USAID
FROM THE AMERICAN PEOPLE

West African Regional Food for Peace Office
USAID/WEST AFRICA
Professional Paper Series

March 2009 Series No 7

IMPACT OF USAID/FFP-FUNDED PROGRAMS ON SMALLHOLDER HOUSEHOLD FOOD SECURITY IN BURKINA FASO

ABSTRACT

The objective of this professional series paper, conducted by regional USAID/West Africa's Office of Food for Peace (FFP) staff in Senegal, is to identify the impact of the Africare Zondoma Food Security Initiative (ZFSI) in Burkina Faso. As part of the analysis, 598 households were randomly selected to assess the impact of various variables on household food insecurity. Based on descriptive statistics and logistic regression analysis results, small households (1-9 persons) seem to be the most vulnerable households in Zondoma province. In addition, households headed by women are the most vulnerable to food insecurity and are 50% more likely to be food insecure than households headed by men. The length of participation in project activities significantly influenced the rate of household adoption of new technologies introduced by the project and its level of impact on household food security. The land rehabilitation and water conservation activities introduced by the ZFSI II project are very effective tools in reducing household vulnerability to food insecurity in Zondoma. Data collected by the ZFSI II project also confirmed the importance of livestock in household food security and livelihood.

INTRODUCTION

With USAID Office for Food fore Peace (FFP) funding, Africare has been implementing the Zondoma Food Security Initiative (ZFSI) in Burkina Faso since 1999. The project was built on Africare's successful Phase I (ZFSI I) project which reduced the percentage of chronically food insecure households from 62% to 39% in 40 villages between 2000 and 2004. The overall goal of the ZFSI Phase II is to increase the ability of households in the province to manage future risks by building stronger, more diversified livelihood systems based on local resources. This will be achieved through improved agricultural

productivity, more diversified income earning opportunities, nutrition education, and access to clean water. During the 2007 mid term evaluation of the ZFSI II project, it was found that the percentage of households considered as food insecure was reduced from 53% at the baseline to 26% in 2007 -- a 50% reduction.

The objective of this professional series paper, conducted by regional FFP staff in Dakar, Senegal, is to identify the impact of the ZSFI II on food insecurity in the province, one of the poorest regions in Burkina Faso. The document contains five sections: Background, Methodology, Findings, Discussion, and Conclusion.

FFP regional staff are very grateful to Ahmed Moussa Ngame, the Africare/Burkina Faso Country Representative, and his staff, for their hard work on behalf of the population of Zondoma Province[1] and for their support of this research. FFP/Dakar is also grateful to Mr. Sounka N'Diaye, the USAID/Dakar Monitoring & Evaluation Specialist, for his helpful and timely comments on this document.

BACKGROUND

Burkina Faso has consistently been ranked among the poorest and least developed countries in the world. The country is landlocked and arid and has highly irregular rainfall patterns. Its predominantly rural population (80%) is concentrated in the central plateau area that has some of the highest rural population densities in West Africa[2]. The National Statistics Institute (INHD) estimates that nearly 40% of the population suffers from some form of food insecurity--in terms of consuming inadequate calories and/or poor utilization. Many households face drastic annual and seasonal variations of caloric intakes particularly during peaks of food shortages. In 2001, 61.2% of the population was reported to be living below $1 a day and about 85.8% was below $2 a day[3]. The General Poverty Index increased from 44.5% in 1994 to 46.4% in 2003[4].

Between 1993 and 2003, stunting levels in children under five increased from 33.3% to 44.5%. Malaria, diarrhoea and respiratory infections are respectively the three leading causes of child morbidity and death. Child malnutrition is mainly rooted in poor nutritional knowledge and inadequate health and nutrition practices of the caregivers. Poor environmental hygiene and lack of potable water compound these problems.[5]

With households meeting only 66% of their annual food needs, Zondoma Province is one of the poorest and least food secure areas in Burkina Faso. According to the Zondoma

[1] The Africare Burkina Faso program was awarded the medal and title of "Chevalier de l'Ordre National" on December 9, 2008 -- on the occasion of Burkina's 48th independence celebration. This award was presented in recognition of the achievements of the second phase of the Title II program. The award is the highest ranking honor to be given by the Burkinabe government.
[2] Africare/Burkina Faso, FY 05 - FY 09 Development Assistance Program Proposal (DAP).
[3] Human Development Report, UNDP, 2003.
[4] Burkina Faso, Cadre stratégique de lutte contre la pauvreté; Ministère de l'Economie et du Développement, Septembre 2003.
[5] Although on average there is 95% accessibility to potable water, this hides huge geographical disparities in access ranging from 31% to 131%.

