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Gender Differentials and Agricultural Productivity in Niger

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Abstract

Most of the poor in Sub-Saharan Africa live in rural areas where agriculture is the main income source. This agriculture is characterized by low performance and its productivity growth has been identified as a key driver of poverty reduction. In Niger, as in many other African countries, productivity is even lower among female peasants. To build policy interventions to improve agricultural productivity among women, it is important to measure the potential gap between men and women and understand the determinants that explain the gap. This paper uses the Oaxaca-Blinder decomposition methodology at the aggregate and detailed levels to identify the factors

that explain the productivity gap. The analysis finds that in Niger on average plots managed by women produce 19 percent less per hectare than plots managed by men. It also finds that the gender gap tends to be widest among Niger's most productive farmers. The primary factors that contribute to the gender productivity gap in Niger are: (i) farm labor, with women facing significant challenges in accessing, using, and supervising male farm labor; (ii) the quantity and quality of fertilizer use, with men using more inorganic fertilizer per hectare than women; and (iii) land ownership and characteristics, with men owning more land and enjoying higher returns to ownership than women.

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1. Introduction

Agriculture remains the main source of livelihood in Sub-Saharan Africa, employing two-thirds of the workforce. Using the international poverty line (\$1.25 a day of 2008 PPP), this region is also the one where poverty is the highest with a poverty headcount of 47.5 percent in 2008 compared to an average of 25.2 percent for the whole developing world excluding China (Chen & Ravallion, 2012). With most of the poor living in rural areas, it is easy to link the high poverty rates with low income in agriculture, the main income source in the countryside.

One of the key weaknesses of Sub-Sahara African agriculture is low productivity. In the early 1960s, cereals yields in all the developing world were around 1 ton per hectare, ranging from 0.8 ton per hectare for Sub-Saharan Africa to 1.3 ton per hectare for East Asia & Pacific and Latin America & Caribbean. Forty years later, Sub-Saharan Africa is just at 1 ton per hectare compared to 2.5 tons per hectare for three regions of the world (Europe & Central Asia, Middle East & North Africa and South Asia), 3 tons for Latin America & Caribbean and 4.5 tons per hectare for East Asia & Pacific (World Bank 2008). Because of this low performance, smallholder agricultural productivity growth has been identified as a key driver of poverty reduction and increased food security in the entire Africa region (FAO, 2009).

While productivity in agriculture is generally low and thereby hindering poverty reduction, it is even lower among female peasants. A cross-country analysis shows that estimated yield gaps based on female-male comparisons across households range widely, but are around 20–30 percent in many countries (World Bank, 2012). Even when comparisons are made within the same households, and thus accounting for possible differences in market conditions and institutional constraints, this finding still holds. The study also shows that there are potential productivity gains through greater gender equality in access to economic opportunities and productive inputs. In this respect, increased productivity among female farmers could help achieve at least two goals. First, it might result in an increase in real income and in turn reduce poverty. Second, higher female productivity may improve development outcomes for the next generation through better nutrition. A recent World Bank study has identified a positive link between the degree of female control over household resources and child nutrition outcomes (World Bank, 2012).

In order to build policy interventions to improve agricultural productivity among women, it is important to measure the potential gap between men and women and understand the determinants which explain the gap. Many studies have been devoted to the issue of the gender gap in Africa: Alderman et al. (1995) for Burkina Faso, Udry (1996) for Burkina Faso, Holden and Bezabih (2008) on Ethiopia, and Peterman et al (2011) on

Nigeria and Uganda, just to name a few. However, to the best of our knowledge no study has examined the extent and root cause of the gender productivity gap in Niger. Niger is a prime candidate for study since it is very poor and has one of the lowest agricultural yields in the world. In addition to filling an important gap on gender differentials in productivity in Niger, the paper has three interesting features derived from recent papers on this topic, namely Kilic et al (2013). The first is that we use a national household survey, not data limited to a specific region. The findings then reflect the diversity of agricultural practices and cultures across the country. Second, the gender productivity gap is considered at the plot level and not at the household level. Peterman et al (2011) have shown that household level gender indicators tend to underestimate gender differences in productivity. For this reason, Peterman et al recommend that particular attention be paid to survey design and that gender differences be examined at the plot level and not only at the household level. Third, the methodology uses the Oaxaca-Blinder decomposition at the aggregate and detailed level, providing the possibility to identify the factors that explain the productivity gap. Identifying these factors can help to inform policy interventions aimed at narrowing the gender productivity gap in Niger.

We found that in Niger on average plots managed by women produce 19 percent less per hectare than plots managed by men. We also find that the gender gap tends to be widest among Niger's most productive farmers, ranging from 4 percent among the least productive farmers (at the 10th percentile) to 34 percent among highly productive farmers (at the 90th percentile). The primary factors that contribute to the gender productivity gap in Niger are: (i) farm labor on which women face significant challenges in accessing, using, and supervising male farm labor; (ii) the quantity and quality of fertilizer use with men using more inorganic fertilizer per hectare than women and (iii) land ownership and characteristics with men owning more land and enjoying higher returns to ownership than women.

The paper is organized as the following. Section 2 presents the country context and the data used for this analysis. The third section deals with the global decomposition and the detailed decomposition of the gender differential. Since the differences in productivity between men and women are not necessarily the same along the distribution, we take into account this potential heterogeneity in section 4 to examine the differences at different levels of productivity. In section 5, we formulate alternative hypotheses to check the robustness of the previous findings and section 6 concludes.

2. The Country Context and the Data

Niger is a vast West African country with an area of 1,267,000 km² and a population of 17.1 million inhabitants according to the 2012 population census. The country faces two structural problems that hinder its development. It is a landlocked country and thus transaction costs are high, and it has a harsh climate that makes its agricultural production vulnerable. Most of the country (two-thirds) is located within the Sahara Desert, and water covers only 0.02 percent of the total area of the country (Collier, 2007). In addition, the rapid rate of population growth (3.9 percent) also contributes to the country's constraints since it requires very good economic performance to create jobs and reduce poverty. With a GDP per capita of \$383 in 2012, Niger is a poor country. The incidence of poverty was 48.2 percent in 2011, with 17.9 percent in urban areas and 54.6 percent in rural areas (INS and The World Bank, 2013). Poverty is particularly concentrated in rural areas where 94 percent of the poor live. Hence there is a clear link between poverty reduction and agricultural production in Niger.

Niger is essentially an agricultural country. More than 8 out of 10 persons live in rural areas where agriculture is the predominant economic activity. An estimated 90 percent of all households and 97 percent of rural households earn income from at least one agricultural activity in Niger. Furthermore, agriculture accounts for over half of household income on average and over 60 percent of rural household income. In addition to its importance at the household level, agriculture is equally important at the macroeconomic level. Between 2004 and 2011, crop and livestock production contributed approximately 27 and 13 percent to GDP, respectively. Agricultural production is predominantly focused on the satisfaction of household needs rather than accumulation of wealth. Although average farm size in Niger is above average compared to other African countries (at more than 5 hectares per agricultural household in Niger), the vast majority of crops grown are cereals. Especially predominant is millet which is grown on more than 80 percent of plots. However, sorghum, cowpeas and to a lesser degree peanuts are also important crops in Niger. During the agricultural off-season, households grow onions, rice and other vegetables. Production of cash crops is quite limited in Niger unlike several of its neighbors who produce cotton (Benin, Burkina Faso and Mali).

Nigerien agriculture is fragile due to the harsh climate that results in water scarcity as well as external shocks that affect the country with some regularity. During the past 10 years (2002-2012), Niger went through three years of drought (2004, 2009 and 2011) which have resulted in significant grain deficits. During the 2011 agricultural season, the cereal deficit was estimated to be about 692,000 tons (INS and SAP, 2011). This deficit represents more than 13% of the total cereal production in 2010 which was a normal year. When the country suffers cereal deficits, the food and nutrition situation is difficult, especially for vulnerable persons such as young children and the elderly. The cereal deficits do not only affect agriculture; they also affect livestock whose food intake is also reduced. While there is no denying that

cereal deficits are a result of negative climatic and environmental factors (such as crickets), they also occur because of weak agricultural performance. If we consider the 30 year period between 1981 and 2010, millet yields in Niger peaked at less than 0.5 ton per hectare, while yields varied between 0.5 and 0.8 ton per hectare in Mali and Burkina Faso, two neighboring countries with a similar agro-climatic situation.

Data from the *Enquête Nationale sur les Conditions de Vie des Ménages et l'Agriculture* (ECVMA) in Niger are utilized for the analysis. The ECVMA is a national, LSMS-ISA type survey of household living conditions and agriculture. It was conducted in 2011 by the Niger *Institut National de la Statistique* (INS), with technical and financial assistance from the World Bank. The survey covers a sample of 3,968 households with 1,538 in urban areas and 2,430 in rural areas. The sample was drawn using a stratified two-stage sampling, and to cover urban areas (Niamey, Other urban) in two strata and all rural agro-ecological zones (Agricultural, Agro-pastoral, Pastoral) in three strata. In the first stage of the sampling, 270 enumeration areas (EA) were drawn among the nearly 10,000 EAs and at the second stage, 12 or 18 households were drawn from each EA respectively in urban and rural areas. Data collection was organized in two visits, a post-planting visit from mid-July to mid-September 2011 and a post-harvest visit in November and December 2011. Three questionnaires were designed to collect a range of information on households, their farms and the communities in which they live. For the household questionnaire, the data collected concerned the household roster, health, education, employment, non-farm enterprises, housing, non-labor income and food and non-food consumption. The community questionnaire is dedicated to information on access to services and market prices. As for the agriculture questionnaire, it is designed to collect data on access to land, inputs used (seeds, fertilizers, pesticides, etc.), labor (household and hired labor), equipment, production, marketing and farm income, and extensive data on livestock.

The initial sample consisted of 6,695 plots, however a number of them have been lost or removed from the analysis for various reasons. First for 136 plots, there was no activity during the season. For 783 plots, the entire harvest was lost due to drought¹. We also have 628 plots eliminated due to the absence of information on one of the two visits and 134 other plots missing other important information (areas cultivated, identity of the manager, etc.). Finally during data processing, we noted that some plots were unreasonably small and others unreasonably large. We have attempted to attenuate any bias caused by the plot size outliers by removing from the sample 200 plots which represent the smallest and largest 2 percent of plots. The final sample consists of 4,814 plots.

¹ We include these plots in an alternative specification.

This paper is primarily concerned with gender differences in plot management. In the ECVMA, respondents were asked who managed each plot operated by the household. However, respondents were allowed to either identify a specific person in the household who managed the plot or to simply state the plot was managed by several household members. In the latter case, the specific household members were not listed. In our final sample there were 2,288 plots managed by a male, 613 managed by a female, and 1,913 managed by several members (henceforth collectively managed plots).

The large share of collectively managed plots poses a problem since the analysis requires at most two groups to compare. There are several potential approaches that could be taken. First, we could attempt to group the collectively managed plots into male and female using alternative information. For example, we could assume the head of the household is the *de facto* manager of these plots. However, that is a rather strong assumption that cannot be verified. In addition, collectively managed plots may in fact be quite different from those where a single manager is specified. If this is the case, it would be inappropriate to group collective plots with male and female plots. We could instead do pairwise comparisons of the three groups to assess differences not only between the male and female plots but also the collectively managed plots. While this kind of analysis may be informative, it would complicate our results and would be a departure from our primary goal of examining *gender* differences in productivity. We therefore opt to exclude the collectively managed plots from the analysis entirely. This requires dropping nearly 40 percent of the sample, but seems the most palatable solution given the drawbacks of the alternatives. As a robustness check we shall also examine the alternative approaches mentioned above.

Table 1 presents mean estimates for various plot characteristics for the total sample and by the gender of the plot manager. The average agricultural production per plot is estimated at 35,571 FCFA. The average production of male managed plots is 39,934 FCFA, nearly twice the production of plots managed by a woman, which is 19,417 FCFA. Likewise, male managed plots have significantly higher yields (50,369 FCFA per hectare) than those managed by females (35,885 FCFA per hectare). The difference is also apparent when comparing the two distributions in Figure 1; female managed productivity distribution is predominately to the left of the male distribution.

<<<<<< TABLE 1 AROUND HERE >>>>>>

The main features of Nigerien agriculture are common to both male and female managed plots, especially regarding poor access to inputs. Despite many similarities, there are also some striking differences between these two types of plots. Considering demographic characteristics, the plot-manager is usually the head of

the household when male and the spouse of the head when female. Male and female plot managers are equally Hausa (the principal ethnic group representing 53 percent of the population), but male plot managers are more often Djerma (the second largest ethnic group representing 21 percent of the population). If one ethnic group has some specific skills in agriculture, the difference in ethnic composition between male and female plots may lead to advantages or disadvantages in productivity, widening or reducing the gender gap.

<<<<<< FIGURE 1 AROUND HERE >>>>>>

The key asset needed for the exercise of agricultural activity is land. The average plot size is 1.54 hectare with male managed plots averaging 1.7 hectare and female managed plots only 1 hectare. This significant difference partially explains why total production is higher for male than female managed plots. However, the male plot size advantage may become a disadvantage for agricultural productivity if an inverse relationship between productivity and farm size is found in Niger as has been found in other Sub-Saharan African countries (Carletto et al, 2013).

Compared to urban populations, the human capital of farmers is quite low. Although education levels are low overall, male farmers have some advantages over women. Men involved in agricultural activities are 42 years old on average compared to just 37 for women. If we take age as a proxy for experience, men are better off in this aspect of human capital than women. This could be an advantage if experience results in improved agricultural practices and outcomes. Similarly we do not know how formal education can be an asset in non-mechanized agriculture using mostly rudimentary techniques of farming, but if this is the case, men are once more at an advantage since they have completed 1.1 year of education on average compared to only 0.5 year for women. However, this level of education could be too small to affect agricultural skills, especially since it seems insufficient for basic literacy and numeracy skills. Moreover, the male education advantage is offset by the fact that there is no significant difference in the highest education within the household.

Labor is usually the most abundant resource in poor countries. In the case of agriculture, it can come from the household or be hired from the market. In Niger the workforce is employed in soil preparation (clearing, burning, fertilizing, etc.), planting and soil maintenance (weeding, tillage, thinning, application of fertilizers and pesticides, etc. after planting and before harvest) and harvesting. There is significant scope for household agricultural labor since the average household size is 6.7 individuals. Among these persons, 1.3 are men (15 years and older) and 1.5 are women (15 years and older). On average, the households of male

managed plots had more male adults while households of female managed plots had more females. Almost all male managed plots use at least one household male member compared to three-quarters of female managed plots. Conversely, 83 percent of female plots employ at least one woman and nearly half use at least one child (person under 15) compared, respectively, to 48 percent and 43 percent of male managed plots. These differences are even more important when considering the volume of work.

The average (unconditional) annual volume of work that male household members allocate to plots under the responsibility of a male person is 38 days, 14 days more than the annual volume of work allocated to plots managed by a woman on average. This difference is important because it represents more than a third of the volume of men's work on those plots and is significant at the 1 percent level. However, the male labor difference is relatively small when compared to the advantage of women's work on female plots. Household females spend 45 days on plots operated by a woman compared to less than 2 days on male managed plots. This female advantage in the allocation of household labor is enhanced when one considers child labor. Household children spend an average of 4 days on the female managed plots but only 0.4 days on male managed plots. Ultimately, household work tends to benefit female managed plots more than male managed. When we look at the average days conditional on use, the unconditional advantage in male household labor of male managed plots disappears with no significant difference. In contrast, the female managed plot advantage in female and child household labor remains.

Households also rely on non-household labor either by hiring from the labor market or using community labor. Community labor is usually not paid, but the plot manager can bear some costs to feed the laborers. Those two types of labor are used much less than household labor. Hired labor was used on about a third of plots and community labor was used on only a sixth. Interestingly, there is no significant difference in the use of these two types of work between male and female managed plots. In terms of the volume of external labor, only 5 days per hectare of hired labor were used and less than 2 days per hectare of community or mutual labor. Again male and female managed plots present no difference on the volume of external labor used.

