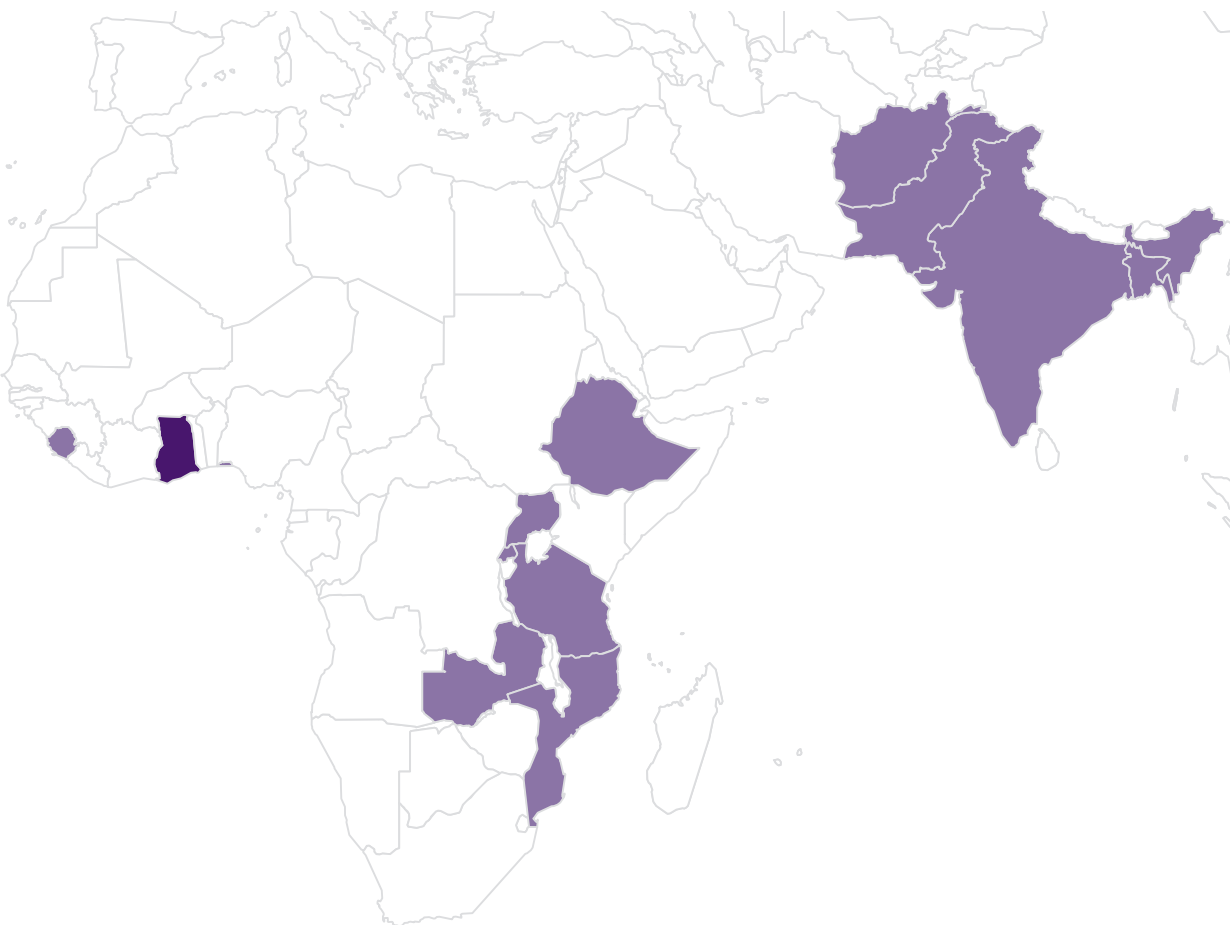# IGC International Growth Centre

Sustainable development for cocoa farmers in Ghana

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BASELINE SURVEY: PRELIMINARY REPORT

Sustainable Development for Cocoa Farmers in Ghana

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Cocoa farming plays a critical economic and social role in Ghana. Cocoa is the country's second most important export and provides income to a large segment of the Ghanaian population. But the cocoa sector has been afflicted with continuing problems, including declining productivity, crop damage from pests and disease, persistent poverty among farming communities, health and environmental problems, and instances of child and forced labor on farms. A variety of initiatives aimed at addressing these problems have been introduced recently by government and non-governmental organizations. Principal among these initiatives is the program developed by the Cadbury Cocoa Partnership (CCP).

This baseline survey has gathered detailed data on conditions and challenges faced by a large sample of cocoa farmers. The goal of the survey was to measure economic and social indicators before the implementation of the key components of the CCP program to enable later comparisons with data gathered post implementation. Overall we surveyed farming households and community leaders in 335 villages in the main cocoa growing regions (Eastern, Central, Ashanti, Brong Ahafo, and Western). We interviewed a sample of approximately 3,000 cocoa farmers, gathering information about approximately 13,400 household members.

This baseline survey provides rich insights into conditions faced by cocoa farmers across the country. Several key results stand out. First, productivity is generally low. Farming practices are simple and the use of fertilizers is negligible. Regional variation in productivity exists but it is minor compared to within-region variation. The opportunity for significant productivity gains is apparent as some farmers are much more productive than others in the same region. Second, the low productivity results in extremely low incomes for cocoa farming households. The average income per capita per day for a cocoa farming household is below GHC 1. This situation describes a kind of poverty trap in which extremely low income inhibits the adoption of more advanced farming practices, including the use of fertilizers and pesticides. Third, these conditions coincide with cocoa farmers' own assessments of their situation that suggest that the general trend is worse rather than better. Less than half of cocoa farmers (40% of farmers, ranging from 21 % in Western to 52 % in Eastern region) would recommend to their children to follow in their footsteps and instead believe that opportunities are better in other sectors. Fourth, farmers are not organized in ways that allow them to confront these problems. Less than 10% of farmers report being members of a farmers' association. Finally, separate responses from farmers and village leaders indicate substantial agreement about what types of community infrastructure is needed most urgently: roads, education, and health consistently ranked among their top priorities.

Cocoa farming is an extremely labor intensive form of agriculture, concentrated in some of the poorest nations in the world. West African nations account for around 70 percent of the cocoa grown for the world market. There are concerns about declining productivity among West African cocoa farmers, persistent poverty, health and environmental problems, and the use of child and forced labor on cocoa farms.

Research to date has not provided reliable assessments of the severity of these problems or the effectiveness of the various initiatives, such as government extension services and the Fairtrade certification program, aimed at promoting sustainable development and addressing human rights issues in rural Africa. Most studies of development programs have no accurate pre-implementation baseline data on farmers to compare against data from the post-implementation period and/or fail to compare farmers directly affected by programs with unaffected groups in a way that accounts for selection bias effects.

The launch of the Cadbury Cocoa Partnership (CCP) program in rural Ghana in 2009-2010 created a unique opportunity to generate new knowledge about how to improve the livelihoods of farmers in developing countries. Key components of the CCP program include new training and consultation services for farmers and the facilitation of Fairtrade certification. By closely working with the CCP we have been able to tailor our research design to the implementation of the program from the beginning, developing a plan to gather detailed data to compare conditions pre- and post-implementation for farmers incorporated into the program in the initial phase and similar groups not affected (or brought into the program in later phases). To broaden the scope of the study and examine other types of initiatives being implemented in the Ghanaian cocoa sector at the same time, we have also cooperated with Mars Inc., Cargill, Solidaridad, AgroEco, and West Africa Fair Fruit (WAFF). These organizations have launched a variety of programs which include farmer training and facilitation of Rainforest Alliance and UTZ certification.

The first step for this research was a pre-implementation large-scale baseline survey that would gather detailed data on current conditions faced by a large sample of cocoa farmers.

SAMPLING STRATEGY

The survey design was based on a two-stage sampling procedure, drawing on the universe of cocoa farmers in all cocoa-growing districts in Ghana. We began by selecting villages to include in the sample. The sampling frame was drawn from a comprehensive list of cocoa farming villages provided by COCOBOD.

Our sample of villages includes 90 communities already selected for first-stage interventions by the CCP (which we designate here as cohort 1 villages) and an additional set of 32 communities targeted by alternative initiatives being implemented by other organizations. The sample also includes approximately 200 comparison villages: of these, some are likely candidates for second-stage interventions by the CCP in the near future (cohort 2); some are unlikely to be targeted for interventions in the next 2 years (cohort 3).

COCOBOD's Quality Control Division provided us with detailed information on cocoa production by village. We merged these data with geo-coded Ghanaian Census data on villages to create the sampling frame for the survey. We matched 2 comparison villages (in cohorts 2 and 3) to each village selected into cohort 1, such that the treatment and comparison communities have roughly comparable levels of cocoa production at baseline. The matching also incorporated geographic information to select the comparison set such that we will be able to measure potential spill-over effects of programs among neighbouring communities. This was accomplished by choosing some comparison villages that are reasonably close to the cohort 1 villages and some that are much further from cohort 1 villages.

In the second stage of the sampling design, we identified households to participate in the study from within each selected village. Our survey team conducted an in-field listing of all village households that participate in cocoa farming (after having obtained consent from community leaders). 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, we interviewed a sample of approximately 3,000 cocoa-farming households.

SURVEY INSTRUMENTS

The baseline survey consisted of both a household-level study of individual cocoa farmers and a village-level study that gathered data from observations and interviews with village leaders and school headmasters in 335 communities in the cocoa farming districts.

The goal of the baseline survey was to measure key economic and social indicators before the major components of the CCP program were implemented. The baseline survey questionnaires focus on 3

general sets of indicators: living standards and wellbeing, farming practices and business performance, and the institutional and organizational capacity of the cocoa industry in Ghana. The first set of indicators includes education, social stability, health indicators, and savings at the level of the farmer and the household. The second set of measures includes current levels of income, farmers' attitudes towards risk, investments, access to credit, product diversification, choice of technology, and environmental performance. The third set of indicators includes the organizational capacities of farmer and village associations, their investments in public goods and services, levels of political engagement, and the broader interactions between farmers and the government. (The complete questionnaires for both the household-level survey and the village-level survey are attached with this report).

We designed the survey instruments to be user-friendly for the enumerators in the field (compared with traditional surveys of this type), while also gathering extremely detailed data at both the individual and village levels. We developed a series of direct and indirect approaches to addressing sensitive labor issues, gathering data on workers on farms (including type of work, forms of payment, hours and duration of employment), migration of workers to and from the villages, school attendance, and children's health (including illnesses and injuries related to farm work). The survey also provides key data on ethnic heterogeneity, social interactions, perceived security of property rights, and individual policy preferences and priorities (e.g., the most important problems facing the village). In addition, the survey provides detailed information about farming practices, productivity, sources of information for farmers, and their current knowledge of the cocoa market, the economy, and politics.

Besides collecting data from individual farmers and village leaders in an interview format, the baseline survey also incorporates data from direct observations recorded by the survey team (e.g., on road access and quality, building materials and maintenance) and results from tests of water quality in each location. Special measuring boards and scales were used to measure the height and weight of all children under the age of 5 years.

The detailed nature in the data collected by the survey will allow us to examine the specific mechanisms by which different types of initiatives generate positive effects for cocoa farmers over time.

SURVEY IMPLEMENTATION

To implement the survey, we partnered with local researchers at the Institute of Statistical, Social and Economic Research (ISSER) at the University of Ghana. ISSER researchers have extensive experience conducting surveys in the Ghanaian cocoa sector. The ISSER survey team was recruited, trained, and supervised by our project team in Ghana. The team followed a strict protocol to ensure sensitivity to the local context and confidentiality, and conducted interviews in the local languages.

In July and August 2009, we worked with ISSER to select and train 56 interviewers and 14 supervisors (mostly graduate students at the University of Ghana who had previous experience conducting survey research). We created 14 survey teams, each with a supervisor and four interviewers. The training encompassed explanations about the purpose and background of the study as well as detailed training

on the household and village-level questionnaires. We worked with ISSER and the trainees, using their input and data from pilot tests (conducted in June 2009) to improve and finalize the survey instruments. The survey questionnaires were translated into three local languages: Twi, Ewe, and Ga-Adangme.

We provided the 14 survey teams with equipment and trained them in their use. Most importantly, we provided each enumerator with a Garmin GPS device to record locations of households and farmers and to measure the size of the farms precisely. We also provided the team supervisors with water quality testing kits (developed and supplied by an MIT lab) for measuring levels of bacteria in drinking water in each community. From the World Health Organization and Ghana Health Services we borrowed special measuring boards and scales to record heights and weights for children under five. Each survey enumerator was trained in how to use the measuring boards and scales to record accurate measures.

The implementation of the survey was begun on October 1, 2009, and completed by November 20, 2009. The 14 survey teams were directed to specific sets of villages in different regions of Ghana and given precise protocols for entering villages, obtaining approvals from district officials and village chiefs, listing cocoa-farming households in each village, randomly selecting a sample of households for interviews, and conducting the interviews with farmers and village leaders. The teams were regularly resupplied with new (blank) questionnaires, water test kits, and payments of per diem allowances, and they returned completed questionnaires.

The basic protocol we developed was for the survey team to meet with the village leader (the chief or assemblyman) when they first arrived in each location, explain the research, describe the surveys, and obtain permission to proceed. The team then completed a household listing for the entire village that identified those households for which the primary source of income was cocoa farming and also identified the main farmer and head of household. From among the cocoa-farming households, the supervisor then used a randomization table to select a sample of households in which to conduct interviews (the size of the sample was calibrated to the size of the village). The interviewers performed the household visits and administered the questionnaire (and visited the farms) while the supervisor conducted a separate interview with the village leader, visited the local school and interviewed the headmaster, conducted tests for water quality, and recorded observations on the quality of roads and buildings. (The full training manual for the teams is available upon request).

SURVEY DESCRIPTIVE STATISTICS

The **Household Survey** included the following elements:

- 2,810 interviews with household heads

- information on 13,374 household members

- 335 villages in five regions

- median of 11 interviews per village

- median interview duration of 86 minutes

- 921 farms measured and farming practices assessed by direct observation in spot visits

The **Community Survey** included the following elements:

- 335 interviews with village leaders and spot assessments of village conditions

- leaders interviewed were mostly chiefs (55%), elders (14%), or committee chairmen (12%)

- median interview duration of 50 minutes

- 276 interviews with headmasters in local schools and spot assessments of school conditions

- 325 water tests for main village water source

GEOGRAPHIC INFORMATION

We conducted the survey in 335 villages in the five cocoa growing regions. **Figure 1** maps all the surveyed communities. The largest number of surveyed villages is in the Eastern region (125 villages), followed by the Western region (81), Ashanti (52), Brong Ahafo (42), and the Central region (35). This geographic distribution is largely due to the location of the CCP communities. The survey includes 90 communities incorporated in the first phase of the CCP program: approximately 30 of these communities are identified with each of the CCP partners (CARE, World Vision, and VSO).

Figure 1: Map of Surveyed Communities
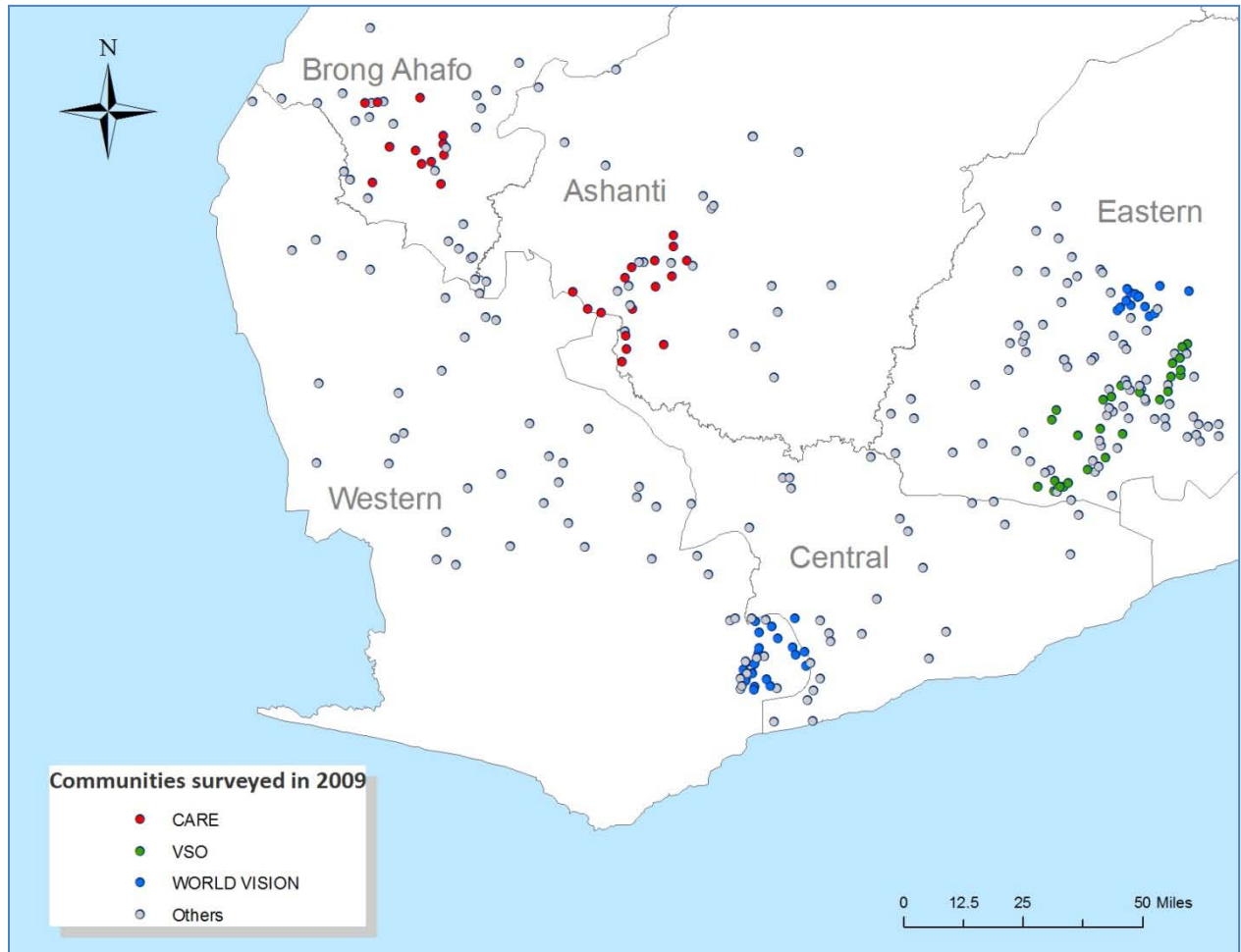
DEMOGRAPHICS

The median number of household interviews per village was approximately 11, overall. The villages surveyed have a median size of about 500 inhabitants (including children) according to the information provided by village leaders. Median village size varies across regions, ranging from around 1,500 inhabitants per village in Ashanti to 294 inhabitants per village in the Western region. The median size of the surveyed CCP communities is 700 inhabitants; among these the CARE communities are larger with a median size of 1,500 inhabitants compared to 600 inhabitants for the World Vision communities and 500 inhabitants for the VSO communities.

Table 1 below provides descriptive statistics for the household heads (who are also identified as the main farmers in 95% of the cases), all household members, and the village leaders we interviewed.

Table 1: Basic Demographic Statistics

	Household Heads	Household Members	Village Leaders
N	2,810	13,374	335
Median age	50	19	56
% Male	81	51	93
% Literate	51	NA	70

The age distribution of the three groups is shown in **Figure 2**, below, using box plot diagrams: the bottom and top of each box are the 25th and 75th percentiles (the lower and upper quartiles, respectively), the band near the middle of the box is the 50th percentile (the median), and the outside bands indicate the overall dispersion with outlier observations identified as dots.

Figure 2: Age Distributions

The median farming household has 5 members, overall, and this is quite consistent across regions, as reported in **Figure 3** below. The typical farming household has a male head (who is also the main farmer), his wife, and their three children.

Figure 3: Household Size
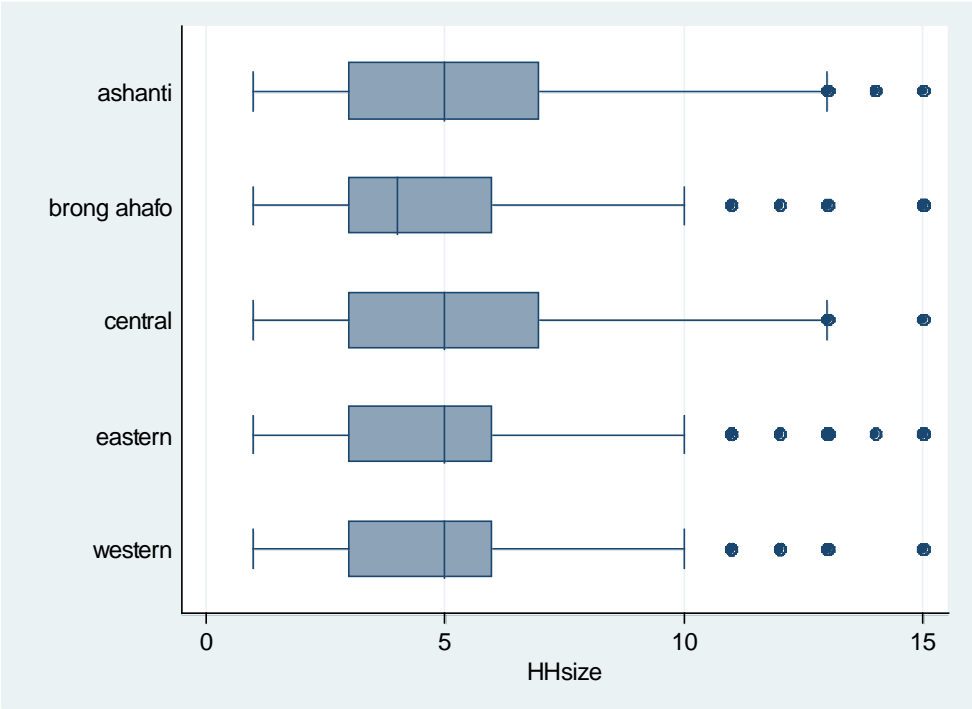
Almost 99% of the household heads are born in Ghana; 52% are born in the same village where they currently reside. Among those born outside of the village the median household head moved to the village 26 years ago. Around 76% of the household heads are currently married.

The religious affiliation of the household heads was varied: around 32% described themselves as Pentecostal (or Charismatic), 22% as other Christian (non-Catholic), 12% as Catholic, and 8% as Muslim. Approximately 43% of attend religious services once a week and 23% attend more than once per week. For 60 % of households the main language spoken at home is Akan (Twi), followed by 15% Fante, and 10% Ga (Dangbe). The large majority of household heads identify themselves with the Akan ethnic group (and within Akan the majority identifies with Ashanti, Fante, Akuapem, and Akeym, although this varies by region).

SEASON AND TIME ALLOCATION

Figure 4 below shows the busiest farming months as reported by the main farmer. For most farmers, the busiest months each year are August to November. The least busy months are January to May. This seasonal pattern is quite consistent among farmers across regions.