Food Security Initiative baseline survey, 62% of the households in the project zone are food insecure for three months or more. Malnutrition levels in the villages not supported by Africare are probably similar to the north where a 1999 Demographic Health Survey (DHS) estimated that 46.11% of the children under five are stunted and 43.5% are underweight. Malnutrition contributes to 37% of infant mortality in this area. These high levels of food insecurity are the direct result of a variety of factors (such as land erosion and erratic rainfall) that are exerting pressure on traditional household livelihood strategies.

METHODOLOGY

As noted earlier, data used in this analysis were drawn from Africare ZFSI II 2007/2008 evaluation data. 598 households were randomly selected to assess the impact of various variables on household food insecurity. FFP/Dakar regional staff conducted descriptive statistical analyses using SPSS/PC and STATA. Statistical analysis (Chi2 analysis) was also conducted to assess the degree of association between individual interventions promoted by the project (independent variables) and household food insecurity (dependent variable). The combined effects of the project interventions on household food security and their degree of association with each other were analyzed using the logistic regression analysis method. The variables analyzed include socio-economic characteristics of the household and their access to microfinance.

FINDINGS

Socio-economic characteristics of households

Zondoma province, like many rural areas in Burkina Faso, is dominated by subsistence smallholder households. The average household size is 14 persons of which six are active workers. According to household data collected in 2007, 12.5% of Zondoma households were headed by women--mainly widows with small children. The average household farm size is 3.7 hectares but only one hectare per household has been rehabilitated[6]. Agriculture is the main activity of the Zondoma population (95% of households) with most farmers practicing some type of livestock rearing including chicken, small ruminants, and cattle. About 81% of Zondoma farmers use animal traction in their farming systems.

Crop production in Zondoma is almost entirely rain fed with very little use of any type of improved water harvesting techniques. Sorghum and millet are the two main staple cereal crops grown in Zondoma for household consumption. Niebe (cowpeas), peanut and sesame are also grown mainly as cash crops.

Technologies adoption

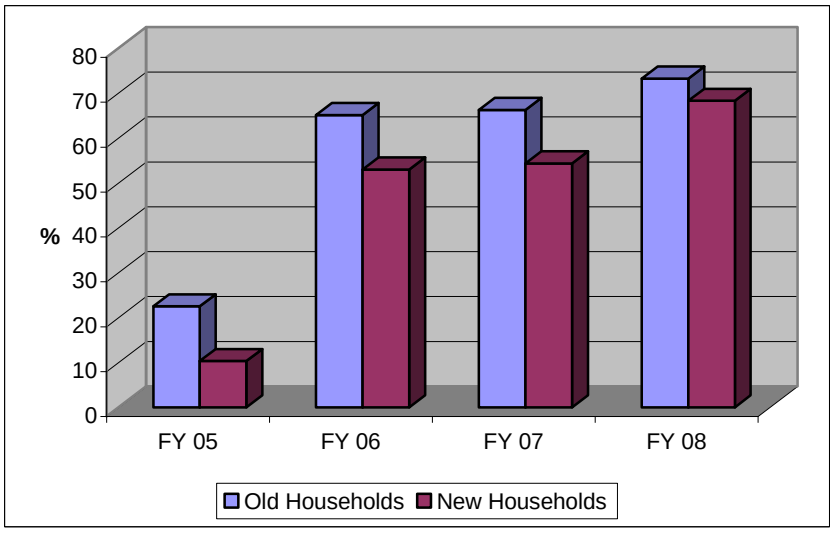
The main focus of the ZFSI II project was to develop and diffuse new technologies such as improved seeds, use of soil fertility enhancing techniques, soil conservation and use of

[6] Eroded land was rehabilitated with project-supported FFW.

improved livestock husbandry techniques that could improve agricultural and livestock production. The adoption level of the improved technologies was measured by the project as the number of farmers using at least three of the new techniques introduced by the project.

