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Adoption of organic cotton in Benin: does gender play a role?

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Abstract

Benin, the number 12 in world cotton exports (2002), relies heavily on this crop for its export revenue (64 %). More than 90% of pesticides imported in the country are used on cotton. The resulting environmental, health and economic problems conduced to the introduction of organic cotton as alternative to make cotton production in the country more sustainable.

Since 1996, organic cotton production is gaining importance despite its labour intensity, and though yields are around 0.5 ton compared to 1 ton in the conventional sector. In addition, it became attractive for women. They are directly engaged in organic cotton production by getting their own field, a situation which is not common in conventional cotton.

This study aims at clarifying various factors that determine the adoption of organic cotton and the role of the gender in this process. Data for this study were collected from 200 households (50% conventional and 50% organic) in central Benin where 70% of organic farmers, with 77% of organic area, are operating in the country (data from season 2003/2004). Gender is defined, not in terms of women or men, rather as the weight of women contribution to household labour and income.

The results show that the main reasons for adoption are based on desire for stable income, lack of transparency in the conventional sector and health. Only 1% of respondents adopt because of environmental reasons. On the side of non-adopter, low yields and a lack of information are the main reasons. Contrary to what one would expect, only 4.8% of respondents do not adopt because of labour intensity.

Econometric models reveal that a range of socio-economic factors, among which gender is crucial, determine significantly the adoption of organic cotton by the households.

Keywords: Adoption, organic cotton, Gender, Benin

1 Background and Problem

1.1 Why organic cotton?

Cotton is the most important cash crop and it plays a determinant role in Benin's economy. It contributes for 24 % to the Gross National Product (GNP) and 64 % to the export revenue. Benin is the 12th largest cotton exporter in the world (MINOT, 2002: 8).

In the two main growing areas (central and northern), cotton is the principal source of monetary income for most farmers and farming families (VODOUHE, 1995). Moreover, more than 100,000 households or one million of people are involved in cotton production in the country. Since 1982, the production has grown considerably (form 31,200 tons of seed cotton in 1982 to 336,507 tons of seed cotton in 2001). One can speak of a cotton boom. This can mainly, be attributed to an increase of cotton area and to the implementation of new technologies like new varieties, mineral fertiliser, synthetic pesticides and animal traction (VODOUHE, 1995 op cit). While the area and production are growing up, the average yield is

regressing. It has decreased from 462 Kg of cotton lint per hectare in 1990 to 349 Kg of cotton lint per hectare in 2002 (ICAC[1], 2003).

More drastically, the price of modern inputs (mineral fertiliser and synthetic pesticides) increased each year, affecting negatively farmers' income. This is explained by two phenomena. First, in 1994, the local currency FCFA[2] was devaluated by 50% and all imported inputs (including pesticides and fertilizer) became very expensive. Second, cotton pests started developing resistance against old pesticides and their active ingredients. In order to cut off the pest resistances (especially *Elicoverpa*), stronger and more expensive pesticides (like endosulfan) have been introduced. Moreover, farmers were not enough informed about the toxicity and the precaution of handling these new pesticides. As results, more than 70 deaths (in 2000) and 24 (in 2001) and many health injuries occurred among farming communities (TON et *al.*, 2000 and TOVIGNAN et *al.*, 2001). These phenomena increased the awareness of farmers and development institutions, and it introduced a mood for problems in cotton, searching for alternatives to the conventional farming systems.

As an alternative system, organic farming in cotton has been proposed and is actually under development. The initiative was led by two NGOs[3], namely, OBEPAB[4] and PADIC-Kandi[5]. These two NGOs started in the central and northern Benin, respectively, in 1996 making experiments in organic cotton production. After some successful experiments, they are going forward and the number of farmers in the program increased from 40 in 1996 to 650 in 2002.

1.2 Alternative farming methods promoted

The intervention methods applied by the two NGOs are more holistic and reconsider farmers' knowledge on the use of local resources. They focussed on improving farmers' abilities to find solution to problems they are facing in their farming activities.