In addition to labor, physical inputs are important factors that are correlated with productivity. Households are supposed to rely not only on fertilizer but also on pesticides, fungicides and herbicides. Compared to labor, physical inputs are less commonly used and men have a clear advantage over women. Organic fertilizers are used only on 36 percent of all plots. Organic fertilizers are usually produced by livestock owned by a household. It is likely that this source explains at least in part why these fertilizers are the most prevalent physical input. Looking at the differences between male and female managed plots, organic

fertilizer was used on about 2 out of 5 male plots and only on 1 out of 5 female plots. This difference in use translates into a difference in unconditional quantity. On male managed plots, the annual value per hectare of organic fertilizer was just over 3,300 FCFA compared to 1,800 FCFA on female managed plots. Unlike organic fertilizer, inorganic fertilizer (which is purchased from the market) is only used on 11 percent of all plots: 12 percent of male plots and 6 percent of female plots. The difference between male and female plots is even more important when considering the quantities involved. Male managed plots benefit from the use of 3 kilograms of inorganic fertilizer per hectare on average compared to only 0.4 kilogram for female plots. For the additional physical inputs, fungicides are used on 5 percent of plots (with no significant difference between male and female managed plots) while pesticides and herbicides are rarely used.

Some additional factors prove to be an advantage for male managed plots while others are an advantage for female managed. The value of household agricultural capital per hectare of land cultivated is not significantly different between male and female managed plots, though the male estimate is higher. Male managed plots more often benefit from agricultural extension programs than female managed plots. This implies that male managers are better able to improve their skills through these programs leading to better productivity on their plots. On the other hand, female plots are less often in a situation where intercropping was performed. Intercropping is widely used in Niger and can be an advantage. There are also relatively more male managed plots in urban areas and closer to markets. These two characteristics can ease the access of male managed plots to physical inputs, particularly inorganic fertilizer.

Based on simple descriptive statistics, the differences between male and female managed plots are mixed. Female managers seem to have a clear advantage in household labor which is by far the most abundant asset possessed by rural households. On the other hand, male managers have larger plots and benefit from a higher use of physical inputs, particularly organic and inorganic fertilizers as well as fungicides.

3. Explaining Gender Differences at the Mean

3.1. The Oaxaca-Blinder Decomposition Framework

The methodology used on this paper relies on recent work on gender differentials and productivity in Sub-Saharan Africa (Oseni et al, 2013; Kilic et al, 2013). Two methods have been traditionally used for explaining gender differences in agricultural productivity. The first method examines differences based on the gender of the head of household. Researchers are often limited to a headship analysis since gender is rarely captured at the plot level. It is difficult to accept that the gender of the head can solely explain

differentials in productivity in an African context where households have complex structures. First household size is usually high in rural Africa and plots are not necessarily managed at the household level but at the individual level. Second it is not uncommon (in Mali for example) to have three generations living together and the person declared as the head of the household might just be the patriarch whose influence on productivity is in fact limited. Since the head of the household does not have the observable and non-observable characteristics as the other household members, the scope of the conclusions drawn from these types of studies is limited in terms of public policy. The second type of method consists of estimating a production function with the gender dummy as an independent variable; the estimation being done at the plot level. The advantage of this method over the previous is that it is better able to isolate the difference in productivity caused by gender among all the factors that influence productivity. While this method does help identify a gender gap, the principal limitation is that the model is not built to identify the root causes of the gender difference which is critical for identifying and prioritizing areas for policy interventions (Kilic et al, 2013).

Following Kilic et al (2013) and Oseni et al (2013), we use the Oaxaca-Blinder (OB) decomposition to assess gender differentials in agricultural productivity. We start by estimating a production function that models plot level agricultural productivity as a function of the gender of the plot manager and other factors that may contribute to productivity. The model to be estimated is:

$$y = \sum_{k=0}^K \gamma_k x_k + \alpha g + u \quad (1)$$

where y is the natural log of output per hectare (a measure of productivity), g is the gender dummy of the plot manager, x is a $K+1$ -dimension vector including the intercept (x_0), land size, non-labor and labor inputs, individual characteristics of the managers, household and community variables, u is the random error term which is assumed to be independently and identically distributed as $N(0, \sigma^2)$. This model provides an indication of any significant gender productivity gap.

We also estimate a model independently for male and female-managed plots defined as:

$$y_g = \sum_{k=0}^K \gamma_{gk} x_{gk} + u_g \quad (2)$$

The model is very similar to the previous one with $g = \{m, f\}$ for male or female plot-manager; and u_g is again the random error term which is assumed to be independently and identically distributed as $N(0, \sigma^2)$. The gap G between men and women on agricultural productivity can be expressed as (Fortin et al, 2010):

$$G = E(y_m|x_m) - E(y_f|x_f) = \left(\sum_{k=0}^K (x_{mk} - x_{fk}) \gamma_{fk} \right) + \left(\sum_{k=0}^K (\gamma_{mk} - \gamma_{fk}) x_{mk} \right) \quad (3)$$

In the classic OB decomposition terminology, the first term is referred as the explained term, meaning that it is the part of the decomposition explained by the difference in covariates. The second term, obviously the unexplained one, is called the structural term. It captures discrimination but also the differences on the non-observable characteristics of the two sub-populations. The problem with this approach is that you can invert the reference group and the decomposition is slightly different. To avoid this problem, we introduce parameter estimate γ_k of the first (pooled) regression (Jann, 2008); the parameter of the pooled regression is assumed to be the non-discriminatory parameter. With this non-discriminatory category becoming the reference category, the decomposition can then be written as follows:

$$G = E(y_m|x_m) - E(y_f|x_f) = \left(\sum_{k=0}^K (x_{mk} - x_{fk}) \gamma_k \right) + \left(\sum_{k=0}^K (\gamma_{mk} - \gamma_k) x_{mk} \right) + \left(\sum_{k=0}^K (\gamma_k - \gamma_{fk}) x_{fk} \right) \quad (4)$$

The first term of the decomposition is the endowment effect, the part of the gender gap explained by group differences on observable covariates; the second term is the male structural advantage, that is the portion of the gap coming from the deviation of the male return factors from the pooled regression; the third part is the female structural disadvantage, which is the deviation of female regression coefficients from pooled counterparts (Kilic et al, 2013). As we can see in the equation below, one of the main advantages of this framework is that it goes beyond the total decomposition because it exhibits the detailed contributions of all the predictors involved in the model.

3.2. The Oaxaca-Blinder Decomposition Results

3.2.1. Underlying Production Function Results

In accordance with the Oaxaca-Blinder framework, we first estimate equation 1 for the pooled plot sample and then separately estimate equation 2 for male-managed plots and female-managed plots. We then use the resulting vector of coefficients γ_k , γ_{mk} , and γ_{fk} , together with the within group mean values for each covariate x_m and x_f to compute the components of equation 4.

Table 2 presents the results from a basic (naïve) estimation of the gender gap in productivity. In this formulation, only the gender dummy and fixed effects at varying levels are included as explanatory variables for agricultural productivity. No other factors are accounted for. The naïve gender gap is relatively consistent at each level of fixed effects ranging from 23.7 to 25.5 percent and is always highly significant. This is a sizeable difference that we aim to explain in the OB analysis that follows.

<<<<<< TABLE 2 AROUND HERE >>>>>>

Table 3 presents the results of the three underlying OLS productivity regressions for the OB decomposition. The first column contains estimates of equation 1 for the pooled sample followed in columns 2 and 3 by the estimates of equation 2 for the male and female managed plot samples, respectively. In the pooled regression results in column 1, the sign of the coefficient associated with the variable identifying the gender of the plot's manager is negative and strongly significant at the 1 percent level. The results indicate that female managed plots are on average 27 percent less productive than male managed plots after controlling for other factors. The effect of land size (measured by the natural log of the area cultivated) is negative and strongly significant in all three regressions indicating that productivity declines with land size. This result is consistent with the inverse relationship between productivity and land size found by Carletto et al (2011). Since female plots are smaller than their male counterparts, this result might give females an advantage in productivity. Other plot characteristics that have a significant relationship with productivity are plot ownership and the plot distance from the household. Agricultural productivity was higher on owned plots managed by males but not significantly higher for owned female managed plots (82 percent of male managed plots are owned compared to 72 percent of female managed). The distance of the plot to the dwelling is also positive and significant contrary to expectation. One would have thought the plots closer to the home would be better managed and thus more productive.

<<<<<< TABLE 3 AROUND HERE >>>>>>

The second set of characteristics expected to be correlated with productivity are non-labor inputs. In our regressions, the coefficients associated with those variables are usually non-significant. As we have

previously seen, non-labor inputs are more likely to be used on male managed plots than female managed, but even among male managed plots both the use and intensity of use of physical inputs do not significantly affect productivity. The only variable positively associated with productivity is the use of pesticide on female managed plots. Input use on male managed plots was not associated with higher yields, though this may be a result of limited input use.

Unlike non-labor input variables, labor characteristics are generally strongly positively correlated with productivity. According to the pooled-regression, the elasticity of male household labor per hectare cultivated is 0.22. In other words, a 10 percent increase in male family labor (in number of days per hectare) is associated with a 2.2 percent increase in productivity. The estimated elasticities for child and female household labor are both about 0.15. The estimates for household labor are larger than those for hired labor, either paid non-family labor (0.1) or mutual labor (0.08). This suggests that individuals working on their family farms are more productive than persons coming from outside the household. Comparing the results for male and female managed plots reveals that male family labor is more productive on male managed plots while female family labor is more productivity on female managed plots. Child family labor is similarly productive on both plots. Non-family labor (hired or mutual) is strongly positively correlated with productivity on male managed plots, but not on female managed plots.

Non-labor inputs are used in conjunction with labor and capital to generate production. Despite the fact that capital resources are low, the coefficient associated with the value of agricultural capital per hectare (in log form) is positive and significant. The coefficient estimate suggests that a 10 percent increase in the value of agricultural capital leads to an increase of 0.7 percent in productivity. While this elasticity is relatively low, the positive correlation shows that there is room to improve productivity in Niger with a minimum of equipment involved in the production process. Comparing the results of the regression on male and female plots, the returns to agricultural capital were slightly higher on female managed plots than male managed plots. This is a surprising result that could imply that expanded use of agricultural capital would be of particular benefit on female managed plots.

Other factors considered here seem to have little or no correlation with productivity. It appears that human capital has no influence on productivity in Niger. Different characteristics associated with human capital, namely (1) the experience (using manager age as a proxy), (2) the number of years of education and (3) whether the household has access to agricultural extension services, do not appear to be associated with productivity. One reason which may explain this result is that the level of human capital is very low overall. As we have seen, manager education is very low, perhaps too low to even allow the average farmer to

become literate. Second, farmers in Niger generally use the same rudimentary agricultural production techniques where experience counts for little. By the same token, most demographic characteristics of the household do not significantly affect productivity in the pooled sample. However, productivity on female managed plots is negatively affected by the household child dependency ratio. The greater share of children there are in the household, the lower productivity is on female managed plots. This likely reflects that females in households with more children will likely have to devote more time to child care at the expense of time spent managing their plot. Male managed productivity is improved when the household has better access to markets, measured by the distance to the nearest road. A household closer to a major road might have lower transaction costs and access to a greater supply of non-labor and labor inputs. There is no significant relationship for the productivity on female managed plots.

3.2.2. Differences at the Mean of the Distributions

After providing the general results on the factors correlated with productivity, we focus in this section on the gender differential using the Oaxaca-Blinder decomposition method presented on section 3.1. The results are presented in Table 4.

Panel A of table 4 identifies the gender productivity differential estimated to be 18.3 percent. This differential is decomposed into two components: (1) the endowment effect which is the part of the gender gap due to the level of observable attributes and (2) the structural effect which is the portion of the gap related to the difference in returns to factors involved in the production process. The aggregate decomposition in panel B of Table 4 depicts a varied picture with women having a slight (though insignificant) advantage in endowments and men have a significant advantage in structural factors. The magnitudes of the estimates indicate that the endowment effect accounts for negative 48 percent of the gender gap while the structural effect represents 148 percent of this gap. The negative sign on the endowment effect means that women benefit more from better endowments than men whereas the positive structural effect suggests that men have an advantage in the returns to factors of production.

<<<<<< TABLE 4 AROUND HERE >>>>>>

The detailed decomposition in Panel C provides the contributions of different factors to the productivity gender differential. We start with the endowment effect. Since this effect is negative, any positive coefficient reduces the gender gap in favor of men and any negative coefficient does the opposite. The two main factors contributing to the endowment effect are land size and labor. The size of the plot accounts for

over 300 percent of the endowment effect. As we have seen in section 2, female managers have smaller plots than male managers and in addition there is a strong inverse relationship between productivity and land size. Therefore, the smaller endowment of land for female managers translates into a productivity advantage. This aspect appears to drive a large portion of the endowment effect.

Looking at labor, male family labor (measured by the log of the number of days per hectare) contributes positively to 340 percent on the endowment effect. Male labor is more often used on male managed plots than on female managed. This could have been a large advantage for men, but it is largely offset by the female manager advantage in female family labor (330 percent of the endowment effect) and child family labor (31 percent). Unlike male family labor, female and child family labor are more often used on female-managed plots.

Two other factors make a relatively small contribution to the endowment effect. Plot ownership accounts for 13 percent and a source of nonfarm, non-labor income in the household contributes 10 percent. Our results seem to suggest that differences in the endowments of very few factors explain the gender productivity gap in Niger. It is surprising that differences in human capital and non-labor input endowments do not play a large role. For most of these factors, male managers are better off than female. One possible explanation for their absence in explaining gender differentials might come from the fact that those factors are used in very small quantities, not enough to make a large difference.

The second component of the gender gap is the structural effect which captures the difference in returns to factors used in production. Several variables related to labor significantly contribute to explaining the female structural disadvantage. Use of male family labor and hired labor both appear to be more effective on male managed plots. The difference in returns to male family labor and hired labor explains 66 and 19 percent of the total female structural disadvantage in productivity, respectively. However, there does not appear to be any significant difference in the returns to female and child family labor on male and female managed plots.

Three additional factors that contribute to the structural component of the gender gap are the child dependency ratio, the distance of the household to the nearest major road and the elevation of the plot. The household child dependency ratio contributed 60 percent to the female structural disadvantage. This result suggests that productivity on female managed plots is more strongly affected by the child dependency ratio than male managed plots. When households have more children (and thus a higher dependency ratio), female managers likely have to split their time between caring for children and cultivating their plots. This

likely causes the productivity of their plots to suffer and thereby contributes to their structural disadvantage. The distance to the nearest road (a proxy for market access), and the elevation of the plots give the opposite result, reducing the gap.

4. Heterogeneity across the Productivity Distribution

4.1. The Recentered Influence Function (RIF) Methodology

The Oaxaca-Blinder decomposition attempts to explain the gender differential in productivity for the *average* farmer. However, this average result may mask meaningful differences across the productivity distribution in the endowment or structural constraints that explain the gender differential. Identifying and understanding these differences will enable more effective targeting and implementation of policy interventions aimed at narrowing the gender gap. In order to examine any heterogeneity across the productivity distribution, we again follow Kilic et al (2013) and implement the Recentered Influence Function (RIF) method of Firpo et al (2009). The RIF method will provide aggregate and detailed Oaxaca-Blinder decomposition estimates at each decile of the agricultural productivity distribution. It will therefore highlight heterogeneity in the overall and specific endowment and structural constraints that contribute to the gender productivity gap at each decile.