As shown in Figure 1, the adoption rate of improved agricultural techniques such as improved seed, land improvement and organic manure varied between 10 to 20% in FY 2005. In FY 2008, the rate of adoption averaged 68%-73%. **This significant increase in the adoption of new technologies was attributed to the use of Title II food aid (Food for Work) to mobilize farmers. Positive results were realized by using improved agricultural production innovations such as organic manure pits to enhance soil fertility and land reclamation techniques for the rehabilitation of eroded lands.**

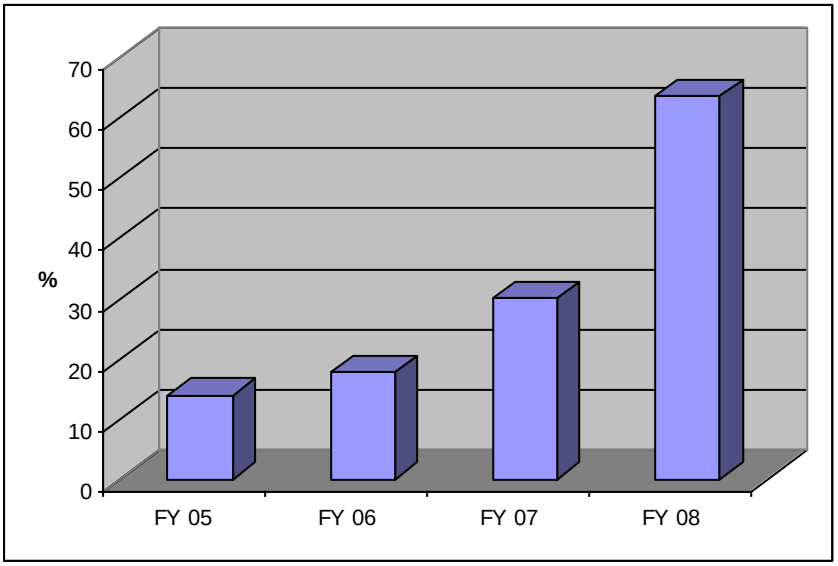
Figure 1: Percent of Households Adopting Improved Agricultural techniques



Source: Africare Burkina Faso ZFSI II FY 08 Result Report

In addition, the number of farmers adopting improved livestock techniques introduced by the project has significantly increased. According to the baseline study (2005), only 14% of the households (old and new) in the project zone were using improved livestock activities (Figure 2). However, since 2006 when Title II interventions were introduced, the number of farmers adopting improved livestock technologies continued to grow reaching a peak of 64% in 2008 compared to the project's target of 30%.

Figure 2: Percent of Households adopting Improved Livestock techniques



Source: Africare Burkina Faso ZFSI II FY 08 Result Report

Lack of financial resources was identified by Africare as one of the major constraints limiting participation of women and poor households in livestock development interventions in Zondoma. To overcome this constraint, the ZFSI II linked its livestock program to a microfinance institution which provided credit for the livestock purchases while the project continued to provide technical assistance as needed. In addition, the project supported poor households that could not afford the 10% loan down payment required by the village banks. In 2008, a total of 4,902 persons (99% women) were supported and received a total of $440,405 through the project's micro-credit activities. About 43% of the loan beneficiaries implemented livestock activities such as raising poultry, sheep fattening, and small ruminants breeding.

The Zondoma household food insecurity profile

Months of Adequate Household Food Provisioning (MAHFP) was developed by Africare in the late 1990s as a tool for identifying vulnerable groups and measuring the impact of Africare Title II funded programs on increasing or diminishing the number of people classified as vulnerable (Simeon Nanama et al). Two methods are used to measure MAHFP. One uses quantitative data from a sample of households to calculate an average MAHFP (hereafter referred to as MAHFP-average). The second uses Participatory Rural Appraisal (PRA) where community-based food security committees provide qualitative information about the percentage of households in different categories of food security based on the group's perception of MAHFP (hereafter referred to as MAHFP-PRA)[7].

Based on food security assessments using the indicator MAHFP-PRA, households are classified into three categories:

[7] "How to Measure the Number of Months of Adequate Household Food Provision (MAHFP) Based on Participatory Rural Appraisals in Food Security Intervention", Africare, September 2007.

Category 1: least food insecure households including households that are able to satisfy their hunger throughout the 12 months of the year.
Category 2: moderately food insecure households including households that are able to satisfy their needs for 9 out of the 12 months of the years.
Category 3: termed as the most food insecure households including households that are food insecure for more than three months of the year.

