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MIGHT WOMEN'S GARDENING ACTIVITIES HAVE AN UNINTENDED NEGATIVE IMPACT ON CHILDREN'S SCHOOL ATTENDANCE?

Summary:

A recent survey conducted by the Regional Food for Peace Office in the Abéché region of eastern Chad concluded that more than 50% of women active in vegetable gardening activities in 2004 used child labor and that only 7% hired extra labor of any kind. The survey also found that a high number of children are not attending school. The study concluded that child work might explain in part the low school attendance rate, and that gardening programs such as the one in the Ouaddaï department might discourage women from sending these free laborers to school. The present study aimed to look more closely at these issues by posing the following research question: 1) Is child labor associated with market gardening an important contributor to low school attendance in Abéché or are other variables (lack of or inadequate schools, lack of teachers or some cultural phenomena) the key determinants of low school attendance? We have tried to answer these questions through a review of the literature and an analysis of the relationship between gardening and school attendance. **The findings suggest that, while other factors such as presence of schools and school and teacher quality are important, gardening in Ouaddaï has a negative impact on school attendance as garden size and labor demands (and household income) increase.** A logistic regression model was used to provide a better understanding of the interrelationship between women gardening and schooling. This paper is divided into three sections: literature review, regression results and, conclusions and policy recommendations.

Review of literature

Research on school attendance in developing countries has shown that low levels of school participation are not completely explained by the lack of schools (Mamadou Thiam, April 2004). Although governments are the primary providers of schooling in Africa, parents, household characteristics, other family members, community and

tradition play a part in the decision as to whether children attend school (Lloyd and Blanc, 1996). Some children do not attend despite the availability of schools. Often, children do not go to school because they work, for a variety of reasons (the most important of which is probably poverty). Children are engaged in economic employment and domestic work (Shapiro et al 2003). In developing countries, children serve as major contributors to household welfare through significant participation in the running of the home, for example by caring for younger children or fetching water and wood or by working in the family farm or business .

Many studies in Africa have concluded that parents' education is one of the most important determinants of children's participation in school. In Ghana, fathers with relatively high levels of education are unlikely to have children who participate in child labor (Cananagarajah/Coulombe 1997) and more likely to be in school. The high child labor rates and the low school enrollment rates in Ghana generally are the consequence of the perceived low quality of schooling (Ray 2000).

School attendance by a child is also highly correlated with family income (Ilon and Mook 1991) and household wealth influences the demand for schooling. Poor families are often not able to bear the cost of sending their children to school. Children's participation in economic employment and domestic work is a common survival strategy for poor families. Girls do more home-related work than boys and thus may be less likely to attend school. Urban and rural area disparities can impact child school attendance. The effect of poverty is always significant but the order of magnitude is moderate (Sudharshan, Canagarajah, Helena Skyt Nielsen, 1999).

Schooling problems also *contribute* to child labor (Faraaz Siddiqi et al.). Sometimes children seek employment simply because there is no access to schools (distance, no school at all). When there is access, the low quality of the education often makes attendance a waste of time for the students. Schools in many developing countries suffer from problems such as overcrowding and apathetic teachers. As a result, parents often conclude that there is no point in sending their children to school when they could be home learning a skill (for example, agriculture).

Traditional factors and religion are also important determinants of child school attendance in Africa. In certain countries girls will not go to school because they will not fit into traditional roles if they become educated (Bequele and Boyden 1988). Parents think that an educated girl will not get married. In Islamic African countries, some parents prefer sending children to Koranic school than to formal school.

Mamadou Thiam (April 2004) conducted a child work and schooling study in Niger. Using the MICS-2[1] survey data collected in 2000, this study shows that child work does not affect school attendance. However, it significantly increases grade repetition and school dropout. The study also finds that children from poor households are less likely to attend school. The more educated the caretaker, the higher probability of children attending school. Thiam finds that in Niger, urbanization and gender can affect children's

[1] Multiple Indicator Cluster Survey

school attendance. Boys and urban children are twice as likely to attend school as girls and rural children.