Implementation of the RIF regression is very straightforward and computationally simple. As in the standard Oaxaca-Blinder decomposition, the RIF involves estimation of a simple OLS. The main difference however is that the dependent variable Y is replaced with the RIF of the relevant distributional statistic. The RIF is defined as:

$$RIF(Y; \nu) = \nu(f_Y) + IF(Y; \nu) \quad (5)$$

where $\nu(f_Y)$ is the relevant distributional statistic (e.g. mean, median, decile, etc.) for the density of the marginal distribution f_Y of Y and $IF(Y; \nu)$ is the influence function for ν . The distributional statistic of interest here is q_τ , the population τ -quantile, whose influence function is defined:

$$IF(Y; q_\tau) = \frac{\tau - \mathbb{I}\{Y \leq q_\tau\}}{f_Y(q_\tau)} \quad (6)$$

where $\mathbb{I}\{Y \leq q_\tau\}$ is an indicator function. Given this formulation, the quantile based RIF is given by:

$$RIF(Y; q_\tau) = q_\tau + IF(Y; q_\tau). \quad (7)$$

When applied, the RIF is calculated for each observation of Y and quantile τ according the above equation with the density f_Y estimated using kernel methods. The standard Oaxaca-Blinder decomposition is then applied for each quantile using the RIF values in place of Y . This provides us with quantile specific estimates of the gender gap and the portion explained by endowment and structural constraints.

4.2. RIF Results

4.2.1. Aggregate RIF Decomposition

Table 5 presents the aggregate decomposition results at nine deciles of the agricultural productivity distribution. One important observation from the table is that the gender differential roughly increases as one moves along the productivity distribution. In addition, the differential does not become significantly different from zero until the 60th percentile and remains so at the 70th, 80th, and 90th percentiles. This suggests that the gender differential is small in magnitude or crudely estimated for the lower half of the productivity distribution.

<<<<<< TABLE 5 AROUND HERE >>>>>>

The lower panel of Table 5 contains the endowment and structural decomposition results. In accordance with the mean Oaxaca-Blinder decomposition results, the endowment effect is negative and the female structural disadvantage is positive at nearly all points along the distribution. However, the endowment effect remains insignificant for almost the entire distribution (except at the 40th percentile) while the female structural disadvantage is significant at all points except the 10th percentile. This emphasizes the relative importance of structural differences in explaining the gender productivity gap in Niger. There does not appear to be a monotonic change in the endowment effect with movement along the productivity distribution. The endowment effect is largest in magnitude at the 10th, 20th, and 40th percentiles suggesting that endowment differences are more important at the lower end of the distribution². The relative share in addition to the magnitude of the endowment effect follows a similar pattern.

² A negative endowment "advantage" implies that female managers benefit from a superior level of endowments. This is surprising since according to Table 1, male managers have an advantage in most agricultural inputs (with the exception of female and child labor). We argue that the negative endowment effect is a result of the smaller plot sizes often farmed by female managers. Since productivity decreases with plot size, the smaller "endowment" of plot size for females is an "advantage" in terms of agricultural productivity.

However the female structural disadvantage does appear to roughly increase with agricultural productivity. The effect ranges from 0.14 at the 10th percentile to 0.32 at the 90th percentile. The structural effect is always larger than the endowment effect. This suggests for female managers across the productivity distribution that the gender gap is largely a result of differences in returns to factors of production rather than differences in endowments of these factors. The detailed RIF decomposition results will indicate which factors are most important.

4.2.2. Detailed RIF Decomposition

Table 6 contains results from the mean decomposition as well as results from the detailed RIF decomposition for the 10th, 50th, and 90th percentiles. The results for the remaining deciles are suppressed due to space constraints. The variables used in the RIF are identical to those used in the mean Oaxaca-Blinder decomposition.

The first four columns in panel C contain the detailed endowment effects. Similar to the endowment effect for the mean decomposition, plot size and family labor use are the most important factors. For family labor, female managers have an endowment advantage in the use and intensity of female family labor whereas male managers have an advantage in intensity of male family labor. As mentioned previously, this result is not surprising given the sex of the manager. Female managers have an endowment advantage in child family labor intensity across the three deciles suggesting that female managers consistently benefit from higher levels of child family labor. The relative magnitude of the endowment effect of labor use and intensity appears to be relatively stable across the productivity distribution though the female labor advantage on female managed plots disappears at the 90th percentile. In the end, the family labor endowment effects largely cancel each other out. What remains to explain a large portion of the endowment effect is plot size. As mentioned above, this is due to two factors: (i) women cultivate smaller plots on average and (ii) smaller plot size is generally associated with higher agricultural productivity per hectare.

<<<<<< TABLE 6 AROUND HERE >>>>>>

Overall, the detailed endowment results indicate that differences in household labor as well as plot size play the largest role. Crudely removing the contribution of decreasing returns to scale to plot size, the endowment effect is almost always positive. Further examination that abstracts from differences in plot size may be warranted.

The last eight columns of panel C contain the male structural advantage and female structural disadvantage results. The results here are much more varied than for the endowment effects. For the 10th, 80th and 90th percentiles, females have a large structural disadvantage in intensity of male family labor and hired labor use. This suggests that female plots have significantly lower returns to male family labor and hired labor than on male plots. The most consistent structural disadvantage for female managers is the child dependency ratio. Only at the 30th and 40th percentiles is there no significant child dependency disadvantage. This further emphasizes the importance of the number of children in the household for the productivity on female managed plots. For the 50th through 80th percentiles, females have a structural *advantage* in the distance to the nearest market. This implies that female managers in these deciles are better able to take advantage of their distance to market places. The structural effect results broadly indicate that the contribution of individual factors varies widely across the agricultural productivity distribution.

5. Tests of Robustness

The findings of the previous sections might not be robust if the regressions are affected by some sample bias. As stated in section 2, our sample can be weakened by two factors. First, an important part of the plots (40 percent) is managed at the household level and those plots have been ignored so far in the analysis. Second, plots with zero production have not been included in the analysis either. It is worth including these categories of plots and checking the robustness of the results. Moreover if men and women developed specific skills on some specific crops, the findings at the overall level might be different at the crop level. The first three sub-sections of this section deal with those three different issues. In addition to potential sample bias issues, the decomposition method involves some key assumptions, one of those being the omission of variables bias. If there are some unobservable characteristics that jointly determined productivity and the gender of the plot manager, then the coefficients estimated are biased. Following Altonji et al (2005) and Oseni et al (2013), we assess the possibility of omitted variables bias by adding other variables in the model, particularly fixed household effects in sub-section 5.4.

5.1 Integrating Collectively Managed Plots

Throughout the analysis thus far, we have excluded the 1,913 plots that are collectively managed by multiple household members. This represents a large portion of the full sample which could contain valuable information and is worthy of further study. Therefore, we integrate collectively managed plots in the decomposition analysis in two ways. First, we attempt to group the plots into male and female categories by assuming the head of the household is the de facto manager of collectively managed plots. While this is

a strong assumption, it is still of interest to see how the results are affected. The results of this estimation are contained in the “With HH” columns of Table 7 alongside our main results in the “Base” columns. The aggregate and detailed decomposition results are nearly identical when including collectively managed plots. This provides some indication that grouping these plots based on the gender of the head of the household would not introduce significant bias into the results and provides support for the de facto manager assumption.

Secondly, we examine whether plots with multiple managers are distinct from male or female managed plots. Plots with multiple managers are compared to female plots in the “F vs. HH” columns of Table 7 and to male plots in the “M vs. HH” columns. There was no significant differential in productivity between female and household plots although there was a differential between male and household plots. This suggests that while household managed plots are not necessarily distinctly different from female managed plots, they may be different from male managed plots. Since the majority of household heads are male, grouping based on head sex could be problematic. The differential between male and collectively managed plots is almost entirely explained by differences in endowments (91 percent of the differential) and not structural advantages (9 percent). The endowment effect again is largely due to difference in labor. Collectively managed plots have an endowment advantage in male family labor and hired labor while male managed plots have an advantage in female and child family labor.

<<<<<< TABLE 7 AROUND HERE >>>>>>

5.2 Including Plots Affected by Drought

As mentioned previously, there were a relatively large number of plots where the entire harvest was lost due to drought. Of the 740 plots where the crop was lost, 405 were managed by either a male or female household member. Thus far, these plots have been excluded from the analysis and therefore our results are only externally valid for successful plots. However, excluding failed plots may mask some of the overall gender differential if there is a gender difference in the failure rate. This would appear to be the case with about 20 percent of female managed plots suffering failure compared to 10 percent of male managed. Therefore, we perform the Oaxaca-Blinder decomposition including failed plots but use Tobit methods to adequately account for the zero harvest observations. The results are presented in the Table 8. Although the gender differential in this specification cannot be interpreted as straightforwardly, the results do indicate that when accounting for plots with harvest loss the gender gap remains positive and widens considerably. The gap is evenly due to female endowment and structural disadvantage. The detailed decomposition results

are largely similar to the base model; however, two noticeable differences are the female structural advantage in the age of the manager and the female structural disadvantage in agricultural capital. If we take age to be a measure of experience, then this would suggest that female managers are better able to put their experience to use in plot cultivation (and in this case perhaps preventing crop loss). However, they see lower returns to the use of agricultural capital.

<<<<<< TABLE 8 AROUND HERE >>>>>>

5.3 Crop Level Analysis

The plot level analysis has indicated that there is a significant gender differential in overall agricultural yields. However, these results could mask significant crop level variation in the gender differential and its root causes. For instance, male managers may have an advantage for some crops, but females do for others. In addition, the characteristics that explain the gender differential could vary across crops. We conduct a crop level analysis to examine variations across the four main crops and all others.

The results of this analysis are presented in Table 9. The “Other” columns account for the production of all crops excluding the four listed in the table. The results indicate that female managers do not have a productivity advantage for any crop. While males do have a significant productivity advantage in millet and other crops, there was no significant gender difference in the production of sorghum, cowpeas and peanuts though the estimated differential in sorghum is large in magnitude. The gap is largest for other crops (50 percent) but also sizeable for millet (16 percent). There are some important differences in which factors explain the gender differential for these three crops. In the case of millet, negative 68 percent of the differential is due to a female endowment advantage while 168 percent is due female structural disadvantages. These results also largely mirror the overall results when aggregating crops. However, we do see a large difference for other crops. In this case the differential is almost entirely due to a female endowment disadvantage (80 percent of the gap). The individual factors that contribute to the differential are largely comparable to the aggregated results. The main difference is that female managers do not have an endowment advantage in female household labor for the production of other crops. This is surprising and suggests that there is not a large difference in the amount of female household labor used on male versus female managed plots or that the difference has no impact on productivity. This analysis has highlighted some important differences across crops, but the crop level results are largely similar to the plot level results.

<<<<<< TABLE 9 AROUND HERE >>>>>>

5.4 Household Fixed Effects

Our results could also suffer from some omitted variables bias. There may be some factors that could explain the gender differential that we cannot observe. One way to limit the potential for omitted variables bias is to use fixed effects which capture the effects of both observable and unobservable characteristics. In the main results, we use regional and crop level fixed effects. However, there may be unobservable characteristics at lower levels that impact the productivity differential. In order to limit the potential for omitted variables bias, we estimate the model with household fixed effects. Including household fixed effects will capture the effect of observable and unobservable household (or higher level) characteristics and will allow us to more finely identify the plot characteristics that account for the gender differential in productivity. However, in order to implement the household fixed effects model, we must limit our sample to households that have at least one male managed and one female managed plot. This leaves us with a much reduced sample of 955 plots. The findings will therefore only be externally valid for households with both male and female managed plots.

The Oaxaca-Blinder decomposition results with the household fixed effects are presented in Table 10. We find a similar productivity gap of 17 percent, only slightly lower than the 18 percent found in the full sample. As in the full sample, we find an endowment advantage for women (though insignificant) but a structural disadvantage for female managers as well. The individual factors that contribute to the female endowment advantage are similar to our main results. However, there are important differences in the factors that contribute to the overall female structural disadvantage. For example, when accounting for other household factors, female managers see lower returns to most forms of labor (male, female, and child family labor and hired labor). Female managers also see lower returns to plot ownership than male managers. Female managers also have higher productivity returns to experience (using age as a proxy) as well as education. The differences in the individual factors that contribute to the female structural disadvantage when accounting for observable and unobservable household characteristics could indicate that the primary results could suffer from some omitted variables bias. However, restriction of the sample to households with both male and female managed plots could also partly explain the difference. If panel data were available, we would be able to perform a more accurate assessment using the full plot sample, but at present the ECVMA is only a cross section.

<<<<<< TABLE 10 AROUND HERE >>>>>>

6. Conclusions

The analysis presented in this paper shows that the agricultural productivity gap between plots managed by men and women is important in Niger. On average, plots managed by women produce 18 percent less per hectare than plots managed by men. The gender gap, which tends to be highest among Niger's most productive farmers, ranges from close to zero percent among the least productive farmers (at the 10th percentile) to 40% among highly productive farmers (at the 90th percentile). Several factors contribute to Niger's gender productivity gap. The first is farm labor on which women face significant challenges in accessing, using, and supervising male farm labor. Men in Niger use more household adult male labor on their plots than women do, and this imbalance largely drives Niger's gender gap. Women also receive less – in terms of productivity returns – from a day per hectare of a man's labor than men do. Resorting to hired farm labor only compounds these inequalities, with men enjoying higher relative returns from using non-family labor more intensively.

The second factor which has been identified is land ownership and characteristics. Men are more likely to report owning land and enjoy higher returns to ownership than women. They also benefit from higher relative returns to an increase in land elevation. These differences all widen the male-female yield gap and underline important gender disparities in tenure security and land quality in Niger.

The last element explaining differences in the gender gap is child care responsibilities. An increase in the share of children in the household confers men with higher returns relative to women. This finding may well be linked to women's larger role in childcare and household responsibilities, likely restricting their ability to supervise farm labor and reducing the productivity of their plots.

In order to lower the gap between men and women, decrease poverty and foster inclusive agricultural growth in Niger, the findings suggest that future agricultural policy interventions should focus on facilitating women's access to and use of hired farm labor and supporting women's access to and control over land. Policy makers in Niger should focus on addressing female farmers' acute labor shortage by helping them find capable farm workers. For example policies that could enable women to devote a larger portion of their time to working on their plots and supervising hired labor, such as community-based child care, should also be explored. Finally, policies aimed at expanding women's land rights and formally documenting their land claims should be considered to improve access to land for women.

References

- Alderman, Harold, John Hoddinott, Lawrence Haddad, Christopher Udry. "Gender Differentials in Farm Productivity: Implications for Household Efficiency and Agricultural Policy," FCND Discussion Paper No. 6, Food Consumption and Nutrition Division, International Food Policy Research Institute, 1995.
- Altonji, J., Elder, T., & Taber, C.. "Selection on observed and unobserved variables: Assessing the effectiveness of Catholic schools," *Journal of Political Economy* 113 (2005): 151-184.
- Carletto, Calogero, Sara Savastano, Alberto Zezza. "Fact or Artefact: The Impact of Measurement Errors on the Farm Size - Productivity Relationship," *Journal of Development Economics* 103 (2013): 254-261.
- Chen, Shaohua, Martin Ravallion. "More Relatively-Poor People in a Less Absolutely-Poor World." World Bank Policy Research Working Paper 6114 (2012).
- Collier, Paul. *The Bottom Billion*. Oxford: Oxford University Press, 2007.
- Food and Agriculture Organization (FAO) of the United Nations. *How to feed the world in 2050. high level expert forum – the special challenge for Sub-Saharan Africa*. Rome: FAO, 2009.
- Fortin, Nicole, Thomas Lemieux, Sergio Firpo. Decomposition Methods in Economics, NBER Working Paper Series 16045, Cambridge, MA 02138, 2010.
- Holden, S. and Bezabih, M. "Why is land productivity lower on land rented out by female landlords? – theory, and evidence from Ethiopia", in: S.T. Holden, K. Otsuka and F.M. Place (eds) *The Emergence of Land Markets in Africa: Assessing the Impacts on Poverty, Equity and Efficiency* (London: RFF Press, 2008): 179–186.
- Kilic, Talip, Amparo Palacios-Lopez, Markus Goldstein. "Caught in a Productivity Trap: A Distributional Perspective on Gender Differences in Malawian Agriculture," Policy Research Working Paper 6381, The World Bank, Washington, D.C., 2013.
- INS, SAP. "Enquête conjointe sur la vulnérabilité à l'insécurité alimentaire au Niger." Ministère de l'économie et des finances, 2011.
- Institut National de la Statistique, Banque mondiale. "Profil et Déterminants de la Pauvreté au Niger en 2011." Ministère de l'Economie et des Finances, 2013.
- Jann, B. "The Blinder-Oaxaca decomposition for linear regression models." *The Stata Journal* 8 (2008): 453-479.