In 2007, the ZFSI team used the MAHFP indicator to detect links between vulnerability and household practices related to health and nutrition. **They concluded that about 50% of the malnourished children in the survey came from the most food insecure households.** Each year, the project's Community-based Food Security Committees use the MAHFP-PRA indicator to determine the number of households in each of the three food security categories in their villages. This categorization process allows the project to reorient its activities towards the most vulnerable group.

An analysis of the relationship between each food insecurity group and ZFSI II activities indicates, as shown in the table 1, a direct link between farmers' exposure to project activities and their food insecurity level. The more the household works with the project the less is its vulnerability to food insecurity. In 2007 overall, 48% of households of Zondoma were classified as the most food insecure. Meanwhile, for the first generation[8] households, 34% were classified as the most food insecure. While, for the third generation households, 57% of them were classified in this category. On the other hand, 17% of the first generation households were categorized as the least food insecure whereas for the third generation households, the rate of the least food insecure was 7.8%.

Table 1: Distribution of Household (%) by Category and Level of Food Insecurity

Generation	Most food insecure %	Moderately food insecure %	Least food insecure %
I	34.00	48.42	17.37
II	48.00	40.69	10.78
III	57.14	34.80	7.84
Average	48.00	41.00	12.00

Source: Africare Burkina Faso Zondoma 2007 data

[8] Generation I: 7 years participation in project activities
Generation II: 4 years participation in project activities
Generation III: 2 years participation in project activities

Food insecurity is more concentrated among female heads of household

The 2007 data shows that 73% of households headed by women in Zondoma province were the most food insecure as compared to 45% for men. Similarly, only 2% in the least food insecure list were women headed households as compared to 13% for men.

In Zondoma province food insecurity is related more closely with smaller household size (1-9 persons (chi2 = 13.430 pr = 0.000)

The study reveals that, in Zondoma province, food insecurity was influenced by household size. Fifty-seven percent (57%) of the households in the most food insecure group were small-size (i.e., less than 10 persons) households as compared to only 37% in the large (20 persons or more) households. In terms of food accessibility, only 9% of the small households are able to satisfy their hunger for all the 12 months of the year compared to 18% for the large households. **This suggests that larger family labor, provided that all other elements required for normal livelihood development are present, was a major contributing factor to the relatively better food security status of the larger size (20 persons or more) households.**

Since its first phase, the project promoted lowland development for vegetable crops to improve household food accessibility. The project particularly focused on assisting women to grow off-season vegetable gardens around hand dug wells. In 2007, only 18% households surveyed affirmed that the activity was being practiced by women. **For the time being, no significant difference--in terms of contribution to improved household food security--was observed between the households cultivating vegetable crops and those that did not.**

Contribution of the Livestock sector to Household Food Security

In 2007, more that 90% of the Zondoma households were involved in small ruminant livestock and chicken production and only 50% of the households had cattle. Traditionally, the small ruminants and chicken belong to women, and the cattle to men. The project made great efforts by training women on improved poultry nutrition, health and infrastructure access. Moreover, in 2008, the project supported women and vulnerable household to get access to loans for the development of livestock activities (poultry, sheep fattening, and small ruminants breeding) with significantly positive results on household food security and income.

Effect of Access to Improved Seeds on Household Food Security

Access to improved seeds played an important role in determining level of household food security. **But in Zondoma, based on data analyzed, there is no significant link between the use of improved seed and household food security.** The survey showed that 68% of households had access to improved seeds in Zondoma province. This adoption rate is based on the number of households surveyed and not on the total surface

used with improved seed. In reality many smallholder farmers declaring to use improved seed do not have capacity to buy sufficiently to substantially improve their food production. For example, for the most food insecure and moderately food insecure households, there is no significant difference (chi2 = 1.007 p = 0.316) between the percent of households using improved seeds and those not using. Further research is needed to understand the issue of improved seed use in Zondoma province.

Impact of Household Access to Microfinance Loans

Only 28% of households had access to project supported microfinance loans in 2007. **Microfinance is mostly provided to women and seems to have a direct impact on household food insecurity in Zondoma province (chi2 = 4.822 p = 0.028).** For the least food insecure households, 42% had access to microfinance loans in 2007 against 23% for the most food insecure households. The most important constraint of this activity was the refusal of micro-finance institutions to provide loans to the most vulnerable households. Also, the loans were mainly used by women for food processing and small trade. Since 2008, the situation has been improved and 4,902 persons had access to credit against a target of 1,600 persons[9]. About 43% of these loan beneficiaries have used their loans to finance livestock activities (sheep fattening and breeding).