Alternative techniques applied, are not similar from one region to another. Whereas in the centre of Benin the palm oil processing residue named "Tchôtchôkpô" is used as organic fertilizer, in the North, cattle manure is available for the same purpose. As alternative to synthetic pesticide, the neem seed, papaya leaves and cow urine are becoming popular. In addition to those techniques, cultivation alternatives are promoted such as: rotation with leguminous crop, scouting before spraying, manual collective collection and destruction of pests, etc.

Yields obtained in organic cotton farming rang from 0.3 to 1.2 ton with a mean of 0.56 ton in 2000 (VODOUHE and TOVIGNAN, 2000). Whereas in conventional farming and in the same area, the average seed cotton yield is around 1 ton per hectare.

1.3 Gender in cotton production in Benin

Cotton production has been for long time dominated by men who use women as labour force only. One can hardly find statistical data explaining women achievements in cotton production. Although they are highly involved, at household level, in critical cotton production activities such as sowing, fertilising, weeding and harvesting. Men are more involved in activities such as land clearing, ploughing and spraying pesticides. Access to modern inputs (synthetic pesticides and fertilisers) and particularly the manipulation of pesticides are among the major constraints for women in cotton production, as they can be the victims of abortion or contaminate easily family food. The few women, who hold separate conventional cotton fields, rescue to men labour (that is not always available on time) when it comes to pesticides application (VODOUHE, 2003: 72).

[1] ICAC: International Cotton Advisory Committee
[2] 1Euro = 655,95 FCFA
[3] NGO : Non Governmental Organisation
[4] OBEPAB: Organisation Béninoise pour la Promotion de l'Agriculture Biologique
[5] PADIC-Kandi: Projet d'Appui au Développement Institutionnel de la circonscriptions Urbaine de Kandi. It is a project of the Dutch development service SNV acting as NGO.

With the introduction of organic farming, more women start getting their separate cotton field, because they can perform safely all the farming activities themselves. Therefore, the number of women producing organic cotton on a separate plot is increasing. For example in Benin, the percentage of organic female farmers increased form 0 to 25% between 1996 and 2001. This trend was not only observed in Benin but also in Senegal where the percentage of women, producing organic, increased from 5 to 38% between 1995 and 2000.

In order to avoid the contamination of organic cotton, one of the regulatory measures is that the whole household should convert to organic farming. The increasing number of households and particularly the number of women coming to organic cotton lead to the assumption that gender is playing somehow a role in the adoption process of organic cotton.
This paper aims to clarify factors that are determinant in the adoption process of organic cotton and, particularly, the role of gender in making organic cotton accepted in households.

2. Methodological bases

2.1 Study area and data collection

The study area is located in the *Zou* department in central Benin. This department is, after *Borgou* the second most important cotton production zone in Benin. Major organic farming activities are occurring in this area where 70% of organic farmers are, with 77% of organic area (data from season 2003/2004). The data collection took place from August 2003 to January 2004.

Data have been collected from 200 cotton producing households by structured interviews with both men and women in the household. In order to assess the flow of resources between both partners, the research took into account only households where both, men and women, are engaged in agricultural activities. Half of the sample is constituted with conventional households and another half with organic households.

2.2 Organic cotton as innovation

Organic cotton can be understood as a composite innovation rather than a single one. Three different technical kinds of innovations are part of the package:
- Innovations related to organic soil fertility management,
- Innovations related to organic crop protection,
- Innovations related to farm management.

The organic premium price (20% above the conventional price) is subject to the fulfilment of a set of requirements, which include simultaneously achieving the technical innovations. These regulatory considerations oblige the farmer to adopt the whole package before getting his cotton certified as organic. Considering this, the study defines organic cotton as a single innovation. In addition, according to the farming practices in Benin the whole household has to convert to organic cotton. Therefore, only two categories of households can be found; the one of organic cotton farmers and the other of conventional farmers.