Figure 4: Farming Seasons
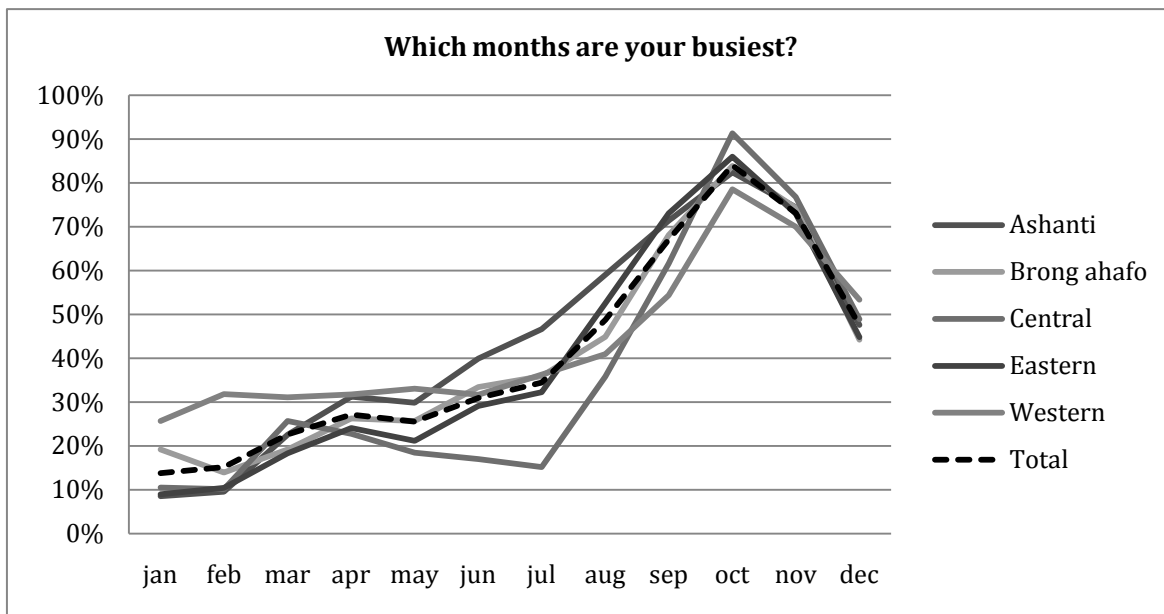
The main farmers report that during the busiest cocoa season they typically spend an average of 34 hours per week working on the cocoa farms that they cultivate. During the least busy season they spend an average of 15 hours per week working on their farms. Around 40% of farmers also report that they spend some time in paid work outside the farms that they cultivate; 20% report doing unpaid work outside the farms. Among those farmers that report working outside the farm, the average time spent doing work outside the farm is 15 hours per week during the busiest cocoa season and 19 hours per week during the least busy season. Among those doing paid work outside the farm, the median additional income earned from such work during the last 12 months was GHC 200. This suggests that income from work outside the farm is only a small fraction of income overall (see the section on income below). Almost all farmers report that they did not spend a single day away from the village for work during the past year.

NUMBER OF FARMS, LAND OWNERSHIP, SHARECROPPING, AND RENTING

The data on the number of farms that the main farmers cultivate is reported in **Figure 5**. Farmers cultivate 1-3 farms on average, and this is quite consistent across regions.

Figure 5: Number of Farms Cultivated
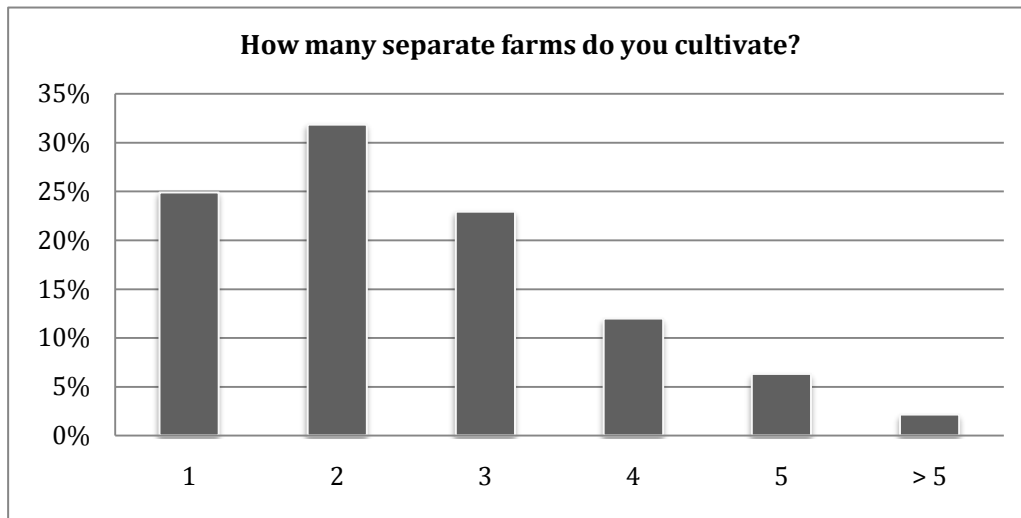
Around 70% of farmers report that they own the farms that they cultivate (see **Figure 6**), and this is quite consistent across regions. Some 38% of farmers report that they have a legal title for the farms that they own. Only about 20% of farmers are sharecropping on the farms they cultivate: 40% of those who did made payments in cocoa (6 maxibags per year on average) and 24% made monetary payments (95 GHC per year on average). Only about 2% of farmers rent any of the farmland that they cultivate.

Figure 6: Ownership of Farms
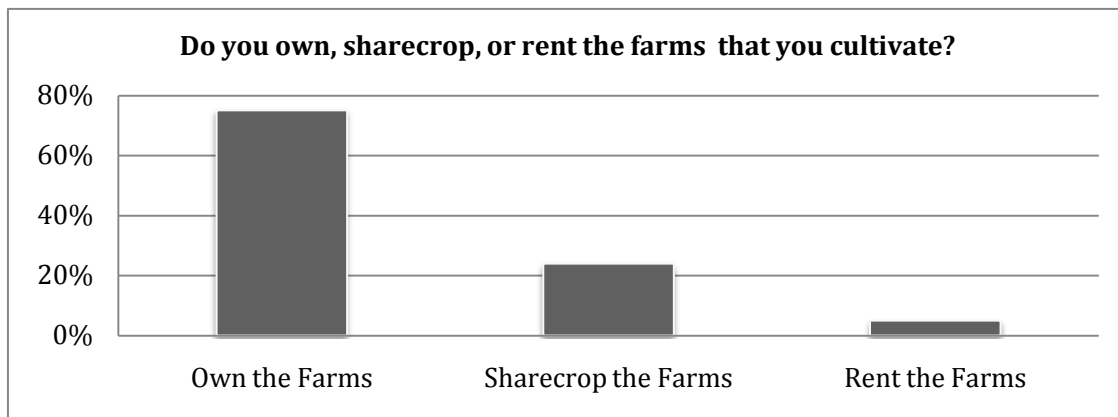
Only 3 % (.5 %) of farmers report that they purchased (sold) any land in the last 12 months, suggesting that there is almost no functioning market for farm land in cocoa growing areas. Only 12% of farmers reported that they ever had a dispute with anyone over the land that they own; such disputes are mostly settled by courts, the family head, or the village chief.

FARM SIZE

Figure 7 illustrates the distribution of farm size by region, based on the estimates of the sizes of farms reported by the main farmers during the interviews.

Figure 7: Reported Farm Size
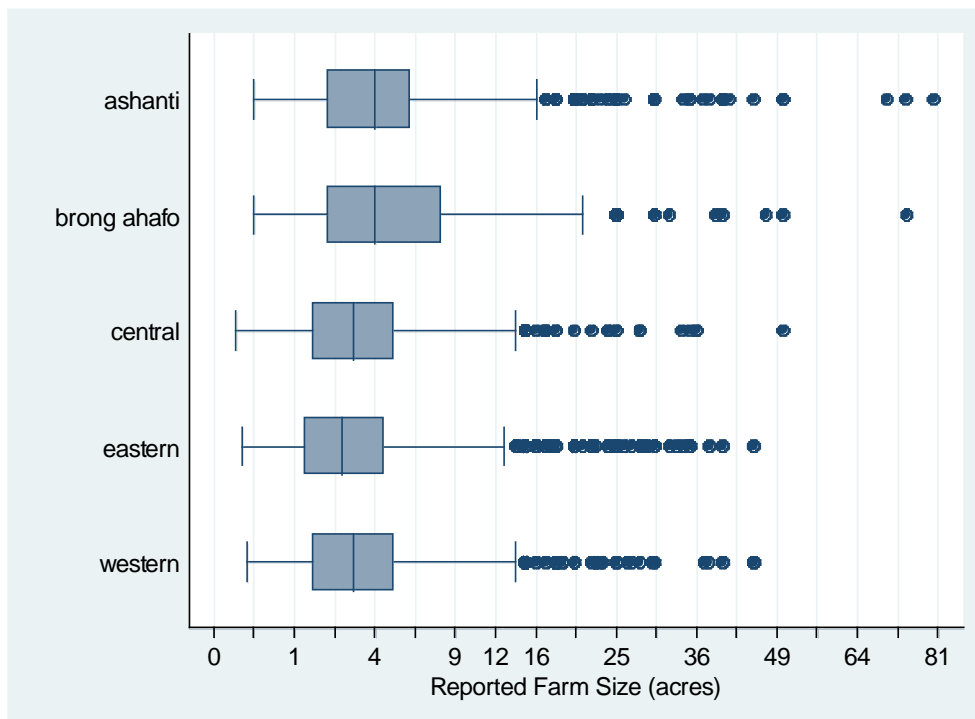
The average farm size across all regions is 5 acres and the median farm size is 3 acres. Overall more than 75% of all farms are 5 acres or smaller. The vast majority of Ghanaian cocoa farmers operate at a very small scale.

An important concern with this data on reported farm size is that farmers may not accurately estimate the true size of their farms. In order to verify the reported farm sizes we visited the largest farm cultivated by 33% of all interviewed farmers in order to conduct a spot survey (the rule was to visit the largest farm of every 3rd farmer interviewed in each community). During the farm spot survey, the

surveyors measured the true size of the farm using a GPS device and conducted a visual assessment of the state of the farm. We conducted 921 farm spot surveys overall. **Table 2** below reports the average reported and measured farm size (median and mean) for all 921 measured farms.

Table 2: Measured versus Reported Farm Size

	Median	*Mean*
Measured size (acres)	2.5	3.6
Reported size (acres)	4	5.1
Over-reporting	60 %	41 %

We find that farmers overestimate the actual size of their farms by about 40-60% on average. **Figure 8** plots the quantile estimates for the reported and measured farm size against each other together with a 45 degree line which gives a measure of how far the quantile estimates are from being equal across the two measures. Clearly, the reported farm size is higher than the measured size across all quantiles (the points are all above the 45 degree). As we show below, this robust over-reporting has important implications for the measures of productivity.

Figure 8: Overestimation of Farm Size
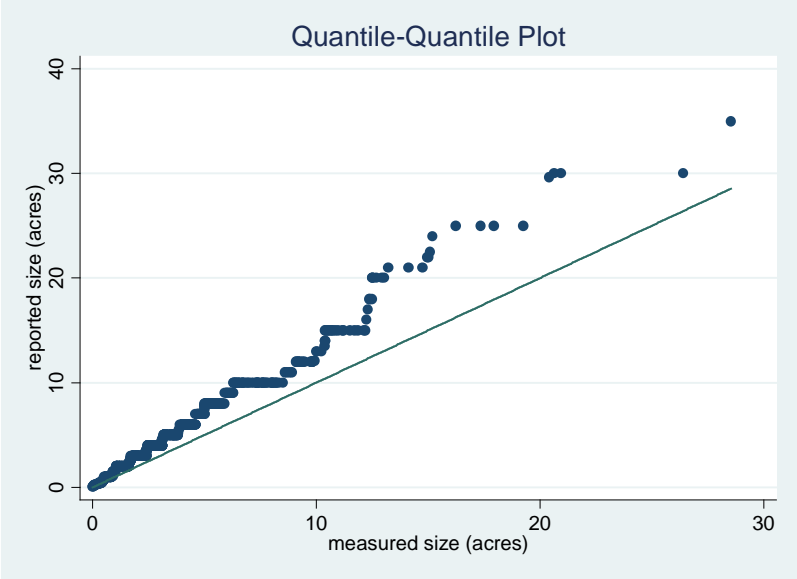
Table 3 provides data on farm size (reported and measured) and farm ownership by region.

Table 3: Farm Size and Ownership by Region

Region	Median Farm Size Overall Reported (Acres)	Percent of Farmers that Own Their Farm	Median Size of Largest Farm Reported (Acres)	Median Size of Largest Farm Measured (Acres)
Ashanti	4	87%	4.7	4.02
Brong Ahafo	4	74%	6.5	4.78
Central	3	71%	4	2.1
Eastern	2.5	72%	3	2.2
Western	3	77%	4	2.7
Total	3	76%	4	2.51

CROPS

The most important crops planted on the farms (as reported by the main farmer) are shown in **Figure 9**. Cocoa is reported as the most important crop in over 70% of the cases. Plantain is most frequently reported as the second most important crop.

Figure 9: Most Important Crops
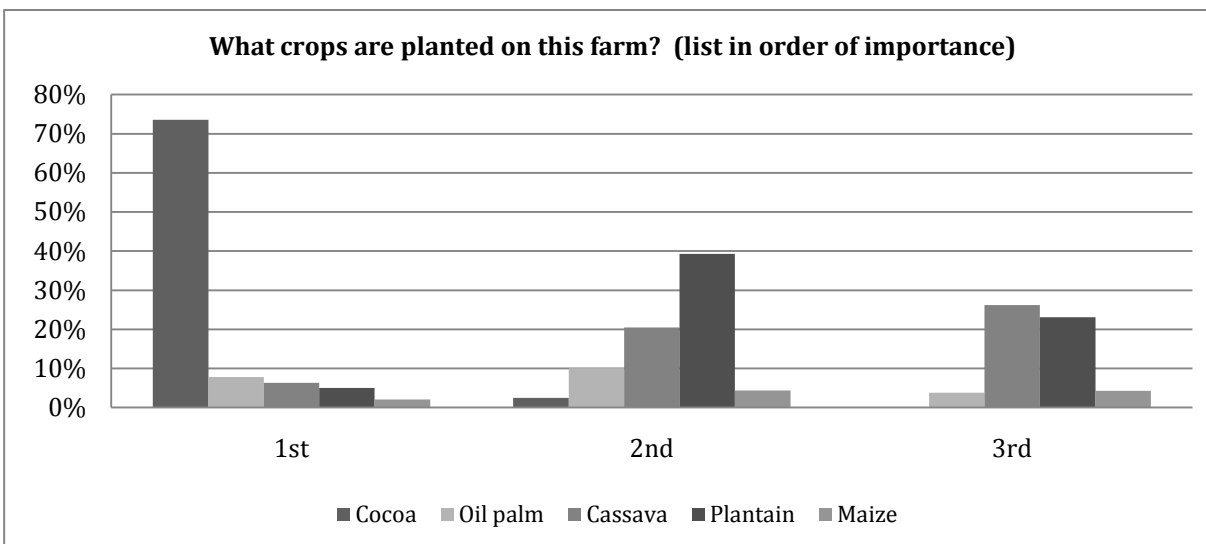
This information is corroborated by the information that we obtained from the village leader. As shown in **Figure 10** below, leaders report that cocoa is by far the most important source of income for the people in the surveyed villages.

Figure 10: Most Important Sources of Income

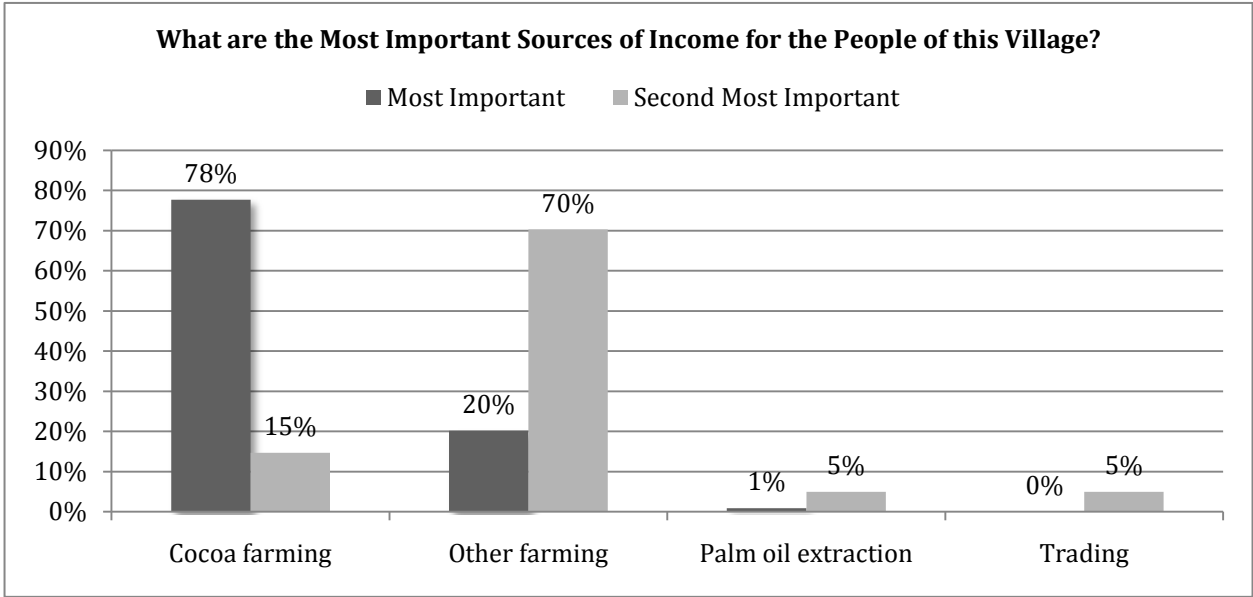In the farm spot surveys, we found that on average about 88% of all visited farms were planted to cocoa. Again, plantains, cassava, and maize were found to be the most important crops other than cocoa (in this order). As we discuss below, income from other crops makes up a tiny fraction of estimated household income. Overall, most cocoa farmers are entirely dependent on their cocoa crop for income.

FARMING PRACTICES AND FARM INFRASTRUCTURE

Overall we find that the adoption of recommended farming practices is rare among the cocoa farmers. **Figure 11** reports assessments of farming practices as measured by the farm spot survey, including statistics on planting, the canopy structure, and weeding.

Figure 11: Farming Practices (Spot Survey)

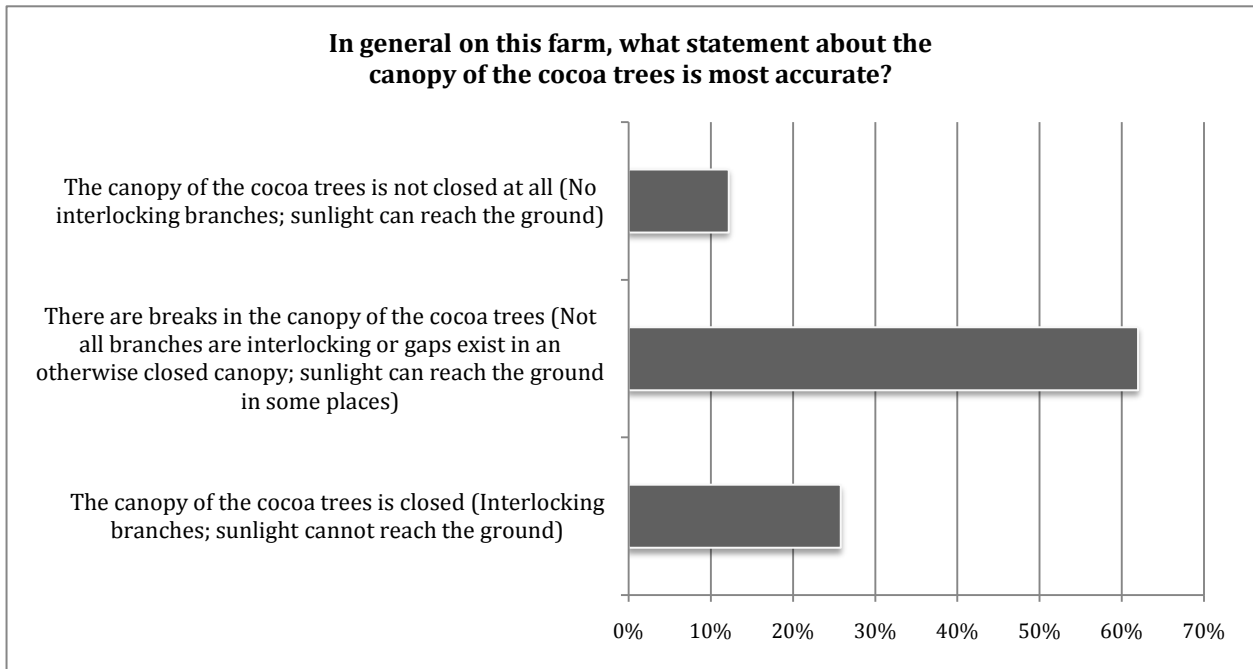**Approximately, how far apart are the cocoa trees on this farm?**

Approximately, how far apart are the shade trees on this farm?
(Farms with Shade Trees)

In general on this farm, what statement about the canopy of the cocoa trees is most accurate?