A common opinion in the African context is that the presence of under-five children in the household has a negative effect on children's school attendance, especially on girls' attendance. Thiam reported that Chernichovsky (1985) conducted a school enrollment and attendance study in rural Botswana and concluded that the presence of very young siblings was detrimental to older children's school attendance. He said that Canagarajah and Coulombe (1997) did not find such effect in a recent study of child labor and schooling in Ghana. The Niger study finds that the number of children under 5 residing in the household is not related to children's likelihood of attending school.

The household's decision to enroll a child in school also may depend on the perceived cost and benefit associated with schooling. Parents' willingness to send children to school will be affected by their beliefs about the profitability of schooling relative to other activities and their ability to afford schooling. The expected returns from education are therefore an important factor (Peter Matz).

High costs of schooling can serve to pull children away from school as was found to be the case in Ghana (Canagarajah /Coulombe 1997). In Chad, the non-governmental organizations (NGOs) are promoting community schools where teachers are hired and paid by the community from the parents' contribution (1,500 FCFA or $3 per month per child). This fee is having the effect of excluding children from school whose parents can not afford the fees.

The lack of teaching materials and housing for teachers can lead to teacher absences, reduced attendance and poor quality education as an example from the Siedougou school in Burkina Faso shows. In Siedougou[2], an international NGO is supporting a school of 150 children (45% girls) with a school lunch program and take home rations for girls. The school was created in 1998 and has three teachers for three classrooms. Children are divided by grade, and each teacher teaches two different grades in the same classroom. Only the school director has a house in the village; the two other teachers live in another village 6 km from Siedougou. According the chief of the village, this situation has negatively impacted the village schooling because there is a high absentee rate among teachers. Teaching materials are also lacking. For example, in 2003, the fifth grade children did not receive any books from the Government. The lack of teachers and teaching materials has clearly translated to poor student achievement. (The success rate on the CEP (6th grade) exam in 2000 was only 45% (8 out of 18 students passed) while the national rate was 65% (RFFP/Senegal, Burkina Faso trip report - 2004).

A comparative study on child labor and schooling in Africa concluded that one way to reduce child labor and increase incentives to keep the children in the educational system is to improve the access to credit (Canagarajah/Nielsen 1999). However, Peter Matz proposes income transfer programs in order to stimulate demand.

[2] Siedougou is located in the Gnagnan province (300 km from the capital city) is one of the most food insecure provinces of Burkina Faso.

Background Information on Chad

Chad, a landlocked country is Africa's fifth-largest country. It is among the world's poorest and least-developed nations. Currently the UN Human Development Index ranks Chad 167 out of 177 countries. About 80 percent of the population survives on agriculture - subsistence farming, fishing and herding livestock. The country is regularly subject to climatic disturbances and natural disasters (drought, floods, and locusts) that lead to food shortages (World Food Program 2005). The most recent occurrence is the entry of refugees from the war-ravaged Dafur region in Sudan.

In 2000, UNICEF estimated that 65.5 percent of children ages 5 to 14 years in Chad were working (World Bank, World Development Indicators 2003, Washington, D.C., 2003). In southern Chad, children are contracted to nomadic herders to tend animals. These children are often abused and provided little monetary compensation for their work. (U.S. Department of State, Country Reports- 2002: Chad, Section 6d). Children also work for little compensation as domestic servants in the households in cities.

Data and methods

Data were collected during the Ouaddaï women gardening survey and were complemented with secondary data and interviews with Africare Chad field agents working in the study zones. A total of 125 women were interviewed for the gardening survey[3]. The questionnaire covers modules relating to the socio-economic characteristics, gardening activities and the impact of these activities on household food security. The questionnaire was not designed with the intention to study gardening activities and child school attendance. Using a logistics regression model (logit), we attempt to understand the socio-economic characteristics and kinds of gardening activities that might affect a woman's likelihood of sending her children to school.