2.3 Review of econometric models to analyse adoption decision

Adoption is defined as a mental process (ROGERS, 1971). However, for a rigorous theoretical analysis, we need a precise quantitative definition. According to FEDER *et al.,* (1985: 256), adoption is the level of use of a new technology in long-run equilibrium when a farmer has full information about the new technology and its potential. Several econometric tools have been used to analyse the factors that prevent or favour the adoption of a new technology. Probit and Logit models are the most suitable methodologies developed to investigate the effects of explanatory variables on dichotomous dependent variables (AMEMIYA, 1973 cited by FEDER *et al*, op cit).

Logit model corresponds to a logistic distribution function and Probit model assumes a normal distribution. These models are actually largely applied in most adoption studies with many variants according to some specific considerations. For example, multinomial Logit is mostly used to analyze simultaneous or sequential adoption decision. The farmer may be in contact with two or more single

technologies and will prefer to adopt one before others or the adoption of one technology is subject to the adoption of another. One common example that led to such analysis in the literature is the adoption of Hybrid maize and fertilizer as innovation during the GREEN REVOLUTION. In this study, organic cotton is considered as single technology because of regulatory requirements that oblige farmers to adopt the whole package of three major single technologies (as described above). Therefore, the model used in this study is a Logit model in which gender as well as household specific and farm specific variables have been introduced as explanatory variables.

3 Model specification and mathematical formulation

The Logit model has been widely applied in adoption studies (BAGI, 1983; POLSON and SPENCER, 1991; ADESINA and SIRAJO, 1995; quoted by ADESINA et al, 2000). For simplicity, let Y be the decision to adopt organic cotton ($Y = 1$ if organic cotton and 0 otherwise) and X a vector of explanatory variables related to adoption. The probability of the adoption of organic cotton can be theoretically expressed as:

$$Prob\ (Y=1) = 1/(1 + e^{-\alpha X}) \quad (1)$$
$$= f(\alpha X)$$

Similarly, in the specification of our empiric model, the adoption of organic cotton (AOC) is expressed as the probability that a farmer practices organic cotton or not. The specified equation can be written as follows:

$$AOC = \theta_0 + \theta_1 GI^* + \theta_2 AH + \theta_3 EL + \theta_4 LT + \theta_5 TS + \theta_6 PA + \theta_7 AC + \theta_8 OF + \theta_9 NR + \theta_{10} NA + \theta_{11} EV + \varepsilon \quad (2)$$

AOC takes the value 1 for organic farmers and 0 for conventional,
*GI** is the predicted gender index,
AH is the age of the head of the household,
EL is the education level of the head of the household,
LR is the land tenure,
TS is the topographic status of the cotton farm,
PA is the experience of the head about pesticide accidents,
AC is the access to credit by the head of the household,
OF is the off-farm income of the head of the household,
NR is the number of ruminant animals in the household,
NA is the number of active household members,
EV is the number of extension visits (per month) to the head of the household,
θ Are coefficients to be estimated and ε is the term of error.

3.1 Conceptualizing Gender

Sex differences are due to innate biological differences between men and women. Gender differences arise from the socially constructed relationship between men and women (OAKLEY, 1972, cited by QUISUMBING, 1996). Many authors have introduced gender in their models by using various considerations of this concept.

Some studies have considered gender as women's achievement separately to that of men's or as women headed households against those headed by men. In the similar way, authors considered gender as dummy variable. This was the case with BURTON *et al.,* (2003) in their study on modelling organic technology adoption in UK. They considered gender as dummy variable in a panel data and have found that female farmers have a conditional probability of adoption which is almost two and a half times that of the male counterparts. However, such methodology of including gender perceives women as separate economic agent, as, opposed to men rather than considering their contribution in the household. A gender study, in view of the definition of the concept, should include the relationship and the flow of resources between men and women in a very close social unit which is the household.