Oseni, Gbemisola, Paul Corral, Markus Goldstein, Paul Winters. “Explaining Gender Differentials in Agricultural Production in Nigeria. Background Paper: Levelling the Field - Improving opportunities for Women Farmers in Africa,” World Bank & ONE Report. Draft: November 15, 2013.

Peterman, Amber, Agnes Quisumbing, Julia Berhman, Ephraim Nkonya. “Understanding the Complexities Surrounding Gender Differences in Agricultural Productivity in Nigeria and Uganda.” *Journal of Development Studies* 47 (2011): 1482–1509.

Udry, Christopher. “Gender, agricultural production, and the theory of the household.” *Journal of Political Economy* 104 (1996): 1010–1046.

World Bank. *Agriculture for Development: World Development Report 2008*.

World Bank. *Gender Equality and Development: World Development Report 2012*.

Figure 1: Male and Female Productivity Distributions

Table 1: Summary Statistics (Full Sample)

	Pooled	Sex of manager		Difference	
		Male	Female		
<i>Harvest value:</i>					
Total harvest value on plot (FCFA)	35,517	39,934	19,417	20,517	***
Harvest value on plot (FCFA/ha)	47,251	50,369	35,885	14,484	***
<i>Plot Characteristics:</i>					
Size of plot in ha	1.54	1.69	0.98	0.71	***
Intercropped	0.82	0.83	0.79	0.05	**
Share of plot size under improved seeds	0.01	0.01	0.01	0.00	
Distance to household (kilometers)	4.04	4.09	3.83	0.27	
Plot is owned by a male	0.62	0.78	0.05	0.73	***
Plot is owned by a female	0.15	0.01	0.63	-0.62	***
Plot is owned by the entire household	0.03	0.03	0.03	-0.01	
Plot is not owned	0.20	0.18	0.28	-0.10	***
<i>Manager characteristics:</i>					
Age of manager	40.86	41.95	36.91	5.04	***
<i>Manager's relationship to head:</i>					
Household head	0.80	0.98	0.15	0.84	***
Spouse	0.18	0.00	0.82	-0.82	***
Child	0.01	0.01	0.00	0.01	***
Other relative	0.01	0.00	0.03	-0.03	***
Other nonrelative	0.00	0.00	0.00	0.00	
<i>Marital status of manager:</i>					
Never married	0.01	0.01	0.01	0.00	
Monogamous marriage	0.67	0.70	0.53	0.17	***
Polygamous marriage	0.29	0.28	0.35	-0.07	***
Previously married (divorced, separated, widowed)	0.03	0.01	0.11	-0.10	***
<i>Ethnicity of manager:</i>					
Djema	0.10	0.10	0.07	0.03	**
Haoussa	0.69	0.69	0.70	-0.02	
Kanouri-Manga	0.09	0.08	0.11	-0.03	*
Touareg	0.09	0.10	0.08	0.02	
Other	0.03	0.03	0.03	0.00	
Years of education of manager	0.96	1.08	0.52	0.56	***
<i>Household characteristics:</i>					
Household size	6.72	6.76	6.58	0.18	
# of male working age adults in household (aged 15-65)	1.29	1.34	1.12	0.23	***
# of female working age adults in household (aged 15-65)	1.55	1.53	1.61	-0.08	*
Highest years of schooling completed within the household	2.87	2.86	2.89	-0.03	
Access to agricultural extension services	0.11	0.12	0.08	0.04	**
Value of household agricultural capital per hectare of land cultivated	10,504	10,755	9,589	1,166	
Household had nonfarm labor income	0.13	0.13	0.14	-0.01	
Household had nonfarm non-labor income	0.84	0.82	0.89	-0.06	***
<i>Physical inputs:</i>					
Used organic fertilizer on plot	0.36	0.40	0.22	0.18	***
Used nonorganic fertilizer on plot	0.11	0.12	0.06	0.05	***
Used pesticides on plot	0.01	0.01	0.00	0.00	
Used fungicides on plot	0.05	0.05	0.05	0.00	
Used herbicide on plot	0.00	0.00	0.00	0.00	*

Table 1: (Cont'd)

	Pooled	Sex of manager		Difference	
		Male	Female		
<i>Physical inputs:</i>					
<i>Unconditional amount used on plot per hectare:</i>					
Manure (FCFA/ha)	3,003	3,326	1,825	1,500	**
Inorganic fertilizer (kg/ha)	2.5	3.1	0.4	2.7	***
Fungicides (FCFA/ha)	49.7	54.2	33.1	21.1	
<i>Conditional amount used on plot per hectare:</i>					
Manure (FCFA/ha)	8,544	8,508	8,789	-281	
Inorganic fertilizer (kg/ha)	25.4	28.1	7.0	21.1	***
Fungicides (FCFA/ha)	1,078	1,207	659	548	**
<i>Labor input:</i>					
Used any male household labor on plot	0.95	1.00	0.76	0.24	***
Used any female household labor on plot	0.56	0.48	0.83	-0.35	***
Used any child household labor on plot	0.44	0.43	0.49	-0.06	**
Hired any mutual labor	0.16	0.17	0.14	0.03	
Hired any other non-family labor	0.33	0.33	0.33	0.00	
<i>Unconditional days used on plot per hectare:</i>					
Male family	35.31	38.41	24.00	14.41	***
Female family	11.02	1.82	44.55	-42.73	***
Child family	1.23	0.36	4.44	-4.08	***
Nonfamily hired labor	4.84	5.14	3.72	1.42	
Mutual labor	1.60	1.59	1.64	-0.05	
<i>Conditional days used on plot per hectare:</i>					
Male family	38.03	38.77	34.23	4.54	
Female family	61.71	28.82	74.34	-45.52	***
Child family	25.79	11.95	38.94	-27.00	**
Nonfamily hired labor	14.71	15.60	11.43	4.17	
Mutual labor	9.94	9.48	11.97	-2.49	
<i>Household geographic characteristics:</i>					
HH Distance in (KMs) to Nearest Major Road	11.64	11.92	10.59	1.33	***
HH Distance in (KMs) to Nearest Market	55.22	56.31	51.26	5.05	***
Elevation (m)	362.57	359.02	375.53	-16.52	***
Urban	0.05	0.05	0.02	0.03	***
<i>Agro-ecological zone:</i>					
Agricultural	0.69	0.70	0.65	0.05	**
Agropastoral	0.23	0.20	0.31	-0.11	***
Pastoral	0.04	0.04	0.02	0.02	***
<i>Observations</i>	2,901	2,288	613		

Notes: All estimates are weighted in accordance with the design of the survey. The results from a Wald test for the weighted mean difference between male and female plots are shown in the far right column. Significance is denoted: * p<0.1, ** p<0.05, *** p<0.01.

Table 2: Naïve Regressions			
<i>Dependent variable: Log value of plot harvest per hectare (FCFA/ha)</i>			
	(1)	(2)	(3)
Female plot manager	-0.253*** (0.060)	-0.237*** (0.059)	-0.255*** (0.064)
Constant	11.933*** (0.202)	11.932*** (0.202)	9.986*** (0.234)
Fixed effects level	Region	Department	Canton
Observations	2901	2901	2901
R-squared	0.128	0.223	0.214
Note: Robust standard errors in parentheses. Statistical significance is denoted: * p<0.1, ** p<0.05, *** p<0.01.			

Table 3: OLS Regression Results Underlying the Mean Decomposition

<i>Dependent variable: Log Value of Plot Output per hectare (FCFA/ha)</i>			
	Pooled	Female plots	Male plots
<i>Manager characteristics:</i>			
Female manager	-0.270*** (0.061)		
Age of manager	0.002 (0.002)	0.002 (0.003)	0.001 (0.002)
Years of education of manager	0.007 (0.008)	0.024 (0.025)	0.006 (0.009)
<i>Plot Characteristics:</i>			
Log of plot size (ha)	-0.484*** (0.030)	-0.575*** (0.076)	-0.439*** (0.033)
Plot is owned	0.139*** (0.051)	0.129 (0.113)	0.153*** (0.059)
Intercropped	-0.308*** (0.071)	-0.146 (0.163)	-0.331*** (0.078)
Distance to household (kilometers)	0.003* (0.002)	0.008** (0.003)	0.003 (0.002)
<i>Plot non-labor inputs</i>			
Used organic fertilizer on plot	0.026 (0.128)	0.287 (0.308)	-0.084 (0.141)
Used nonorganic fertilizer on plot	0.093 (0.095)	0.022 (0.273)	0.092 (0.106)
Used pesticides on plot	0.214 (0.223)	1.234** (0.507)	0.206 (0.235)
Used fungicides on plot	0.036 (0.346)	0.363 (1.585)	-0.115 (0.340)
Log estimated value of manure used on plot (FCFA/ha)	0.010 (0.016)	-0.012 (0.039)	0.023 (0.017)
Log amount of inorganic fertilizer used on plot (kg/ha)	0.028 (0.036)	-0.013 (0.140)	0.028 (0.038)
Log estimated value of fungicide used on plot (FCFA/ha)	0.016 (0.056)	0.040 (0.259)	0.018 (0.054)
<i>Plot labor input:</i>			
Used any male household labor on plot	-0.107 (0.115)	0.036 (0.140)	-0.164 (0.551)
Used any female household labor on plot	-0.158*** (0.044)	0.013 (0.132)	-0.165*** (0.048)
Used any child household labor on plot	0.089** (0.044)	0.127 (0.095)	0.083* (0.050)
Hired any mutual labor	0.029 (0.069)	-0.216 (0.261)	0.061 (0.072)
Hired any other nonfamily labor	0.213*** (0.059)	0.256 (0.157)	0.196*** (0.064)
Log male family labor days per hectare	0.220*** (0.022)	0.111*** (0.041)	0.276*** (0.027)
Log female family labor days per hectare	0.149*** (0.026)	0.130*** (0.040)	0.087** (0.041)

Table 3: (Cont'd)

<i>Dependent variable: Log Value of Plot Output per hectare (FCFA/ha)</i>			
	Pooled	Female plots	Male plots
Log child family labor days per hectare	0.153*** (0.034)	0.135** (0.055)	0.132*** (0.045)
Log nonfamily labor days per hectare	0.103*** (0.027)	-0.010 (0.071)	0.132*** (0.030)
Log mutual labor days per hectare	0.080** (0.033)	0.115 (0.115)	0.074** (0.035)
<i>Household characteristics:</i>			
Child dependency ratio	-0.017 (0.023)	-0.132*** (0.051)	0.025 (0.026)
# of male working age adults in household (aged 15-65)	-0.024 (0.031)	-0.006 (0.067)	-0.042 (0.035)
# of female working age adults in household (aged 15-65)	0.045* (0.026)	0.065 (0.061)	0.038 (0.029)
Log value of agricultural capital per hectare	0.073*** (0.012)	0.078*** (0.028)	0.071*** (0.013)
Access to agricultural extension services	0.036 (0.061)	-0.010 (0.150)	0.050 (0.068)
Household had nonfarm labor income	-0.034 (0.053)	0.036 (0.117)	-0.038 (0.061)
Household had nonfarm non-labor income	-0.178*** (0.051)	-0.093 (0.127)	-0.174*** (0.055)
HH Distance in (KMs) to Nearest Major Road	0.006*** (0.002)	-0.003 (0.005)	0.006*** (0.002)
HH Distance in (KMs) to Nearest Market	0.001 (0.001)	0.004** (0.002)	-0.000 (0.001)
<i>Household geographic characteristics:</i>			
Elevation (m)	-0.001*** (0.000)	-0.004*** (0.001)	-0.001 (0.001)
Constant	8.706*** (0.393)	9.692*** (1.002)	8.331*** (0.669)
Observations	2901	613	2288
R-squared	0.551	0.472	0.584

Note: Robust standard errors in parentheses. Results omitted for region fixed effects and crop type.
Statistical significance is denoted: * p<0.1, ** p<0.05, *** p<0.01.

Table 4: Oaxaca Decomposition of the Gender Differential in Agricultural Productivity

<i>Dependent variable: Log Value of Plot Output per hectare (FCFA/ha)</i>			
<i>A. Gender Differential</i>	<i>Male cultivated plots</i>	<i>Female cultivated plots</i>	<i>Gender differential</i>
Mean agricultural productivity	9.903*** (0.031)	9.720*** (0.052)	0.183*** (0.061)
<i>B. Aggregate Decomposition</i>	<i>Endowment effect</i>	<i>Male structural advantage</i>	<i>Female structural disadvantage</i>
Total	-0.087 (0.063)	-0.000 (0.003)	0.270*** (0.061)
Share of the gender differential	-48%	0%	148%
<i>C. Detailed Decomposition</i>	<i>Endowment effect</i>	<i>Male structural advantage</i>	<i>Female structural disadvantage</i>
<i>Manager characteristics:</i>			
Age of manager	0.008 (0.008)	-0.019 (0.040)	-0.007 (0.111)
Years of education of manager	0.005 (0.005)	-0.001 (0.003)	-0.008 (0.012)
<i>Plot characteristics:</i>			
Log of plot size (ha)	-0.282*** (0.028)	0.005** (0.002)	-0.042 (0.030)
Plot is owned	0.012** (0.005)	0.011 (0.026)	0.007 (0.072)
Intercropped	-0.012* (0.007)	-0.018 (0.027)	-0.118 (0.105)
Distance to household (kilometers)	0.003 (0.002)	0.000 (0.003)	-0.022 (0.014)
Used organic fertilizer on plot	0.005 (0.022)	-0.042* (0.025)	-0.055 (0.058)
<i>Plot non-labor inputs:</i>			
Used nonorganic fertilizer on plot	0.007 (0.007)	-0.000 (0.005)	0.004 (0.015)
Used pesticides on plot	0.002 (0.003)	-0.000 (0.001)	-0.002 (0.002)
Used fungicides on plot	0.000 (0.002)	-0.007 (0.005)	-0.014 (0.064)
Log estimated value of manure used on plot (FCFA/ha)	0.014 (0.023)	0.040* (0.024)	0.035 (0.055)
Log amount of inorganic fertilizer used on plot (kg/ha)	0.006 (0.008)	0.000 (0.003)	0.003 (0.010)
Log estimated value of fungicide used on plot (FCFA/ha)	0.000 (0.002)	0.001 (0.004)	-0.006 (0.064)

Table 4: (Cont'd)

<i>Dependent variable: Log Value of Plot Output per hectare (FCFA/ha)</i>			
<i>C. Detailed Decomposition (cont'd)</i>	<i>Endowment effect</i>	<i>Male structural advantage</i>	<i>Female structural disadvantage</i>
<i>Plot labor inputs:</i>			
Used any male household labor on plot	-0.031 (0.033)	-0.057 (0.524)	-0.101 (0.069)
Used any female household labor on plot	0.057*** (0.016)	-0.004 (0.009)	-0.145 (0.103)
Used any child household labor on plot	-0.005 (0.003)	-0.003 (0.010)	-0.018 (0.038)
Hired any mutual labor	0.002 (0.004)	0.006 (0.005)	0.029 (0.028)
Hired any other nonfamily labor	0.007 (0.005)	-0.006 (0.011)	-0.013 (0.042)
Log male family labor days per hectare	0.299*** (0.034)	0.169*** (0.047)	0.179*** (0.056)
Log female family labor days per hectare	-0.288*** (0.052)	-0.008* (0.004)	0.038 (0.062)
Log child family labor days per hectare	-0.027*** (0.008)	-0.001 (0.002)	0.004 (0.010)
Log nonfamily labor days per hectare	0.011** (0.006)	0.017** (0.008)	0.053* (0.030)
Log mutual labor days per hectare	0.002 (0.003)	-0.001 (0.003)	-0.007 (0.022)
<i>Household characteristics:</i>			
Child dependency ratio	0.001 (0.002)	0.055*** (0.020)	0.160*** (0.059)
# of male working age adults in household (aged 15-65)	-0.007 (0.008)	-0.024 (0.018)	-0.019 (0.067)
# of female working age adults in household (aged 15-65)	-0.005 (0.003)	-0.010 (0.019)	-0.033 (0.090)
Log value of agricultural capital per hectare	-0.007 (0.006)	-0.016 (0.042)	-0.039 (0.208)
Access to agricultural extension services	0.001 (0.003)	0.002 (0.003)	0.004 (0.011)
Household had nonfarm labor income	0.000 (0.001)	-0.001 (0.004)	-0.011 (0.016)
Household had nonfarm non-labor income	0.009** (0.004)	0.003 (0.019)	-0.074 (0.097)
<i>Household geographic characteristics</i>			
HH Distance in (KMs) to Nearest Major Road	0.004 (0.003)	0.007 (0.012)	0.100* (0.053)
HH Distance in (KMs) to Nearest Market	0.002 (0.003)	-0.039* (0.022)	-0.174* (0.089)
Elevation (m)	0.015* (0.008)	0.166* (0.093)	1.024** (0.437)

Note: 2,901 plot observations. Robust standard errors in parentheses. Results omitted for region fixed effects and crop type. Statistical significance is denoted: * p<0.1, ** p<0.05, *** p<0.01.

