikh 1999). The technology diffusion models (1) consider the characteristics of technology as determinants of adoption. Sarker and Itohara (2008) identified the simplicity of organic farming technology and availability of basic production factors as the important influential factors related to organic farming technology. Hong (1994) argues that motivations for organic farming include willingness to follow sound farming practices or reaction against unpleasant experience with agricultural chemicals in Korea. Svensson (1991) pointed out the importance of the profitability in the adoption of organic farming in Sweden. The economic constraints models (2) emphasize the importance of economic and institutional factors in the adoption of technology. For instance, Bolwig et al. (2009) provided some evidence that product marketing guarantees, in relation to receiving a price premium for meeting given quality requirements which reduce smallholders' uncertainty about the net returns to processing of the coffee crop, affect the adoption of organic farming in tropical Africa. Kvist (1994) had identified the grant to support organic farming as an important adoption factor in Sweden, especially for farmers still converting new areas. Bruckmeier et al. (1994) supported that farmers who converted to organic farming followed economic incentives rather than ethically based motivation in East Germany. The technology characteristics–user's context models (3) argue that farmers' characteristics and subjective perceptions of technology influence adoption. For example, Sarker and Itohara (2008) identified farmers' knowledge and awareness regarding environmental issues and health awareness as influential factors in Bangladesh. Burton et al. (1999) found that organic horticultural producers are more likely to be young, female, and small farmers in the UK. Willer and Gillmour (1992) stated that organic producers were motivated primarily by ideological reasons in Ireland. Svensson (1991) in Sweden and Molder et al. (1991) in Saskatchewan found that farmers adopted organic agriculture because they were concerned about environmental degradation and food quality. It comes out clearly that a large range of factors, including significant noneconomic variables, were identified as likely to influence the decision to adopt organic techniques as shown by Conacher and Conacher (1982), Fisher (1989), Fairweather (1999), and Kallas et al. (2010).

Two important remarks come up from this literature review. First, most of the empirical studies reported have been conducted in the north. Nevertheless, the logic of actions of farmers can vary importantly from community to community, from context to context, and even from one farmer to another (Olivier de Sardan 1995; Cochet 2006). Some specific characteristics of organic farming in the south are that (1) adopters are smallholders with low formal education and primarily concerned about subsistence, and (2) farmers must apply for group certification because they cannot afford individual certification, implying mutual control which means that farmers at village level should control each other. Second, little attention has been devoted to psychosocial analysis, although this can provide us with new insights on the issue (Chouichom and Yamao 2010; Herzfeld and Jongeneel 2011). The paper aims at describing the psychosocial adoption factors associated with an institutional and technical support system setup for the promotion of organic farming, based on a case study in Benin. We applied the cognitive evaluation theory (Deci and Ryan 1985; Guay et al. 2001) which posits that individuals progressively develop motivation through their self-evaluations of how competent, socially related, and self-determined they are. This theoretical framework is applicable since farming can be considered in many instances as a social activity (Vanclay 2004). However, we added to this perspective the variable of safety of farm income because farming is the main subsistence activity in our study area. The framework may help to link technology diffusion and economic constraint models to technology characteristics–user's context models. In other words, the perspective can help to understand how technical and institutional factors influence the construction of farmers' subjective perceptions which led to the adopting or rejecting of organic farming, or reverting to conventional. Understanding the nature and mechanisms of those psychosocial phenomena will help policy making.