Taking this consideration into account, some other studies defined gender as number or percentage of women in the household. For example, SOMDA *et al* (2002), by studying the socio-economic factors of composting technology in Burkina Faso found that gender, defined as percentage of active women in the household was positively significant. Defining gender as percentage of active women is a way of considering women's contribution in the household. However, in some cases this percentage may be high and in reality women's contribution low. Considering women's contribution directly may help to avoid

this bias. Thus, this study defines gender as a cumulative contribution of women with regard to labour and income within a household.

3.1.1 Schematic explanation of gender

Gender can be represented schematically as shown in Figure 1.

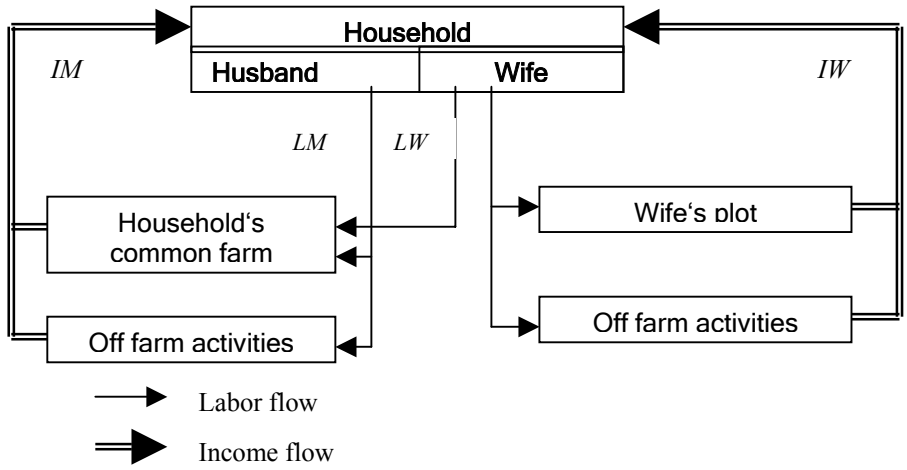

Figure 1: Schematic representation of gender

In Benin and particularly in the study area, each household has a common farm (cash crop and food crop) which is managed by the husband. Each member (including the wife) has to contribute labour. Though a wife can get her own small plot of cash crop and food crop and can be helped in the farm activities by other family members with the agreement of the husband. Each household member can also perform other off farm activities. The income generated by all those activities is some how used to satisfy the needs of the household. In this study, a specific gender is computed as index representing the cumulative share of women in terms of labour and income. This index is considered as one of the characteristics of the household.

3.1.2 Mathematical explanation of Gender

Let *LW* and *LM* be respectively the total labour the woman and her husband of the *ith* household use on the common farm (for cash crop and food crop). Similarly, let *IW* and *IM* be respectively the total income the woman and her husband get from both farm and off-farm activities.

The GI_i, the gender index of the *ith* household can be mathematically expressed as follow:

$$GI_i = \frac{\varpi LW_i + IW_i}{\varpi(LW_i + LM_i) + IW_i + IM_i} \qquad (3)$$

ϖ is the average wage rate in the study area. It has been used to convert the labour in terms of money in order to put the two component of the gender index in the same basis.

The gender index *GI* is comprised in the interval [0; 1]. This means that, if *GI* takes the value zero, the woman contributes neither to the labour nor to the income; a situation which is not common. The other extreme is when the *GI* takes the value one, a situation that can occur only in a woman headed household. This situation can not be found in the scope of this study because only households constituting with husband and wife have been taken into account during the field study.

Prediction of the gender index

An OLS regression model helps to estimate the predicted value of this index. If *GI** is the predicted value of GI, its equation can be written as follow:

$$GI^* = \beta_0 + \beta_1 AW + \beta_2 NAF + \beta_3 ELF + \beta_4 MFO + \omega \qquad (4)$$

AW is the age of the woman in years,
NAF is the number of active female household members,
ELF is the education level of the woman,
MFO is the membership of the woman in local women's organizations, β are the coefficients to be estimated and ω is the term of error.
Table 1 presents the characteristics of the gender index and its influencing factors.