Figure 11 (cont.):
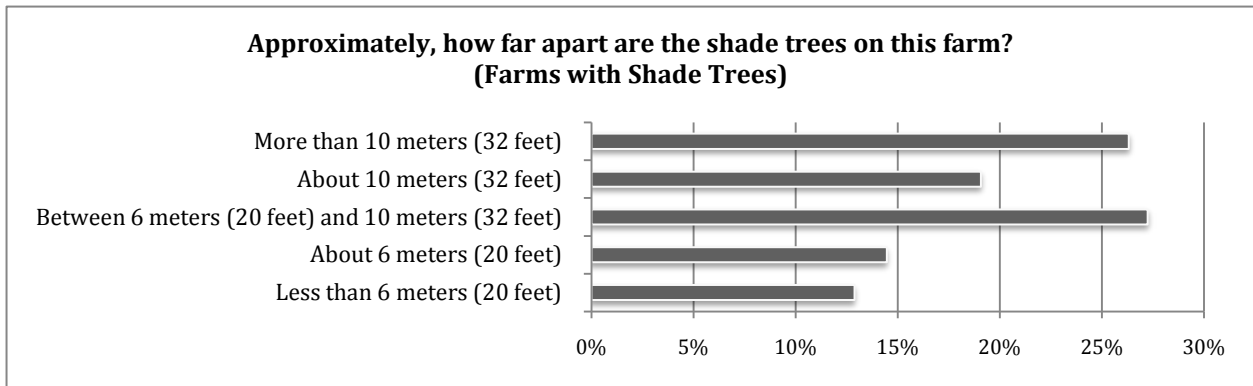

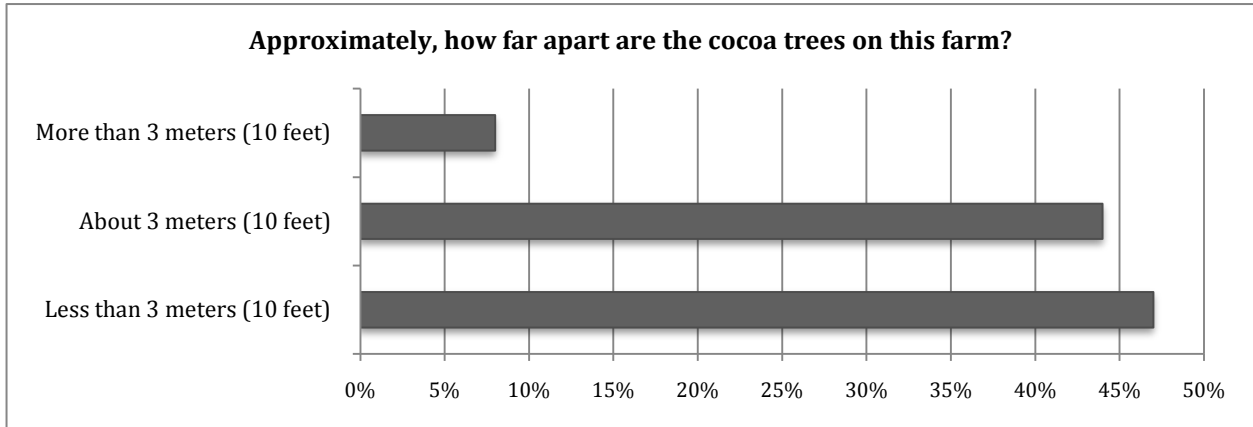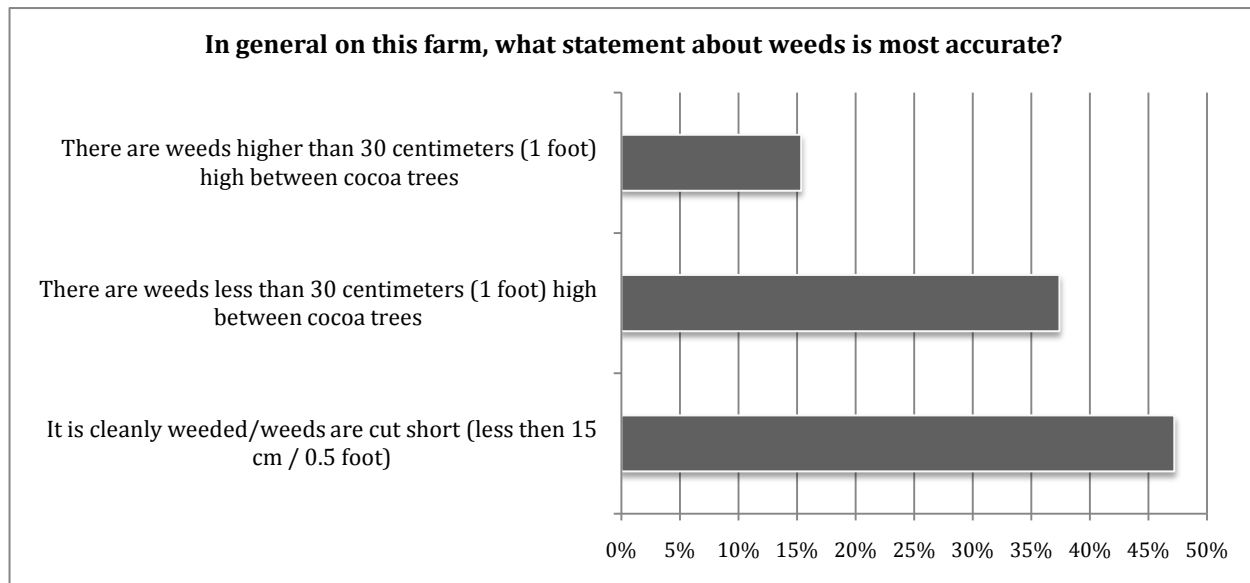**In general on this farm, what statement about weeds is most accurate?**

Overall, 94% of visited farms had no irrigation system. Only 6 % of visited farms had drainage channels.

Table 4 presents evidence on farming activities reported by the main farmers in each household. Even using conservative measures (whether a particular activity was performed at least once in the last year) the results suggest that few farmers engage in practices that are recommended for raising productivity. While 90% of farmers report that they did weed at least once in the last year, only 70% report doing any pruning, only 21% report applying fertilizer, and only 37% report applying pesticides. Fertilizer use is as low as 9% in the Eastern region.

Table 4: Farming Practices (Farmer Interviews)

In the last 12 months, did you [ACTIVITY], even if only once? (Main Farmer)						
ACTIVITY:	Ashanti	Brong Ahafo	Central	Eastern	Western	Total
Fell trees	53%	34%	53%	43%	59%	48%
Weed or clear with a cutlass	86%	80%	92%	92%	94%	90%
Prune trees	64%	59%	74%	71%	76%	70%
Apply fertilizers	26%	21%	22%	9%	39%	21%
Apply pesticides	45%	40%	42%	26%	48%	37%
Remove defective cocoa beans	83%	79%	87%	90%	87%	87%

More detailed data on weeding and use of fertilizer are shown for each month in **Figure 12**. We find that the percentage of farmers using fertilizer is extremely low, never above 5% during any month.

Figure 12: Monthly Weeding and Use of Fertilizer
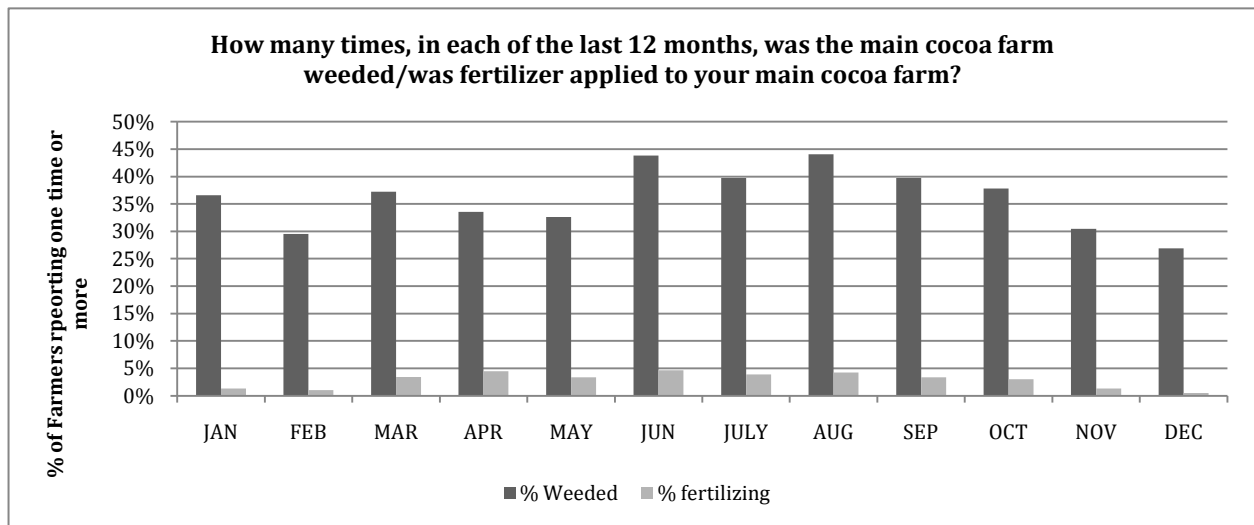
In general, the evidence indicates there is substantial potential for productivity gains from better farming practices.

PRODUCTIVITY

Table 5 reports statistics on the productivity of cocoa farmers by region. Overall, the median cocoa yield is 234 KG per Hectare when the reported farm size is used and 377 KG per Hectare when the measured farm size is used. The productivity is roughly stable across regions ranging from 355 KG per Hectare in the Eastern region to 389 in Brong Ahafo and in the Western region. The median cocoa yield among the surveyed CCP communities is 312 KG per Hectare; 374 KG per Hectare among the CARE communities, 313 among the VSO communities, and 254 among the World Vision communities. Overall farmers reported losing about 34% of the cocoa harvest due to problems with diseases.

Table 5: Productivity and Crop Loss

Region	Median Cocoa Yield (KG per Hectare) Based on Reported Size	Median Cocoa Yield (KG per Hectare) Based on Measured Size	Average Share of Cocoa Crop Reported Lost Due to Problems Like Black Pod, Swollen Shoot, Capsid, etc.)
Ashanti	259	382	33%
Brong Ahafo	234	389	37%
Central	195	355	28%
Eastern	249	374	32%
Western	234	389	37%
CCP First Cohort - All	201	312	35%
CCP First Cohort - CARE	213	374	34%
CCP First Cohort - VSO	234	313	37%
CCP First Cohort - World Vision	156	254	34%
Total	234	377	34%

Figure 13 below shows the distributions for the measures of cocoa yield in the different regions. These data reveal that farmer productivity varies considerably across farmers within the same region. For example, in the Western region farmers in the 75th percentile of the distribution achieve yields of over 800 KG per Hectare, while farmers in the 25th achieve a yield of 180 KG per Hectare on average. The within-region variability among farmers is larger than the variability across regions. This again suggests considerable potential for productivity gains among low-yield farmers if they can apply the same practices (or have access to the same resources) as high-yield farmers. **Figure 14** compares the cocoa yields measured for farmers in our survey with other published measures of yields from Ghana and also other cocoa-growing countries.
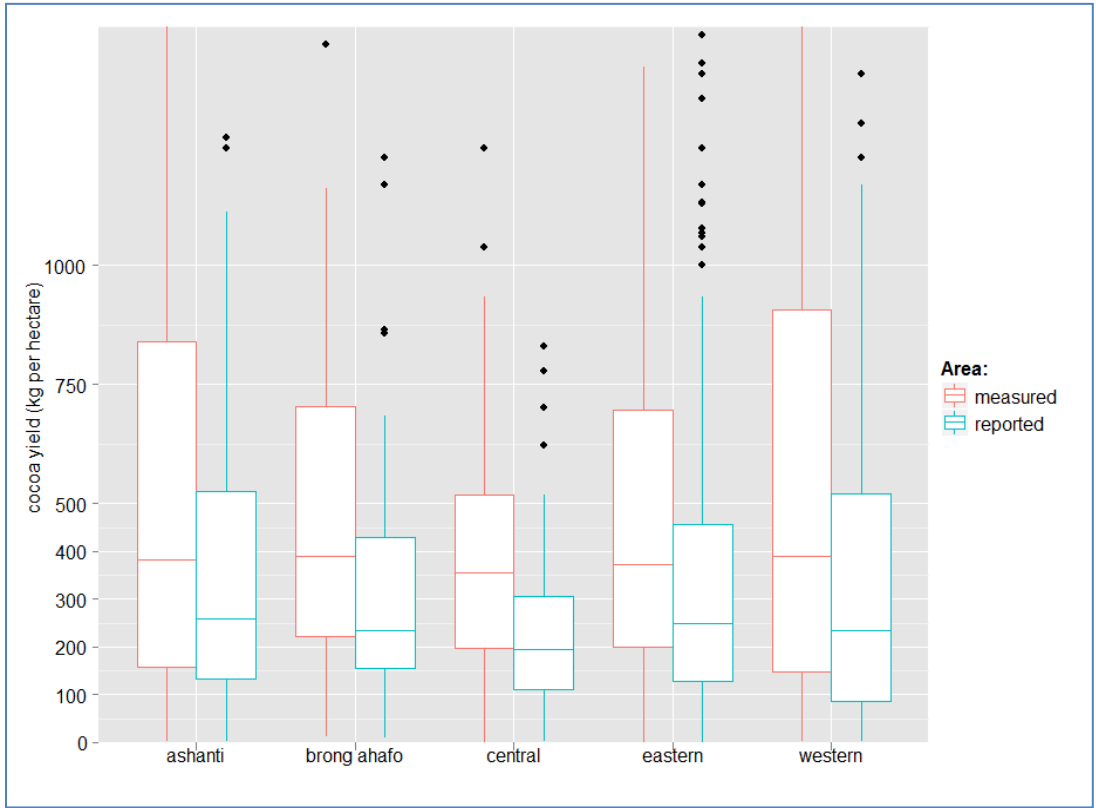
Figure 13: Cocoa Yields by Region

Figure 14: Comparison of Measures of Cocoa Yields
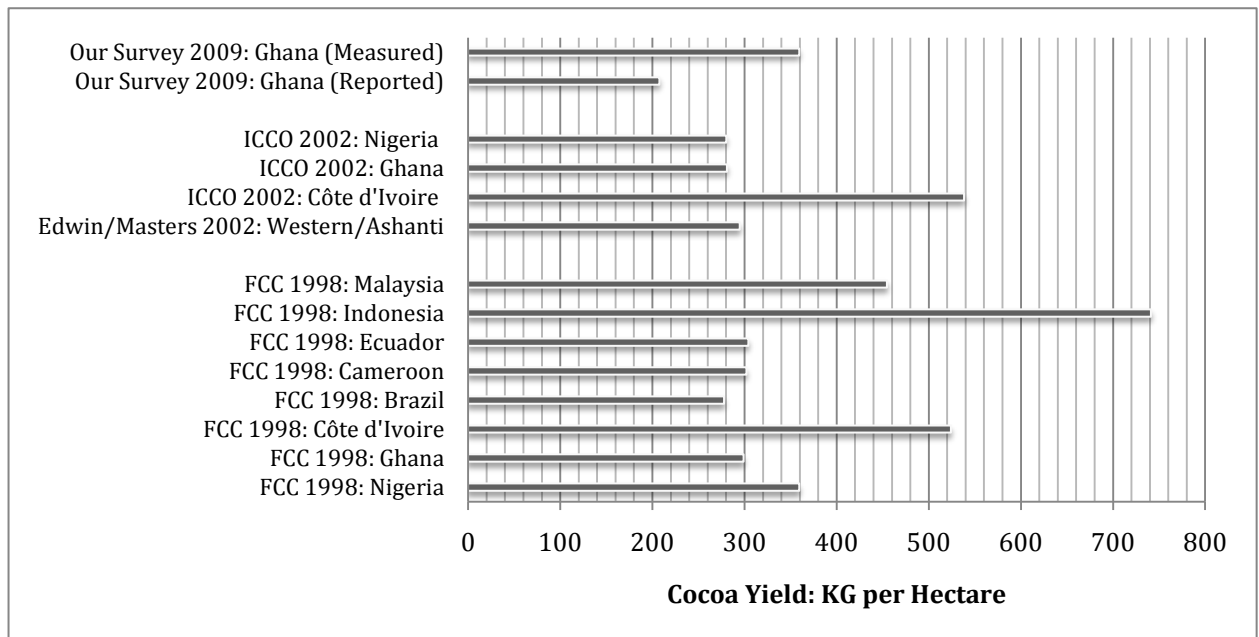
Figure 15 reports the most common problems encountered by farmers during the last year. Productivity among the majority of farmers is hampered by significant problems with crop disease and pests.

Figure 15: Problems with Cocoa Crop
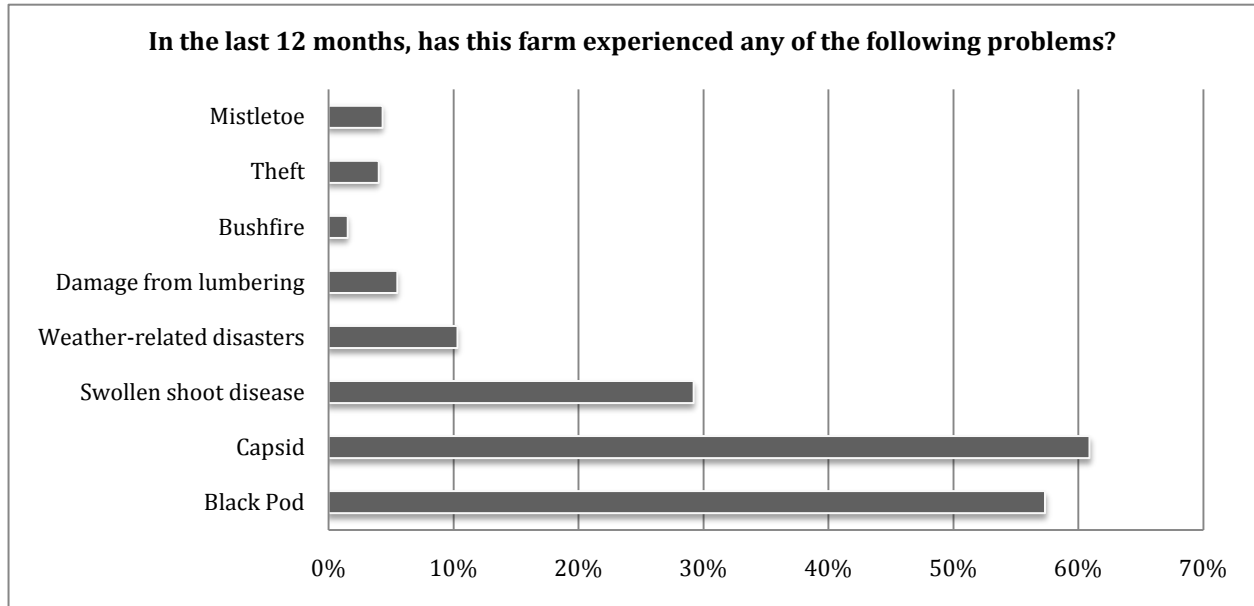
COCOA SALES

The number of different buyers to whom farmers sell their cocoa is shown in **Figure 16.** Almost all farmers sell to only one buyer, almost always a Licensed Buying Company (LBC).

Figure 16: Number of Buyers

Figure 17 shows the percentages of farmers in each region reporting the specific LBCs as their largest buyer. The Produce Buying Company (PBC) is by far the largest buyer in all of the regions. Kuapa Kokoo is the second most important buyer in most regions.
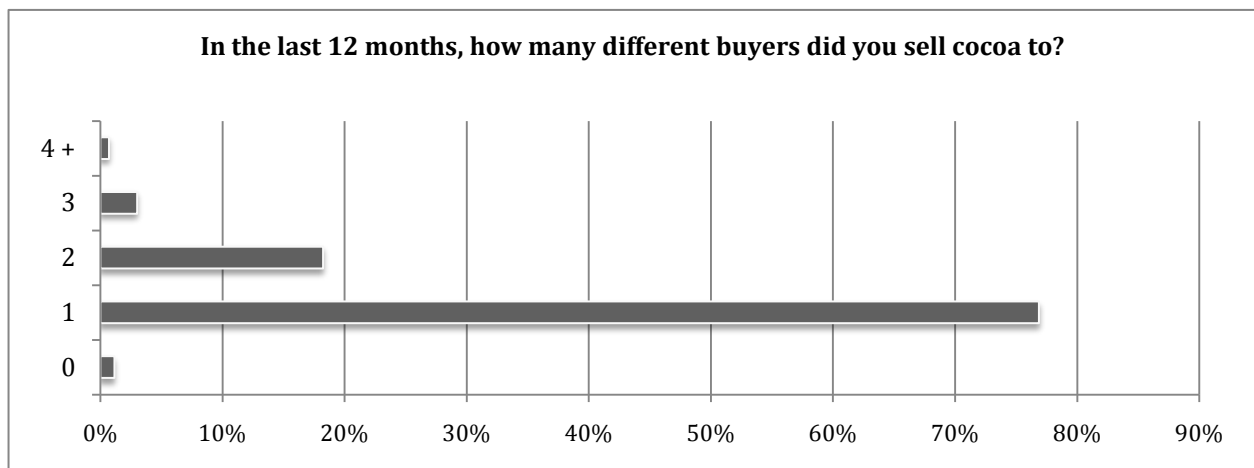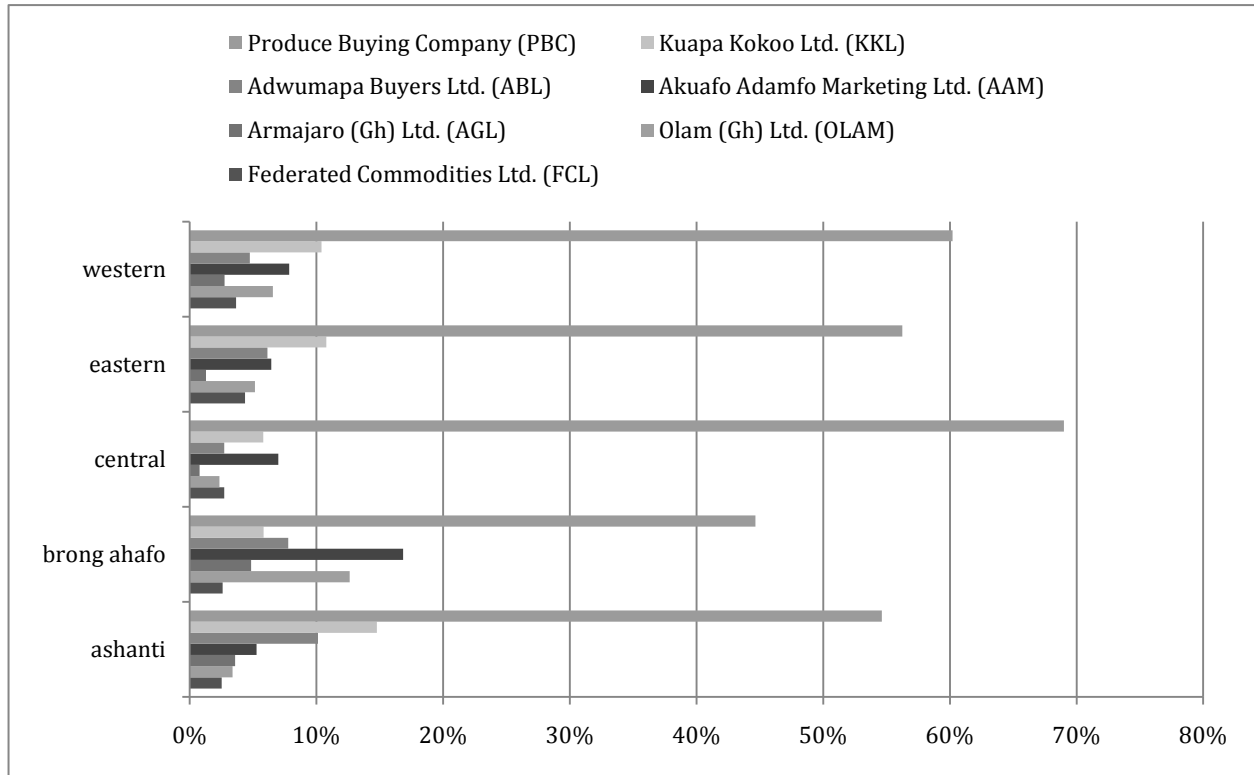
Figure 17: Buying by Specific LBCs

Approximately 94% of farmers report that they received payments in full at the time of sale; for the others the median waiting time to receive the payment was 2 weeks. Some 98% of farmers report that they were paid in cash, and 55% received a bonus payment from the LBC involved (the median bonus payment was 12 GHC). Around 40% of farmers also report that they received gifts from the LBC (50% of gifts were personal/household goods; 10% were tools).