Methods

We carried out this study in Djidja District in South Benin. Djidja was selected with Benin Organisation for Promoting Organic Agriculture (OBEPAB) leaders because this district was one of the earliest production

areas in Benin. Farmers in Djidja are on average 36 years old, with generally no formal education. They are heads of households including on average 13 people. The size of the cultivated land is 5.5 ha on average. They undertake agriculture mainly for subsistence. Cotton, maize, and groundnut are the main crops. Most households use family labor predominantly. We conducted semi-structured interviews with two leaders and five agricultural advisers from OBEPAB to collect data on the technico-institutional support to organic cotton farmers and on the evolution of the numbers of farmers, seed cotton productions, and yields. Structured interviews with 100 farmers selected randomly among 255 organic farmers were conducted, thereby we (1) measured organic farmers' feelings on competence, social relatedness, self-determination, income security, and motivation with Likert scales, inspired from those developed by Losier et al. (1993), Blais et al. (1993), and Richter and Vallerand (1995) and (2) collected farmers' opinions about the usefulness of OBEPAB's support and about the advantages and requirements of organic farmers (time, input, labor). This sample included 10 % of females, as gender may influence the adoption of organic farming (Tovignan 2005). We interviewed 50 non-adopters to record why they did not adopt organic farming and 25 farmers who reverted to conventional to understand their rationales. We used descriptive statistics (means, percentages, and graphs), Pearson correlation for quantitative data analysis, and discourse analysis for qualitative data analysis.

Results

Institutional support to organic farming in Benin

Benin is a West African country (112,622 km², eight million inhabitants) where about 60 % of the people rely on agriculture for subsistence and conventional cotton is the main cash crop that contributes to 13 % of the GDP (MAEP 2010). Public organizations governed Benin's cotton sector up to 1990: Société Nationale pour la Promotion Agricole for input supply and cotton marketing, Institut National des Recherches Agricoles du Bénin for research, and Centre d'Action Régional pour le Développement Rural for extension services. The liberalization of the cotton industry in early 1990 led to the partial withdrawal of the state and the involvement of private actors and farmer

organizations in input supply, cotton ginning, and marketing services. For inappropriate management of the reform, the conventional cotton network was facing troubles and bad financial and organizational management followed by indebtedness. An increasing number of farmers were abandoning the crop (Sinzogan 2006). Such an environment was favorable to any alternative.

Since the United Nations Conference for Environment and Development in Rio de Janeiro in 1992 has pointed out the necessity to consider the three dimensions—environment, economy, and social—of development into consideration in development programs, many organizations, mostly nongovernmental organizations (NGO) have been involved in promoting sustainable and organic farming in Benin. We selected OBEPAB for case study. OBEPAB is a nongovernmental organization established in 1995 which has been the first NGO devoted to organic farming promotion in Benin. This organic cotton initiative benefited from financial and technical support from the Pesticides Trust which became the Pesticides Action Network UK, the Sustainable Development Agreement between the Netherlands and Benin, the agricultural consultancy firm Agro Eco, Swiss development cooperation, etc. (Glin et al. 2012). The intervention area of OBEPAB includes Djida, Bohicon, and Glazoue districts in southern Benin, and Kandi and Sinende districts in northern Benin. Organic farming is a form of agricultural production that makes use of natural or organic resources only as inputs. It is expected to be compatible with environment protection, economically satisfactory for the farmer, and socially acceptable. OBEPAB focused its activities on promoting organic cotton as alternative for conventional cotton that makes use of an important quantity of synthetic chemical pesticide and fertilizer (Vodouhe 1997). Bad handling of these products threatens the environment, the sustainability of agriculture, and the health of farmers and consumers (Ton et al. 2000; OBEPAB 2001, 2002). Alternative technologies, using local natural resources, were developed for cotton pest and soil fertility management.

OBEPAB established a participatory extension system that aimed at developing the analysis skills of the farmer, encouraging his initiatives and valorizing his knowledge. Extension workers were committed to close training and supervision of farmers. Farmers are organized at village level in organic farmers associations. Peer visits are organized for farmers to

promote experience sharing and networking. OBEPAB played an interface role between farmers and the international market. Each organic farmers association applied for group certification. A social control system was set up to ensure the respect of the requirement of organic agriculture by the farmer within each association. This social control system is also expected to ease and reinforce solidarity in organic farmers' associations and community. To sum up, the institutional support to organic farmers promoted and ensured:

- Learning (training, farmer field schools, preparation and use of inputs, sustainable farming)
- Networking (lively farmer associations, meeting, outside peer visits, mutual control)
- Marketing (group certification, premium of 20 % on conventional cotton price, guarantee of acceptable income, no payment delay)

To support an effective decision making, OBEPAB held a database on the evolution of the organic cotton farmers (number of farmers according to gender and region), their commitment (cultivated areas), performance (yields, production, etc.), and the premium to organic farmers. As consequence, the numbers of organic farmers and production (areas and seed cotton) have impressively increased. From 1996 to 2010, the number of organic farmers has increased from 17 to 2,000 from which 216 were females (Fig. 1), the cultivated areas from 10 to 800 ha, and the produced seed cotton from 4.8 to 450 tons (Fig. 2).

What are the main influential factors in converting to organic farming in Benin? Our results show that the lack of transparency in the conventional cotton sector is a favorable situation for the development of organic farming. In addition, the organic farmers' rationales include the need for stable farm income (89.3 %), acceptable farm income (75 %), and health issues

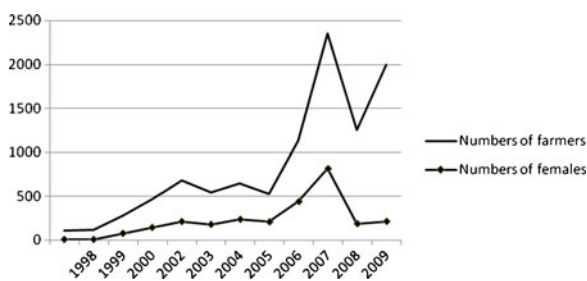


Fig. 1 Evolution of the numbers of organic farmers

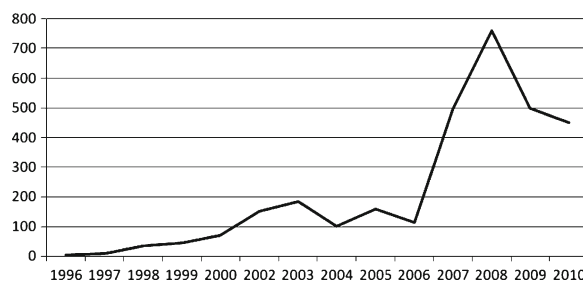


Fig. 2 Evolution of seed cotton production in tons

(35.5 %). Organic cotton farm income was said to be acceptable because of the premium of 20 % on conventional cotton price for fulfilling the requirement of organic farming. Only 1.5 % of respondents adopt organic farming for environmental reasons. Of organic farmers in general, 91.1 % and 100 % of females appreciated the low requirement of financial capital (fertilizers, pesticides, etc.) in organic farming because they made use of natural resources. This was particularly true for women who did not have easy access to chemical inputs for conventional cotton cultivation. One of them stated:

We female farmers in this village think that organic farming was invented for us. We were not allowed to get conventional cotton inputs from our own. We needed to pass through our men. This was uncomfortable because their needs should be satisfied first before we pretend having any input. We were exposed to uncertainty and conflicts. With organic cotton, we can produce inputs for ourselves.

Of organic farmers, 88.4 % enjoyed socio-technical networking through lively farmer associations, peer visits outside the village, collective experiences, solidarity, close and permanent contact with OBEPAB's leaders, etc.). Of them, 78.2 % get pleasure in technical learning (frequent trainings and farm visits by the advisers, farmer field school sessions, etc.).