Table 1: Characteristics of the gender index and its influencing factors

Variables	Symbols	Mean	Std. Deviation	Expected sign
Gender index	*GI*	.25	.174	+
Education level of woman	*ELF*	.69	1.81	+
Member of local women's organization	*MFO*	.56	1.59	+
Age of the Woman (year)	*AW*	32.12	8.39	+
Number of active female household members	*NAF*	3.44	1.96	+

It is important to remember that the gender index varies from zero to one. The table 1 shows the average value of 0.25 which means that women contribute for 25% (average) to the labour and income in the household.
As regard to the relationship between labour contribution and income contribution, the Pearson Correlation coefficient is -.146 and significant at 5% level of probability. The negative sign of this coefficient reveals that if the labour contribution is high, the income contribution is low and vice-versa. It means that there is a kind of trade-off relationship between those two components of the gender index. The characteristics of variables that are supposed to influence the gender index are also presented in the table 1.

3.2 Other variables in the organic cotton adoption model

In addition to the gender, nine other variables have been included in the model. FEDER *et al*. (op cit.) and NKONYA *et al.* (1997), by reviewing the factors affecting adoption of agricultural technologies in developing countries, have noted that many studies identified the following variables as main determinants: access to information, credit, farm size, human capital, labour availability, off-farm income, land tenure, adequate input supply and infrastructure. However, the specificities of each study determine variables to consider. These specificities can derive from the technology considered, socio-economic conditions in the study area and policy that may remove some of the constraints. In the context of this study, the variables considered and their characteristics are presented in the table 2.

Table 2: Characteristics of the variables in the adoption equation

Variables	Symbols	Mean	Std. Deviation	Expected sign
Predicted Gender index	*GI**	.264	.123	+
Age of the head of the household (years)	*AH*	3.82	10.24	+
Education level of the head	*EL*	.815	2.01	+
Access to credit by the head (dummy)	*AC*	.36	.481	+
Off farm income of the head (10,000 FCFA)	*OF*	5.34	11.97	+
Topography of cotton farm	*TS*	3.27	1.80	+
Land tenure*	*LT*	2.95	1.140	+
Total number of animals in the household	*NR*	17.42	8.02	+
Number of active family members	*NA*	7.07	2.73	+
Experience about pesticides accident**	*PA*	2.59	1.08	+
Number of visits of extension agent per month	*EV*	1.69	1.06	+

* 1= borrowing, 2= Hiring, 3= buying, 4= inheriting
** 0= Never heard about pesticides accident, 1 = have just heard about it, 2 = Have been eye witness of pesticides accident, 3= Have got family member victim, 4 = have been victim

4 Results and discussion

4.1 Reasons cited for the decision to adopt organic cotton

According to SOMDA *et al* (2002), the choice of a technology is the result of a complex set of interactions between comparable technologies and farmers' socio-economic and demographic characteristics. Thus, reasons justifying the adoption or rejection of organic cotton are related to the technology's characteristics, the socio-economics environment and the socio-demographic conditions of the farmers' household. The table 3 is obtained from descriptive analysis and presents the reasons cited by farmers to justify their decision.

Table 3: Reasons cited for adopting/non-adopting organic cotton (% of respondents)

Category	Reasons	Percentage
Adopters	Get stable revenue	58.8
	Lack of transparency in conventional sector	20.6
	Health problems	19.6
	Environmental problems	1
Non-adopters	Low yield	58.2
	Lack of information	20.9
	Can not fulfil the requirements	16.1
	Labour intensity	4.8

Source: field study, 2003

The Table 3 shows that farmers do not go for organic cotton because of environmental reasons. Even, if it is perceived by many policy makers and development agencies as offering solutions to environmental degradation and other problems associated with conventional agricultural practices (BURTON *et al.*, 2003). They are rather motivated by the stability of their revenue, the malfunction of the organizational framework in the conventional sector, and health problems associated with the use of synthetic chemicals they experienced in conventional cotton. In the same line, the non-adopters do not choose not to adopt because of labour intensity of organic cotton. Farmers are rather unmotivated in their choice by the low yield in organic cotton, lack of information about organic cotton and some strict regulations that they can not fulfil.

