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## GENDER INEQUALITY IN THE GHANAIAN COCOA SECTOR

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### **Executive Summary**

- We examine detailed data from a 2009 baseline survey of cocoa-farming households in Ghana, covering communities targeted for participation in the Cocoa Life program
- The evidence indicates dramatic gender gaps in key outcomes: female farmers have levels of income and productivity 25-30% below those of male counterparts
- Major sources of these gaps in outcomes are also clear: compared with male cocoa farmers, female farmers are 25% less likely to have received training in the past year, they are 20% less likely to have received a loan in the past year and almost 40% less likely to have a bank account, and they are 30-40% less likely than men to use crucial farm inputs such as fertilizer
- Major levers for change are farmer training and access to finance, which are strong predictors of use of key inputs on farms and hence levels of productivity and income
- The clear implication is that Cocoa Life program interventions that effectively address gender gaps in farmer training and access to finance could have large positive impacts on productivity and income levels for female farmers and sharply reduce gender inequality in the sector

## **1. Introduction**

A growing body of academic research has documented the marked gap between men and women in productivity levels in agriculture in the developing world generally and in cocoa farming specifically. The World Bank's 2012 *World Development Report* focused entirely on gender issues and documented sharp disparities in agricultural productivity between men and women. In general, women are less likely than men to own the land that they farm, farm smaller plots of land, and grow less profitable crops. Even when women and men cultivate the same crops on similar plots, women-run farms produce lower yields. Women appear to have less access than men to fertilizers, seeds, mechanization, credit, markets and other key determinants of agricultural success.

In this brief report we examine key measures of inequality between male and female cocoa farmers in Ghana using detailed data gathered in a large-scale survey in 2009. The survey was designed to assess baseline conditions in communities targeted for participation in the Cocoa Life (Cadbury Cocoa Partnership) program and a large sample of comparison communities in cocoa growing regions across Ghana. The statistical analysis we report here – discussed at greater length in a separate working paper – reveals that female farmers produce and sell significantly less cocoa in total and per planted cocoa acre than male farmers. The raw gender gaps in key outcomes are dramatic: income and productivity levels for female farmers are 25-30% lower than those of male farmers.

A substantial proportion of this gender gap in outcomes can be traced directly to differences in the use of crucial farm inputs: compared to male counterparts, female cocoa farmers in Ghana are far less likely to use fertilizer, insecticide, and motorized mist blowers. Female farmers are much less likely than men to have received training on farming techniques and they are much less likely than men to have access to a bank account or to have received a loan in the previous year, and these differences help explain their relative underutilization of key farm inputs and hence lower productivity and income levels.

Overall, the analysis confirms expectations that there was substantial gender inequality in cocoa farming in Ghana in 2009, the baseline year for the Cocoa Life program. It also suggests that any program interventions that can effectively address gender gaps in participation in farmer training and access to finance could have large positive impacts on productivity and income levels for cocoa female farmers and hence sharply reduce gender inequality in the sector.

## **2. Data**

The 2009 Harvard survey of cocoa farmers in Ghana was based on a two-stage sampling procedure, drawing on the universe of cocoa farmers in all cocoa-growing districts in Ghana. To select villages to include in the sample, a sampling frame was drawn from a comprehensive list of cocoa farming villages provided by the Ghana Cocoa Board. We selected 335 villages in total: the 100 villages targeted for program interventions by the Cadbury Cocoa Partnership and 235 comparison villages with similar levels of cocoa production and population. In the second stage of the sampling design, households were chosen to participate in the study from within each selected village. An in-field listing of all village households that participate in cocoa farming was constructed, and from this list, a random sample of 5-15 households was selected for survey interviews. The number of households selected was proportional to the size of each village. Overall, 2,809 cocoa-farming households were surveyed. For the analysis here, female cocoa farmers are defined as females who are the heads of households and main farmers. Of the 2,809 households in the sample, 510 have female household heads (about 18 percent).

The survey collected a large amount of detailed information from survey respondents. For the purposes of this analysis we have focused on a select set of variables which previous research indicates are important predictors of farm productivity. Full summary statistics are reported in Table 1.