Technical constraints for converting to organic farming

For high percentages of conventional farmers, organic farming was time and labor demanding and physically constraining but with low productivity (Fig. 3). Lower proportions of organic farmers and of farmers who reverted to conventional shared the same opinions

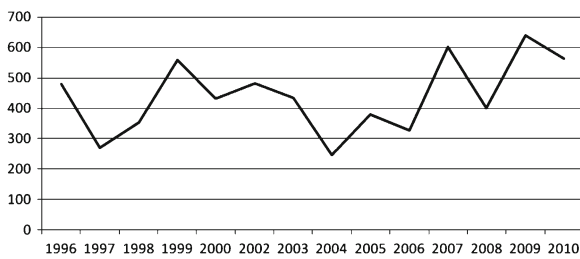


Fig. 3 Average yields in kilogram per year

(Table 1). Especially, an important number of organic farmers (30.5 % in general and 30.2 % of females) and farmers who reverted to conventional agriculture (55.2 %) found organic farming to be time demanding and were dissatisfied with its low productivity. Farmers must collect natural input (oil palm cake, cowpat, neem leaves, etc.) and prepare their own insecticides and fertilizers. This appeared more clearly in the speeches of conventional farmers and farmers who reverted to conventional farming, such as this one:

I have been one of the pioneers of organic farming in Djidja. I practiced it for two seasons before first abandoning cotton and then reverting to conventional. Therefore, I can talk well about it. It takes lot of time to collect raw materials to make organic manure and insecticide. You need to mobilize your friends, wives and children for many days. Those without this labor or good relationships with animal breeders for instance are in trouble. They could not collect raw materials to make enough inputs. This was my case.

But for most of the organic farming adopters, the free access to these inputs compensated for the collection constraints, and the premium of 20 % on the conventional cotton price balanced the low productivity. Of farmers, 2.1 % showed compliant behavior. They could not explain their decision for conversion.

This observation made it important to analyze how the institutional support to organic farming influences farmers' cognitive behavior.

Psychosocial analysis of farmers' motivation to convert to organic farming

The contextual conditions where the adoption of organic farming occurred were characterized by effective (1) socio-technical networking through lively farmer associations, peer visits outside the village, collective experiences, solidarity, and close and permanent contact with OBEPAB's leaders, and (2) technical learning through frequent trainings and farm visits by the agricultural advisers, farmer field school sessions, etc. This afforded farmers the possibility to satisfy their sense of social relatedness and competence. They felt themselves members of a socio-technical community. They also get the impression of being able to successfully do something differently. The following statement of one organic farmer reveal such feelings:

Organic farmers are like a family in the village. We shared many concerns and benefited from many training sessions. Our meeting and training sessions are places for information and knowledge sharing which goes sometimes beyond farming. We can produce cotton that will be internationally recognized as organic product. For this reason, we are considered by many people as knowledgeable persons. I think many organic farmers are proud of that and this also attracts many other villagers to join us.

The social control system (mutual control between farmers for fulfilling organic farming requirement) and close interaction with OBEPAB's field workers, which apparently restrained individual farmers to observe

Table 1 Perceptions on organic cotton farming

	Percentages of organic farmers	Percentages of conventional farmers	Percentages of farmers who reverted to conventional	Percentages of female organic farmers
Time demanding	30.5	54.5	55.2	30.2
Physical constraints	10.3	21.8	13.3	15.5
Labor demanding	08.1	14.6	10.5	08.5
Low productivity	45.9	65.1	60.5	43.1

organic farming rules, made the farmers feel that their farm income was secured. This is corroborated by many farmers, one of whom stated:

In this village, we know each other. It would be very hard for any organic farmers to transgress organic farming principles without being denounced by people. Our destinies are tied since non observance of rules by anyone may have bad consequences on everyone. Therefore we need to control each other, as our technical adviser from OBEPAB looks at anything we do. This is definitively good for we all. We are confident to produce organic and sell our cotton as such, i.e. with premium price.