Figure 18 shows the percentage of farmers that had their last sale in a given month. Most farmers had their last cocoa sale in September, October, and November of 2009 (note that our interviews took place between October 1 and November 20, 2009), or in the same three months in the previous year).

Figure 18: Timing of Cocoa Sales

Month and Year when Farmer last Sold Cocoa
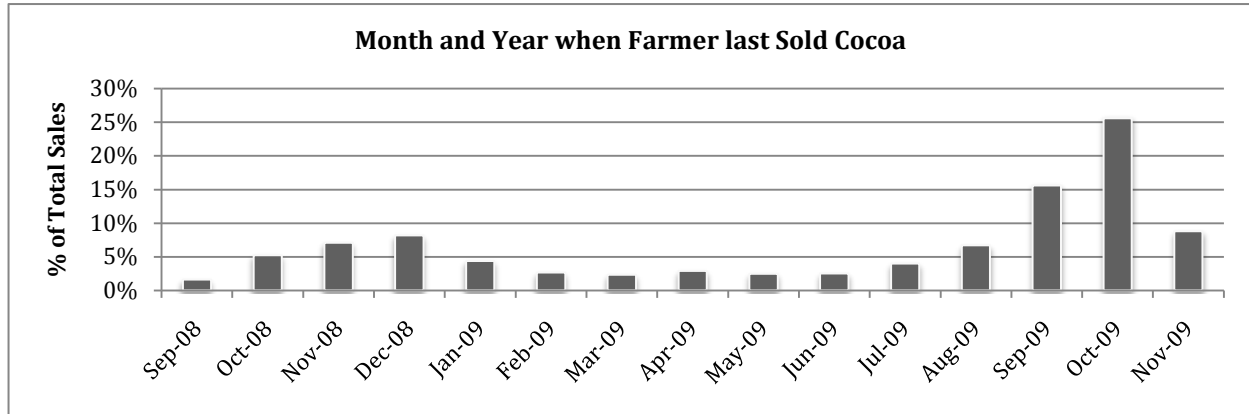
The prices that farmers received from the buyer at the time of the last sale are shown in **Figure 19**. For the period from September 2008 to September 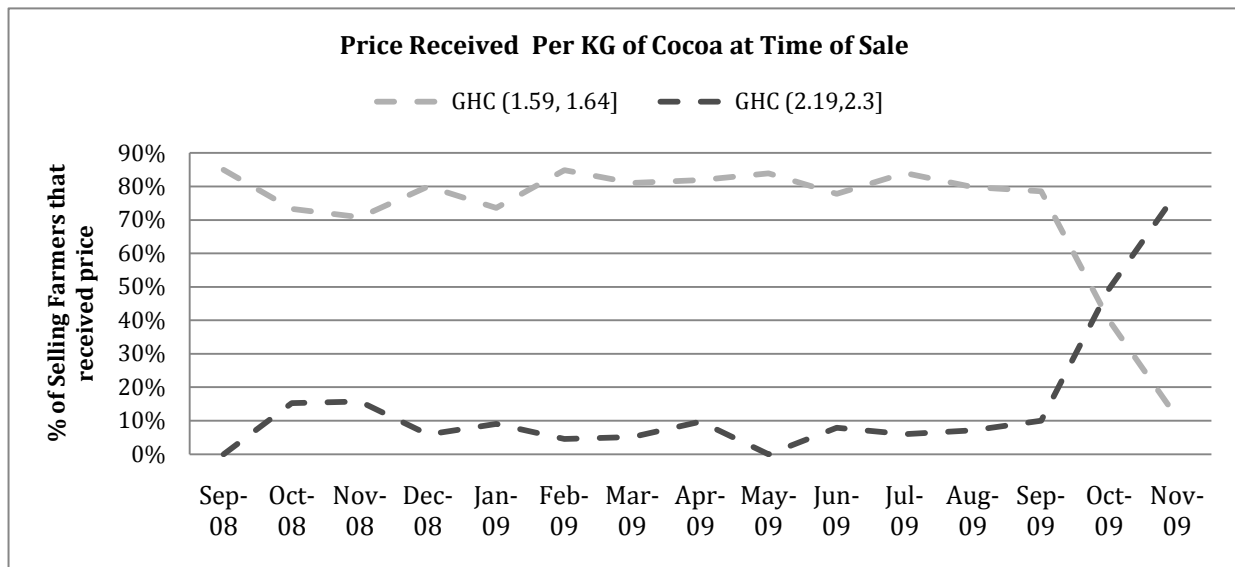2009 almost all farmers received between 1.59-1.64 GHC per KG of cocoa, a narrow price range around the official producer price set by COCOBOD for the 08/09 season of 1.6 GHC per KG. Only a very small fraction of farmers report receiving a higher price during this period.

Figure 19: Prices Received by Farmers

Price Received Per KG of Cocoa at Time of Sale

There is a marked change beginning in October 2009. On October 1st COCOBOD announced a new official producer price of 2.2 GHC per KG for the 09/10 season, an increase of around 38% over the previous price. The price increase was effective as of October 1. It is striking, however, that almost 50%

of farmers who sold cocoa in October appear to have received the old (lower) price for their cocoa. This represents a large group of farmers (about 25% of sales occurred during this month, as shown in the preceding Figure 18). By November most farmers selling cocoa received a price of 2.19-2.3 GHC per KG, converging on the new official price, although about 10% were still only being paid the old official price.

This evidence suggests that information asymmetries between farmers and buyers create severe problems for farmers. In October 2009, and even November, many farmers appear not to have been aware of the new official price and accepted the lower (old) price for their cocoa offered by buyers. These farmers were thus deprived of a 38% increase in their income.

Figure 20 shows the percentage of framers that receive the new producer price of 2.2 for the last three months. It illustrates that the uptake of the new price is slowest in Central region. Overall, however, the pattern is quite consistent across regions.

Figure 20: Prices Received by Farmers by Region

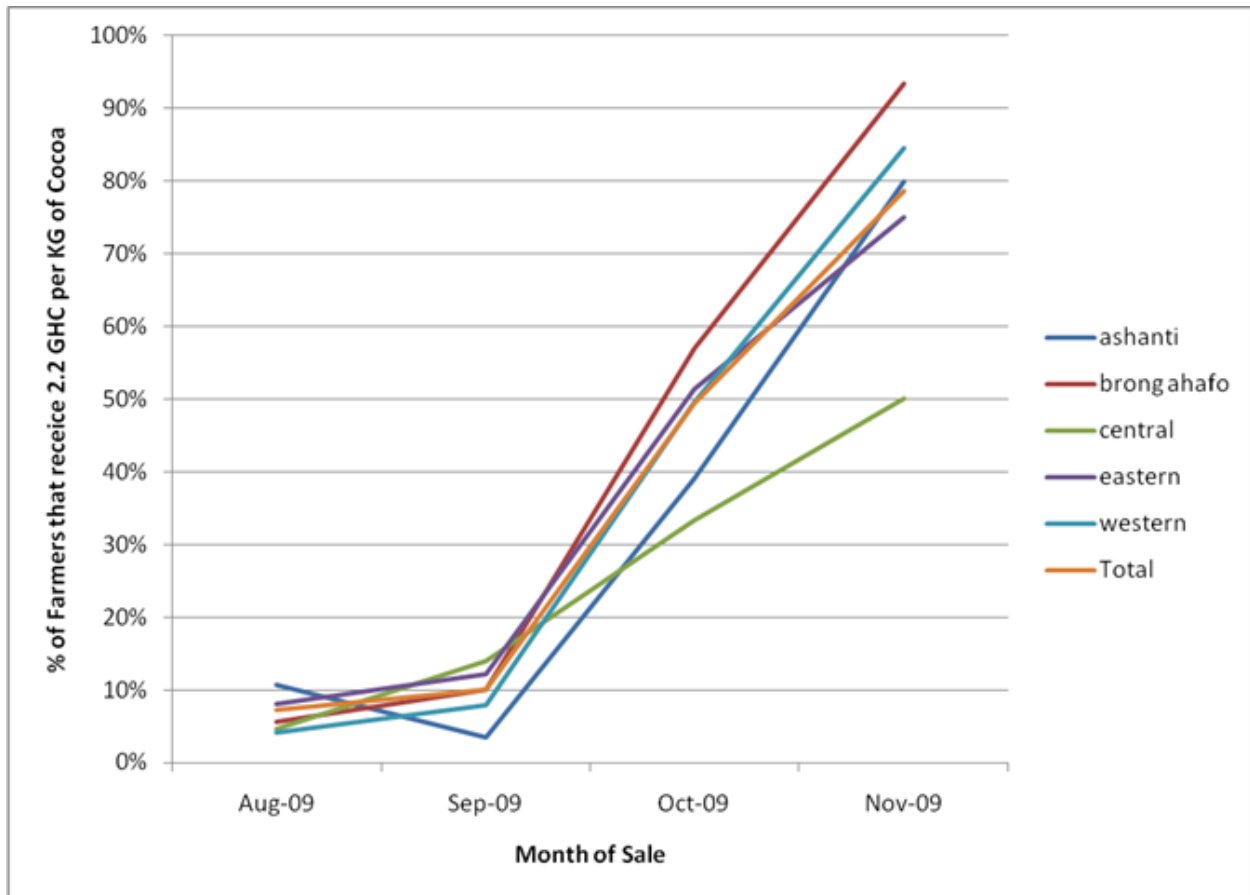**Figure 21** repeats this analysis depending on how farmers assess their level of information about cocoa prices in their region. Well informed farmers report receiving the new price significantly faster than farmers that less well informed.

Figure 21: Prices Received by Farmers by Self-Assessed Level of Information
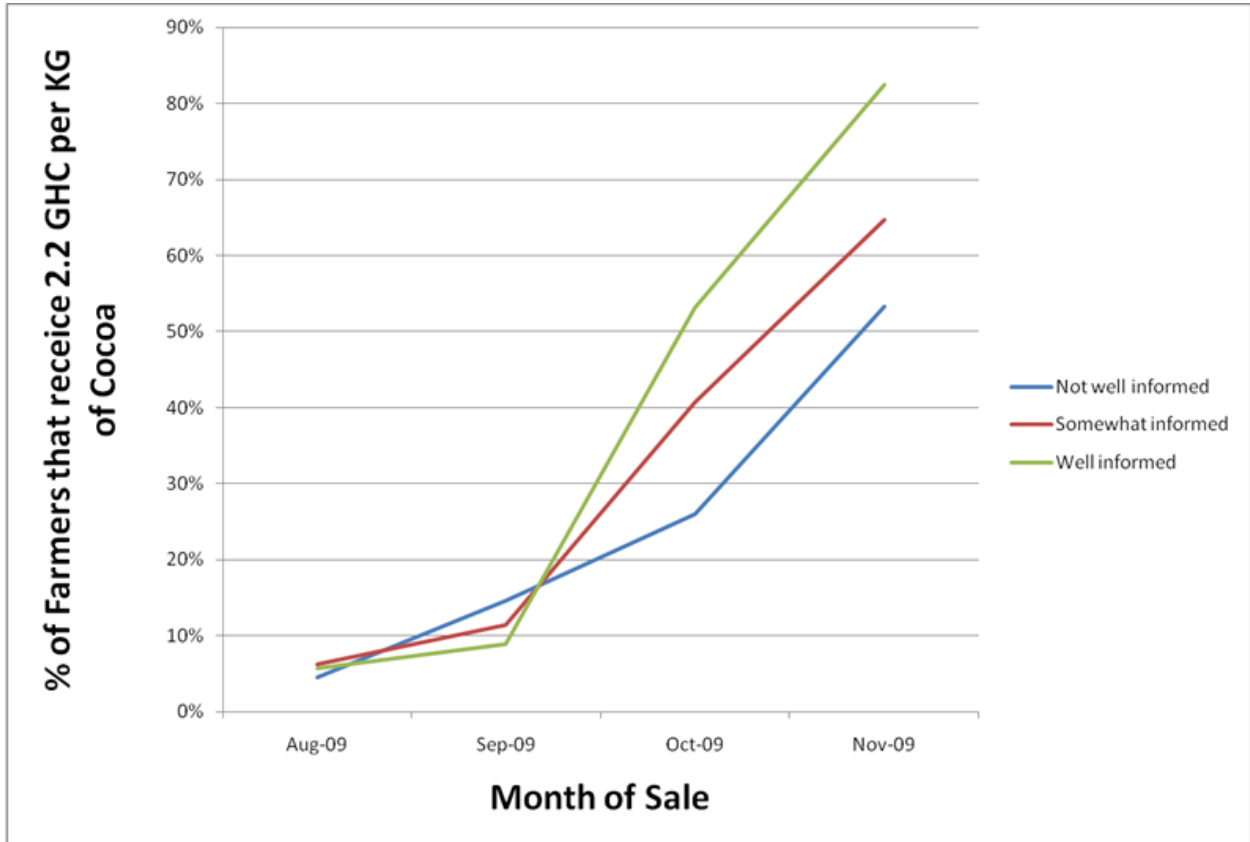
Figure 22 below displays the variation of the uptake of the new price by LBC.

Figure 22: Prices Received by Farmers by LBC
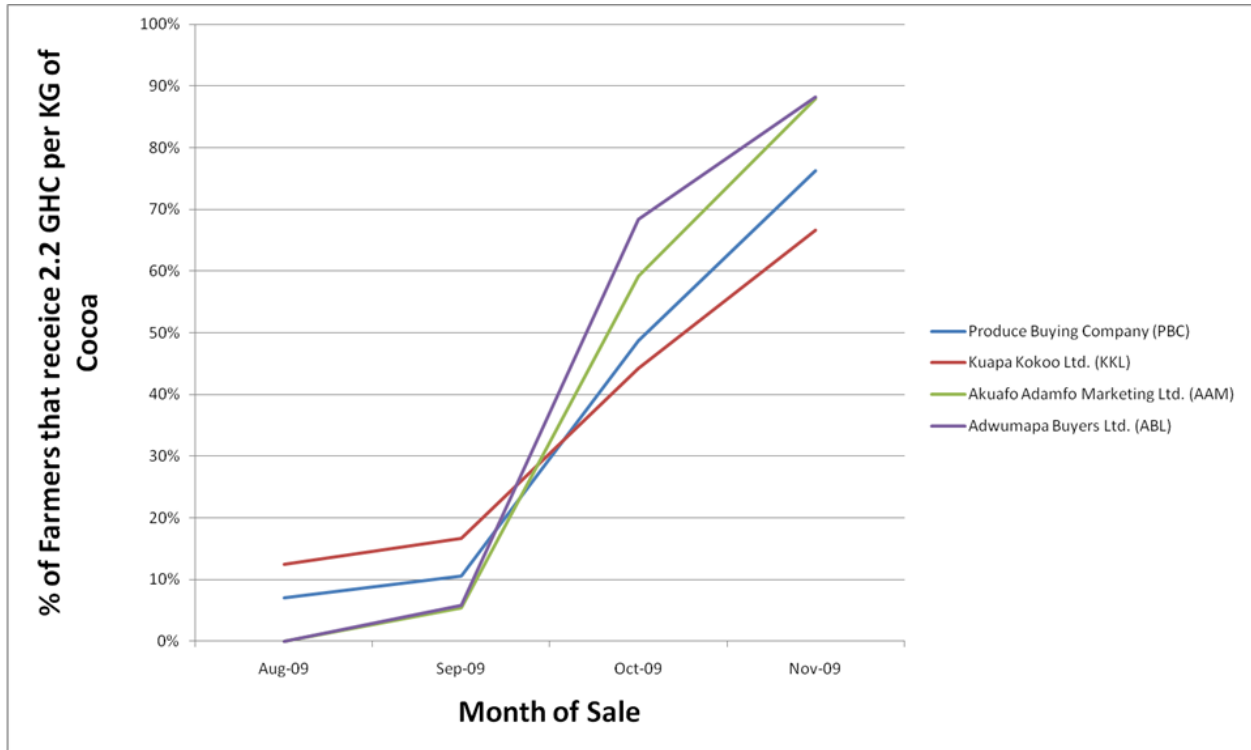
Figure 23 below shows the distribution of cocoa unit sales across regions. The median farmer sold 441 KG of cocoa over the last 12 months. Median sales are somewhat lower in the Eastern and Central regions compared to the other regions. Again the within-region variability among farmers is much greater than the variability across regions.

Figure 23: Unit Sales of Cocoa by Region

INCOME

In **Table 6** below we report the median annual crop income for farming households by region and also for the CCP communities. The median farming household reports an annual income of 716 GHC from cocoa farming, and only 80 GHC from the sale of other crops. The total annual crop income is 1020 GHC. This translat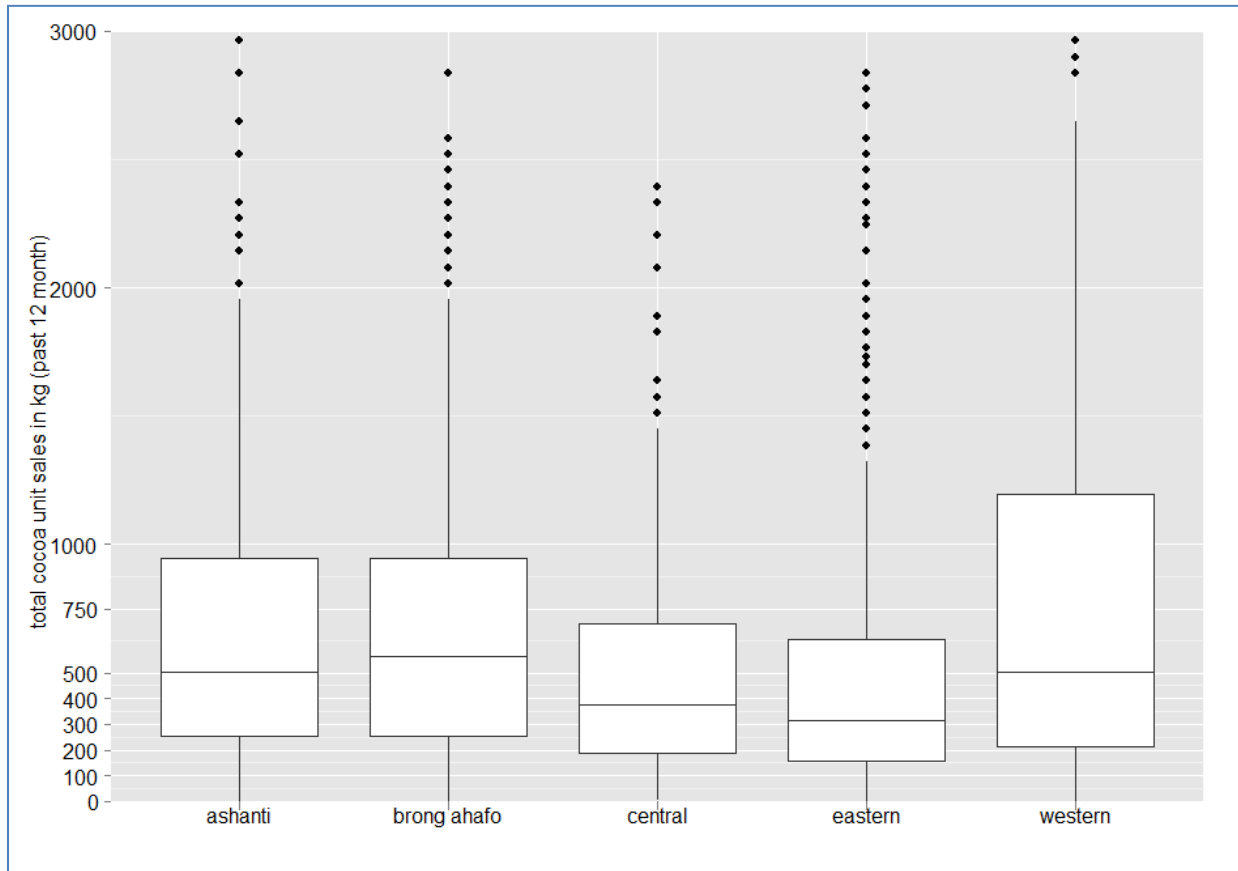es to a median annual income of 250 GHC per household member, so less than 1 GHC per person per day. The median income varies across regions, with incomes being lower in the Central and Eastern regions than elsewhere. The ratio of income from cocoa to income from other crops is highest in the Eastern region.

Overall the table suggests that farming households are almost exclusively dependent on income from cocoa sales. Overall 38 % of farmers report having zero income from crops other than cocoa. Moreover, below we will see that households have almost no income from other non-farming sources, so the total income from crops is very close to the total annual income.

Table 6: Median Annual Income from Farming by Region (in GHC)

Region	Cocoa Income	Income From Other Crops	Total Crop Income	Total Crop Income per Household Member
Ashanti	918	53	1122	255
Brong Ahafo	1020	100	1290	326
Central	663	45	863	187
Eastern	570	155	936	225
Western	966	20	1114	277
CCP First Cohort - All	612	120	960	252
CCP First Cohort - CARE	1020	60	1326	330
CCP First Cohort– VSO	558	250	932	254
CCP First Cohort – World Vision	470	120	704	162
Total	716	80	1020	250

Figure 24 shows the distributions of total annual income from farming for the different regions. We again see large within-region variability among farmers.

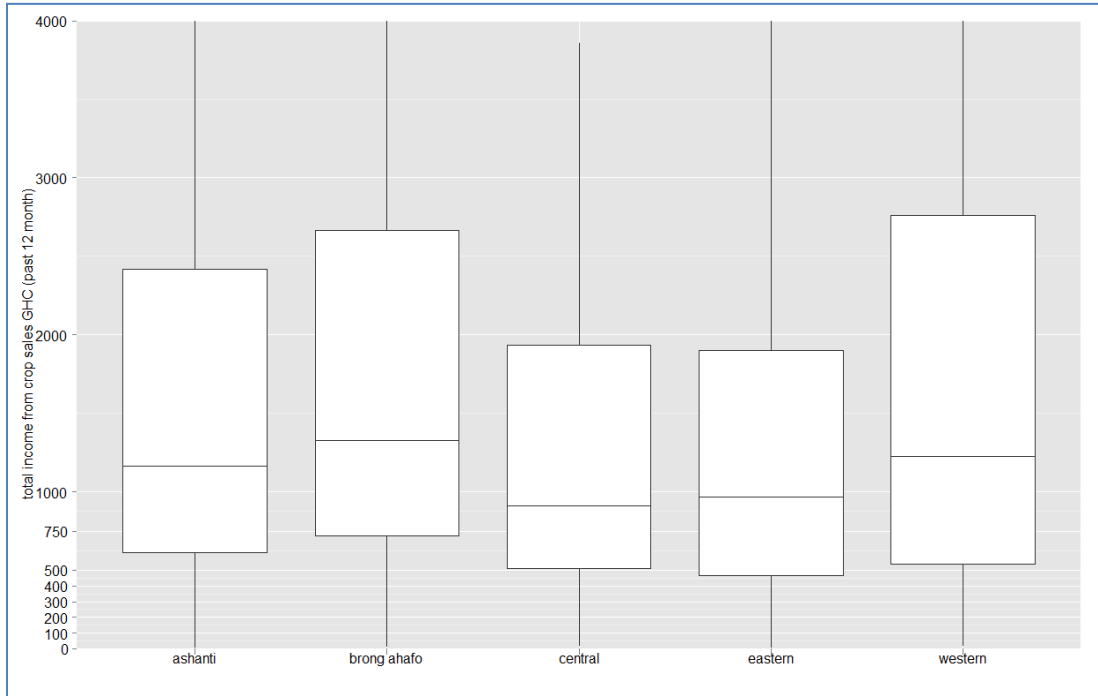**Figure 24: Annual Income from Farming by Region**

Figure 25 below shows which other crops contribute to the farmer income, focusing on farmers that report sales of other crops (recall that 38% of farmers report no income at all from other crops). Plantain and cassava are the most important other crops, but contribute only a small fraction of overall income.