Table 5: Aggregate Decomposition of the Gender Differential At Selected Points of the Agricultural Productivity Distribution

<i>Dependent variable: Log Value of Plot Output per hectare (FCFA/ha)</i>										
	<i>Mean</i>	<i>10th Percentile</i>	<i>20th Percentile</i>	<i>30th Percentile</i>	<i>40th Percentile</i>	<i>50th Percentile</i>	<i>60th Percentile</i>	<i>70th Percentile</i>	<i>80th Percentile</i>	<i>90th Percentile</i>
<i>A. Agricultural Productivity Gender Differential</i>										
Male cultivated plots	9.903*** (0.031)	8.074*** (0.056)	8.779*** (0.044)	9.221*** (0.036)	9.557*** (0.034)	9.873*** (0.033)	10.180*** (0.034)	10.532*** (0.036)	10.967*** (0.047)	11.791*** (0.071)
Female cultivated plots	9.720*** (0.052)	8.079*** (0.097)	8.674*** (0.077)	9.101*** (0.073)	9.473*** (0.064)	9.772*** (0.060)	10.017*** (0.060)	10.348*** (0.066)	10.725*** (0.073)	11.385*** (0.093)
Gender Differential	0.183*** (0.061)	-0.005 (0.112)	0.105 (0.089)	0.120 (0.081)	0.084 (0.073)	0.101 (0.068)	0.163** (0.069)	0.183** (0.075)	0.242*** (0.087)	0.406*** (0.117)
<i>B. Aggregate Decomposition</i>										
1. Endowment effect										
Total	-0.087 (0.063)	-0.149 (0.102)	-0.132 (0.084)	-0.113 (0.074)	-0.135** (0.068)	-0.091 (0.065)	-0.083 (0.068)	-0.072 (0.076)	-0.112 (0.096)	0.082 (0.147)
Share of the gender differential	-48%	2980%	-126%	-94%	-161%	-90%	-51%	-39%	-46%	20%
2. Male structural advantage										
Total	-0.000 (0.003)	-0.000 (0.006)	0.000 (0.004)	-0.000 (0.003)	-0.000 (0.003)	0.000 (0.003)	-0.000 (0.003)	-0.000 (0.004)	-0.000 (0.004)	-0.000 (0.007)
Share of the gender differential	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
3. Female structural disadvantage										
Total	0.270*** (0.061)	0.144 (0.146)	0.237** (0.114)	0.234** (0.099)	0.219** (0.086)	0.192** (0.080)	0.246*** (0.079)	0.255*** (0.085)	0.354*** (0.099)	0.325** (0.143)
Share of the gender differential	148%	-2880%	226%	195%	261%	190%	151%	139%	146%	80%

Note: 2,901 plot observations throughout. Robust standard errors in parentheses. Statistical significance is denoted: * p<0.1, ** p<0.05, *** p<0.01.

Table 6: Detailed Decomposition of the Gender Differential At Selected Points of the Agricultural Productivity Distribution

Dependent variable: Log Value of Plot Output per hectare (FCFA/ha)												
A. Gender Differential	Male Cultivated Plots				Female Cultivated Plots				Gender Differential			
	Mean	10th	50th	90th	Mean	10th	50th	90th	Mean	10th	50th	90th
Mean agricultural productivity	9.903*** (0.031)	8.074*** (0.056)	9.873*** (0.033)	11.791*** (0.071)	9.720*** (0.052)	8.079*** (0.097)	9.772*** (0.060)	11.385*** (0.093)	0.183*** (0.061)	-0.005 (0.112)	0.101 (0.068)	0.406*** (0.117)
B. Aggregate Decomposition	Endowment effect				Male structural advantage				Female structural disadvantage			
	Mean	10th	50th	90th	Mean	10th	50th	90th	Mean	10th	50th	90th
Total	-0.087 (0.063)	-0.149 (0.102)	-0.091 (0.065)	0.082 (0.147)	-0.000 (0.003)	-0.000 (0.006)	0.000 (0.003)	-0.000 (0.007)	0.270*** (0.061)	0.144 (0.146)	0.192** (0.080)	0.325** (0.143)
Share of the gender differential	-48%	2980%	-90%	20%	0%	0%	0%	0%	148%	-2880%	190%	80%
C. Detailed Decomposition	Endowment effect				Male structural advantage				Female structural disadvantage			
	Mean	10th	50th	90th	Mean	10th	50th	90th	Mean	10th	50th	90th
Manager characteristics:												
Age of manager	0.008 (0.008)	0.006 (0.019)	0.024** (0.010)	0.006 (0.019)	-0.019 (0.040)	0.075 (0.100)	0.021 (0.049)	-0.014 (0.084)	-0.007 (0.111)	0.230 (0.263)	0.076 (0.141)	0.348 (0.239)
Years of education of manager	0.005 (0.005)	-0.004 (0.013)	0.014** (0.007)	-0.016 (0.014)	-0.001 (0.003)	0.003 (0.007)	-0.004 (0.005)	0.004 (0.007)	-0.008 (0.012)	-0.013 (0.022)	-0.010 (0.017)	0.014 (0.025)
Plot characteristics:												
Log of plot size (ha)	-0.282*** (0.028)	-0.239*** (0.043)	-0.248*** (0.029)	-0.437*** (0.059)	0.005** (0.002)	0.016*** (0.005)	-0.000 (0.003)	0.007 (0.005)	-0.042 (0.030)	-0.151** (0.067)	0.001 (0.036)	-0.009 (0.068)
Plot is owned	0.012** (0.005)	0.020* (0.012)	0.004 (0.006)	0.037*** (0.014)	0.011 (0.026)	-0.017 (0.060)	-0.040 (0.032)	0.112* (0.062)	0.007 (0.072)	-0.070 (0.171)	-0.055 (0.086)	0.211 (0.163)
Intercropped	-0.012* (0.007)	-0.014 (0.010)	-0.013* (0.007)	-0.014 (0.009)	-0.018 (0.027)	0.071 (0.063)	-0.042 (0.030)	-0.084 (0.056)	-0.118 (0.105)	0.102 (0.240)	-0.208* (0.122)	-0.306 (0.198)
Distance to household (kilometers)	0.003 (0.002)	0.005 (0.004)	0.003 (0.002)	0.003 (0.006)	0.000 (0.003)	0.004 (0.005)	0.001 (0.003)	-0.004 (0.007)	-0.022 (0.014)	0.002 (0.020)	-0.007 (0.014)	-0.091** (0.038)
Plot non-labor inputs:												
Used organic fertilizer on plot	0.005 (0.022)	0.009 (0.054)	-0.002 (0.027)	-0.006 (0.057)	-0.042* (0.025)	-0.050 (0.045)	0.013 (0.028)	-0.061 (0.056)	-0.055 (0.058)	0.047 (0.101)	0.040 (0.073)	-0.107 (0.152)
Used nonorganic fertilizer on plot	0.007 (0.007)	0.009 (0.017)	0.033*** (0.010)	-0.021 (0.016)	-0.000 (0.005)	-0.006 (0.011)	0.003 (0.007)	-0.009 (0.010)	0.004 (0.015)	-0.012 (0.026)	0.004 (0.022)	-0.002 (0.030)
Used pesticides on plot	0.002 (0.003)	0.000 (0.005)	0.001 (0.003)	0.004 (0.008)	-0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)	0.001 (0.001)	-0.002 (0.002)	-0.004 (0.005)	0.002 (0.002)	-0.001 (0.002)
Used fungicides on plot	0.000 (0.002)	0.002 (0.005)	-0.000 (0.002)	-0.003 (0.009)	-0.007 (0.005)	-0.010 (0.008)	-0.009 (0.006)	-0.008 (0.011)	-0.014 (0.064)	-0.018 (0.088)	-0.030 (0.086)	0.106 (0.155)
Log estimated value of manure used on plot (FCFA/ha)	0.014 (0.023)	-0.003 (0.050)	0.022 (0.027)	0.027 (0.065)	0.040* (0.024)	0.024 (0.039)	0.004 (0.027)	0.059 (0.055)	0.035 (0.055)	-0.139 (0.092)	-0.003 (0.073)	0.088 (0.150)
Log amount of inorganic fertilizer used on plot (kg/ha)	0.006 (0.008)	0.019 (0.016)	-0.018** (0.009)	0.039 (0.028)	0.000 (0.003)	0.003 (0.007)	-0.001 (0.004)	-0.003 (0.007)	0.003 (0.010)	0.001 (0.015)	0.008 (0.015)	-0.018 (0.027)
Log estimated value of fungicide used on plot (FCFA/ha)	0.000 (0.002)	-0.002 (0.005)	0.001 (0.004)	0.003 (0.009)	0.001 (0.004)	0.002 (0.007)	0.005 (0.005)	0.000 (0.010)	-0.006 (0.064)	0.006 (0.088)	0.020 (0.084)	-0.131 (0.162)
Plot labor inputs:												
Used any male household labor on plot	-0.031 (0.033)	-0.001 (0.075)	-0.007 (0.040)	-0.163** (0.072)	-0.057 (0.524)	1.613 (1.407)	-0.693 (0.482)	-1.311 (1.221)	-0.101 (0.069)	0.159 (0.173)	-0.044 (0.086)	-0.505*** (0.170)
Used any female household labor on plot	0.057*** (0.016)	0.097** (0.040)	0.064*** (0.021)	0.022 (0.039)	-0.004 (0.009)	-0.003 (0.021)	0.011 (0.011)	0.012 (0.019)	-0.145 (0.103)	-0.334 (0.236)	0.019 (0.138)	-0.019 (0.208)

Table 6: (Cont'd)

Dependent variable: Log Value of Plot Output per hectare (FCFA/ha)												
C. Detailed Decomposition (cont'd)	Endowment effect				Male structural advantage				Female structural disadvantage			
	Mean	10th	50th	90th	Mean	10th	50th	90th	Mean	10th	50th	90th
<i>Plot labor inputs (cont'd):</i>												
Used any child household labor on plot	-0.005 (0.003)	-0.011 (0.008)	-0.003 (0.003)	-0.004 (0.007)	-0.003 (0.010)	-0.021 (0.024)	-0.010 (0.013)	-0.026 (0.023)	-0.018 (0.038)	-0.097 (0.090)	-0.053 (0.050)	-0.108 (0.093)
Hired any mutual labor	0.002 (0.004)	0.024* (0.012)	0.005 (0.005)	-0.019** (0.009)	0.006 (0.005)	0.003 (0.013)	0.005 (0.005)	0.015* (0.008)	0.029 (0.028)	0.069 (0.073)	0.029 (0.030)	0.038 (0.041)
Hired any other nonfamily labor	0.007 (0.005)	0.010 (0.008)	0.008 (0.006)	0.004 (0.005)	-0.006 (0.011)	-0.009 (0.027)	0.008 (0.012)	-0.026 (0.019)	-0.013 (0.042)	0.004 (0.102)	0.019 (0.046)	-0.091 (0.069)
Log male family labor days per hectare	0.299*** (0.034)	0.385*** (0.070)	0.247*** (0.040)	0.299*** (0.082)	0.169*** (0.047)	0.331*** (0.101)	0.038 (0.060)	0.309*** (0.118)	0.179*** (0.056)	0.336*** (0.125)	0.010 (0.075)	0.428*** (0.146)
Log female family labor days per hectare	-0.288*** (0.052)	-0.452*** (0.103)	-0.262*** (0.061)	-0.031 (0.130)	-0.008* (0.004)	0.000 (0.009)	-0.014*** (0.005)	-0.016 (0.011)	0.038 (0.062)	0.327** (0.127)	-0.128 (0.079)	-0.124 (0.156)
Log child family labor days per hectare	-0.027*** (0.008)	-0.035*** (0.013)	-0.025*** (0.010)	-0.055** (0.023)	-0.001 (0.002)	0.005 (0.004)	-0.005* (0.003)	0.003 (0.006)	0.004 (0.010)	0.035* (0.021)	-0.008 (0.013)	0.038 (0.028)
Log nonfamily labor days per hectare	0.011** (0.006)	0.007 (0.007)	0.008 (0.005)	0.025* (0.013)	0.017** (0.008)	0.038** (0.018)	-0.003 (0.008)	0.041** (0.017)	0.053* (0.030)	0.091 (0.069)	-0.010 (0.030)	0.180*** (0.061)
Log mutual labor days per hectare	0.002 (0.003)	-0.004 (0.005)	0.000 (0.001)	0.011 (0.014)	-0.001 (0.003)	-0.009 (0.006)	-0.003 (0.003)	0.004 (0.008)	-0.007 (0.022)	-0.061 (0.053)	-0.022 (0.024)	0.024 (0.047)
<i>Household characteristics:</i>												
Child dependency ratio	0.001 (0.002)	0.003 (0.004)	0.001 (0.002)	-0.003 (0.005)	0.055*** (0.020)	0.115** (0.048)	0.061** (0.024)	0.069 (0.044)	0.160*** (0.059)	0.368*** (0.136)	0.187** (0.074)	0.312** (0.135)
Number of male working age adults in household (aged 15-65)	-0.007 (0.008)	0.004 (0.017)	-0.015 (0.010)	0.033 (0.022)	-0.024 (0.018)	-0.096** (0.038)	-0.001 (0.022)	0.016 (0.041)	-0.019 (0.067)	-0.297** (0.144)	-0.013 (0.086)	0.298* (0.158)
Number of female working age adults in household (aged 15-65)	-0.005 (0.003)	0.004 (0.007)	-0.003 (0.004)	-0.011 (0.008)	-0.010 (0.019)	-0.049 (0.043)	0.008 (0.023)	0.016 (0.045)	-0.033 (0.090)	-0.079 (0.184)	0.048 (0.106)	0.015 (0.192)
Log value of agricultural capital per hectare	-0.007 (0.006)	-0.009 (0.008)	-0.006 (0.005)	-0.003 (0.003)	-0.016 (0.042)	0.001 (0.099)	-0.026 (0.046)	-0.004 (0.101)	-0.039 (0.208)	0.260 (0.489)	-0.119 (0.237)	0.064 (0.492)
Access to agricultural extension services	0.001 (0.003)	-0.007 (0.007)	0.003 (0.003)	0.006 (0.007)	0.002 (0.003)	0.009 (0.010)	0.002 (0.004)	-0.000 (0.007)	0.004 (0.011)	0.017 (0.030)	0.005 (0.015)	0.005 (0.024)
Household had nonfarm labor income	0.000 (0.001)	-0.000 (0.001)	0.000 (0.001)	-0.000 (0.000)	-0.001 (0.004)	-0.010 (0.010)	0.003 (0.006)	-0.009 (0.011)	-0.011 (0.016)	-0.043 (0.036)	0.003 (0.021)	-0.008 (0.039)
Household had nonfarm non-labor income	0.009** (0.004)	0.005 (0.006)	0.007* (0.004)	0.008 (0.007)	0.003 (0.019)	0.018 (0.046)	-0.027 (0.024)	-0.065 (0.040)	-0.074 (0.097)	-0.085 (0.228)	-0.187 (0.124)	-0.443** (0.192)
<i>Household geographic characteristics:</i>												
HH Distance in (KMs) to Nearest Major Road	0.004 (0.003)	-0.001 (0.003)	0.004 (0.003)	0.015 (0.011)	0.007 (0.012)	0.016 (0.032)	0.013 (0.013)	0.006 (0.025)	0.100* (0.053)	0.209 (0.132)	0.127** (0.064)	0.130 (0.098)
HH Distance in (KMs) to Nearest Market	0.002 (0.003)	0.016* (0.009)	-0.008* (0.004)	0.006 (0.007)	-0.039* (0.022)	-0.001 (0.043)	-0.056** (0.023)	-0.041 (0.047)	-0.174* (0.089)	-0.063 (0.176)	-0.321*** (0.103)	-0.101 (0.197)
Elevation (m)	0.015* (0.008)	0.020 (0.017)	0.016* (0.009)	-0.005 (0.015)	0.166* (0.093)	0.255 (0.253)	0.077 (0.110)	0.375* (0.207)	1.024** (0.437)	2.178* (1.144)	0.176 (0.536)	2.266** (0.887)