4.2 Empirical prediction of the gender index

The results of the gender index prediction presented in the table 4 show that the education level of the woman, her belonging to a local women's association and the number of active female household members influence the gender index positively and significantly. Whereas, the age of the woman does not affect the gender index significantly, even if these variables have a positive effect.

Table 4: Prediction of the gender index (dependent variable: Gender index)

Explanatory variables	Coefficients	t-ratio	Sig.
Constant	.136***	4.891	.000
Education level of woman	.438***	6.729	.000
Member of local women's organization	.331***	5.216	.000
Age of the woman	.028	.520	.603
Number of active female household members	.107***	2.119	.035
Number of observation		200	
R^2 (adjusted)		.556	
F statistic		63.35	
Significance level		.000	
Dependent variable		Gender Index	

Asterisks indicate significance at the following levels: *** 1%, ** 5%, * 10%.

Our results suggest that the contribution of women in the household in terms of labour and income is determined by the education level of the woman and participation in local women's association. The

highest education level of women is the college level. In their associations, educated women play the role of a leader. This position brings them in close contact with intervention agencies (governmental and non-governmental) and they are more informed than others. Women take advantage of their position to initiate farming and off farming activities to increase their income and to show good example to their group mates.

One limitation of the defined gender index is that, it ignores the cultural dimension of the gender. But the imperative of estimating the gender quantitatively makes it difficult to consider all the dimensions of the concept.

4.3 Empirical estimation of adoption of organic cotton

The results of the estimation of organic adoption cotton, at household level, as presented in the table 5 show that the model is significant at 1% probability level.

Table 5: Results of Logit model for the adoption of organic cotton

Variables	Coefficients	Standard error	Ceoff./S.E
Intercept	-11.228***	1.975	-5.683
Predicted Gender index	11.441***	2.496	4.583
Age of the head	.055*	.030	1.828
Education level of the head	.328***	.144	2.276
Access to credit	-1.459***	.535	-2.725
Off farm income of the head (10,000 FCFA)	.056*	.035	1.673
Topography of cotton farm	.600***	.290	2.070
Land tenure	.120	.228	.529
Number of ruminant animals	.002	.010	.211
Number of active family members	.096*	.101	1.846
Experience about pesticides accidents	.732***	.270	2.706
Number of extension visits per month	1.232***	.287	4.283

Pearson Goodness-of-Fit Chi Square = 331.444 DF = 188 P = .000
Asterisks indicate significance at the following levels: *** 1%, ** 5%, * 10%.

According to their significance status, three categories of variables can be distinguished. First, The variables such as: the predicted gender index, education level of the head, the topographic status of the land, the farmer's experience about pesticides accidents, access to credit and the number of extension visits farmers receive per month determine positively the adoption of organic cotton at 1% level of probability. Second, factors such as the age of the farmer, the amount of his off-farm income and the number of active household members also determine the decision of adopting organic cotton but significant at 10% level of probability. Third, land tenure and number of ruminant animals are not significant. In the following discussion, more attention will be given to variables that can lead to possible policy implications.

In the previous section (4.2), we found that the gender index itself is determined by the education level of women and their membership in women's associations. This result suggests that women use the opportunity to be educated and belonging to local associations to increase their information level about economic and technical possibilities around them. By taking advantage of those possibilities, they increase their income and contribution to the household needs. Thereby, they may convince their husband to adopt organic cotton in the household, as the whole household has to be converted into organic cotton (and knowing that women are highly constrained in producing conventional cotton).

Educated farmers are more inclined to adopt organic cotton. This result is not surprising because many former studies have reported the evidence of relation between farmer's education and the adoption of agricultural innovation. For example, NKONYA *et al*, (1997) have found a positive relation between education level of the farmers and the adoption probability of improved maize seed in northern Tanzania. In the same line, ERSADO *et al* (2004) in their study on productivity and land enhancing technologies in northern Ethiopia have found that more educated household's heads are well informed and receptive, which translates into a higher likelihood of engaging in new technologies.