The explanatory variables used in the model were: interviewed woman's age, matrimonial status (non married, married, widowed, divorced), education level, number of children, presence of school in the village, use of child labor for gardening activities, use of gardening income (buying cereal for household, credit reimbursement, buying small animal, commerce), distance to the regional capital Abéché, and geographic locations (cantons).

Results

Children's school attendance rate is very low in the survey area. Only 32% of married women have at least one child in school. Of 236 children who were greater than 6 years

[3] A sample of 25 villages was randomly selected from the 41 villages that practice gardening. Similarly, the number of women carrying out vegetable gardening was listed for each village and a sample of five (5) women per village was randomly selected. Thus a total of 125 women were interviewed for the survey by Africare Chad's field agents.

old, only 54 (23%) are currently attending school. More than 70% of these students are from only three cantons[4]--where school attendance rates are high: Ouaddaï Hamra (68%), Koniere (56%) and Mandjabo (50%). School attendance rates in the other 6 cantons are between 0 and 21%. The sex ratio of school attendance is 1 girl for 3 boys. The results of the regression analysis are presented in table 2.

Although, much of the literature on the determinants of schooling indicated that the educational level of the household head and the caretaker are important determinants of children's school attendance, there was no relationship observed between women's education level and child school attendance in the present study. This is probably due to the very high illiteracy rate (98%) among the women surveyed. Only 3 women out of 122 women have a primary education level.

Contrary to the conventional wisdom in Africa that the presence of children under-five in the household has a negative impact on children's school attendance, this study finds that the number of children under five does not affect a woman's probability of having children in school. Similar conclusions were reached in Niger (Thiam, 2004) and Ghana (Canagarajah and Coulombe, 1997). On the other hand, the number of school age children (6-14 years old) is an important determinant of a woman's likelihood of having children in school. The logistic regression coefficients of two variables (number of children 6- 10 years old, and number "more than 10 years old" children) are statistically significant (p=0.008, p=0,032). However, the variable "number of children 6-10 years" is more highly positively correlated with the likelihood of a woman having children in school (32% higher) than is the second variable ("number of children more than ten years old"). Possible explanations for this observed relationship include the fact that in a harsh environment like the Ouaddaï department in Chad, a woman's primary source of assistance in her daily housework is her children, especially girls. It is not probable that a woman will send her only child to school if she has to walk every day more than 10 km to look for drinking water, mill cereal, fetch firewood, prepare and bring food to the field. In general in the Sahelian society, children 6-10 years old are the closest to their mother in the household. Children 10 years or older have a tendency already to leave the family either to get married (girls) or to look for a job in the cities (boys). The regression results imply that the more help a woman has, the higher likelihood there is that she will send at least some children to school.

Nevertheless, Nankhuni and Findeis in August 2003, using a 2SCML model for children's schooling in Malawi concluded that the presence of more children above age 6 is associated with lower children's school attendance, while the presence of more 1- 5 year olds is not statistically significant. According to them, this is likely due to the increased financial demands that children place on a household. However they do add, seemingly in concordance with this study findings, that presence of more young girls (6-10 years) and women all age categories, is correlated with increased school attendance.

[4] A geographic location of the country, it is constituted by a group of village

The results suggest that the presence of a school in the village does not necessary imply a high likelihood of school attendance. The variable presence of public school in the village was used. The coefficient of this variable is not statistically significant (p=0.349) implying there is no difference between public school and community school in the study area. This is probably due to the GOC's primary school policy which gives priority to the construction of new a schools rather than school quality. For example, through the World Bank and other funding sources, there is a proliferation of new schools in Chad, especially in rural areas. This policy is reinforced by the development of community schools in the villages where the Government does not intervene. For example, from a sample of 25 villages surveyed, 16 schools were counted. Five of these schools were constructed and managed by the communities. In these surveyed villages, only 23% of school age children (6-14 years old) are attending school. This rate seems to be very low compared to the national rate of 34% (2000) in the rural areas of Chad. This low school attendance is probably due to many factors: quality of school, the relevance of teaching materials to children, the opportunity costs of schooling for children's parents and cultural and religious factors. It has also been reported that many non professional teachers who were teaching in the community schools in the study area have left teaching for humanitarian work when NGOs, which pay better salaries, came to Chad in support of the Sudanese refugees.

woman filling a 20 liter container with drinking water, after six Kilometers walking – Ouaddaï – Chad

In addition, many teachers are reluctant to work in remote rural areas. In terms of school quality, public versus communal school, the regression results reveal that there is no quality difference between public and communal schools that impact a woman's likelihood of having a child in school.