Note: 2,901 plot observations throughout. Robust standard errors in parentheses. Results omitted for region fixed effects and crop type. Statistical significance is denoted: * p<0.1, ** p<0.05, *** p<0.01.

Table 7: Oaxaca Decomposition - Alternative Sample Definitions

<i>Dependent variable: Log Value of Plot Output per hectare (FCFA/ha)</i>												
<i>A. Gender Differential</i>	<i>Male Managed Plots (Female for F vs. HH)</i>				<i>Female Managed Plots (HH managed for F/M vs. HH)</i>				<i>Gender Differential</i>			
	<i>Base</i>	<i>With HH</i>	<i>F vs. HH</i>	<i>M vs. HH</i>	<i>Base</i>	<i>With HH</i>	<i>F vs. HH</i>	<i>M vs. HH</i>	<i>Base</i>	<i>With HH</i>	<i>F vs. HH</i>	<i>M vs. HH</i>
Mean agricultural productivity	9.903*** (0.031)	9.865*** (0.024)	9.720*** (0.052)	9.791*** (0.035)	9.720*** (0.052)	9.672*** (0.049)	9.791*** (0.035)	9.903*** (0.031)	0.183*** (0.061)	0.193*** (0.054)	-0.070 (0.063)	-0.113** (0.047)
<i>B. Aggregate Decomposition</i>	<i>Endowment effect</i>				<i>Male structural advantage (Female for F vs. HH)</i>				<i>Female structural disadvantage (HH disadv. for F/M vs. HH)</i>			
	<i>Base</i>	<i>With HH</i>	<i>F vs. HH</i>	<i>M vs. HH</i>	<i>Base</i>	<i>With HH</i>	<i>F vs. HH</i>	<i>M vs. HH</i>	<i>Base</i>	<i>With HH</i>	<i>F vs. HH</i>	<i>M vs. HH</i>
Total	-0.087 (0.063)	-0.084 (0.052)	0.086 (0.062)	-0.103** (0.040)	-0.000 (0.003)	0.000 (0.002)	0.000 (0.022)	0.000 (0.006)	0.270*** (0.061)	0.277*** (0.052)	-0.156** (0.063)	-0.010 (0.037)
Share of the gender differential	-48%	-44%	-123%	91%	0%	0%	160%	0%	148%	144%	214%	9%
<i>C. Detailed Decomposition</i>	<i>Endowment effect</i>				<i>Male structural advantage (Female for F vs. HH)</i>				<i>Female structural disadvantage (HH disadv. for F/M vs. HH)</i>			
	<i>Base</i>	<i>With HH</i>	<i>F vs. HH</i>	<i>M vs. HH</i>	<i>Base</i>	<i>With HH</i>	<i>F vs. HH</i>	<i>M vs. HH</i>	<i>Base</i>	<i>With HH</i>	<i>F vs. HH</i>	<i>M vs. HH</i>
<i>Manager characteristics:</i>												
Age of manager	0.008 (0.008)	0.003 (0.005)	-0.006 (0.018)	0.004 (0.008)	-0.019 (0.040)	-0.009 (0.028)	0.047 (0.112)	-0.001 (0.065)	-0.007 (0.111)	-0.085 (0.106)	-0.007 (0.048)	-0.020 (0.056)
Years of education of manager	0.005 (0.005)	0.000 (0.003)	-0.000 (0.002)	-0.000 (0.004)	-0.001 (0.003)	-0.002 (0.002)	0.011 (0.011)	0.000 (0.007)	-0.008 (0.012)	-0.014 (0.010)	0.001 (0.004)	-0.007 (0.006)
<i>Plot characteristics:</i>												
Log of plot size (ha)	-0.282*** (0.028)	-0.251*** (0.023)	0.294*** (0.031)	-0.005 (0.016)	0.005** (0.002)	0.001 (0.002)	0.037 (0.030)	-0.003 (0.004)	-0.042 (0.030)	-0.015 (0.024)	-0.002 (0.003)	-0.001 (0.003)
Plot is owned	0.012** (0.005)	0.008** (0.003)	-0.009 (0.006)	0.000 (0.002)	0.011 (0.026)	0.029* (0.017)	0.019 (0.073)	-0.029 (0.043)	0.007 (0.072)	0.097 (0.071)	0.003 (0.033)	-0.014 (0.036)
Intercropped	-0.012* (0.007)	0.000 (0.005)	-0.012** (0.006)	0.028*** (0.006)	-0.018 (0.027)	-0.007 (0.015)	0.054 (0.105)	0.054 (0.035)	-0.118 (0.105)	-0.128 (0.091)	-0.004 (0.023)	0.029 (0.044)
Distance to household (kilometers)	0.003 (0.002)	0.001 (0.001)	0.001 (0.001)	-0.004 (0.002)	0.000 (0.003)	0.000 (0.002)	0.027** (0.012)	-0.001 (0.017)	-0.022 (0.014)	-0.004 (0.013)	-0.003 (0.013)	0.000 (0.002)
<i>Plot non-labor inputs:</i>												
Used organic fertilizer on plot	0.005 (0.022)	-0.002 (0.012)	-0.002 (0.015)	0.005 (0.006)	-0.042* (0.025)	-0.021 (0.015)	0.057 (0.059)	-0.006 (0.030)	-0.055 (0.058)	-0.062 (0.056)	0.040** (0.020)	-0.002 (0.041)
Used nonorganic fertilizer on plot	0.007 (0.007)	-0.006 (0.004)	0.025*** (0.009)	-0.003 (0.002)	-0.000 (0.005)	0.000 (0.003)	0.015 (0.015)	-0.023** (0.011)	0.004 (0.015)	-0.005 (0.016)	0.002 (0.005)	-0.026** (0.010)
Used pesticides on plot	0.002 (0.003)	-0.001 (0.002)	0.003 (0.004)	-0.000 (0.001)	-0.000 (0.001)	-0.001 (0.000)	0.002 (0.002)	-0.003 (0.003)	-0.002 (0.002)	-0.002 (0.002)	0.001 (0.001)	-0.004 (0.002)
Used fungicides on plot	0.000 (0.002)	0.003 (0.004)	0.001 (0.009)	-0.001 (0.002)	-0.007 (0.005)	-0.004 (0.004)	-0.027 (0.063)	0.027 (0.027)	-0.014 (0.064)	-0.069 (0.055)	0.002 (0.012)	0.019* (0.011)
Log value of manure used (FCFA/ha)	0.014 (0.023)	0.017 (0.011)	-0.015 (0.013)	-0.015* (0.008)	0.040* (0.024)	0.018 (0.014)	-0.047 (0.056)	0.014 (0.028)	0.035 (0.055)	0.047 (0.054)	-0.031* (0.018)	0.004 (0.039)
Log amount of inorganic fertilizer used (kg/ha)	0.006 (0.008)	0.013*** (0.005)	-0.023** (0.009)	-0.002 (0.003)	0.000 (0.003)	0.002 (0.002)	-0.009 (0.010)	0.011 (0.009)	0.003 (0.010)	0.018 (0.013)	-0.002 (0.003)	0.016* (0.008)
Log value of fungicide used (FCFA/ha)	0.000 (0.002)	-0.001 (0.002)	-0.004 (0.008)	0.002 (0.003)	0.001 (0.004)	0.001 (0.004)	0.041 (0.064)	-0.023 (0.027)	-0.006 (0.064)	0.056 (0.057)	0.004 (0.013)	-0.015 (0.010)
<i>Plot labor inputs:</i>												
Used any male household labor on plot	-0.031 (0.033)	-0.058** (0.029)	0.022 (0.025)	0.004 (0.005)	-0.057 (0.524)	-0.489** (0.241)	0.088 (0.078)	0.061 (0.075)	-0.101 (0.069)	-0.155** (0.063)	-0.045 (0.117)	0.060 (0.513)
Used any female household labor on plot	0.057*** (0.016)	0.035*** (0.011)	-0.010 (0.013)	-0.010*** (0.004)	-0.004 (0.009)	-0.004 (0.006)	0.042 (0.103)	0.064*** (0.025)	-0.145 (0.103)	-0.172* (0.095)	-0.025* (0.014)	0.029* (0.016)
Used any child household labor on plot	-0.005 (0.003)	0.004 (0.002)	-0.029** (0.011)	0.025** (0.010)	-0.003 (0.010)	-0.004 (0.009)	-0.003 (0.038)	0.028 (0.030)	-0.018 (0.038)	-0.012 (0.039)	-0.000 (0.022)	0.004 (0.014)

Table 7: (Cont'd)

Dependent variable: Log Value of Plot Output per hectare (FCFA/ha)												
C. Detailed Decomposition	Endowment effect				Male structural advantage (Female for F vs. HH)				Female structural disadvantage (HH disadv. for F/M vs. HH)			
	Base	With HH	F vs. HH	M vs. HH	Base	With HH	F vs. HH	M vs. HH	Base	With HH	F vs. HH	M vs. HH
<i>Plot labor inputs (cont'd):</i>												
Hired any mutual labor	0.002 (0.004)	0.003 (0.002)	-0.004 (0.003)	-0.002 (0.002)	0.006 (0.005)	0.006** (0.003)	-0.038 (0.028)	0.008 (0.011)	0.029 (0.028)	0.049* (0.028)	-0.008 (0.006)	0.006 (0.008)
Hired any other nonfamily labor	0.007 (0.005)	-0.001 (0.004)	0.029*** (0.009)	-0.029*** (0.007)	-0.006 (0.011)	-0.003 (0.006)	-0.007 (0.039)	0.012 (0.013)	-0.013 (0.042)	-0.017 (0.036)	0.002 (0.010)	0.006 (0.013)
Log male family labor days per hectare	0.299*** (0.034)	0.328*** (0.029)	-0.226*** (0.031)	-0.065*** (0.012)	0.169*** (0.047)	0.076** (0.030)	-0.154*** (0.058)	-0.056 (0.057)	0.179*** (0.056)	0.107** (0.052)	-0.091** (0.046)	-0.054 (0.060)
Log female family labor days per hectare	-0.288*** (0.052)	-0.251*** (0.038)	0.187*** (0.040)	0.033*** (0.008)	-0.008* (0.004)	-0.008** (0.004)	0.029 (0.066)	-0.013 (0.009)	0.038 (0.062)	-0.062 (0.060)	0.020** (0.010)	0.002 (0.004)
Log child family labor days per hectare	-0.027*** (0.008)	-0.031*** (0.007)	-0.003 (0.005)	0.029*** (0.006)	-0.001 (0.002)	0.000 (0.002)	0.002 (0.011)	-0.004 (0.004)	0.004 (0.010)	-0.002 (0.014)	-0.001 (0.004)	0.001 (0.002)
Log nonfamily labor days per hectare	0.011** (0.006)	0.003 (0.004)	0.004 (0.005)	-0.026*** (0.007)	0.017** (0.008)	0.007 (0.005)	-0.017 (0.027)	-0.019 (0.012)	0.053* (0.030)	0.048* (0.026)	-0.007 (0.008)	-0.017 (0.010)
Log mutual labor days per hectare	0.002 (0.003)	0.001 (0.002)	-0.002 (0.003)	0.002 (0.002)	-0.001 (0.003)	-0.002 (0.002)	0.015 (0.022)	-0.008 (0.009)	-0.007 (0.022)	-0.024 (0.023)	0.004 (0.004)	-0.003 (0.006)
<i>Household characteristics:</i>												
Child dependency ratio	0.001 (0.002)	0.001 (0.001)	-0.005 (0.004)	-0.000 (0.001)	0.055*** (0.020)	0.043*** (0.014)	-0.110* (0.057)	-0.035 (0.031)	0.160*** (0.059)	0.136** (0.054)	-0.037 (0.026)	-0.029 (0.024)
Number of male working age adults	-0.007 (0.008)	-0.009 (0.009)	0.002 (0.016)	-0.009 (0.008)	-0.024 (0.018)	-0.008 (0.012)	-0.004 (0.036)	0.022 (0.036)	-0.019 (0.067)	-0.027 (0.060)	0.017 (0.021)	0.023 (0.034)
Number of female working age adults	-0.005 (0.003)	0.001 (0.001)	-0.001 (0.005)	0.003 (0.006)	-0.010 (0.019)	0.003 (0.012)	0.099 (0.091)	-0.026 (0.031)	-0.033 (0.090)	0.003 (0.081)	0.017 (0.020)	-0.045 (0.033)
Log value of agricultural capital per hectare	-0.007 (0.006)	-0.001 (0.005)	-0.000 (0.005)	0.007 (0.004)	-0.016 (0.042)	-0.020 (0.027)	0.107 (0.206)	-0.079 (0.105)	-0.039 (0.208)	-0.152 (0.201)	0.069 (0.061)	-0.040 (0.073)
Access to agricultural extension services	0.001 (0.003)	0.001 (0.003)	0.000 (0.005)	0.001 (0.002)	0.002 (0.003)	0.003 (0.002)	-0.000 (0.011)	-0.004 (0.008)	0.004 (0.011)	0.004 (0.009)	-0.003 (0.004)	-0.001 (0.006)
Household had nonfarm labor income	0.000 (0.001)	0.000 (0.000)	0.000 (0.001)	-0.000 (0.000)	-0.001 (0.004)	0.003 (0.003)	0.010 (0.016)	0.002 (0.008)	-0.011 (0.016)	-0.002 (0.015)	-0.001 (0.005)	0.001 (0.007)
Household had nonfarm non-labor income	0.009** (0.004)	0.003* (0.002)	-0.000 (0.001)	-0.004 (0.002)	0.003 (0.019)	0.007 (0.014)	-0.119 (0.095)	0.190*** (0.051)	-0.074 (0.097)	0.015 (0.096)	-0.090*** (0.033)	0.085*** (0.030)
<i>Household geographic characteristics:</i>												
HH Distance in (KMs) to Nearest Major Road	0.004 (0.003)	0.002 (0.002)	0.003 (0.003)	-0.007** (0.003)	0.007 (0.012)	0.000 (0.007)	-0.095* (0.055)	0.003 (0.019)	0.100* (0.053)	0.044 (0.050)	-0.010 (0.012)	-0.005 (0.018)
HH Distance in (KMs) to Nearest Market	0.002 (0.003)	0.002 (0.002)	-0.005 (0.007)	0.001 (0.002)	-0.039* (0.022)	-0.022 (0.014)	0.178** (0.087)	-0.024 (0.044)	-0.174* (0.089)	-0.150* (0.081)	0.050 (0.032)	0.011 (0.029)
Elevation (m)	0.015* (0.008)	0.008 (0.012)	-0.008 (0.045)	-0.009 (0.024)	0.166* (0.093)	0.186*** (0.067)	-1.432*** (0.424)	0.438** (0.184)	1.024** (0.437)	0.924** (0.402)	-0.523*** (0.140)	0.331*** (0.127)
Observations	2288	4068	2526	4201	613	746	2526	4201	2901	4814	2526	4201

Note: The "Base" columns contain the main results of the paper presented in Table 4. The other columns present results based on different sample definitions and assumptions: (1) for "With HH" all plots with multiple managers were included assuming the head of the household is the manager, (2) "F vs. HH" compares female plots with plots managed by multiple members, (3) compares male plots with plots managed by multiple memberst. Robust standard errors in parentheses. Results omitted for region fixed effects and crop type. Statistical significance is denoted: * p<0.1, ** p<0.05, *** p<0.01.