Figure 25: Most Important Other Crops
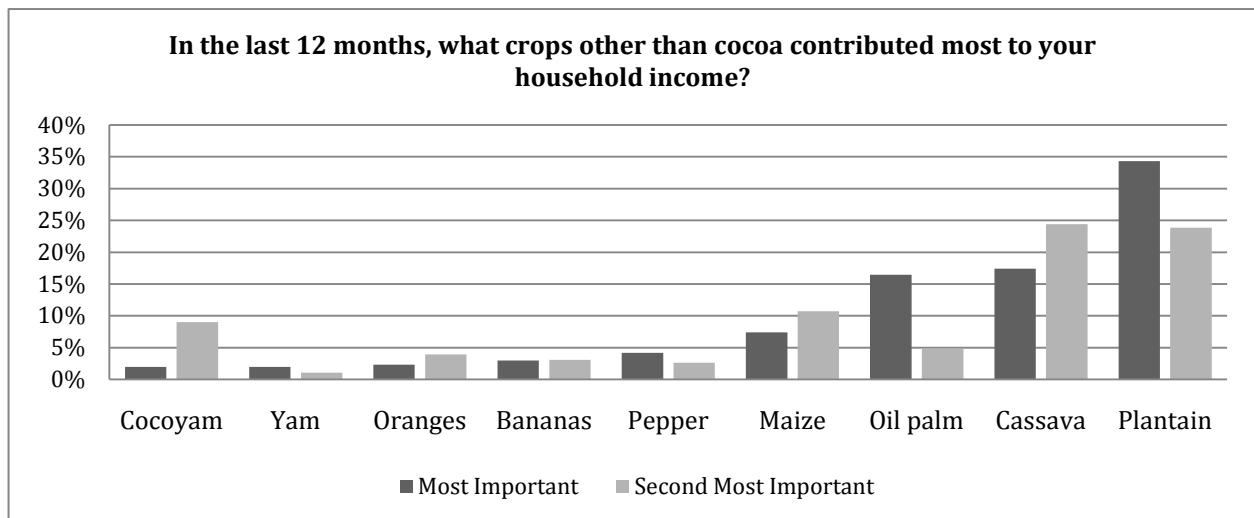
The percentages of farmers reporting zero income from other (non-crop) sources are shown in **Figures 26**. In **Figure 27** we show data on farmers reporting any income from remittances. The data confirm the almost exclusive reliance on income from cocoa among the farmers.

Figure 26: Farmers Reporting Zero Income from Non-Crop Sources

In the last 12 months, roughly how many Ghana cedis did your household earn from the following sources?

% of Farmers that answer 0 GHC
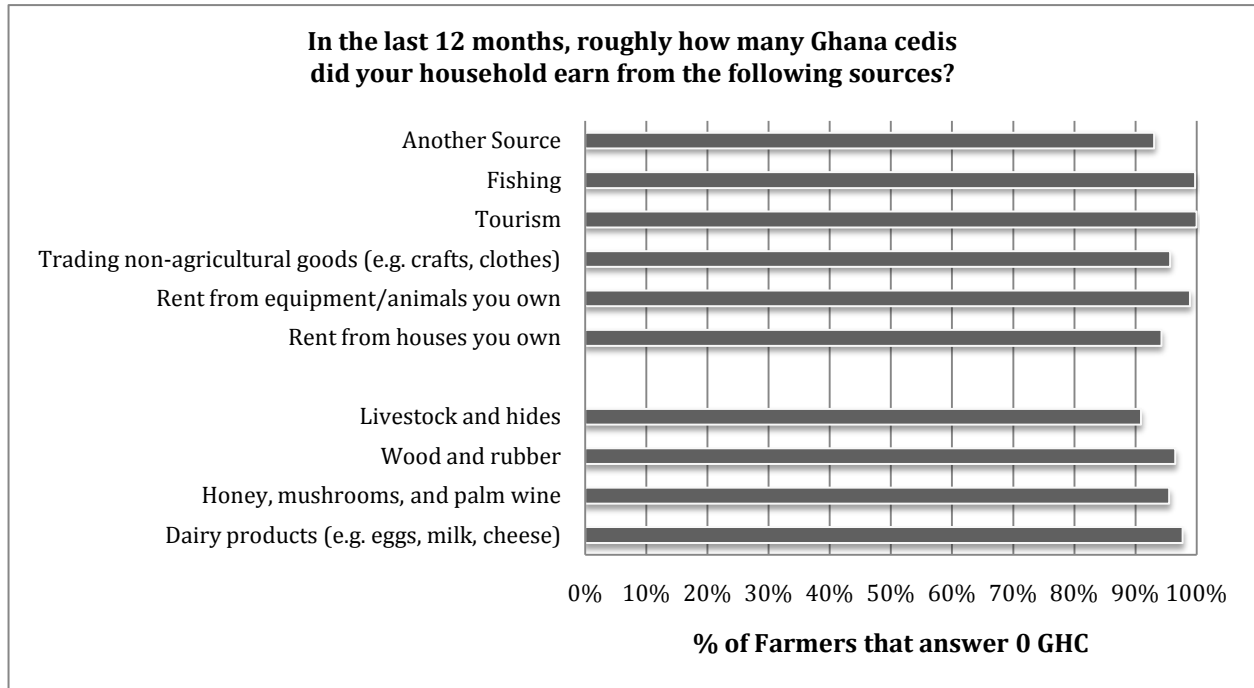
Figure 27: Farmers Reporting Income from Remittances

In the last 12 months, how many Ghana cedis has your household received in income from relatives who live in another part of Ghana or in another country and send money to you?
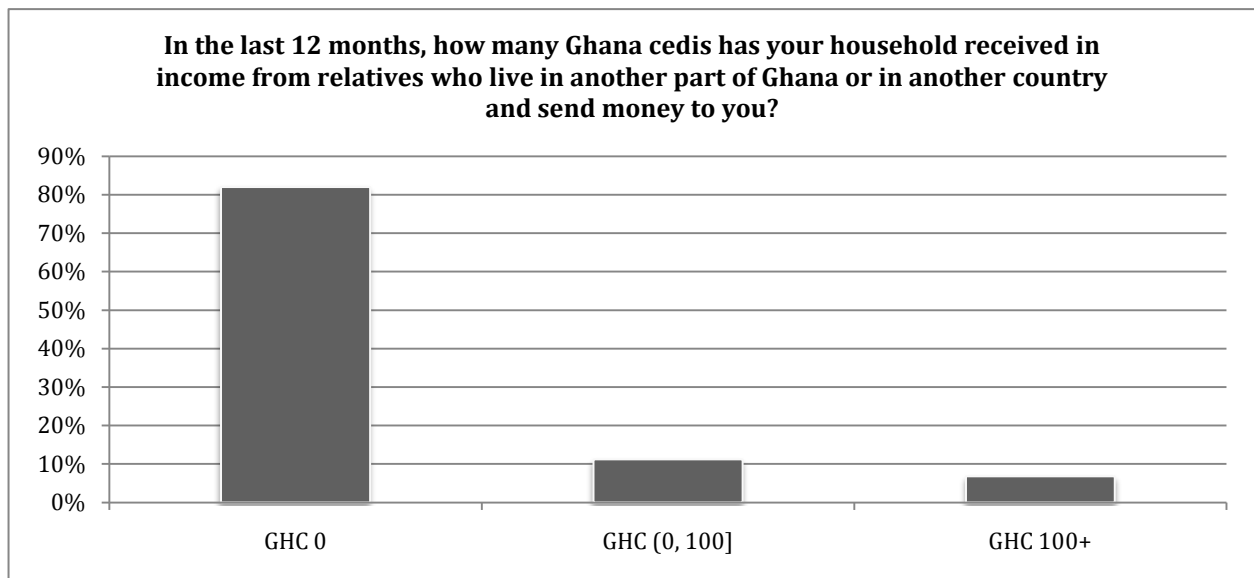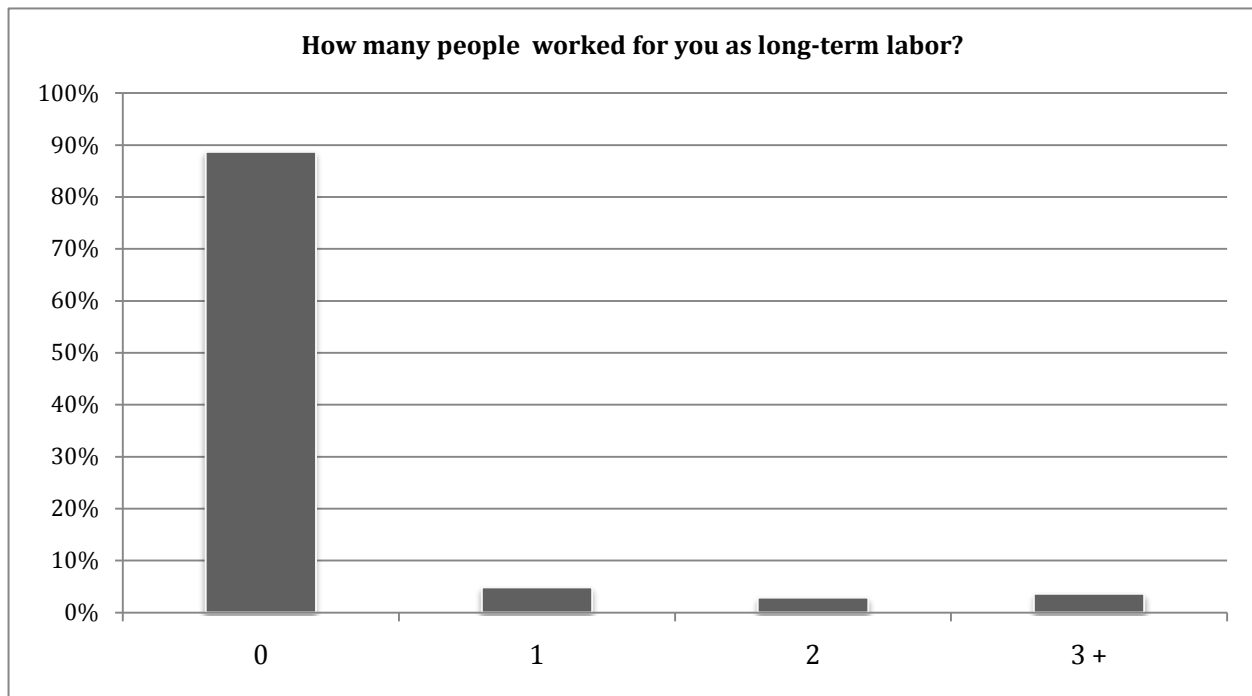
LABOR INPUTS

Around 71% of farmers report that they hired day labor in the past 12 months. The median total day labor cost for the last year was GHC 60. Day labor was mostly hired for weeding and farm maintenance. According to village leaders, a typical male agricultural day laborer receives 4 GHC for a day's work (and this estimate is similar across regions). Approximately 89% of day laborers are from same village and 6% come from outside the village but from the same district.

As can be seen in **Figure 28** below, almost 90% of farmers report that they did not hire any long-term labor for work on the farm. Among the few farmers that did hire long-term workers the average long-term laborer worked for an annual wage of 75 GHC. Some 41% of these long-term laborers were from same village and 40 % were from another region in Ghana.

Figure 28: Long-Term Labor

The next figures report use of exchange laborers. The large majority of farmers (almost 80%) have not used any exchange labor in the past year. The few farmers that did only used them for a few days work, usually between 1-5 days.

NON-LABOR INPUTS

In **Figure 29** we report on the use of non-labor inputs by farmers during the last year. The data again indicate low rates of use of fertilizers and pesticides among the farmers.

Figure 29: Use of Non-Labor Inputs
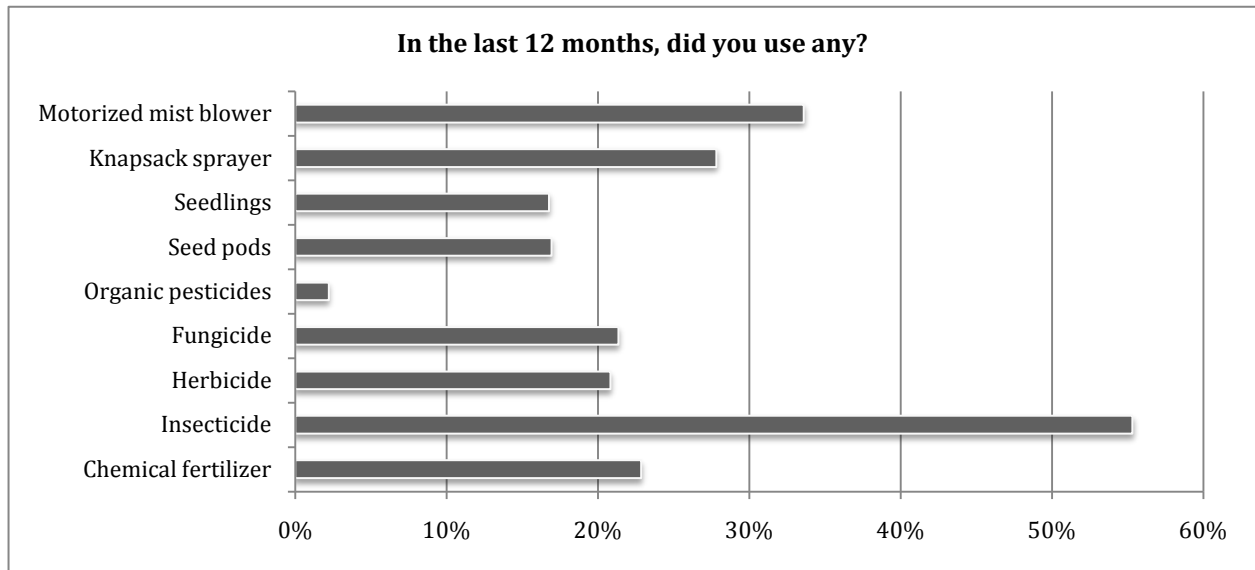
Of the farmers that report using fertilizer in the last year, 60% used *Cocoa Asaase Wura.* Among farmers who report using insecticide, 60% used *Akate Master* and 25% used *Confidor,* 51% obtained the insecticide from a private seller and 37 % from the government, and around 27% obtained the insecticide for free.

Almost 50% of farmers report no costs for non-labor inputs of the last 12 months. The median annual cost of non-labor inputs among the farmers is 8 GHC.

CONSUMPTION

Most farmers send someone from the household to the market once per week to purchase food and supplies and spend an average of 10 GHC.

Figure 30 below displays the annual short-term expenditures for foods and supplies per household member and compares them to the annual crop income per household member. This comparison suggests that most households spend about as much as they earn from the crop income.

Figure 30: Annual Short-Term Expenditures and Income per Household Member by Region
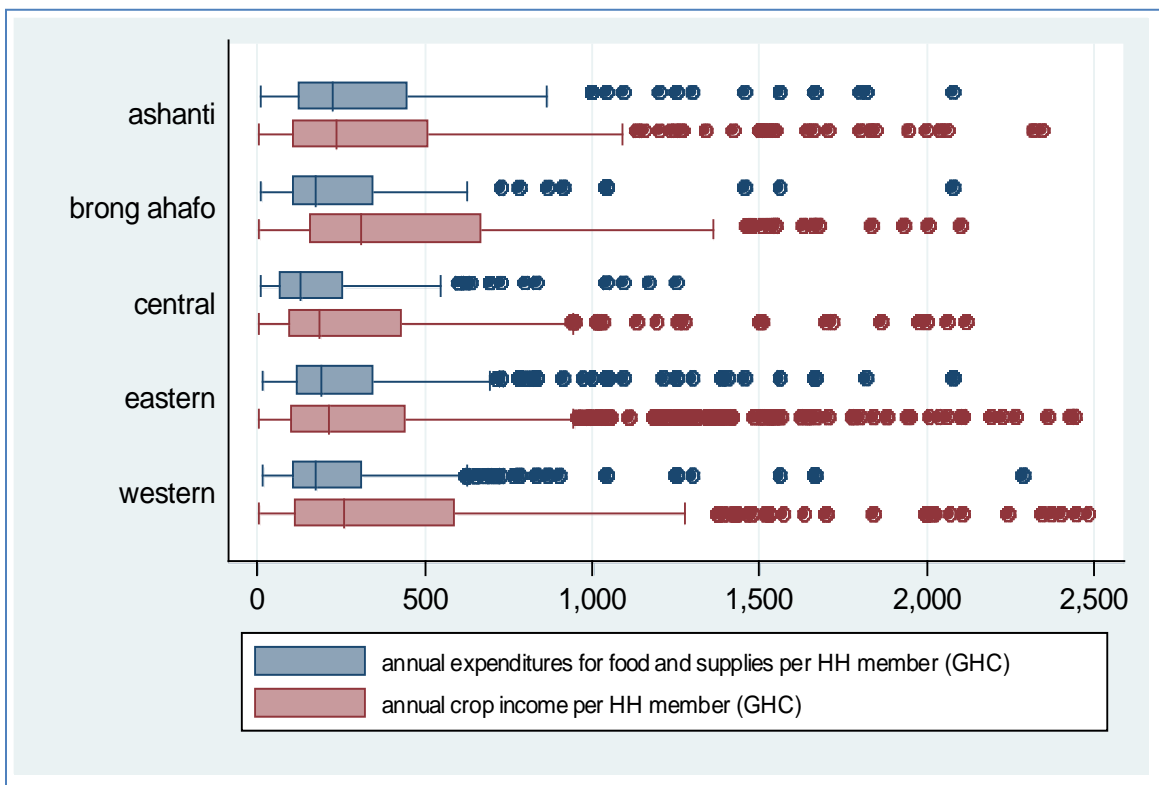
The average household expenditures for long-term items are displayed in **Figure 31** below. Funerals make up the largest fraction of long-term expenditures. The median annual expenditure for funerals is 40 GHC. The median medical expenses are 10 GHC per year.

Figure 31: Annual Long-Term Expenditures per Household by Region

In the last 12 months, how many Ghana cedis did you spend on the following for the household?
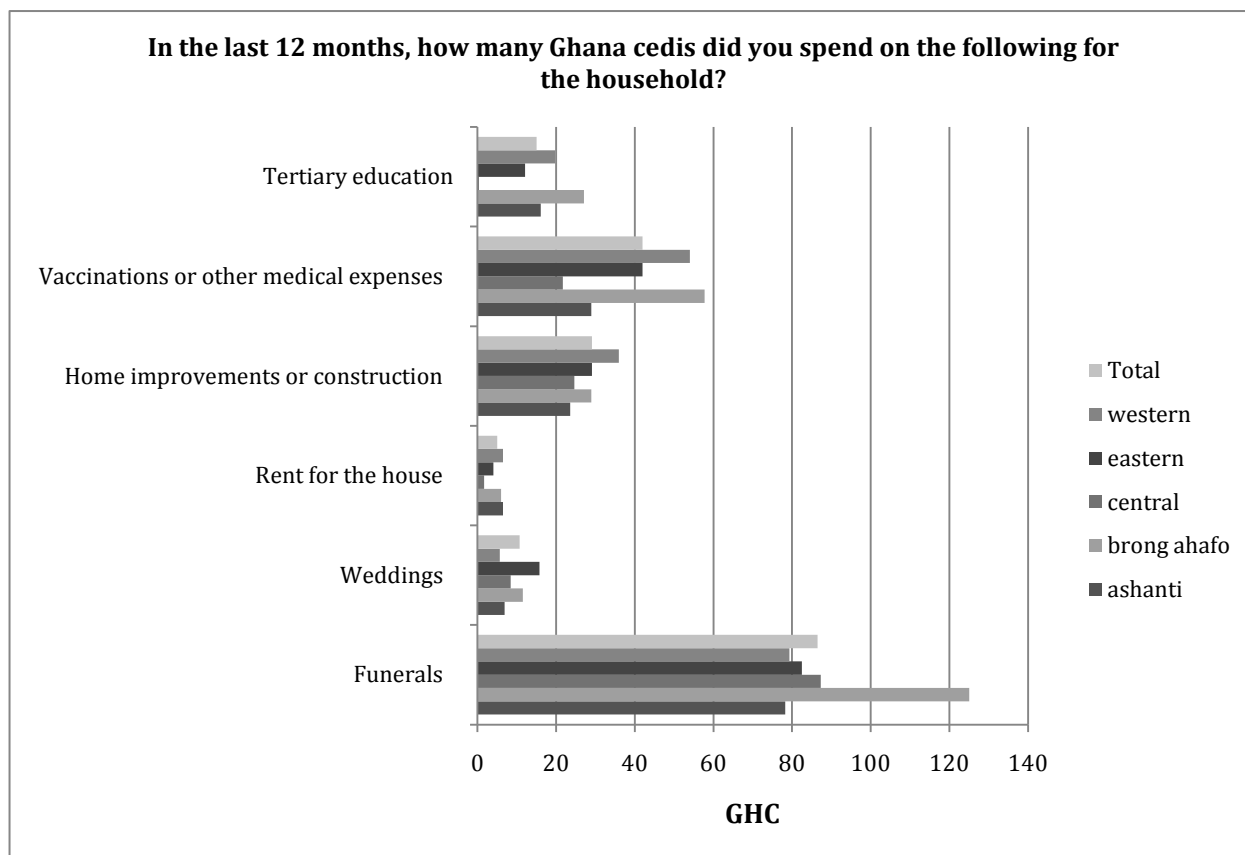
FINANCIALS

Only 31% of farmers report having a bank account; 11 % report having a Susu account. Among these account holders, 19% allow their spouse access to the account. Median total savings are reported at 40 GHC. Around 29 % of farmers report zero savings. Median savings are fairly similar across regions (ranging from 50 GHC in Brong Ahahfo to 20 GHC in the Western region).

About 14% of farmers have received a loan within the past 12 months (ranging from 23% in Brong Ahafo to 11 % in Eastern). Of these loans, 39% were from friends or relatives, 13% were from LBCs, 11% were from a money lender, and 11% were from a rural bank. The median loan size was 200 GHC.

Approximately 20% of farmers report that they tried to get a loan in the last 12 months but were unable to do so. The reported reasons are shown in **Figure 32** below.