In order to address the question of the relationship between school attendance and women's gardening activities in Chad, a dummy variable was used to assess the impact of the use of child labor by woman on schooling. The variable was not statistically significant (p=0.885), meaning that a mother using her child in a gardening activity is not less likely to have a child in school compared to a woman who is not using her child

(when all levels of gardening income are examined together). The Niger study (Thiam 2003) confirms that, even after controlling other factors. Many studies argue that owning a non farm business could positively impact attendance. Non working children still do not significantly differ on school attendance.

The most important and perhaps surprising finding is that a woman's net gardening income has a negative effect on a woman's likelihood to have her children in school. The logistic regression coefficient for revenue is statistically significant at 10% level (p-value = 0.08). Holding other factors constant, this implies that an increase in a woman's income will decrease her odds of sending her children to school. When the net income variable was transformed into class income[5] variables, only the coefficient of the highest class (class 4) is negatively significant (p=0.044). For example a woman with an income higher or equal to 300,000 F CFA ($500) is less likely to have children in school than a woman with 50,000 F CFA ($100) net income. This finding is confirmed by the results of the multiple correspondences analysis (see table 2) using the same data. Canagarajah and Nielson reported that studies which estimate a bivariate probit model generally indicate that the effect of the income measure on school attendance is always significantly positive, whereas the effect on child labor is less clear. Our regression results have confirmed some field evidences. The canton of Ouaddaï Chok is known as the most important vegetable crop production area in the Ouaddaï department. On average each woman works on 1,196 m^2 against an average of 250 m^2. The mean income in this zone is $368,630 or $736 per woman per season. Eighty six per cent (86%) of women surveyed use their children as laborers in gardens while only 5% of school age children are going to school. On the other hand, in the Ouaddaï Harma canton, where school attendance is the highest (68.18%), average net gardening income per woman is 89,678 F CFA or $179. Forty percent of women surveyed use their children in gardening activities, however, most of these children are both going to school and helping their mothers in the garden. The agricultural field agents

A community School constructed by the community using WFP food aid in Chad

[5] class 1: net income < 50,000 FCFA; class 2: 50,000 FCFA >= net income < 150,000 FCFA; class 3: 150,000 FCFA >= net income < 300,000 FCFA; class 4 : net income >= 300,000 FCFA

report that they have often been contacted by teachers and asked to sensitize mothers regarding the importance of allowing their children to go to school.

This finding—that as a woman's income from gardening increases, her tendency to send her children to school decreases (with the implicit assumption that income increases with increasing hectarage farmed and that, in turn, increasing hectarage means an increase in labor demands, and hence child labor)--might be explained by the opportunity costs and the immediate benefit that women can get from gardening and sending children to school. In rural areas of Cote d'Ivoire, Coulombe (1998) finds the probability of school attendance decreases proportionally with the number of acres of land owned by the household. The negative relationship between women's gardening and school attendance seems to be explained by the high demand for labor for gardening—especially as gardening incomes increase.
Among the matrimonial status variables introduced in the model, only the divorced variable is statistically significant. A divorced woman is less likely than a widowed, married or non married woman of having her children in school. This finding is probably due to the marginalized and vulnerable status of divorced women in Chadian society. Most divorced rural mothers are extremely poor and cannot afford to send their children to school. However, this variable is not stable in our model and is influenced by other variables i.e. geographic locations, activities.

The effect of distance to the regional capital was examined and as would be expected, there was a negative relationship between distance from the regional capital and school attendance (the coefficient of this variable is significant p-value = 0.02). Women living long distances from regional capitals are less likely to have children in school and teachers resist working in remote schools.