Table 8: Oaxaca Decomposition - Tobit Results Including Plots with Crop Loss

<i>Dependent variable: Log Value of Plot Output per hectare (FCFA/ha)</i>						
<i>A. Gender Differential</i>	<i>Male Managed Plots</i>		<i>Female Managed Plots</i>		<i>Gender Differential</i>	
	<i>Base</i>	<i>Tobit</i>	<i>Base</i>	<i>Tobit</i>	<i>Base</i>	<i>Tobit</i>
Mean agricultural productivity	9.903*** (0.031)	8.802*** (0.074)	9.720*** (0.052)	7.416*** (0.181)	0.183*** (0.061)	1.385*** (0.196)
<i>B. Aggregate Decomposition</i>	<i>Endowment effect</i>		<i>Male structural advantage</i>		<i>Female structural disadvantage</i>	
	<i>Base</i>	<i>Tobit</i>	<i>Base</i>	<i>Tobit</i>	<i>Base</i>	<i>Tobit</i>
Total	-0.087 (0.063)	0.781*** (0.161)	-0.000 (0.003)	-0.112*** (0.017)	0.270*** (0.061)	0.717*** (0.165)
Share of the gender differential	-48%	56%	0%	-8%	148%	52%
<i>C. Detailed Decomposition</i>	<i>Endowment effect</i>		<i>Male structural advantage</i>		<i>Female structural disadvantage</i>	
	<i>Base</i>	<i>Tobit</i>	<i>Base</i>	<i>Tobit</i>	<i>Base</i>	<i>Tobit</i>
<i>Manager characteristics:</i>						
Age of manager	0.008 (0.008)	0.013 (0.017)	-0.019 (0.040)	-0.141 (0.104)	-0.007 (0.111)	-0.465* (0.280)
Years of education of manager	0.005 (0.005)	0.023 (0.015)	-0.001 (0.003)	-0.005 (0.010)	-0.008 (0.012)	-0.001 (0.040)
<i>Plot characteristics:</i>						
Log of plot size (ha)	-0.282*** (0.028)	-0.208*** (0.051)	0.005** (0.002)	-0.005 (0.005)	-0.042 (0.030)	0.132 (0.104)
Plot is owned	0.012** (0.005)	0.058*** (0.016)	0.011 (0.026)	0.013 (0.075)	0.007 (0.072)	0.046 (0.166)
Intercropped	-0.012* (0.007)	-0.088*** (0.022)	-0.018 (0.027)	-0.221*** (0.073)	-0.118 (0.105)	-0.124 (0.222)
Distance to household (kilometers)	0.003 (0.002)	-0.001 (0.003)	0.000 (0.003)	0.008 (0.012)	-0.022 (0.014)	-0.005 (0.034)
<i>Plot non-labor inputs:</i>						
Used organic fertilizer on plot	0.005 (0.022)	-0.013 (0.050)	-0.042* (0.025)	0.008 (0.057)	-0.055 (0.058)	-0.180* (0.106)
Used nonorganic fertilizer on plot	0.007 (0.007)	0.043*** (0.015)	-0.000 (0.005)	0.000 (0.012)	0.004 (0.015)	-0.047 (0.034)
Used pesticides on plot	0.002 (0.003)	0.008 (0.006)	-0.000 (0.001)	0.001 (0.002)	-0.002 (0.002)	0.000 (0.002)
Used fungicides on plot	0.000 (0.002)	-0.002 (0.006)	-0.007 (0.005)	0.013 (0.011)	-0.014 (0.064)	0.061 (0.128)
Log value of manure used (FCFA/ha)	0.014 (0.023)	-0.020 (0.051)	0.040* (0.024)	-0.002 (0.055)	0.035 (0.055)	0.150 (0.106)
Log amount of inorganic fertilizer used (kg/ha)	0.006 (0.008)	-0.059*** (0.021)	0.000 (0.003)	-0.003 (0.008)	0.003 (0.010)	0.057 (0.040)
Log value of fungicide used (FCFA/ha)	0.000 (0.002)	0.006 (0.008)	0.001 (0.004)	-0.018* (0.011)	-0.006 (0.064)	-0.058 (0.138)
<i>Plot labor inputs:</i>						
Used any male household labor on plot	-0.031 (0.033)	-0.045 (0.072)	-0.057 (0.524)	1.565 (1.152)	-0.101 (0.069)	-0.333** (0.157)
Used any female household labor on plot	0.057*** (0.016)	0.036 (0.034)	-0.004 (0.009)	0.022 (0.023)	-0.145 (0.103)	-0.009 (0.293)
Used any child household labor on plot	-0.005 (0.003)	-0.007 (0.006)	-0.003 (0.010)	-0.027 (0.026)	-0.018 (0.038)	0.029 (0.096)
Hired any mutual labor	0.002 (0.004)	-0.023** (0.010)	0.006 (0.005)	0.004 (0.012)	0.029 (0.028)	0.091 (0.069)
Hired any other nonfamily labor	0.007 (0.005)	0.010 (0.008)	-0.006 (0.011)	-0.009 (0.022)	-0.013 (0.042)	0.056 (0.083)
Log male family labor days per hectare	0.299*** (0.034)	0.363*** (0.070)	0.169*** (0.047)	0.267* (0.142)	0.179*** (0.056)	0.369*** (0.126)
Log female family labor days per hectare	-0.288*** (0.052)	-0.201 (0.127)	-0.008* (0.004)	0.021 (0.013)	0.038 (0.062)	-0.127 (0.161)
Log child family labor days per hectare	-0.027*** (0.008)	-0.017 (0.016)	-0.001 (0.002)	0.001 (0.007)	0.004 (0.010)	-0.013 (0.025)

Table 8: (Cont'd)

<i>Dependent variable: Log Value of Plot Output per hectare (FCFA/ha)</i>						
<i>C. Detailed Decomposition</i>	<i>Endowment effect</i>		<i>Male structural advantage (Female for F vs. HH)</i>		<i>Female structural disadvantage (HH disadv. for F/M vs. HH)</i>	
	<i>Base</i>	<i>Tobit</i>	<i>Base</i>	<i>Tobit</i>	<i>Base</i>	<i>Tobit</i>
<i>Plot labor inputs (cont'd):</i>						
Log nonfamily labor days per hectare	0.011** (0.006)	0.026** (0.011)	0.017** (0.008)	0.003 (0.019)	0.053* (0.030)	-0.015 (0.062)
Log mutual labor days per hectare	0.002 (0.003)	0.010 (0.009)	-0.001 (0.003)	-0.006 (0.009)	-0.007 (0.022)	-0.024 (0.058)
<i>Household characteristics:</i>						
Child dependency ratio	0.001 (0.002)	-0.001 (0.003)	0.055*** (0.020)	0.130*** (0.049)	0.160*** (0.059)	0.146 (0.160)
Number of male working age adults	-0.007 (0.008)	-0.017 (0.015)	-0.024 (0.018)	0.127** (0.057)	-0.019 (0.067)	0.341** (0.168)
Number of female working age adults	-0.005 (0.003)	-0.001 (0.007)	-0.010 (0.019)	-0.059 (0.051)	-0.033 (0.090)	-0.385** (0.184)
Log value of agricultural capital per hectare	-0.007 (0.006)	0.004 (0.008)	-0.016 (0.042)	-0.262** (0.129)	-0.039 (0.208)	-0.804* (0.464)
Access to agricultural extension services	0.001 (0.003)	0.006 (0.006)	0.002 (0.003)	0.012 (0.008)	0.004 (0.011)	0.023 (0.025)
Household had nonfarm labor income	0.000 (0.001)	0.001 (0.002)	-0.001 (0.004)	-0.004 (0.013)	-0.011 (0.016)	-0.074* (0.039)
Household had nonfarm non-labor income	0.009** (0.004)	0.007 (0.006)	0.003 (0.019)	0.014 (0.052)	-0.074 (0.097)	-0.055 (0.233)
<i>Household geographic characteristics:</i>						
HH Distance in (KMs) to Nearest Major Road	0.004 (0.003)	0.007 (0.005)	0.007 (0.012)	0.021 (0.031)	0.100* (0.053)	0.046 (0.125)
HH Distance in (KMs) to Nearest Market	0.002 (0.003)	0.001 (0.002)	-0.039* (0.022)	0.031 (0.056)	-0.174* (0.089)	-0.042 (0.216)
Elevation (m)	0.015* (0.008)	-0.009 (0.011)	0.166* (0.093)	0.159 (0.229)	1.024** (0.437)	0.713 (1.165)
Observations	2288	2542	613	764	2901	3306

Note: The "Base" columns contain the main results of the paper presented in Table 4. The "Tobit" column presents the results from a tobit estimation that includes plots where all crops were lost. Robust standard errors in parentheses. Results omitted for region fixed effects and crop type. Statistical significance is denoted: * p<0.1, ** p<0.05, *** p<0.01.

Table 9: Oaxaca Decomposition by Type of Crop

Dependent variable: Log Value of [CROP] Output per hectare (FCFA/ha)															
A. Gender Differential	Male Cultivated Plots					Female Cultivated Plots					Gender Differential				
	Millet	Sorghum	Cowpeas	Peanuts	Other	Millet	Sorghum	Cowpeas	Peanuts	Other	Millet	Sorghum	Cowpeas	Peanuts	Other
Millet agricultural productivity	10.033*** (0.032)	9.232*** (0.055)	9.360*** (0.042)	10.897*** (0.111)	10.766*** (0.119)	9.874*** (0.063)	9.026*** (0.139)	9.339*** (0.078)	10.906*** (0.157)	10.269*** (0.133)	0.159** (0.071)	0.205 (0.149)	0.021 (0.089)	-0.009 (0.192)	0.497*** (0.178)
B. Aggregate Decomposition	Endowment effect					Male structural advantage					Female structural disadvantage				
	Millet	Sorghum	Cowpeas	Peanuts	Other	Millet	Sorghum	Cowpeas	Peanuts	Other	Millet	Sorghum	Cowpeas	Peanuts	Other
Total	-0.108 (0.068)	-0.037 (0.129)	-0.114 (0.080)	-0.785*** (0.202)	0.400** (0.196)	0.000 (0.004)	0.000 (0.007)	0.000 (0.005)	0.000 (0.026)	0.000 (0.023)	0.267*** (0.077)	0.243* (0.127)	0.135 (0.094)	0.776*** (0.198)	0.098 (0.167)
Share of the gender differential	-68%	-18%	-543%	8667%	80%	0%	0%	0%	0%	0%	168%	119%	643%	-8667%	20%
C. Detailed Decomposition	Endowment effect					Male structural advantage					Female structural disadvantage				
	Millet	Sorghum	Cowpeas	Peanuts	Other	Millet	Sorghum	Cowpeas	Peanuts	Other	Millet	Sorghum	Cowpeas	Peanuts	Other
<i>Manager characteristics:</i>															
Age of manager	0.010 (0.010)	-0.002 (0.025)	0.013 (0.012)	-0.015 (0.036)	0.030 (0.027)	0.064 (0.046)	-0.089 (0.073)	0.030 (0.058)	-0.112 (0.144)	-0.115 (0.152)	0.182 (0.147)	0.042 (0.358)	-0.128 (0.203)	-0.373 (0.328)	0.095 (0.248)
Years of education of manager	0.003 (0.006)	0.008 (0.008)	0.010 (0.009)	-0.000 (0.017)	-0.001 (0.006)	-0.002 (0.003)	-0.006 (0.005)	0.005 (0.005)	-0.003 (0.019)	-0.004 (0.014)	-0.017 (0.013)	-0.063* (0.032)	-0.012 (0.020)	0.030 (0.040)	-0.025 (0.031)
<i>Plot characteristics:</i>															
Log of plot size (ha)	-0.165*** (0.023)	-0.238*** (0.056)	-0.247*** (0.040)	-0.740*** (0.147)	-0.504*** (0.104)	0.022*** (0.007)	0.013 (0.008)	0.004 (0.008)	-0.020 (0.022)	-0.060** (0.030)	-0.036** (0.016)	-0.052 (0.051)	-0.016 (0.016)	-0.322 (0.279)	-0.122 (0.141)
Plot is owned	0.002 (0.002)	0.004 (0.008)	0.001 (0.004)	0.023 (0.046)	0.089*** (0.033)	0.031 (0.028)	0.016 (0.055)	-0.008 (0.036)	0.107 (0.112)	-0.012 (0.098)	0.066 (0.114)	-0.287* (0.172)	0.128 (0.135)	-0.026 (0.203)	0.089 (0.104)
Intercropped	-0.023*** (0.008)	0.006 (0.010)	-0.005 (0.007)	0.143 (0.105)	-0.003 (0.007)	-0.053* (0.030)	-0.059 (0.054)	-0.008 (0.088)	0.024 (0.153)	0.036 (0.080)	-0.233 (0.185)	-2.000* (1.033)	-1.839*** (0.681)	-0.082 (0.113)	0.002 (0.143)
Distance to household (kilometers)	0.007** (0.004)	0.011 (0.007)	0.007 (0.007)	-0.020 (0.025)	-0.001 (0.005)	-0.001 (0.001)	0.016* (0.009)	-0.001 (0.004)	-0.020 (0.027)	0.005 (0.048)	-0.022 (0.051)	0.203** (0.100)	0.020 (0.069)	-0.118 (0.151)	-0.021 (0.022)
<i>Plot non-labor inputs:</i>															
Used organic fertilizer on plot	0.015 (0.026)	0.078 (0.060)	0.014 (0.028)	-0.230 (0.297)	-0.039 (0.073)	-0.014 (0.029)	-0.070 (0.057)	-0.041 (0.038)	-0.517 (0.481)	-0.166 (0.110)	0.171 (0.112)	-0.091 (0.179)	-0.088 (0.139)	-0.143 (0.113)	-0.254*** (0.087)
Used nonorganic fertilizer on plot	0.006 (0.007)	0.001 (0.011)	0.005 (0.007)	-0.011 (0.060)	0.027 (0.036)	-0.004 (0.007)	-0.011 (0.010)	-0.010 (0.009)	-0.013 (0.027)	0.000 (0.032)	-0.020 (0.025)	-0.053 (0.046)	-0.005 (0.031)	-0.119 (0.130)	0.030 (0.028)
Used pesticides on plot	0.002 (0.002)	0.001 (0.002)	0.001 (0.002)	0.026 (0.017)	-0.001 (0.014)	-0.000 (0.001)	0.002 (0.001)	0.000 (0.001)	-0.003 (0.005)	-0.002 (0.006)	-0.001 (0.002)	0.020 (0.022)			
Used fungicides on plot	0.001 (0.003)	-0.007 (0.017)	-0.005 (0.010)	-0.004 (0.018)	0.011 (0.017)	-0.006 (0.008)	-0.042** (0.021)	-0.005 (0.009)	-0.004 (0.040)	-0.046 (0.030)	-0.023 (0.115)	-0.054 (0.087)	-0.074 (0.079)	-0.238 (0.330)	-0.116 (0.076)
Log value of manure used (FCFA/ha)	0.040 (0.027)	-0.041 (0.058)	0.036 (0.028)	0.361 (0.292)	0.059 (0.070)	0.012 (0.028)	0.074 (0.050)	0.032 (0.037)	0.457 (0.466)	0.151 (0.093)	-0.177 (0.111)	0.198 (0.171)	0.077 (0.136)	0.120 (0.118)	0.232*** (0.083)
Log amount of inorganic fertilizer used (kg/ha)	0.012 (0.008)	0.015 (0.018)	-0.009 (0.011)	0.030 (0.056)	0.051 (0.042)	0.008** (0.004)	0.009 (0.007)	0.005 (0.006)	0.017 (0.021)	0.000 (0.025)	0.038** (0.019)	0.026 (0.025)	-0.009 (0.035)	0.108 (0.114)	-0.024 (0.022)
Log value of fungicide used (FCFA/ha)	-0.003 (0.006)	0.013 (0.024)	0.003 (0.012)	0.008 (0.039)	-0.004 (0.013)	-0.001 (0.008)	0.033* (0.019)	-0.003 (0.009)	0.010 (0.036)	0.028 (0.024)	0.001 (0.113)	0.041 (0.081)	0.048 (0.076)	0.233 (0.325)	0.070 (0.063)
<i>Plot labor inputs:</i>															
Used any male household labor on plot	-0.043 (0.035)	-0.054 (0.071)	0.028 (0.042)	-0.291** (0.135)	-0.033 (0.105)	0.552 (0.650)	0.308 (0.403)	-0.127 (0.195)	-2.289*** (0.671)	-0.042 (0.617)	-0.019 (0.103)	0.212 (0.410)	-0.266* (0.153)	-0.122 (0.310)	-0.106 (0.148)
Used any female household labor on plot	0.051*** (0.017)	0.093*** (0.032)	0.046** (0.019)	0.067 (0.065)	0.141*** (0.054)	0.008 (0.011)	-0.001 (0.014)	0.005 (0.014)	-0.036 (0.047)	-0.032 (0.035)	0.040 (0.118)	0.254 (0.211)	-0.150 (0.132)	-0.582 (0.358)	-0.782*** (0.289)
Used any child household labor on plot	-0.003 (0.004)	0.002 (0.008)	-0.010 (0.008)	0.029 (0.024)	-0.003 (0.015)	-0.008 (0.011)	0.032 (0.020)	-0.014 (0.016)	-0.049 (0.040)	-0.018 (0.034)	-0.043 (0.051)	-0.030 (0.101)	-0.068 (0.080)	-0.121 (0.083)	-0.129 (0.086)
Hired any mutual labor	0.005 (0.005)	0.011 (0.011)	0.001 (0.007)	-0.046 (0.040)	-0.022 (0.024)	0.002 (0.005)	0.016 (0.011)	-0.000 (0.005)	0.031 (0.029)	0.074** (0.034)	0.006 (0.029)	0.034 (0.057)	0.008 (0.037)	0.063 (0.083)	0.075 (0.061)
Hired any other nonfamily labor	-0.001 (0.003)	0.007 (0.009)	0.004 (0.009)	-0.019 (0.051)	0.063 (0.040)	-0.009 (0.011)	-0.029 (0.019)	0.012 (0.015)	0.045 (0.067)	0.013 (0.050)	-0.023 (0.057)	-0.139 (0.112)	0.052 (0.070)	0.077 (0.129)	0.037 (0.088)