**Table 1: Summary Statistics**

<i>Variable</i>	<i>N</i>	<i>Mean</i>	<i>St. Dev.</i>	<i>Min</i>	<i>Max</i>
Female main farmer/head of household (1=yes)	2,809	0.18	0.39	0	1
Literate (1=yes)	2,711	0.50	0.50	0	1
Landowner (1=yes)	2,805	0.70	0.46	0	1
Total cocoa acreage farmed	2,809	5.54	9.53	0	200.00
Cocoa acreage less than 1 acre (1=yes)	2,809	0.30	0.46	0	1
Total income (past 12 months)	2,522	756.13	14,940.06	0	672,256
Total cocoa income (past 12 months)	2,809	645.94	14,209.05	0	672,256
Used fertilizer (past 12 months) (1=yes)	2,809	0.23	0.42	0	1
Used insecticide (past 12 months) (1=yes)	2,809	0.55	0.50	0	1
Used herbicide (past 12 months) (1=yes)	2,809	0.21	0.41	0	1
Used fungicide (past 12 months) (1=yes)	2,809	0.22	0.41	0	1
Used motorized mist blower (past 12 months) (1=yes)	2,809	0.34	0.47	0	1
Received training from any source (past 12 months)(1=yes)	2,809	0.34	0.47	0	1
Loan receipt (past 12 months) (1=yes)	2,801	0.14	0.35	0	1
Bank account? (1=yes)	2,801	0.31	0.46	0	1
Member of an organization (1=yes)	2,777	0.38	0.49	0	1
Leader in the organization? (1=yes; only among org. members)	778	0.43	0.50	0	1
Feel informed about cocoa prices in their region	2,708	0.75	0.43	0	1

Several of the variables require further description. Literacy is defined as a respondent’s indication that it is “easy”, “somewhat easy”, or “somewhat difficult”, but not “very difficult” to or that they “cannot” read or write in English. Landowning status is determined by an affirmative response to the question “do you own any farm land?” Total income is defined as the sum of cocoa and non-cocoa income, excluding remittances. The training received includes any training provided by the Cocoa Board, the Ministry of Food and Agriculture, Licensed Buying Companies, Cooperatives, other non-governmental organizations, other farmers, or any other source which the respondent described. Being a member of an organization is defined as an affirmative response to the question, “People sometimes join organized groups, such as farmers’ groups and associations, cooperatives or societies, and other types of political and religious organizations. Are you a member of any such organized group?” Respondents who answered affirmatively were also asked if they had “a leadership position in this organization?”

### **3. Gender Gaps**

Table 2 provides a simple comparison of means for the set of selected variables for male and female cocoa farmers. The evidence indicates clearly that female cocoa farmers face systematic disadvantages relative to male farmers. In particular, male farmers are more than twice as likely as female farmers to be literate their farms are over 60 percent larger on average. Female farmers are actually more likely than

male farmers to report that they own farm land, but are also much more likely to farm an area of less than one acre.

**Table 2: Gender Gaps – comparison of means of key measures for male and female farmers**

<i>Variable</i>	<i>Mean: all</i>	<i>Mean: males</i>	<i>Mean: females</i>	<i>t-test p val</i>
Literate	0.50	0.56	0.25	0.00
Landowner	0.70	0.68	0.79	0.00
Total cocoa acreage	5.54	5.96	3.65	0.00
Cocoa acreage less than 1 acre	0.30	0.29	0.33	0.06
Total income (past 12 months)	756.13	854.38	312.17	0.20
Total cocoa income (past 12 months)	645.94	733.87	249.57	0.20
Used fertilizer (past 12 months)	0.23	0.24	0.18	0.00
Used insecticide (past 12 months)	0.55	0.57	0.46	0.00
Used herbicide (past 12 months)	0.21	0.24	0.08	0.00
Used fungicide (past 12 months)	0.22	0.23	0.16	0.00
Used motorized mist blower (past 12 months)	0.34	0.36	0.26	0.00
Received training (past 12 months)	0.34	0.35	0.27	0.00
Loan receipt (past 12 months)	0.14	0.15	0.12	0.06
Bank account?	0.31	0.34	0.18	0.00
Member of an organization	0.38	0.38	0.39	0.66
Leader in the organization? (only org. members)	0.43	0.42	0.48	0.20
Feel informed about cocoa prices in their region	0.75	0.78	0.63	0.00

The total income and total cocoa income in male-farmer households are roughly three times greater on average than the total cocoa income in female-farmer households. If we account for underlying variation in the size of the farms and their regional location in our estimations (see our working paper for details), the raw gender gaps in key outcomes remain dramatic: income and productivity levels for female farmers are consistently 25-30% lower than those of male farmers.