Figure 32: Problems Obtaining a Loan

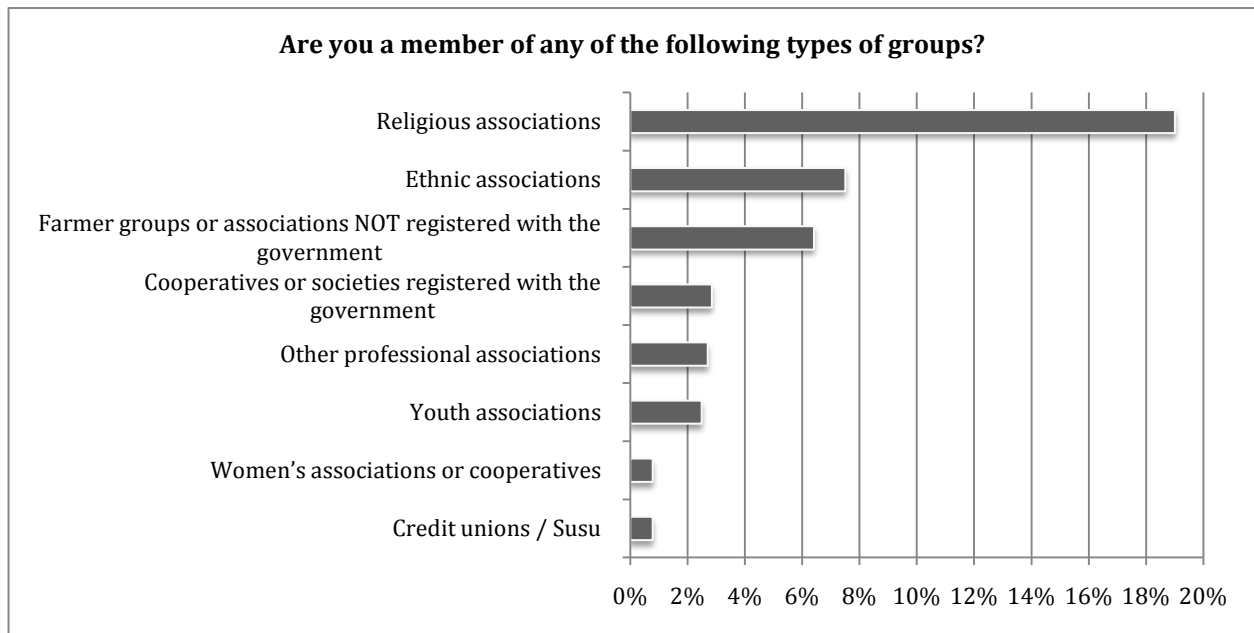**What were the reasons you could not obtain the loan?**

Category	Value
Loan application rejected	~37%
No lenders	~34%
Lack of collateral	~11%
High interest rate	~11%
Another reason	~5%
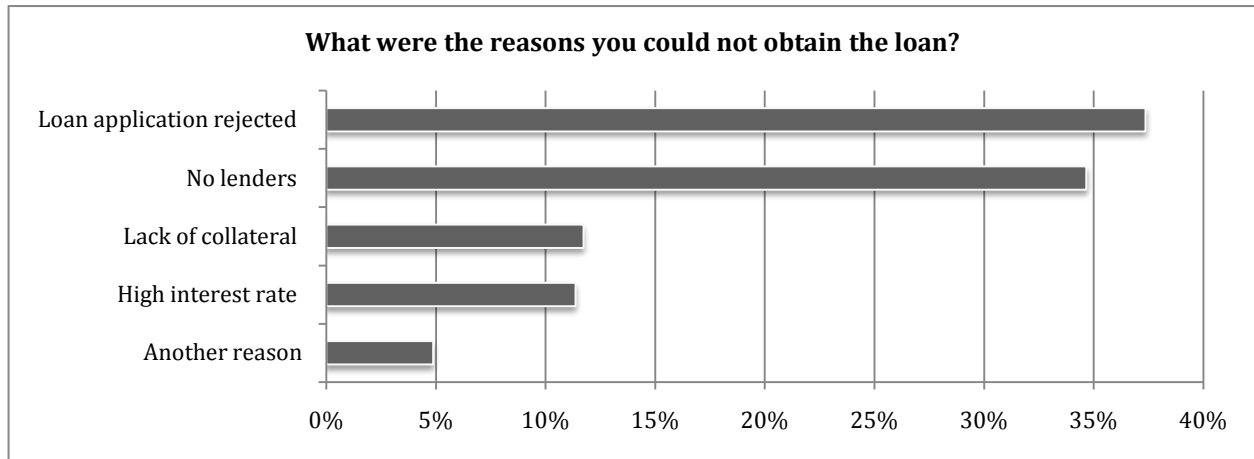
ORGANIZATION

Overall about 38% of farmers report that they are members of an organized group, such as a farmers' group or association, cooperative or society, or some other type of political or religious organization. Among those, the large majority (74%) report being a member of only one such group. **Figure 33** shows the membership by type of group. Membership is concentrated in religious organizations.

Figure 33: Membership by Type of Group

Are you a member of any of the following types of groups?

| Category	Value
Religious associations	~19%
Ethnic associations	~7%
Farmer groups or associations NOT registered with the government	~6%
Cooperatives or societies registered with the government	~3%
Other professional associations	~3%
Youth associations	~2.5%
Women's associations or cooperatives	~1%
Credit unions / Susu	~1%

Overall, only 260 farmers report being members of a farmer organization or a cooperative, suggesting that there is a large potential for further organizational development. For the 260 farmers that report being members of a farmer organization, on average the organization held meetings 6 times during the last year and most members attended only one (67%) or two (21%) meetings. In these farmer organizations decisions are made either by a vote of all members (in 54% of cases), an elected leader (35%), or by the village chief (7%). Around 68 % of farmers who are members of a farmer organization paid a membership fee; about 40% of these farmers had seen the annual budget of the organization.

Many village leaders reported that there are farmers' groups in their village. Overall, as shown in **Figure 34**, about 39% of leaders indicated that such groups exist in their village.

Figure 34: Village Leaders Report on Farmers' Groups
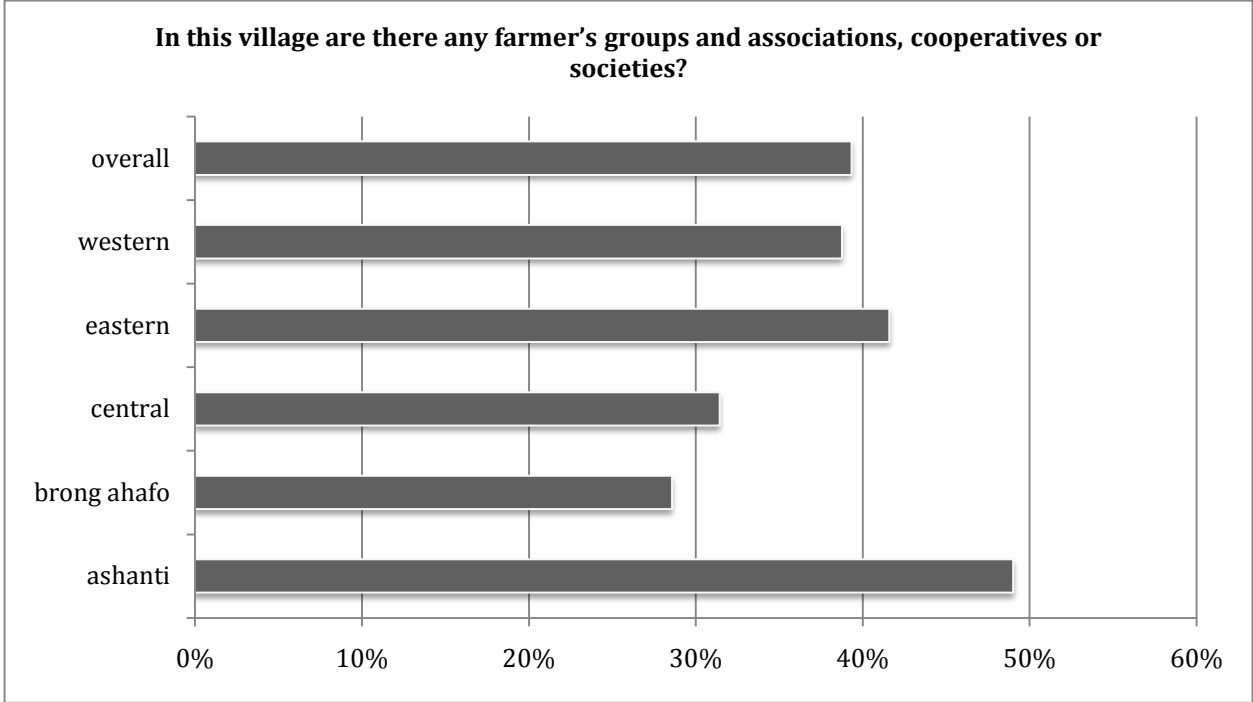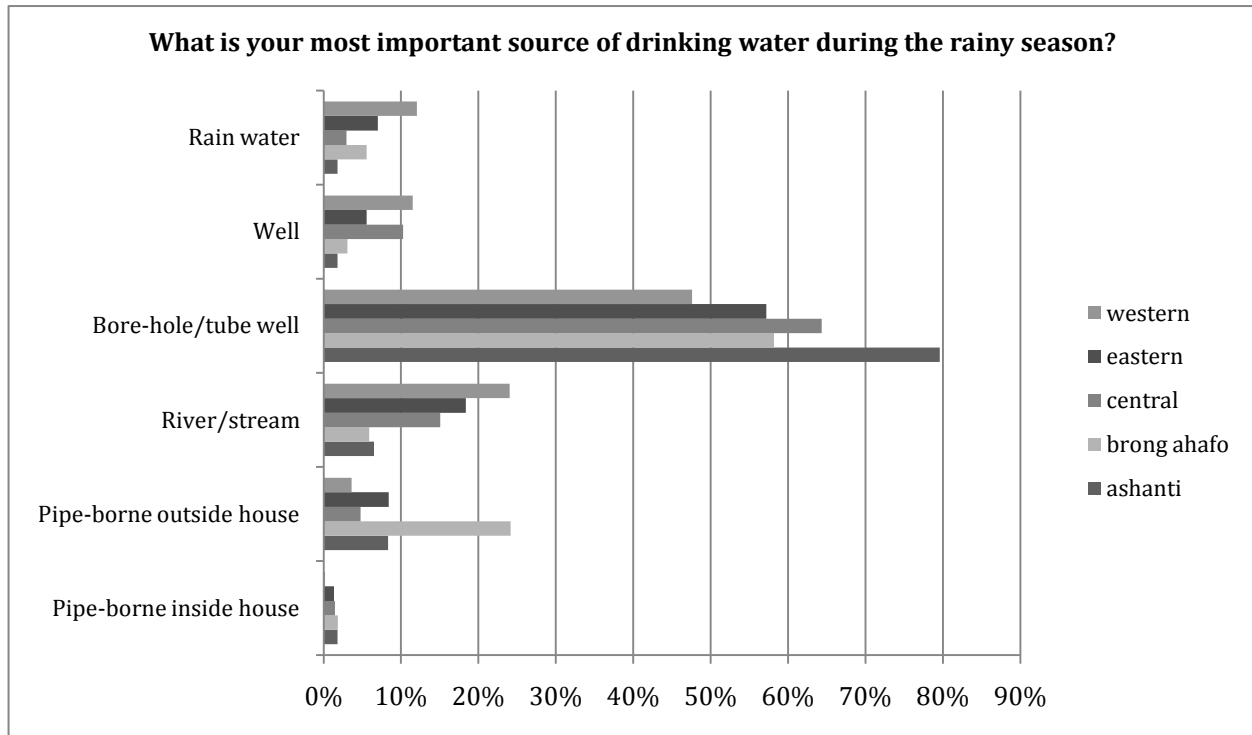

INFRASTRUCTURE

WATER

The most important sources of drinking water by region are shown in **Figure 35**. Most farming households have access to a bore-hole or tube well. However, a sizable proportion of farmers rely on rain water or a river or stream for their drinking water. This fraction is highest in the Western region.

Figure 35: Main Source of Drinking Water

The average walking time to the main water source is between 4-10 minutes (one way) and is similar across the regions. The median household sends one of its members to fetch drinking water from that source 7 times per week. The large majority of households report that drinking water was available throughout the year from their main source. About 55% of households say that they get their water for free. Among the other households the average monthly cost of water is 1.2 GHC for those who use a bore-hole/tube well, 0.2 GHC for those who use a well, and 2.4 GHC for those who use a pipe-borne water source.

We used portable water quality test kits, developed recently by a water specialist at MIT, to gather detailed data on water quality in the surveyed villages. The testing was carried out by the supervisors of each of our survey teams for the most commonly used source of drinking water in each village. The test classified the water quality into four risk levels (from very high risk to low) based on the incidence of *E.coli* in the water sample. As shown in **Table 7** below, we find that water quality at the most widely used source is of grave concern in 26% of the villages overall (with high or very high risk levels). The incidence of high and very high risk water quality varies across regions, ranging from 5% in Brong Ahafo to about 50% in Western region. About 25% of the CCP cohort communities have water quality in the high or very high risk category.

Table 7: Water Quality and Risk Levels

| Region	% drinking water source river/stream	% drinking water bacteria risk level very high or high
Ashanti	6	8%
Brong Ahafo	12	5%
Central	17	23%
Eastern	24	26%
Western	38	50%
CCP First Cohort Communities	18	24%
Total	22	26%

ELECTRICITY

Overall, 72% of farmers report that their household has access to electricity from some source. For those with electricity, the household's primary source of electricity is reported in **Figure 36**. Only 4% of farmers have access to a generator.

Figure 36: Source of Electricity (Households Reporting Access)
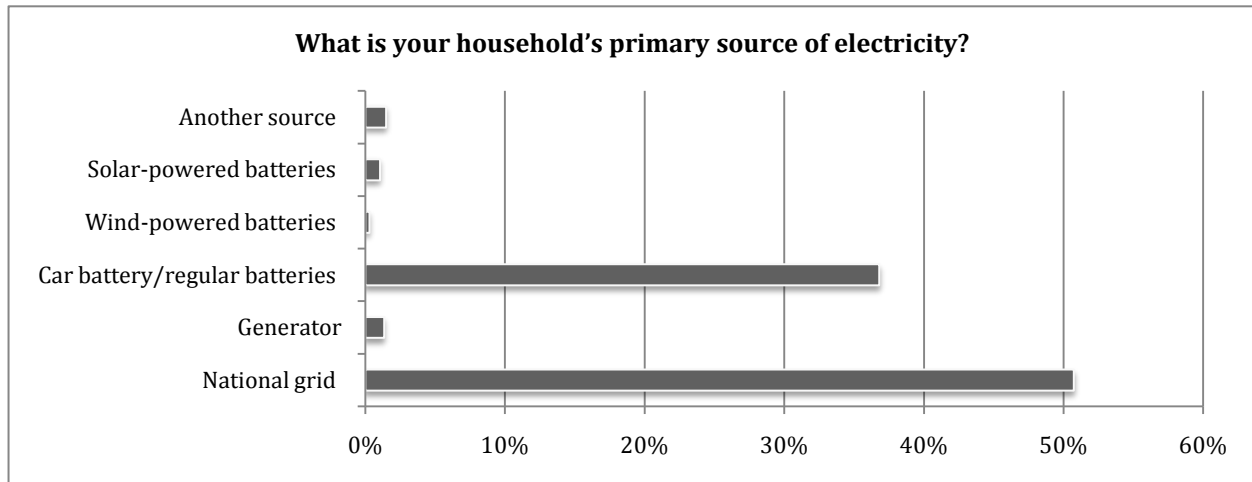
Households with access to the national grid experience frequent outages, as indicated in **Figure 37**. On average the electricity from the national grid is not available for about 28 hours per week.

Figure 37: Power Outages

Average Hours household without electricity from national grid
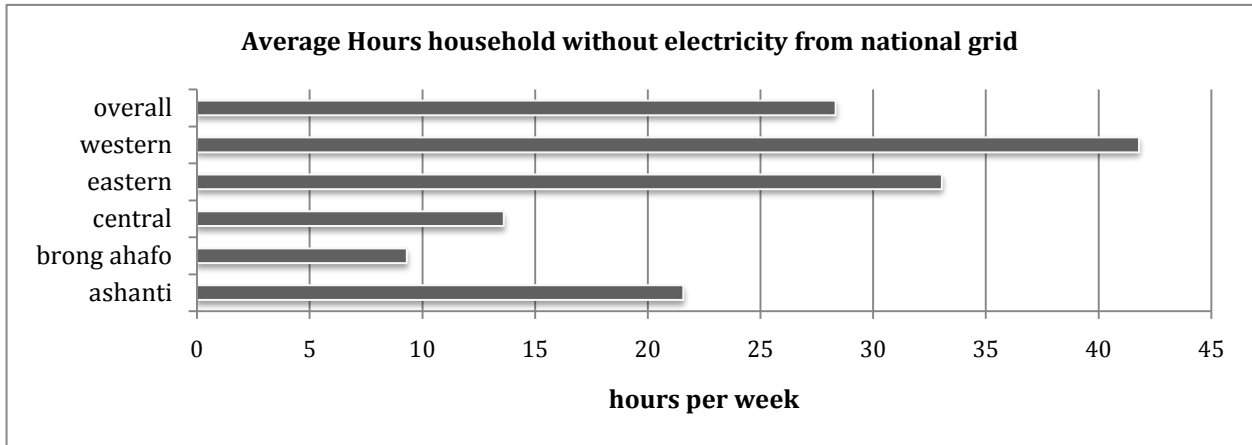
ACCESS

The one-way travel times (in minutes) to the closest financial institution, health facility, market, and primary school are shown in **Figure 38**. While a primary school is usually in the village itself, the median travel time to the closest health facility, market, and financial institution is about 35-60 minutes.

Figure 38: Travel Times
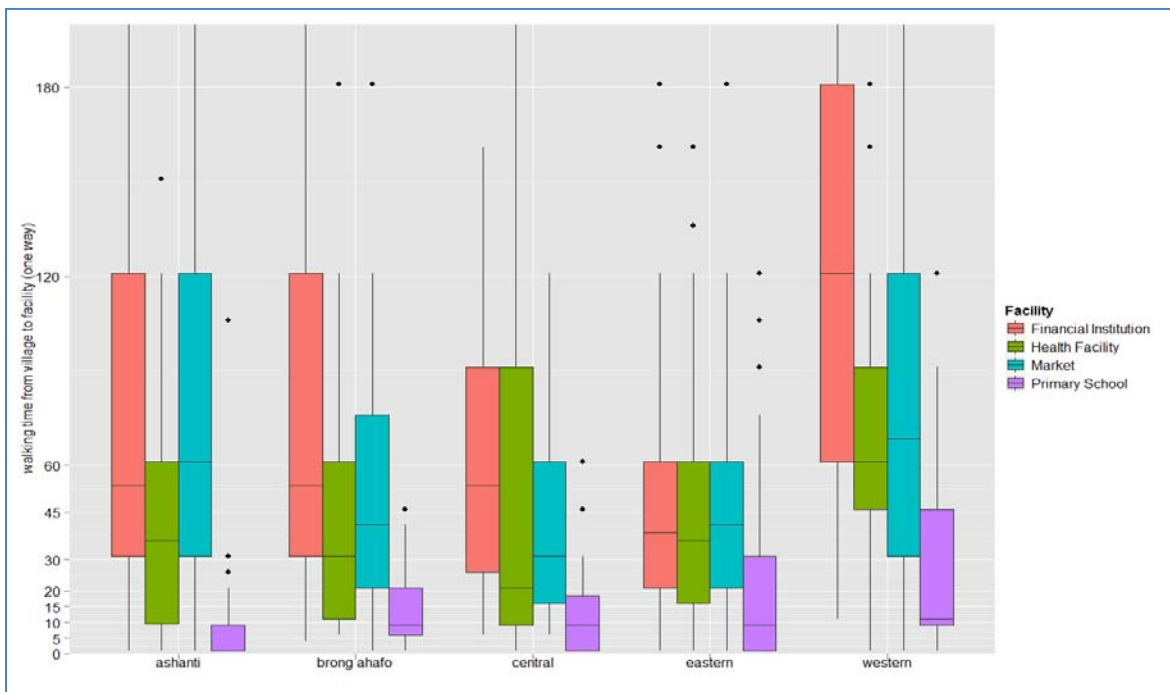
Overall, the villages are quite remote. The median one-way travel time to the nearest neighboring village is about 20 minutes (slightly higher in the Western region). Around 74% of farmers report that they usually walk to the nearest neighboring village, 12% report using the trotro bus, and 8% a taxi.