Villages were classified according to their potential for wadi (river beds) gardening activities. A dummy variable was used to assess the impact of wadis on women's likelihood of having children in school. The regression coefficient of this variable is negatively significant (p= 0,001) implying that women living in areas with wadis are less likely of having children in school than women in villages where access to wadis is difficult.

Many school attendance studies in Africa reported that the possession of assets by a woman can significantly impact school attendance. Others concluded that school attendance is highly correlated with family income (Ilon and Mook 1991) and that household wealth influences the demand for schooling. To test this hypothesis, several variables were used as asset possession proxies. Only the coefficient of the variable "has bought small animals" was significant and positive—suggesting that the possession of small animals secures women in the case of food or other financial emergency and increases her likelihood of having children in school. For instance, animals may be sold to finance school expenses.

Regarding "location variables", the survey covered nine cantons (districts) and each canton was considered as a dummy variable. Location effects may reflect traditions and

attitudes but also measurement errors related to included or omitted variables describing for instance the education system, infrastructure, demand for labor in the study area, and credit constraints (Sudharshan, Canagarajah and Helena Skyt, Nielsen 1999).

Conclusion

An analysis of the data in this study and a review of the literature suggest that while other factors mainly related to the quality of schooling are also important, **gardening in Ouaddaï has a negative impact on school attendance as garden size and labor demands (and household income) increase.**

The logistic regression results show that the Ouaddaï women's likelihood of sending children to school increases as the number of children over 6 years old in the household increases probably in large part because children in this age group are a woman's main source of assistance in the household. Any activity or project - i.e. potable water in the village, cereal milling that will reduce women's daily workload will increase her likelihood of having children in school. Contrary to conventional wisdom, the number of children under five does not affect the probability of school attendance for the household's children. On the other hand, the low quality of schooling in the Ouaddai - i.e. lack of qualified teachers in remote villages, the high rate out of student, local religious practices do not encourage women to send children to school. There is no statistical difference between public and communal school in the Ouaddaï department.

Finally, the study suggests that although there is a very profitable vegetable gardening activity in the region, it is highly labor intensive and that child labor is the main source for fulfilling that need. Gardening activities appear therefore to negatively affect school attendance when they reach the commercial stage. For low income class women, vegetable gardening does not have an impact on children's school attendance. To increase gardening income, women will increase the size of their garden which requires more labor, which is mainly furnished through child labor. **The findings suggest that gardening in Ouaddaï has a negative impact on school attendance as garden size and labor demands (and household income) increase.**

A widowed woman is very vulnerable in the Ouaddaï department because of her social status. The likelihood that she will send her children to school is very low compared to that of other women. She needs special attention from a development perspective. The logistic regression results reveal that the Ouaddaï department is not homogeneous in terms of school attendance. Geographic location is an important determinant in schooling.

This study is just a first attempt to look at the relationship between market gardening, child labor and school attendance and its findings need to be validated by other gardening and school attendance studies in the Ouaddaï department (and elsewhere in West Africa where women's gardening activities are funded by Title II resources such as in Burkina Faso, Mali, and Guinea). Future studies in the Ouaddaï could be improved over the

present exercise through the use of a larger sample size and by considering other possible determinant variables such as: household characteristics, and credit availability, etc.