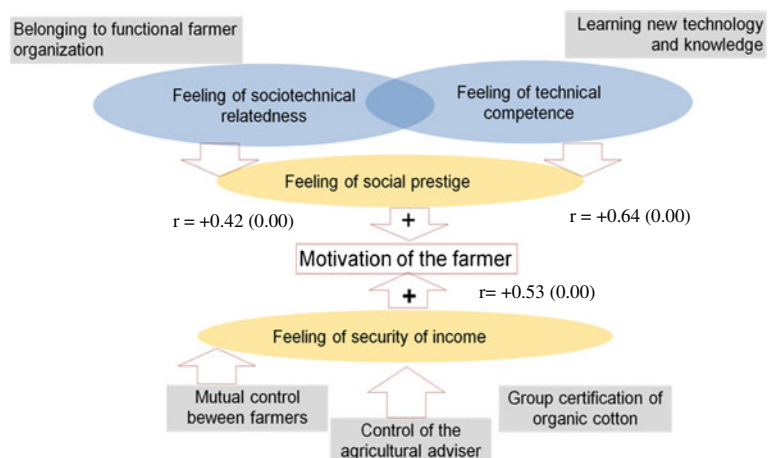
Correlation analyses supported these statements. The motivation to convert occurred when the institutional support system made the farmers feel the satisfaction of their needs for social relatedness ($r=+0.42$, 0.00), technical competence ($r=+0.64$, 0.00), and income security ($r=+0.53$, 0.00). On the other hand, the effect of the sense of self-determination on farmers' motivation was low and nonsignificant ($r=0.23$, 0.12) (Fig. 4).

Discussion

We found that the main factors which affect the adoption of organic farming were their perceptions of the characteristics of the technology (time demanding, physical constraints, labor demanding), the economic factors (low productivity, low financial requirements, premium, etc.), the institutional support for socio-

technical networking and learning, and the credit gained by the nongovernmental organization promoting organic farming. These findings support Conacher and Conacher (1982), Fisher (1989), Fairweather (1999), and Kallas et al. (2010) who found that many noneconomic factors can influence the conversion of farmers to organic agriculture. Contrary to the common environmentalist discourses and some research findings (Dubgaard and Sorensen 1988; Willer and Gillmour 1992; Cranfield et al. 2010) and consistent with Bruckmeier et al. (1994), Tovignan (2005), and Glin et al. (2012), few farmers adopt organic farming for ecological reasons in Benin. Our study brings new insights on how these factors motivate the farmers to adopt organic farming. Contextual conditions such as socio-technical networking (lively farmer association, peer visits outside the village, collective experiences, solidarity, close and permanent contact with OBEPAB's leaders, etc.), and technical learning (frequent trainings and farm visits by the advisers, farmer field school sessions, etc.) afford farmers the possibility to satisfy their sense of social relatedness and competence and thus lead to motivation. As stated by Glin et al. (2012, p. 343), "the social advantages of organic farming lie in the social learning that validates the farmers' knowledge and views about technological development. (...) the organic system relates the cotton to its ecosystem." Nonconsistent with Deci and Ryan's (1985) cognitive evaluation theory, the need for self-determination did not impact farmers' motivation. On the other hand, the social control system, which apparently restrained farmers' autonomy, made the farmers feel that their farm income is secured. Income and income security seem to be more

Fig. 4 Importance of psychosocial factors in farmers' motivation to convert



important for farmers than autonomy. This is consistent with classical motivation theories (see Maslow 1943; McClelland 1961; Alderfer 1969; Roussel 2000) presenting the needs for subsistence and security as basic and priority needs. In light of the organic farmers' motivation schemes presented above, we can argue that organic farming would considerably collapse when the organic market could no longer pay for the premium or when OBEPAB's organizational system could no longer ensure income security to farmers. Our results support recent findings such as those of Herzfeld and Jongeneel (2011) who argue that psychological and sociological literature adding motivational factors should be given more attention in analyzing farmers' behaviors.

Conclusion

This paper has provided an application of the cognitive evaluation theory and its usefulness in analyzing organic farming adoption processes. The cognitive evaluation theory enlarged to address safety issues that helped to explore the interfaces between the institutional support system and the adoption of organic farming. The needs for competence, social relatedness, and farm income safety act as psychosocial mediators between the technical and institutional support and the motivation to convert to organic farming. Alongside their technical abilities, the capacity of agricultural advisers to cope with psychosocial factors associated with the institutional support systems appears to be crucial in motivating farmers to adopt innovation.

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