About 90% of surveyed villages have access to a motorable road (as reported by the village leader and confirmed by village spot surveys). Among the 31 villages without road access, the median time to walk to the nearest motorable road is 45 minutes. Among those villages with access to a motorable road, 47% of leaders say that road is unusable certain times of the year. As shown in **Figure 39,** most access roads are usually unusable during the months of June, July, and August. Most access roads are made of dirt or gravel (see **Figure 40**); only 19% of villages have a paved access road (only 4% in the Western region).
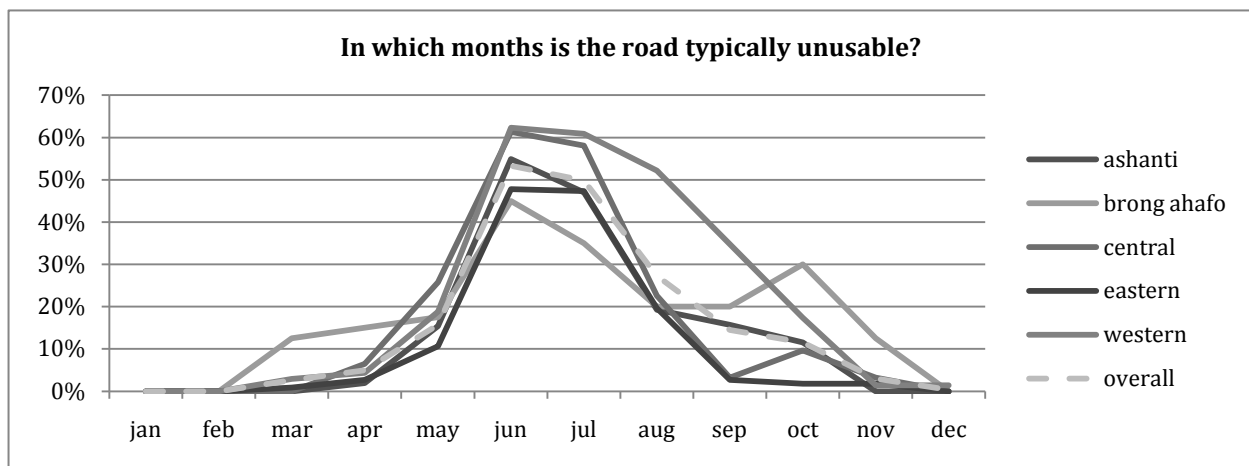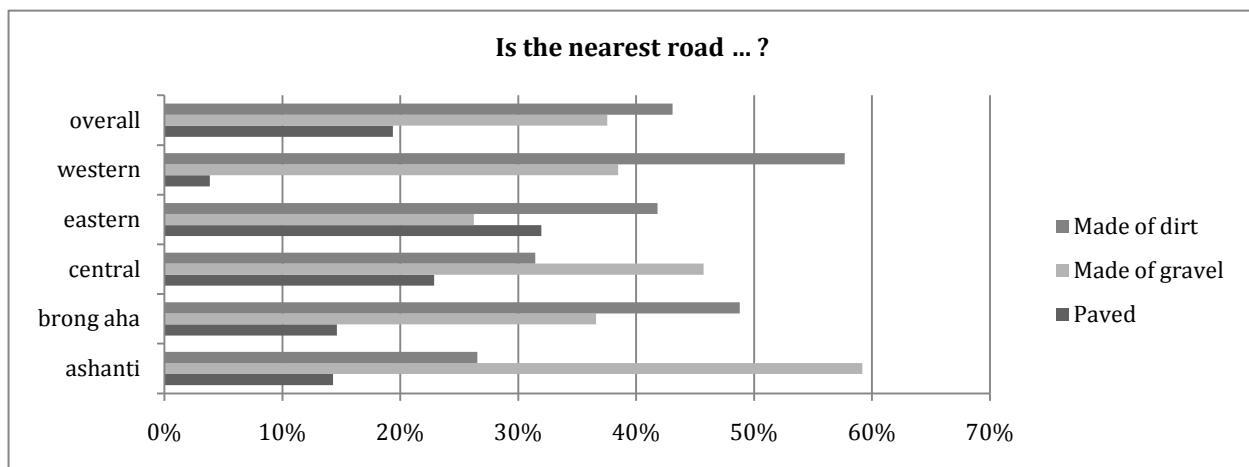
Figure 39: Road Conditions

Figure 40: Road Materials

SANITATION

Basic information about garbage disposal and sanitation in the surveyed communities is reported below in **Figure 41** and **Figure 42**. Farming households mostly dump waste in a public garbage site and almost 60% rely upon an open pit (latrine).
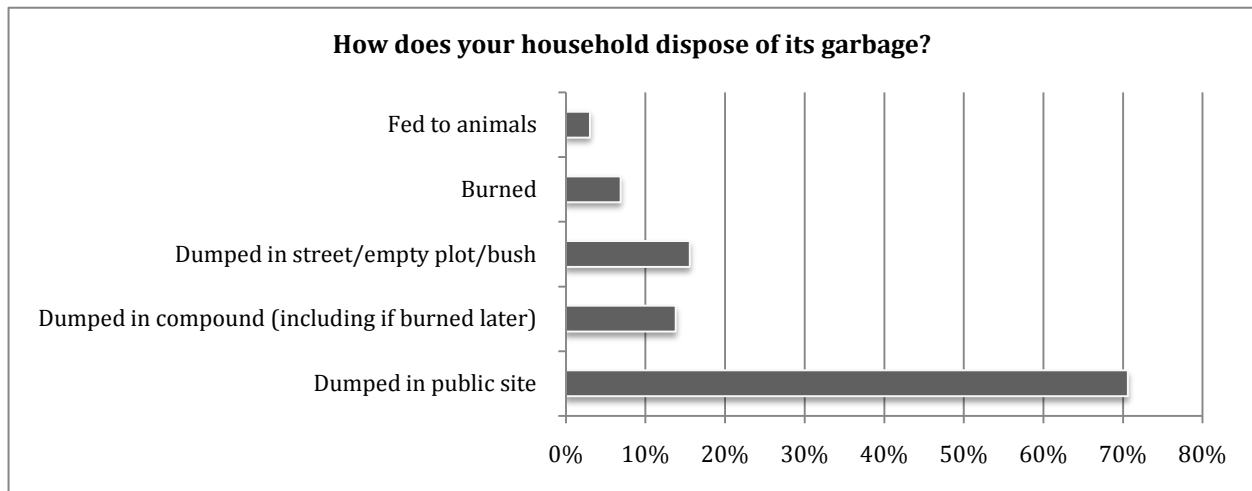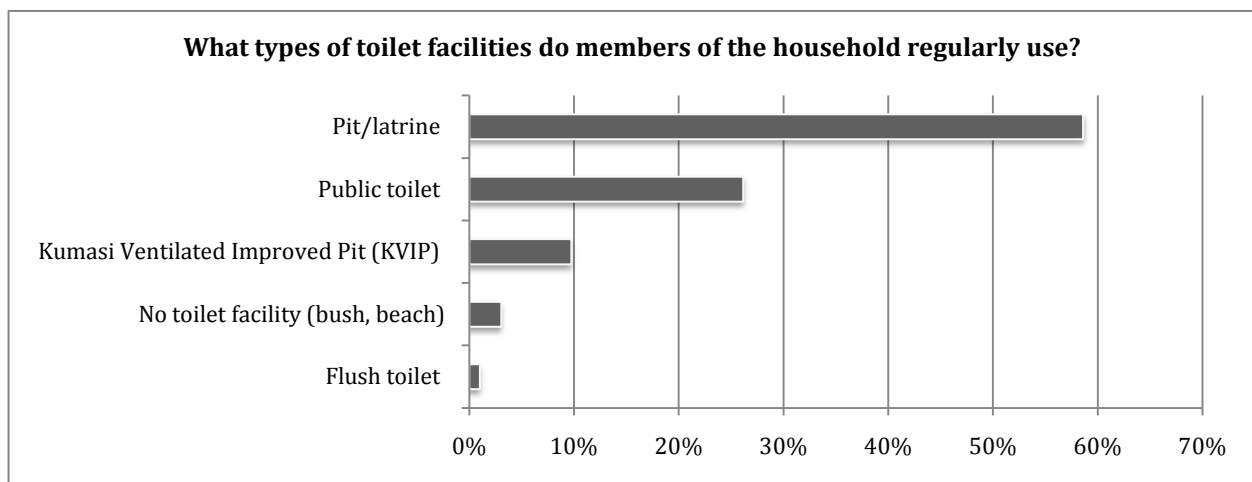
Figure 41: Disposal of Waste

How does your household dispose of its garbage?

Category	
Fed to animals	~2%
Burned	~6%
Dumped in street/empty plot/bush	~15%
Dumped in compound (including if burned later)	~13%
Dumped in public site	~71%

Figure 42: Toilet Facilities

What types of toilet facilities do members of the household regularly use?

Category	
Pit/latrine	~58%
Public toilet	~26%
Kumasi Ventilated Improved Pit (KVIP)	~10%
No toilet facility (bush, beach)	~3%
Flush toilet	~1%

MATERIALS

Basic statistics about the materials used for the roofs and floors of farmers' homes are reported below in **Figure 43.**
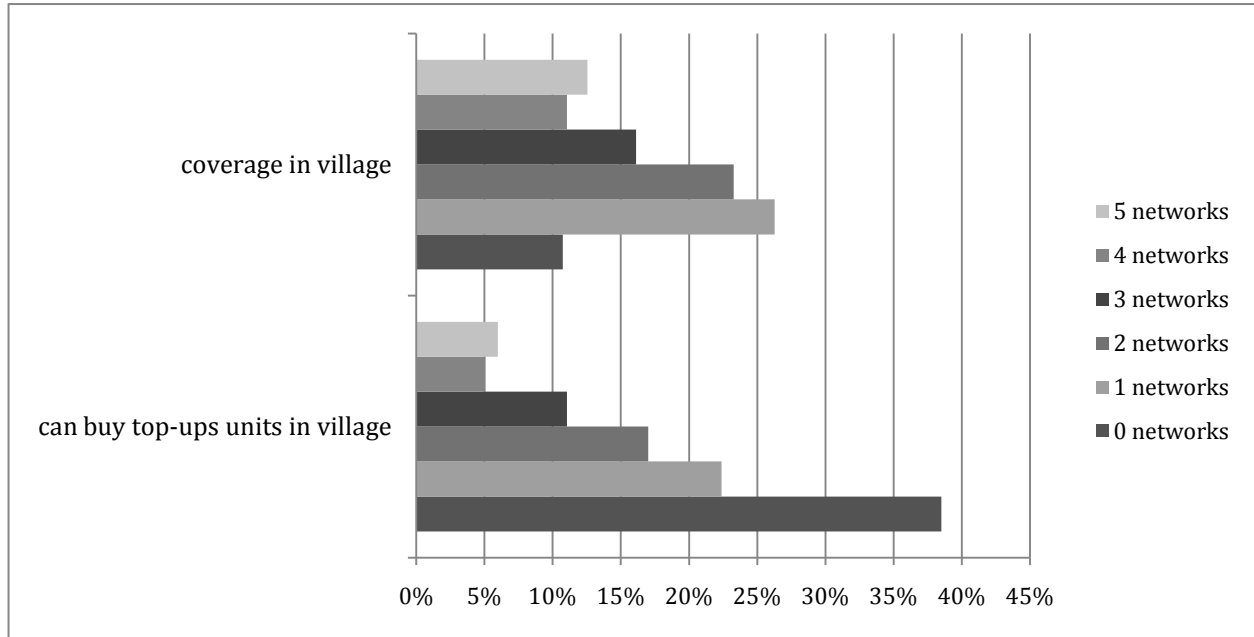
Figure 43: Housing Materials
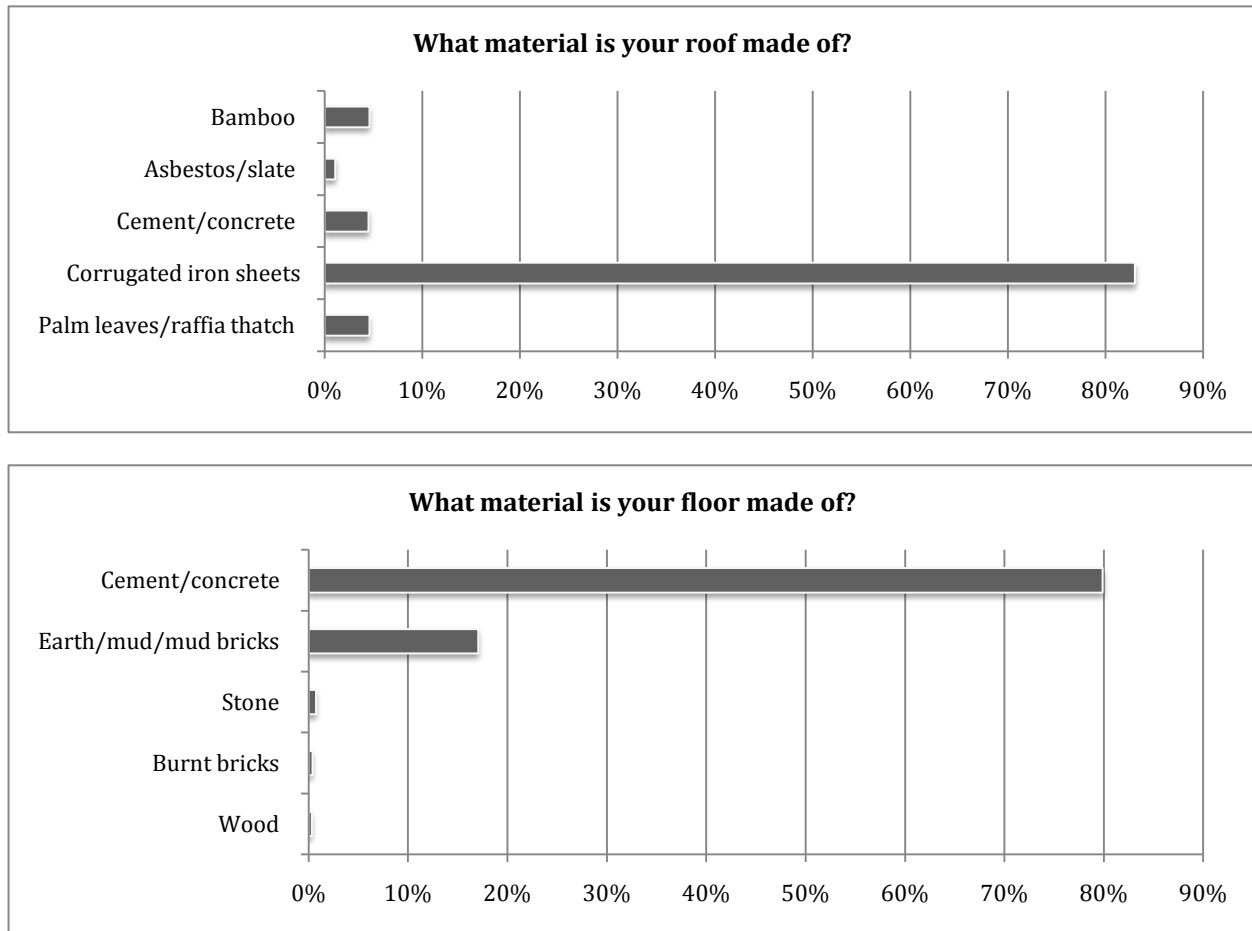

MOBILE NETWORKS AND RADIO

Most villages have access to several mobile networks, but top-up units are only available in about 38% of the villages (see **Figure 44**).

Figure 44: Mobile Networks

We conducted a survey of available radio stations in every village. The results are shown in **Figure 45** below. Most villages can receive between 4-10 different FM stations.

Figure 45: Radio Stations
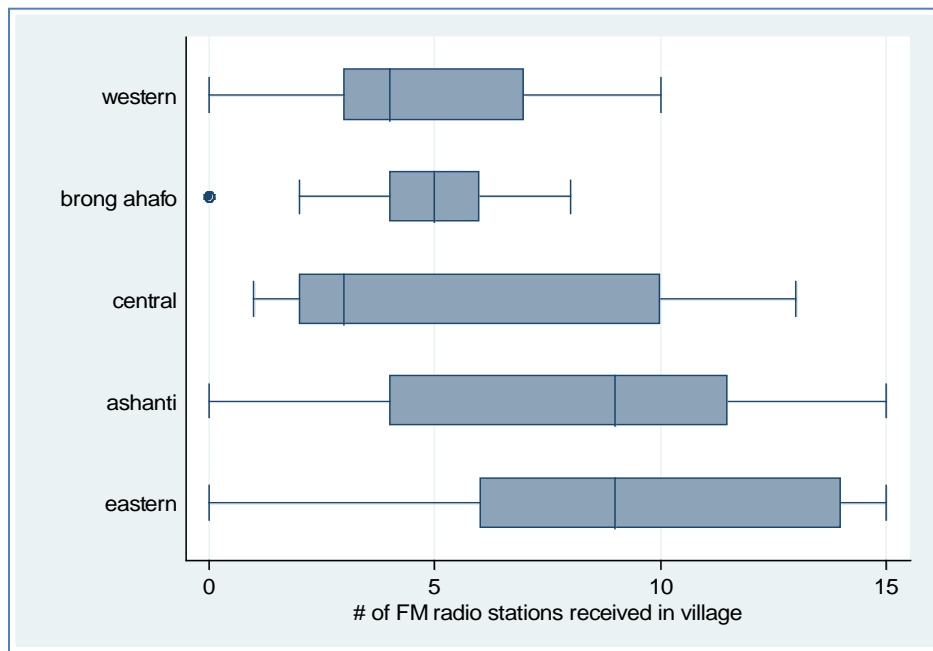
Radio also is by far the most common source of news for village leaders, as can be seen in **Figure 46**. Over 95% of village leaders report having used the radio for news in the last four weeks. Among farmers, 100% report that their main source of information for news is the radio.

Figure 46: News Sources for Village Leaders

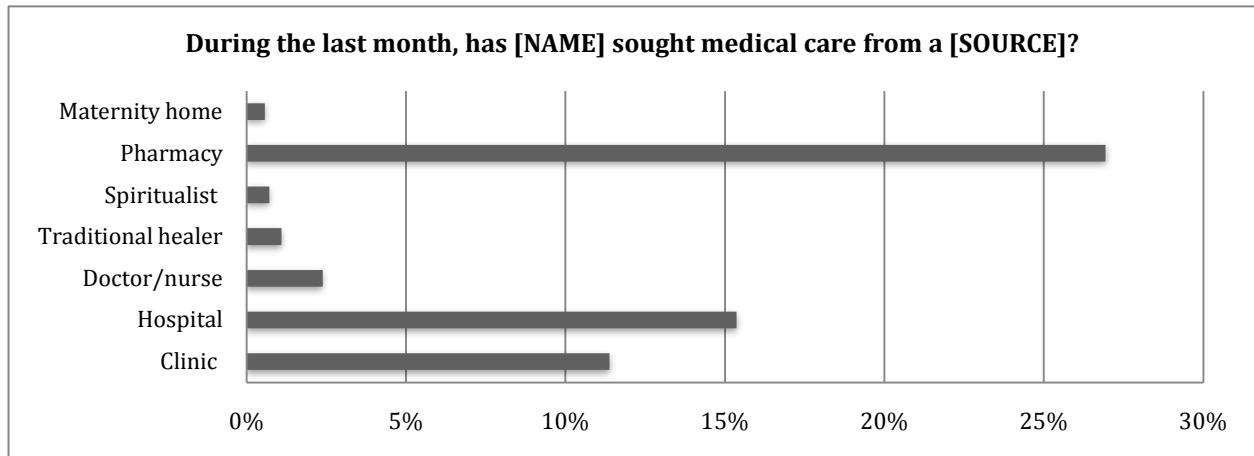**In the past 4 weeks, have you used [SOURCE] for news?**
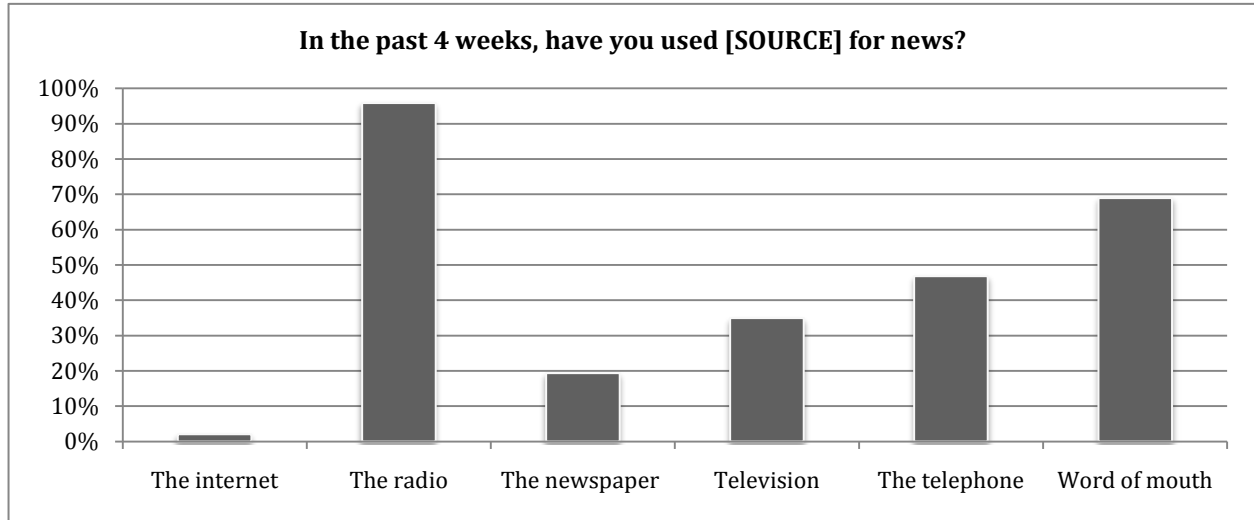
HEALTH

CARE UTILIZATION AND INSURANCE

**Figure 47** below shows the reported utilization of different medical care options.

Figure 47: Use of Alternative Types of Medical Care

During the last month, has [NAME] sought medical care from a [SOURCE]?

About half of the surveyed farmers (see **Figure 48**) report that they are covered by the National Health Insurance scheme.

**Figure 48: Health Insurance**

% covered by the National Health Insurance Scheme
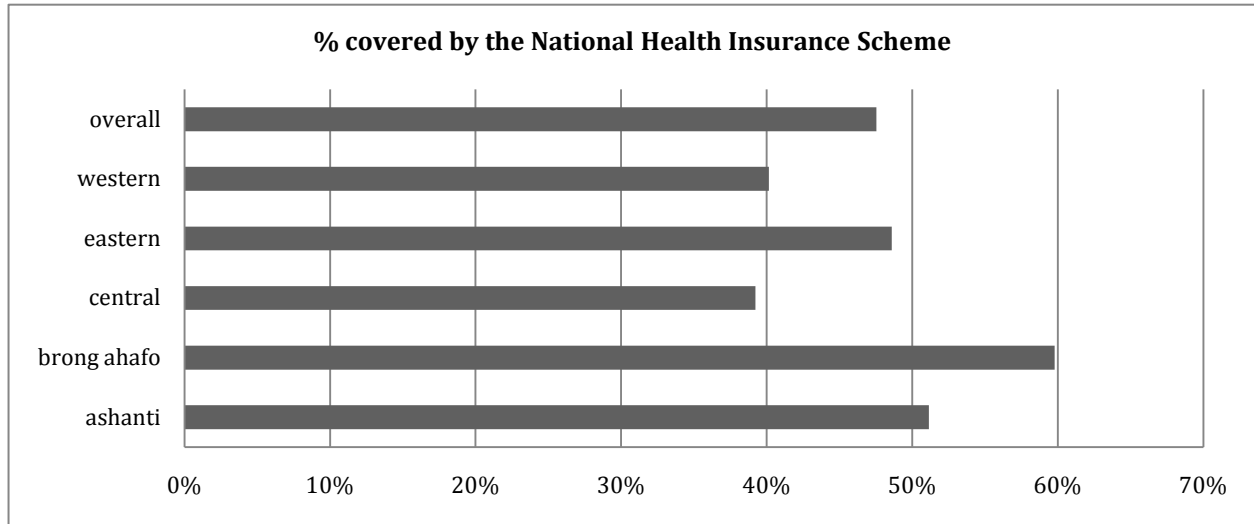
VACCINATION RATES

In **Figure 49** we report the percent of household members who have received the two basic vaccinations against common infectious diseases: one for measles, and the other for diphtheria, pertussis (whopping cough) and tetanus. Around 65-70% percent of household members have been vaccinated.