Impact of Agricultural Equipment Distributions on Household Food Security

Owning agricultural equipment has a direct impact on household food insecurity (chi2=6.82 p=0.009) in Zondoma province. More than 80% of Zondoma households own agricultural equipment. More surprisingly, 77% of the most food insecure households have their own agricultural equipment against 90% of the least food insecure households. **That means the lack of equipment should not be a limiting factor for food security in Zondoma province. However, there is very little information on the quality of the equipment and their impact on agricultural productivity.**

Cash Crop Production and Household Food Security

No impact of the project's cash crop production activities on the most insecure households has been identified. Cowpea and sesame are the two cash crops that ZFSI II is promoting. However, data analyzed shows that there no significant link between household food insecurity and the production of cowpea (chi2 = 0.805 p = 0.370) and sesame crops (chi2 = 0.6317 p = 0.427).

DISCUSSION

Based on descriptive statistics and logistic regression analysis results, **small households (1-9 persons) seem to be the most vulnerable households in Zondoma province**. In addition, households headed by women are the most exposed to food insecurity. Smallholder farmers in Zondoma are three times more likely to be the most food insecure than large farmers. Medium-sized farmers' likelihood to be in the most food insecure

[9] This is the ZFSI target for FY 2008

category is two times greater than the large farmers'. **Households headed by women are among the most food insecure in Zondoma.** They are about 50% more likely to be food insecure than the households headed by men.

In Zondoma, like in the other Sahelian rural zones, the farming system heavily depends on human labor. All operations in the rain-fed agricultural production systems are conducted manually. Animal tractions are used principally for cash crop production (cotton and peanut). **Lack of labor is the main production constraint in smallholder farming systems during the seeding and weeding operations**. These moments coincide with the hungry season when poor smallholders exchange part of their labor to wealthy households to buy food.

One of the ZFSI II strategies is to build community capacity through the training of villagers on key food security concepts and the creation and management of village cereal banks. **The length of participation in project activities significantly influenced the rate of household adoption of new technologies introduced by the project and their impact on household food security.** In the ZFSI II, for example, the third generation households (two years of project participation) were almost three times more likely to be in the most food insecure category than households of the first generation (six years participation). Similarly, second generation households (four years participation) were two times more likely to be in the most food insecure category than the first generation. Although, as anticipated, the length of time households participated in project activities was the most determinant factor, staff turn-over played a role in household performance.

The ZFSI II project's land rehabilitation activities were designed to address land degradation. The land rehabilitation and water conservation activities introduced by Africare are very effective tools in reducing household vulnerability to food insecurity in Zondoma. For example, crop yields increased by 67% in project areas when land rehabilitation and soil-water conservations are used.

Traditionally, livestock rearing is one of the most important strategies used by households in agro-pastoral food production systems to improve their incomes as well as their food security. In the Sahel, lack of livestock is one of the key markers of household vulnerability to food insecurity.[10] **Data collected by the ZFSI II project confirmed the importance of livestock in household food security and its livelihood.** Agro-pastoralists in Zondoma, for example, were half of the time less likely to be most food insecure as compared to farmers that did not have livestock. **With access to credit to buy livestock, ZFSI project was able to significantly improve the standard of living conditions for women participants and their children.** Besides being able to buy more food for their families, the women were able to pay for the schooling and health expenses of their children.

[10] Category III based on the MAHFP.

CONCLUSION

In the Zondoma context, food insecurity is more concentrated among smallholder farmers and female headed households. The ZFSI project has introduced some new technologies such as land rehabilitation using soil conservation techniques, organic manure, improved seeds, better livestock raising (small ruminants breeding, chicken production) and access to credit by women. These technologies have had a positive impact on household food security. However, the level of impact achieved was highly influenced by the length of household participation in the project or the length of exposure to technology. In other words, the longer the duration of household participation in project activities the better the status of its food security.