As we will discuss below, a substantial proportion of this gender gap in key outcomes can be traced directly to gender differences in the use of critical inputs on the farms. Compared to male counterparts, female cocoa farmers are 25% less likely to use fertilizer, 20% less likely to use insecticide, 66% less likely to use herbicide, and about 30% less likely to use motorized mist blowers.

These patterns in input utilization are connected to the clear gender differences in training and access to finance. Female farmers are about 25% less likely than men to have received training on farming techniques in the previous 12 months. Meanwhile, compared with the men, women are 20% less likely to have received a loan in the past 12 months and they are 50% less likely to hold an account at a bank.

It is worth noting that men are no more likely than women to be a member of a farmer organization, and among those who reported that they were members of an organization, men were no more likely than women to report that they were leaders – women were actually slightly ahead in this measure, but the difference is not statistically significant.

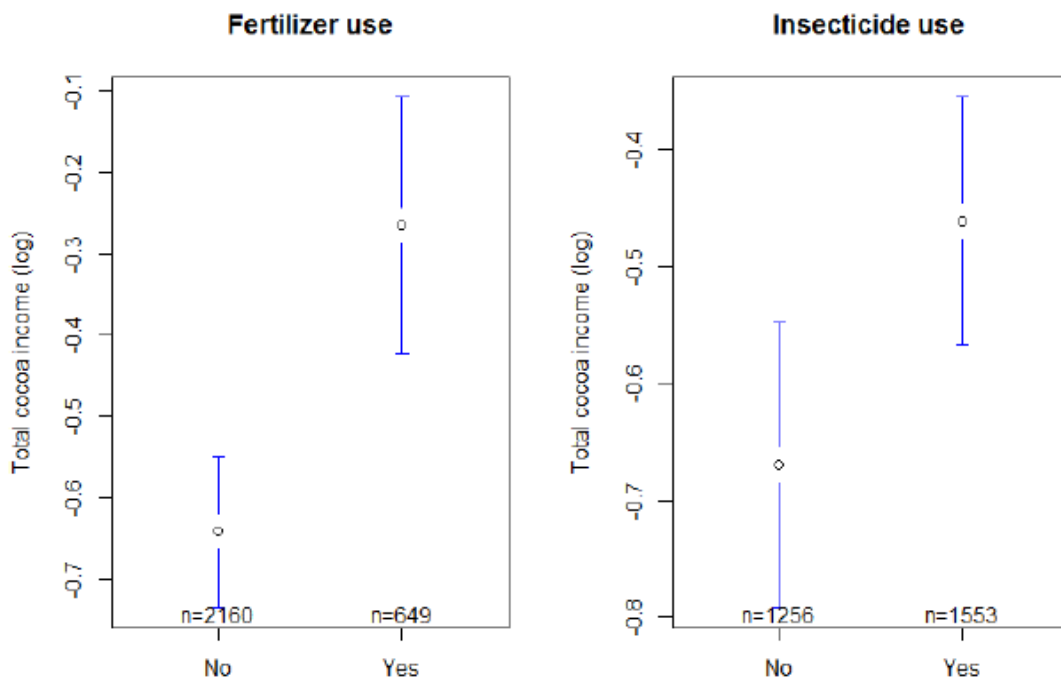
Finally, note that almost half of women farmers report feeling “not well informed” about cocoa prices in Ghana, and they are about 25% less likely than men to report feeling “well informed” about prices.