According to pesticides accidents, all cotton producers who used to handle synthetic pesticides experienced health injury or more dramatic accidents at least once. The situation exacerbated with the liberalization of cotton inputs market. In 1998, a suspicious environment was created around the intervention of private economic operators accused to have sold pesticides of fake quality to farmers, which conduced to the breakout of pests and their resistance to molecules used before. Then a more strong pesticide (endosulfan) was introduced to cut-off the pest resistance. Unfortunately, farmers were not informed enough about security precautions. As a result, many deaths and health injuries occurred among farming communities (TOVIGNAN *et al,* 2001). Organic cotton gives farmers who experienced such accidents the opportunity to continue producing cotton.

With regard to capital related variables, while off-farm income has positive influence, access to credit is negatively related to organic cotton adoption decision. In fact, organic farmers do not have access to official credit system that is reserved for conventional farmers who use their association as guarantee. Organic farmers even in association can count only on informal credit (with high interest rate) and their off farm income to finance farming activities. The reason for that is related to the marketing of organic cotton through different scheme than the one of conventional cotton. Indeed, the strict requirements of the organic sector regulation recommend a separate marketing system. Therefore, authorities giving official credit are reserved because of limited guarantee. These results reveal indirectly that an official policy support to the organic sector in providing credit facilities may yield in increased adoption of organic cotton.

Land tenure and the number of ruminant animals showed non-significant effects. These unexpected results reveal that there is no specific difference between organic and conventional farmer regarding those two variables. Sustainable agriculture practices are more likely adopted by farmers with secure land tenure (BIAOU, 1995), and the possession of ruminant animals which means availability of animal manure should support farmers' decision of adopting organic cotton. Nevertheless, the positive sign of the coefficient related to this variable can comfort about its relationship with organic cotton adoption in the study area.

Finally, the above discussion drives to some policy implications. As the gender index is strongly linked to the education level of women and their membership in women organisations, it is advisable to encourage education in rural area (particularly, girls education), as long term strategy. In the short term, women should be encouraged to come together in association to share knowledge. Farmer with former health disabilities should be encouraged to adopt organic cotton in order to reduce their vulnerability vis-à-vis chemicals. Furthermore, information exchange between organic and conventional farmers should be encouraged in order to reduce the information deficit among non-adopters. An official support like credit facilities is necessary to upgrade the adoption of organic cotton in Benin.

5 Concluding remarks

Among reasons justifying adoption of organic cotton, environmental reasons do not get much attention from farmers contrary to the common perception among development agencies that promote this technology. In addition, the high labour demand as reason for non-adoption seems not to be much obvious. Adopters' rationales are rather, stability of revenue, lack of transparency in the conventional cotton sector and health problems. Whereas non-adopters put out low yield, lack of information and regulatory requirements they can not fulfil. In general, it appears obviously that, farmers who experienced bad pesticide accidents and/or are victims of dysfunctions in conventional sector are more favourable to adopt of organic cotton.

Empirical results reveal that the gender defined as women's contribution in terms of labour and income in the household is determined by their education level and membership in local women's associations. Furthermore, results show significant influence of gender on organic cotton adoption decision. In other words, women use their contribution level to household needs to convince for the adoption of organic cotton by the household. Transitively, it means that encouraging women's associations and women education can lead to an increase in their contribution to the household and upgrade the adoption of organic cotton in the study area.

Among other factors, the education level of farmers and their frequent contact with extension agents ease access to accurate information about organic cotton and are decisive in the adoption decision. Moreover, more communication between organic and conventional farmers should be encouraged in order to increase the information level of conventional farmer about the advantages and disadvantages of organic cotton. This may become the determining factor, especially if it comes to the extension of organic cotton in Benin. In this regard, an official policy support will be necessary and can take, for example, the form of credit facilities to organic farmers.

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