The results of analyses also show that in the context of Zondoma, the surface of land rehabilitated per household should be at least one hectare in order to positively impact household food security. This result corroborates with previous findings related to household demographic size and coping strategies such as migration. Family labor is crucial in the labor intensive small scale food production systems commonly practised in the arid and semi-arid Sahelian conditions. Thus, the loss of family labor due to the exodus or outmigration of household members during the growing season has been shown to be very harmful for small holder households**. The introduction of labor saving, income generating and productivity increasing/diversifying technologies can also significantly reduce household food insecurity and incomes.**

In the context of the Sahel region, with eroded lands and erratic rainfall, land rehabilitation using technologies such as *zaï holes, half moon* and *stone lines* coupled with the use of organic manure and improved seed should be at the center of any program intending to improve household food security. These interventions should be associated with livestock (sheep, goat, pork, chicken) rearing, with women as the primary target beneficiaries.

A sustainable micro-finance system to support smallholder farmers in the Sahel can be very effective in fighting household vulnerability to food insecurity. Small households (1-9 persons) and female headed households should be the top priority to be targeted by any food security project in the Sahel.

To positively impact household food security, cash crops--if conditions are favorable--should be included in the production system in addition to the use of technologies that improve crop productivity and post harvest storage and marketing of products.

ANNEX

Table 2: Parameter Estimates For Factors Associated With Small Households' Food Insecurity

			Model II				
Variables	Coefficients	Std. Err.	Z	P>|z|	EXP(B)	Odd Ratio [95% Conf. Interval]	
Household population							
More than 20 persons					1.000		
11-20 persons	0.491	0.332	1.480	0.139	1.635	0.852	3.136
1-10 persons	1.092***	0.405	2.700	0.007	2.980	1.348	6.589
Distance to Gourcy	-0.023***	0.004	-4.990	0.000	0.977	0.968	0.986
Head of household							
Female					1.000		
Male	-0.522*	0.294	-1.760	0.079	0.595	0.319	0.981
Experience of household							
Generation I					1.000		
Generation II	0.642***	0.231	2.770	0.006	1.900	1.207	2.990
Generation III	1.076***	0.241	4.460	0.000	2.934	1.829	4.708
Nb persons in exodus	0.103**	0.048	2.160	0.031	1.109	1.010	1.217
Livestock breeding							
No					1.000		
Yes	-0.188	0.199	-0.950	0.344	0.829	0.562	1.223
Chick production							
No					1.000		
Yes	-0.524	0.379	-1.380	0.167	0.592	0.282	1.245
Access to microfinance loan							
No					1.000		
Yes	-0.199	0.215	-0.930	0.355	0.820	0.538	1.249
Land surface rehabilitated							
less than 0.5 hectare					1.000		
0.5-1 hectare	0.206	0.225	0.361	-0.236	1.228	0.737	1.760
More than 1 hectare	-0.554**	0.239	0.020	0.020	0.575	0.360	0.918
Constant	1.638	0.832	1.970	0.049	5.144	1.008	25.534

Significance levels *** = 0.01, **= 0.05 and *=0.1

Table 3: Parameter Estimates For Factors Associated With Small Households' Food Insecurity

			Model II		Odd Ratio		
Variables	Coefficients	Std. Err.	Z	P>|z|	EXP(B)	[95% Conf.	Interval]
Distance to Gourcy	-0.023***	0.005	-4.99	0.000	0.978	0.969	0.986
Head of household							
Female							
Male	-0.54**	0.290	-1.88	0.060	0.580	0.329	1.024
Experience of household							
Generation I					1.000		
Generation II	0.615***	0.227	2.71	0.007	1.850	1.185	2.887
Generation III	1.069**	0.231	4.63	0.000	2.912	1.852	4.579
Nber persons in exodus	0.087*	0.046	1.9	0.057	1.091	0.997	1.193
Livestock breeding							
No					1.000		
Yes	-0.384**	0.185	-2.27	0.023	0.658	0.228	0.899
Small ruminants							
No					1.000		
Yes	-0.761*	0.436	-1.75	0.081	0.467	0.199	1.098
Chick production							
No					1.000		
Yes	-0.708**	0.374	-1.89	0.058	0.493	0.237	1.025
Land rehabilitation							
less than 0.5 hectare					1.000		
0.5-1 hectare	0.144	0.223	0.65	0.518	1.155	0.746	1.788
more than 1 hectare	-0.576**	0.236	-2.44	0.015	0.562	0.354	0.893
Surface cash crop (sesame)	0.43	0.318	0.93	0.350	1.346	0.722	2.511
Constant	2.285	0.607	3.770	0.000	9.826	2.992	32.299

Significance levels *** = 0.01, **= 0.05 and *=0.1

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