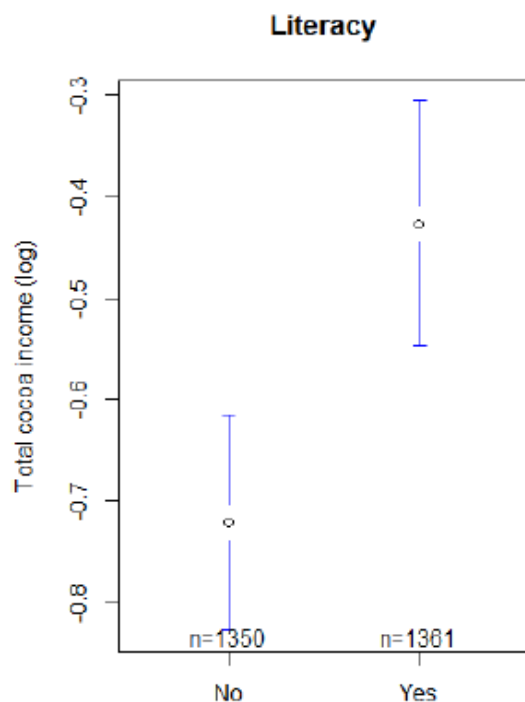
#### 4. Causes of Gender Gaps in Outcomes

What accounts for the dramatic differences in key outcomes among male and female farmers? We can gain insights here by conducting a rigorous statistical analysis of the determinants of cocoa income and productivity levels (see the working paper). In particular, we can identify the main determinants of success in cocoa farming where female farmers face major challenges and where program interventions could provide the most help, and we summarize the main results here.

Figure 1 shows the estimated effects of three key factors associated with farming success, based upon our benchmark statistical models that account for underlying variation among farmers in farm size, location, and ownership status. The charts show point estimates of total cocoa income (the dots) with 95% confidence intervals (the lines) under different scenarios for the average farmer. The use of critical farm inputs such as fertilizer and insecticide stand out as major sources of gender gaps in outcomes that could be targeted by interventions. Fertilizer use is associated with a 30% jump in total cocoa income, all else equal, and the use of insecticide is associated with a 20% increase in income. Literacy is another important predictor of farming success where there is a large gender disparity that could be addressed over the longer term. Attainment of literacy is associated with a 30% improvement in income from cocoa farming.

**Figure 1: Key determinants of cocoa income**





We know that there are dramatic disparities between male and female cocoa farmers in literacy rates and in utilization of key farm inputs and it is clear that these disparities are translated into large gender gaps in income and productivity.