Policy recommendations

1. Given the high involvement of children in vegetable gardening production in Chad and elsewhere in the West Africa region and its possible consequences on school attendance, governments and their partners should make schooling and gardening activities more closely linked— rather than attempting a radical step such as the elimination of child labor. One approach would be to promote the creation of vegetable gardens in schools where children could learn the most efficient gardening technologies. Parents could benefit from this experience which would also constitute an incentive for sending children to school.
2. PVOS, USAID and the governments should make it a priority to provide new technologies to women working in the gardening sector to reduce labor demand. School gardens could be used as a base for the diffusion of more efficient technologies such as drip irrigation.
3. Parents make recourse to child labor because they don't have other alternatives. Making microfinance loans available to women working in the vegetable gardening sector might result in a reduction in the demand for child labor and increase school attendance, as women are able to hire labor. Microfinance school loans could encourage women to send children to school and increase incentives to keep children in the education system.
4. Household work load is one of the most important burdens for rural women in the Sahel region. In addition, it is depriving children of access to education when they are a woman's only source of assistance. Assisting women to reduce their daily household work load could significantly increase children school attendance. Examples include but are not limited to digging village wells, increasing incomes, providing milling machines, improving child health, helping women obtain more assets: activities in all of these areas could substantially reduce women's workload and therefore improve the likelihood that children will be freed up to attend school.
5. Title II food distributions, for example through school feeding programs or take home rations should be used as a form of incentive for parents to send their children to school.

Table 1: Logit Regression coefficients

Variable	Model I Coef.	Model I Std. Error	Model I z-Statistic	Model I Prob.	Model II Coef.	Model II Std. Error	Model II z-Statistic	Model II Prob.
C	7.643	5.958	1.283	0.200	1.128	2.794	0.404	0.686
Age	0.041	0.043	0.964	0.335	0.039	0.043	0.912	0.362
Education	-1.240	2.705	-0.458	0.647	-1.790	2.924	-0.612	0.540
Matrimonial Status								
Non married	---	1	--	--				
Divorced	-0.656	2.133	-0.308	0.758	-1.113	2.241	-0.497	0.619
Married	-0.335	1.369	-0.244	0.807	-0.491	1.386	-0.354	0.723
Widow	-0.072	1.635	-0.044	0.965	-0.310	1.657	-0.187	0.852
Number of Children								
Under 5	0.371	0.307	1.211	0.226	0.414	0.308	1.346	0.178
6 -10 years old	0.888	0.336	2.640***	0.008	0.933	0.355	2.626***	0.009
> than 10 years old	0.560	0.261	2.149**	0.032	0.605	0.258	2.347**	0.019
Child work	-0.098	0.680	-0.144	0.885	-0.215	0.693	-0.311	0.756
Log Net income	-0.719	0.417	-1.725*	0.085	-	-	-	-
Presence of Ouaddis	-1.931	1.038	-1.861*	0.063	-2.149	1.065	-2.018**	0.044
Income class								
1st quarter	--	--	--	--	--	--	--	--
2nd quarter	--	--	--	--	-2.014	1.225	-1.644	0.100
3rd quarter	--	--	--	--	-1.920	1.243	-1.545	0.122
4th quarter	--	--	--	--	-3.094	1.533	-2.018**	0.044
School presence								
Public school	-0.711	0.834	-0.853	0.394	-0.687	0.859	-0.800	0.424
Community school	--	--	--	--	--	--	--	--
Buy animal	1.534	0.645	2.378**	0.017	1.282	0.679	1.890**	0.059

Credit payment	-0.684	0.991	-0.690	0.490	-0.639	1.154	-0.554	0.580
Distance to Abéché	-0.025	0.013	-1.985	0.047**	-0.025	0.013	-1.933**	0.053
Distance/health center	0.163	0.065	2.488	0.013**	0.168	0.066	2.556**	0.011

*0.10 level; ** 0.05 level; *** 0.001 level or better

Table 2: Result of Multiple Correspondence Analysis – Income class vs child school attendance