Table 9: (Cont'd)

<i>C. Detailed Decomposition (cont'd)</i>	<i>Endowment effect</i>					<i>Male structural advantage</i>					<i>Female structural disadvantage</i>				
	<i>Millet</i>	<i>Sorghum</i>	<i>Cowpeas</i>	<i>Peanuts</i>	<i>Other</i>	<i>Millet</i>	<i>Sorghum</i>	<i>Cowpeas</i>	<i>Peanuts</i>	<i>Other</i>	<i>Millet</i>	<i>Sorghum</i>	<i>Cowpeas</i>	<i>Peanuts</i>	<i>Other</i>
<i>Plot labor inputs (cont'd):</i>															
Log male family labor days per hectare	0.318*** (0.038)	0.196*** (0.054)	0.123*** (0.038)	0.083 (0.059)	0.118 (0.119)	0.149*** (0.045)	0.145 (0.099)	0.010 (0.070)	0.160 (0.189)	0.418* (0.222)	0.227*** (0.079)	0.222 (0.199)	0.039 (0.141)	-0.130 (0.241)	-0.046 (0.109)
Log female family labor days per hectare	-0.191*** (0.050)	-0.227*** (0.075)	-0.066 (0.061)	-0.065 (0.188)	-0.172 (0.175)	-0.010** (0.004)	-0.002 (0.005)	-0.017*** (0.006)	-0.004 (0.019)	0.011 (0.011)	0.078 (0.067)	0.070 (0.117)	-0.100 (0.090)	0.475 (0.316)	0.342 (0.235)
Log child family labor days per hectare	-0.053*** (0.015)	-0.017 (0.020)	-0.025 (0.016)	0.001 (0.004)	-0.005 (0.011)	-0.001 (0.002)	-0.003 (0.007)	-0.001 (0.003)	-0.001 (0.004)	-0.004 (0.007)	0.020 (0.017)	0.011 (0.026)	0.013 (0.021)	0.017 (0.021)	-0.002 (0.017)
Log nonfamily labor days per hectare	0.003 (0.005)	0.001 (0.004)	0.003 (0.005)	0.022 (0.028)	0.043 (0.032)	0.009 (0.007)	-0.012 (0.014)	-0.006 (0.010)	-0.094* (0.054)	0.041 (0.042)	-0.000 (0.037)	-0.048 (0.083)	-0.044 (0.059)	-0.228* (0.123)	0.050 (0.061)
Log mutual labor days per hectare	-0.001 (0.002)	0.003 (0.011)	-0.001 (0.002)	0.010 (0.045)	0.046* (0.027)	0.000 (0.002)	-0.005 (0.004)	0.000 (0.003)	0.012 (0.019)	-0.016 (0.021)	-0.008 (0.019)	-0.023 (0.036)	-0.012 (0.029)	-0.014 (0.070)	0.042 (0.052)
<i>Household characteristics:</i>															
Child dependency ratio	0.004 (0.004)	-0.000 (0.004)	-0.003 (0.004)	0.001 (0.005)	0.011 (0.012)	0.021 (0.022)	-0.038 (0.038)	0.015 (0.026)	0.125 (0.079)	0.185** (0.078)	0.088 (0.074)	-0.141 (0.169)	0.088 (0.106)	0.293* (0.157)	0.292** (0.114)
Number of male working age adults	-0.022** (0.010)	-0.005 (0.015)	-0.014 (0.013)	0.055 (0.043)	-0.006 (0.018)	-0.055*** (0.020)	-0.039 (0.031)	0.032 (0.034)	0.036 (0.096)	0.092 (0.061)	-0.096 (0.083)	-0.325** (0.154)	0.185 (0.116)	-0.049 (0.241)	0.438*** (0.143)
Number of female working age adults	-0.002 (0.003)	-0.001 (0.004)	0.006 (0.006)	-0.016 (0.020)	-0.000 (0.006)	-0.003 (0.022)	0.078** (0.038)	-0.023 (0.035)	0.062 (0.103)	-0.035 (0.072)	-0.081 (0.110)	0.270 (0.201)	-0.158 (0.121)	0.166 (0.269)	-0.445*** (0.157)
Log value of agricultural capital per hectare	-0.008 (0.008)	0.015 (0.011)	0.008 (0.008)	-0.004 (0.010)	0.018 (0.018)	-0.011 (0.048)	0.055 (0.103)	0.038 (0.067)	0.148 (0.206)	0.079 (0.173)	0.137 (0.254)	0.242 (0.547)	0.128 (0.335)	-0.426 (0.714)	0.463 (0.407)
Access to agricultural extension services	-0.003 (0.002)	-0.002 (0.009)	-0.001 (0.006)	-0.013 (0.021)	0.000 (0.003)	-0.000 (0.004)	-0.008 (0.005)	-0.007 (0.006)	0.011 (0.015)	0.005 (0.014)	-0.012 (0.015)	-0.011 (0.023)	-0.040** (0.020)	0.042 (0.031)	0.030 (0.029)
Household had nonfarm labor income	-0.001 (0.002)	0.001 (0.003)	-0.000 (0.002)	0.004 (0.014)	-0.002 (0.005)	0.002 (0.005)	0.003 (0.005)	-0.006 (0.006)	-0.007 (0.021)	0.008 (0.019)	-0.000 (0.018)	-0.005 (0.025)	-0.046* (0.027)	-0.079 (0.072)	-0.018 (0.038)
Household had nonfarm non-labor income	0.005 (0.003)	-0.004 (0.006)	0.008 (0.006)	0.004 (0.010)	0.012 (0.012)	0.002 (0.021)	-0.039 (0.035)	0.009 (0.029)	-0.063 (0.148)	-0.122 (0.101)	-0.032 (0.114)	-0.614* (0.343)	-0.242 (0.206)	0.044 (0.544)	-0.595*** (0.210)
<i>Household geographic characteristics:</i>															
HH Distance in (KMs) to Nearest Major Road	0.001 (0.002)	0.001 (0.003)	-0.010 (0.007)	-0.024 (0.026)	0.100** (0.042)	-0.005 (0.015)	-0.047 (0.030)	0.001 (0.018)	0.105 (0.069)	0.096** (0.047)	-0.038 (0.076)	-0.281* (0.163)	0.044 (0.093)	-0.039 (0.216)	0.228 (0.144)
HH Distance in (KMs) to Nearest Market	-0.006 (0.005)	-0.006 (0.009)	-0.018 (0.012)	0.132** (0.056)	0.021 (0.024)	-0.012 (0.024)	-0.040 (0.052)	-0.064* (0.034)	-0.140* (0.079)	-0.299** (0.121)	-0.231* (0.129)	-0.027 (0.290)	-0.504*** (0.164)	-0.119 (0.311)	-0.608*** (0.223)
Elevation (m)	0.063** (0.029)	0.029 (0.021)	0.098*** (0.030)	-0.601*** (0.219)	-0.248*** (0.092)	0.350*** (0.130)	0.086 (0.197)	0.112 (0.169)	1.240** (0.535)	0.005 (0.347)	1.676*** (0.568)	0.629 (0.940)	0.351 (0.917)	3.282** (1.465)	-0.695 (0.887)
Observations	1946	721	1105	234	335	442	132	263	92	153	2388	853	1368	326	488

Note: Each column contains results from crop specific regressions. Robust standard errors in parentheses. Results omitted for region fixed effects. Statistical significance is denoted: * p<0.1, ** p<0.05, *** p<0.01.

Table 10: Oaxaca Decomposition - Household Fixed Effects

<i>Dependent variable: Log Value of Plot Output per hectare (FCFA/ha)</i>			
<i>A. Gender Differential</i>	<i>Male cultivated plots</i>	<i>Female cultivated plots</i>	<i>Gender differential</i>
Mean agricultural productivity	9.919*** (0.053)	9.747*** (0.065)	0.173** (0.084)
<i>B. Aggregate Decomposition</i>	<i>Endowment effect</i>	<i>Male structural advantage</i>	<i>Female structural disadvantage</i>
Total	-0.117 (0.098)	0.000 (0.021)	0.290*** (0.071)
Share of the gender differential	-68%	0%	168%
<i>C. Detailed Decomposition</i>	<i>Endowment effect</i>	<i>Male structural advantage</i>	<i>Female structural disadvantage</i>
<i>Manager characteristics:</i>			
Age of manager	0.074* (0.042)	0.149 (0.523)	-0.227 (0.170)
Years of education of manager	-0.008 (0.007)	-0.017 (0.055)	-0.031* (0.016)
Log of plot size (ha)	-0.297*** (0.044)	0.029** (0.014)	-0.185*** (0.056)
<i>Plot characteristics:</i>			
Plot is owned	-0.001 (0.005)	-0.121 (0.083)	0.394** (0.168)
Intercropped	-0.007 (0.007)	0.034 (0.109)	-0.359** (0.153)
Distance to household (kilometers)	-0.000 (0.004)	-0.081 (0.050)	-0.214* (0.123)
Used organic fertilizer on plot	0.067 (0.045)	0.057 (0.073)	-0.169 (0.295)
<i>Plot non-labor inputs:</i>			
Used nonorganic fertilizer on plot	-0.017 (0.016)	0.025 (0.023)	0.105*** (0.038)
Used pesticides on plot	0.003 (0.003)	-0.001 (0.001)	0.000 (.)
Used fungicides on plot	-0.006 (0.010)	0.011 (0.039)	-0.480* (0.272)
Log estimated value of manure used on plot (FCFA/ha)	-0.023 (0.044)	-0.019 (0.072)	0.169 (0.283)
Log amount of inorganic fertilizer used on plot (kg/ha)	0.005 (0.014)	-0.019 (0.016)	-0.149*** (0.056)
Log estimated value of fungicide used on plot (FCFA/ha)	0.002 (0.008)	-0.020 (0.030)	0.109 (0.074)

Table 10: (Cont'd)

<i>Dependent variable: Log Value of Plot Output per hectare (FCFA/ha)</i>			
<i>C. Detailed Decomposition (cont'd)</i>	<i>Endowment effect</i>	<i>Male structural advantage</i>	<i>Female structural disadvantage</i>
<i>Plot labor inputs:</i>			
Used any male household labor on plot	-0.069*** (0.025)	0.088 (0.808)	-0.801** (0.360)
Used any female household labor on plot	-0.010 (0.028)	-0.094 (0.110)	-0.694*** (0.230)
Used any child household labor on plot	-0.003 (0.008)	-0.043 (0.097)	0.339*** (0.090)
Hired any mutual labor	0.020** (0.010)	-0.011 (0.018)	0.027 (0.019)
Hired any other nonfamily labor	0.001 (0.003)	-0.035 (0.030)	-0.019 (0.059)
Log male family labor days per hectare	0.183*** (0.044)	0.625*** (0.193)	0.452** (0.192)
Log female family labor days per hectare	-0.124** (0.061)	-0.019* (0.011)	0.295** (0.145)
Log child family labor days per hectare	-0.006 (0.006)	0.009 (0.006)	0.014* (0.009)
Log nonfamily labor days per hectare	0.007 (0.009)	0.024 (0.029)	0.119** (0.056)
Log mutual labor days per hectare	0.000 (0.001)	-0.007 (0.011)	-0.003 (0.024)

Note: 955 plot observations from households with at least one plot managed by a male and one by a female: 578 male plots and 377 female plots. Robust standard errors in parentheses. Results omitted for crop type. Statistical significance is denoted: * p<0.1, ** p<0.05, *** p<0.01.