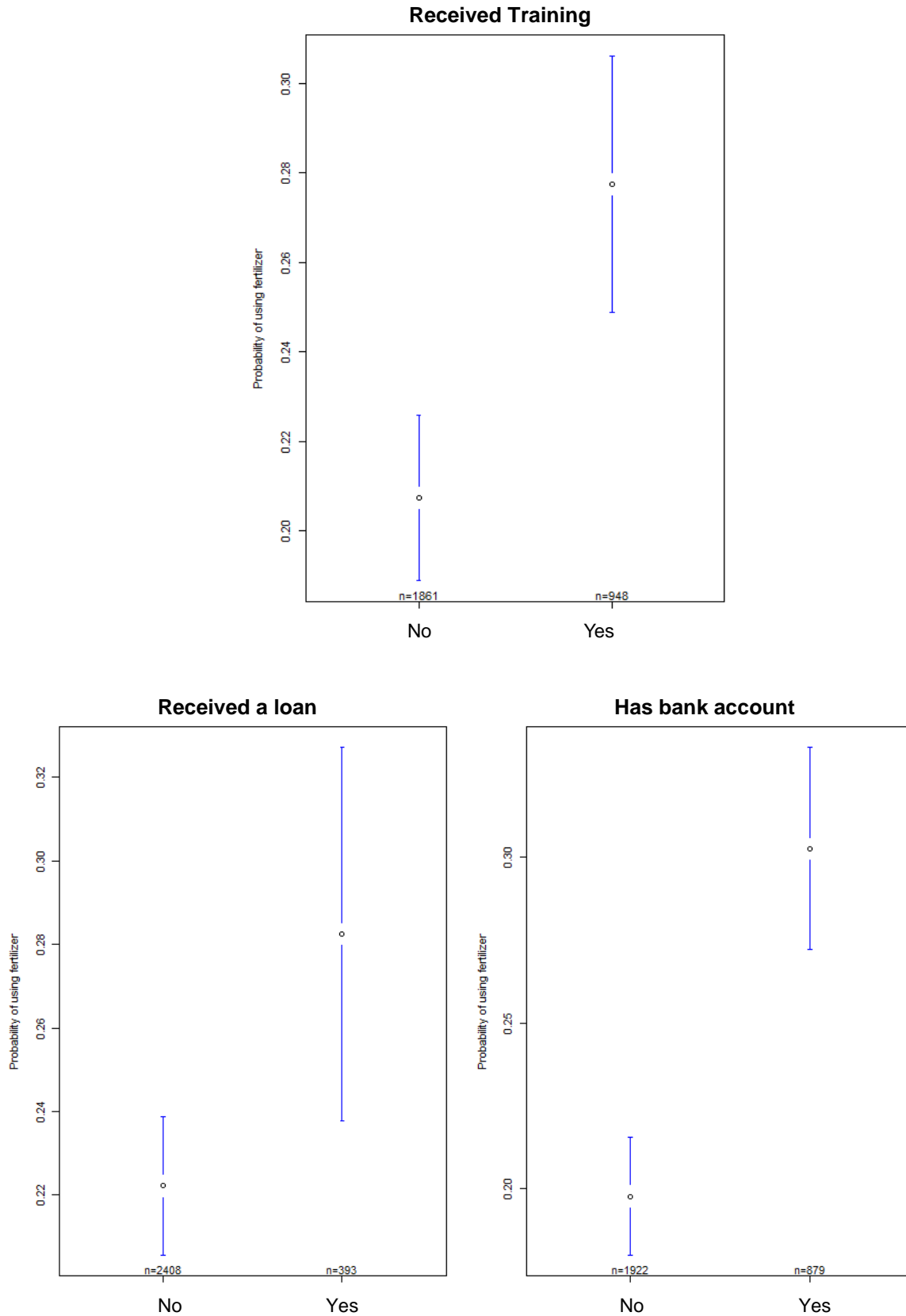
## 5. Levers for change

What types of program interventions can address these sources of gender inequality? We focus here on farmer training and access to finance. Previous research indicates that training aimed at improving farming practices, and focused on the application of fertilizer and insecticides, can have large positive impacts on farmer productivity. In addition, past research suggests that many farmers are unable to invest in these and other crucial inputs – such as farm machinery and equipment – because they have limited or no access to credit and no contact with financial institutions that can reward saving and provide loans.

We conducted an analysis of the Ghana survey data to examine the main determinants of use of critical inputs, focusing on the effects of training and access to finance. Figure 2 shows the estimated effects on the use of fertilizer associated with receiving training in the previous 12 months, receiving a loan in the past 12 months, and with having a bank account, again based upon the benchmark statistical models that account for underlying variation in farm size, location, and ownership.

Here the charts show point estimates of the probability that the average farmer uses fertilizer (the dots) with 95% confidence intervals (the lines) under different scenarios. Training has a marked impact on fertilizer use: receiving training raises the probability of fertilizer use by almost 33% (7 percentage points). Access to credit also has large effects: receiving a loan lifts fertilizer use by 30% (almost 6 percentage points). Meanwhile, just having a bank account is associated with a 50% (10 percentage points) greater probability of using fertilizer.

**Figure 2: Fertilizer use – impacts of training and access to finance**



In 2009 there were marked gender disparities in terms of farmer training and access to finance. If the Cocoa Life program can target these disparities, improving participation in training among female cocoa farmers and providing or facilitating greater access to credit and the use of bank accounts, the data strongly suggests it can reduce gender inequality.

## **6. Conclusions**

Overall, the analysis confirms expectations that there was substantial gender inequality in cocoa farming in Ghana in 2009, the baseline year for the Cocoa Life program. It also suggests that any program interventions that can effectively address gender gaps in participation in farmer training and access to finance could have large positive impacts on productivity and income levels for cocoa female farmers and hence sharply reduce gender inequality in the sector.