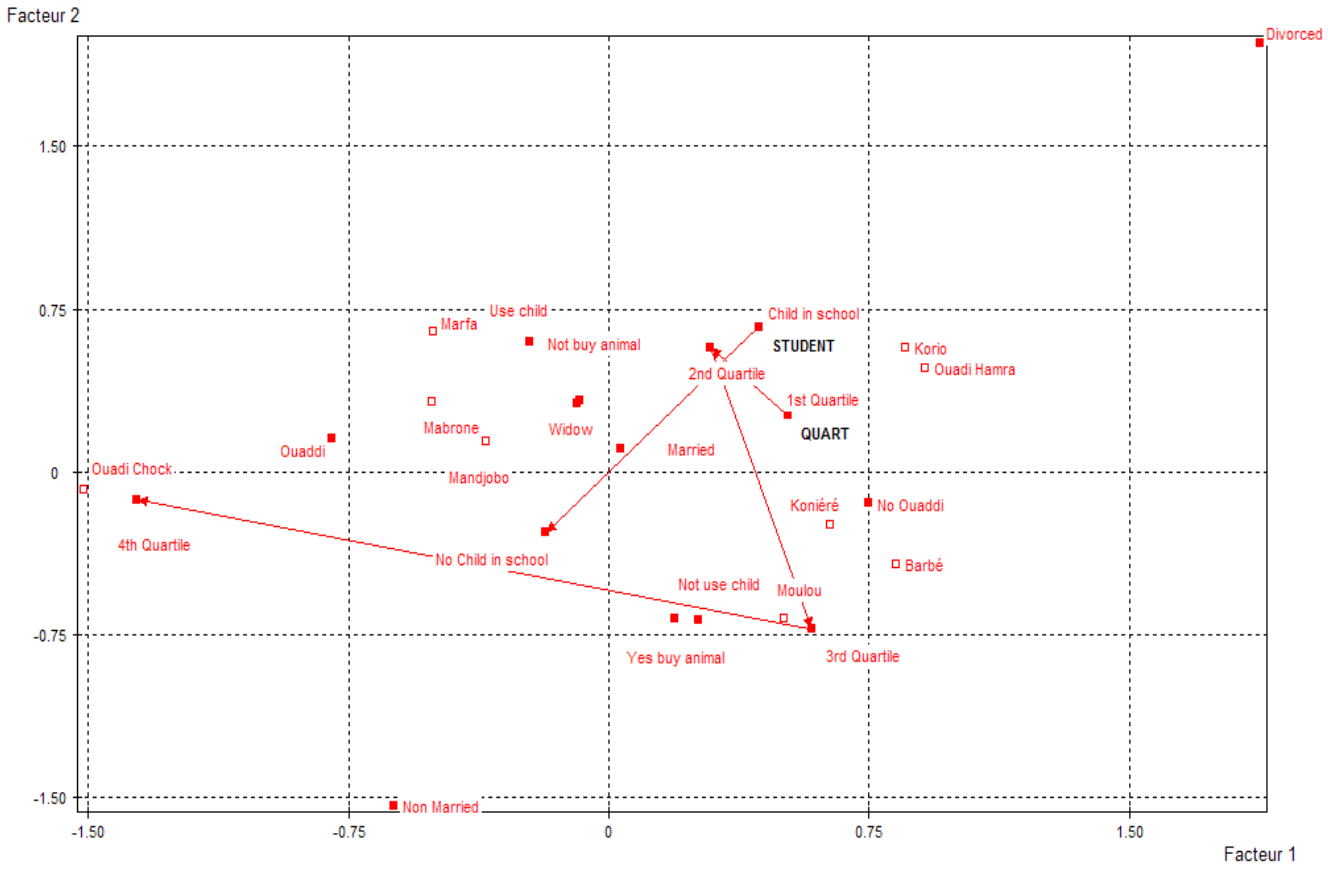

Table 3: Women's gardening activity and School attendance in the Ouaddaï department

Cantons	Total area cultivated by woman	Average Net Income per woman	School attendance rate (%)	Percent of women using child labor	Average number of school per village
Mandjobo	639.07	178589.32	41.94	57.89	0.74
Mabrone	465.00	130026.60	13.64	53.33	1.00
Ouadi Chock	1196.60	368630.00	5.00	85.71	0.50
Barbé	457.38	141612.50	15.91	36.84	0.50
Moulou	465.23	128434.62	0.00	66.67	0.31
Koniéré	241.20	210429.20	55.56	66.67	1.00
Marfa	181.44	122152.40	0.00	80.00	1.00
Korio	473.60	133083.16	21.05	44.44	0.50
Ouadi Hamra	207.00	89677.50	68.18	40.00	1.00
Total			22.88	56.88	

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