Figure 49: Rates of Vaccination for Measles, Diphtheria, Pertussis, and Tetanus

Percent vaccinated
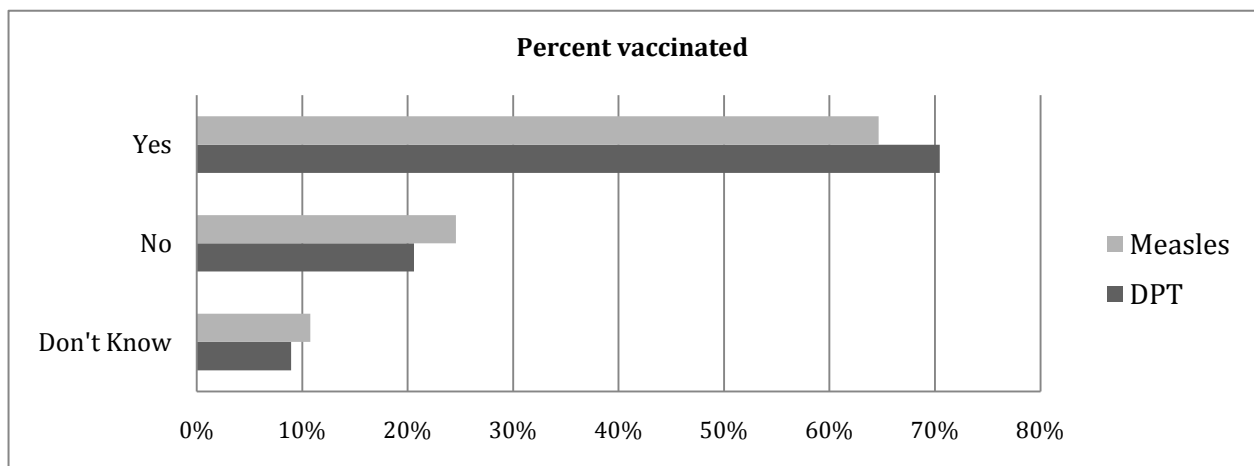
CHILDREN WEIGHT AND HEIGHT

We measured the height and weight for all children below 5 years of age in the households we surveyed. The estimates of the Body Mass Index (BMI) derived from this data are displayed in the **Figure 50** below. The BMI is calculated as body weight divided by the square of height. For children, these values are compared with typical values for other children of the same age in healthy populations. A BMI score that is less than the 5th percentile of such a population is considered underweight. Plotting percentiles of distribution of BMI scores for children in farming households at each age, we can see that most of the children at each age have scores of around 16 or below. The 50th percentile is slightly below 50th percentile in the World Health Organization's standard chart (approximately 17 for children up to 24 months). Both the 10th and 5th percentiles among the Ghanaian children are below 5th percentile defined in the WHO standard (approximately 14), indicating that a disproportionate fraction of children are underweight.

Figure 50: Body Mass Index for Children Under 5 Years
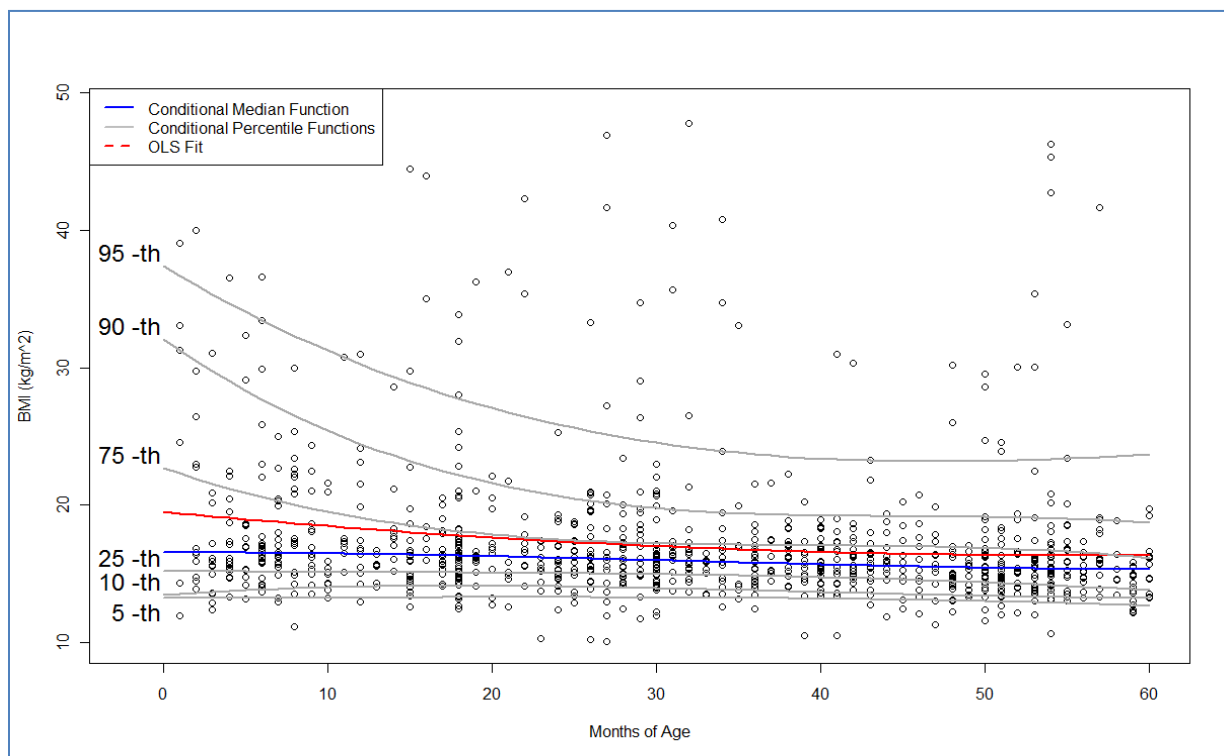
MATERNAL HEALTH

Around 59% of farmers reported a pregnancy in the household in the last 10 years. During the most recent pregnancy the mother received prenatal care in 98% of cases. Some 54% of births took place in a public hospital or clinic and 31% of births were delivered at home. In 54% of cases a nurse or midwife

assisted with the delivery; in 22% of cases a traditional birth attendant was present, and 10% of the time a relative or friend provided care.

MALARIA

Approximately 83% of farmers report that they are doing something to prevent malaria in their household. The specific types of anti-malaria measures taken are described in **Figure 51** below. About 54% of farmers report that they use mosquito bed nets.
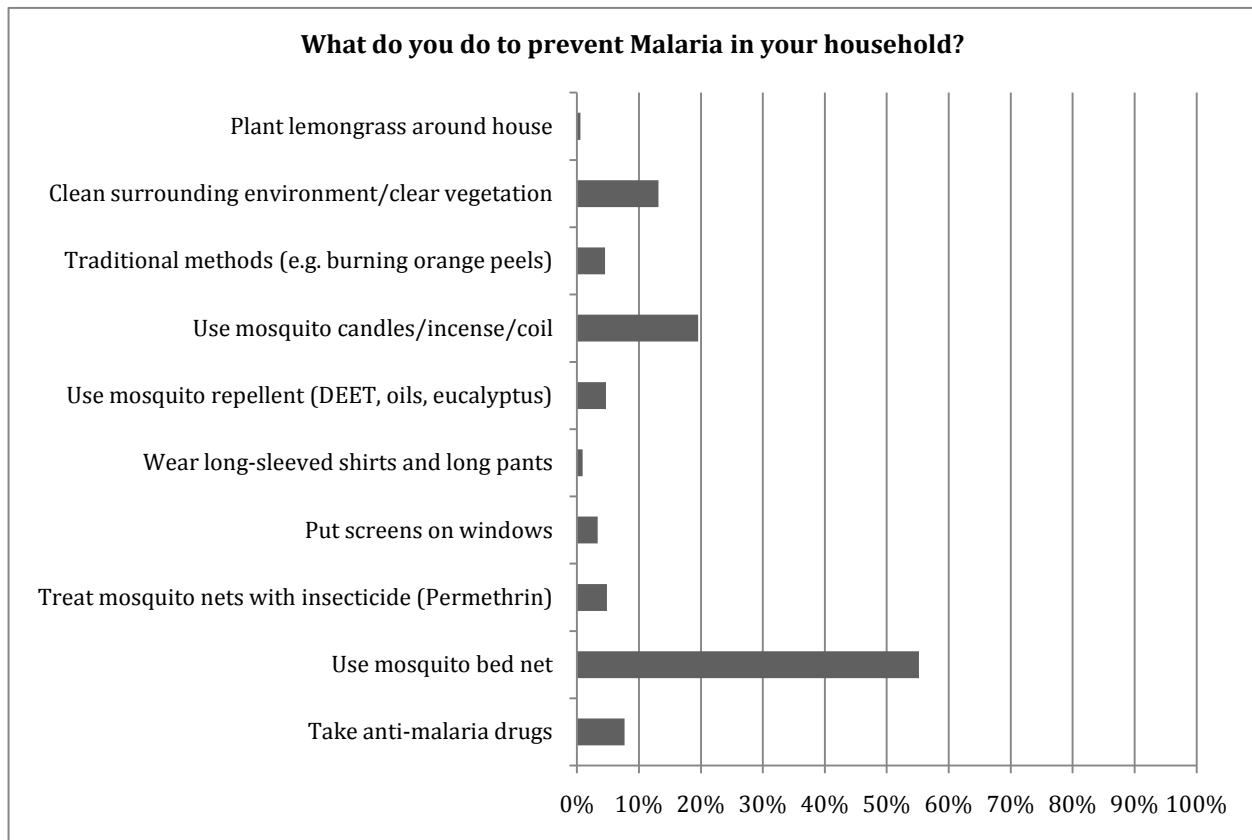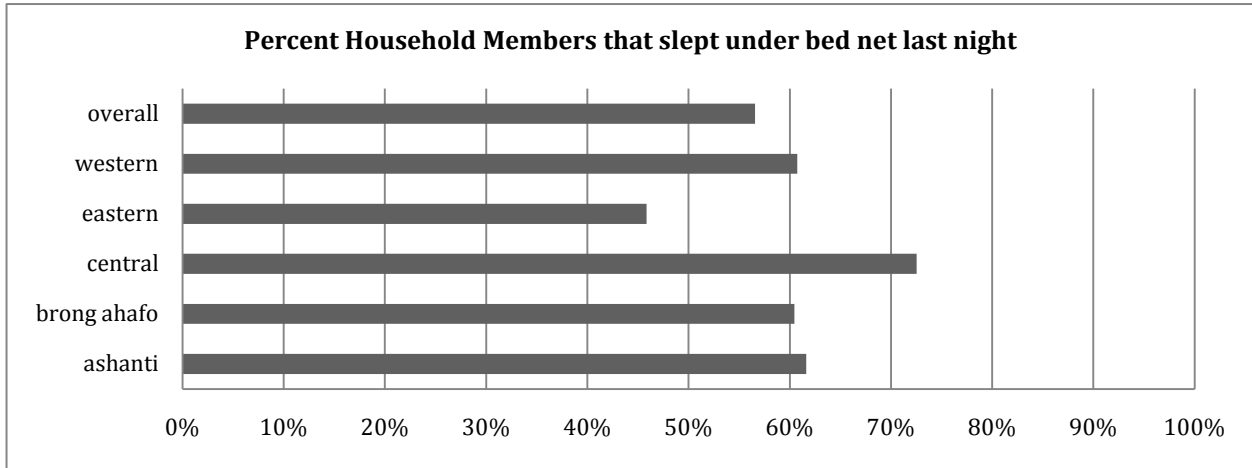
Figure 51: Anti-Malaria Measures

What do you do to prevent Malaria in your household?

Figure 52 shows the reported percentage of household members that slept under a bed net the night before the interview was conducted.
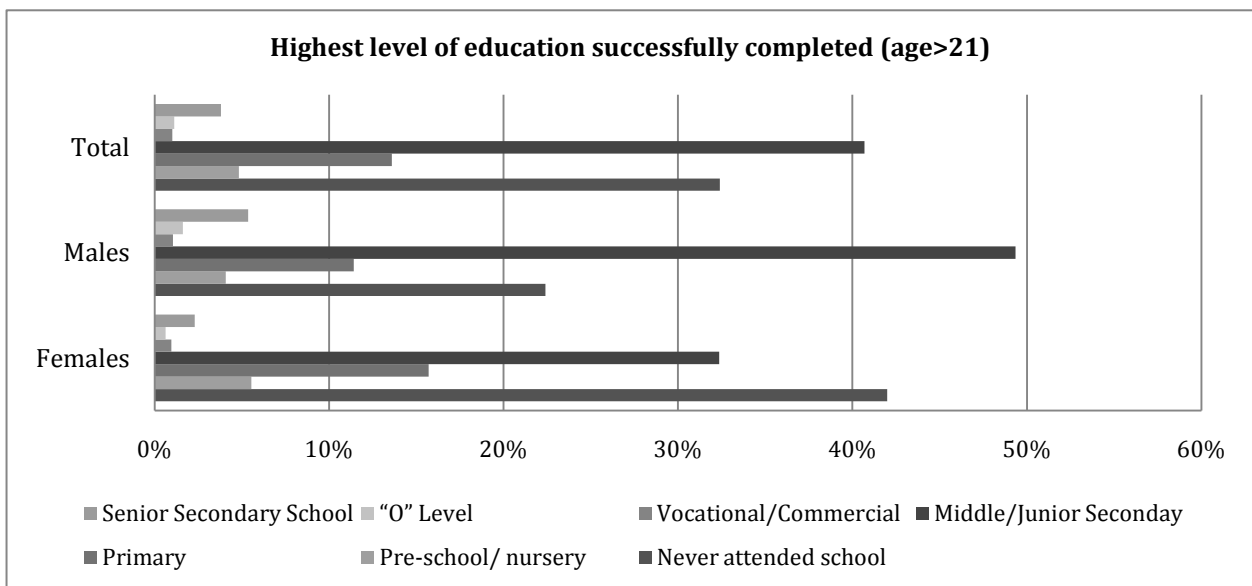
Figure 52: Use of Bed Nets

Percent Household Members that slept under bed net last night

EDUCATION

LEVELS OF EDUCATIONAL ATTAINMENT

The education attainment levels for household members that are above 21 years of age at the time of the survey are described in **Figure 53**. About 33% of household members have never attended school. About 40% completed Middle or Junior Secondary school. The average number of years of schooling is 2.5 for females, 3.6 for males, and 3 years overall.

**Figure 53: Education Attained**

Highest level of education successfully completed (age>21)

■ Senior Secondary School ■ "O" Level ■ Vocational/Commercial ■ Middle/Junior Seconday
■ Primary ■ Pre-school/ nursery ■ Never attended school

SCHOOL ENROLLMENTS

Figure 54 reports the enrollment rates for those household members that are aged 5-21. About 80% are enrolled and this is very consistent across all regions.

Figure 54: Enrollment Rates

Percent Currently Enrolled in School (aged 5-21)
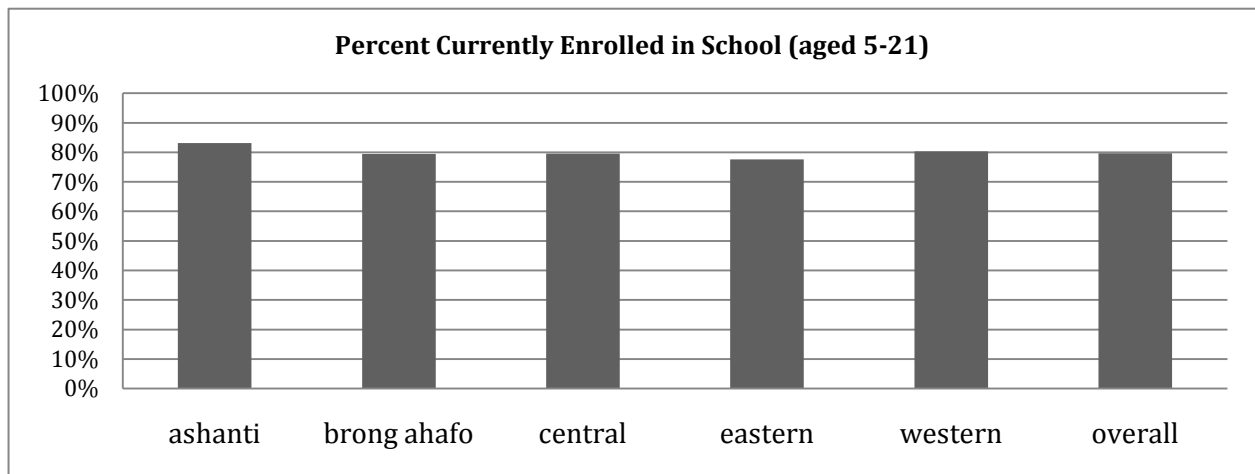
When asked for the reasons of why children in the household are not enrolled in school, most heads of household say that the children have already completed school or are learning a job (see **Figure 55**).
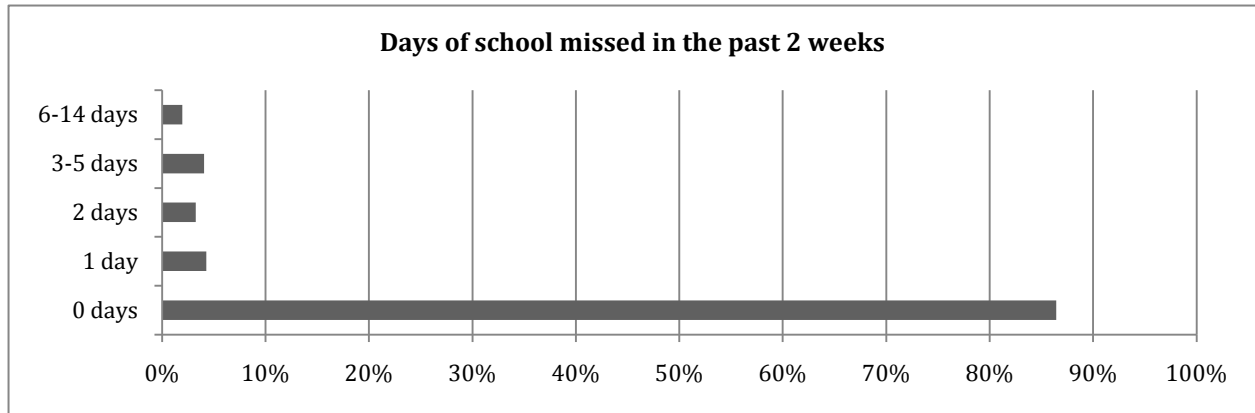
Figure 55: Reasons for Non-Enrollment

Why is child not enrolled in school?
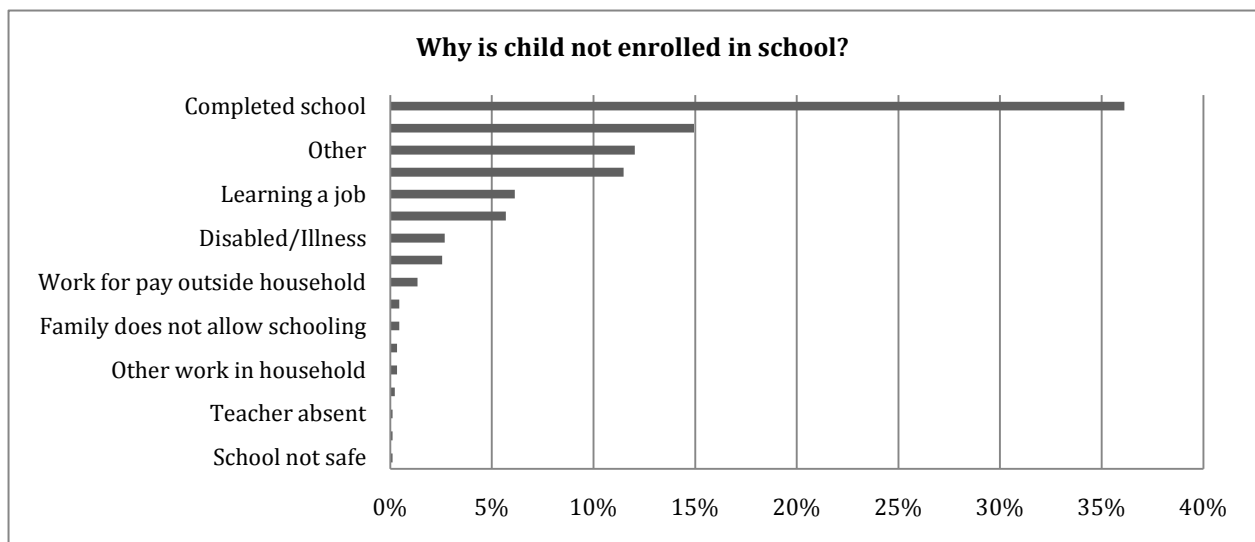
ATTENDANCE

Household heads report that about 86% of children enrolled in school did not miss a single day of the school in the past 2 weeks: see **Figure 56** below.
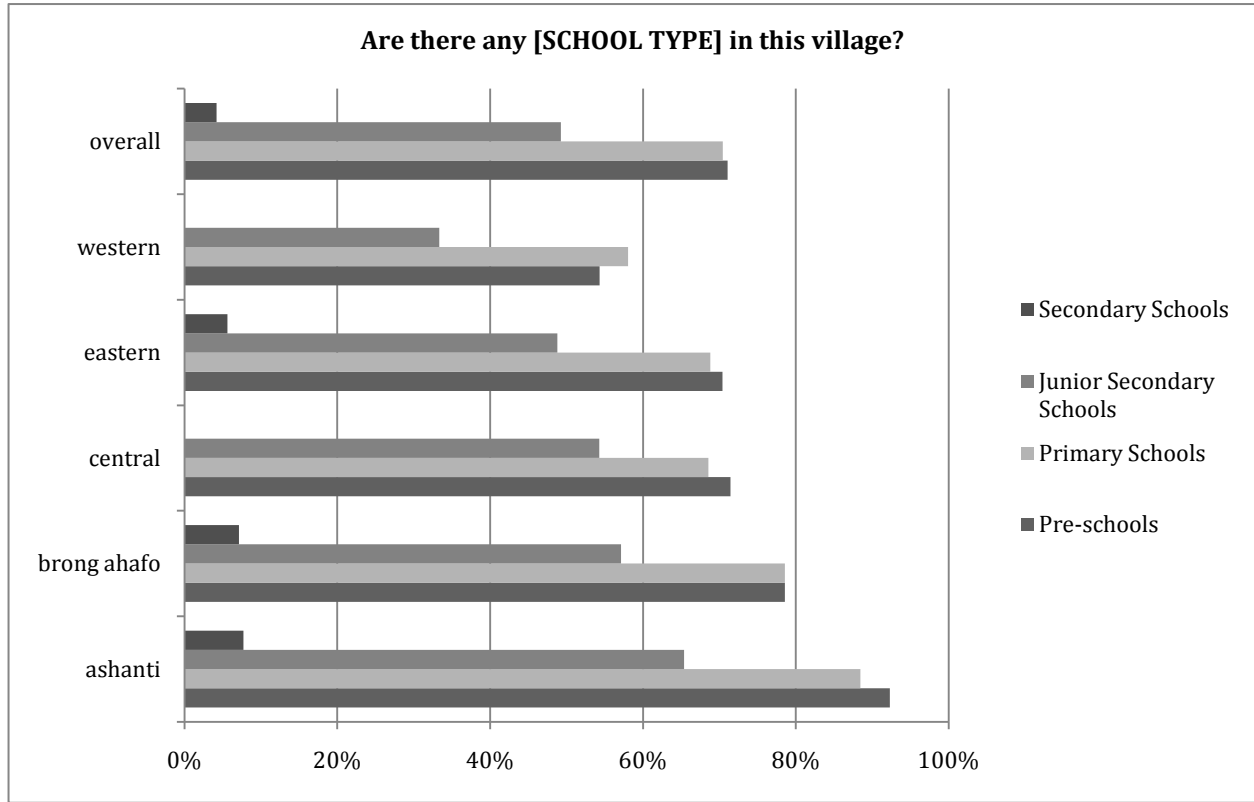
Figure 56: Missed School Days

Days of school missed in the past 2 weeks
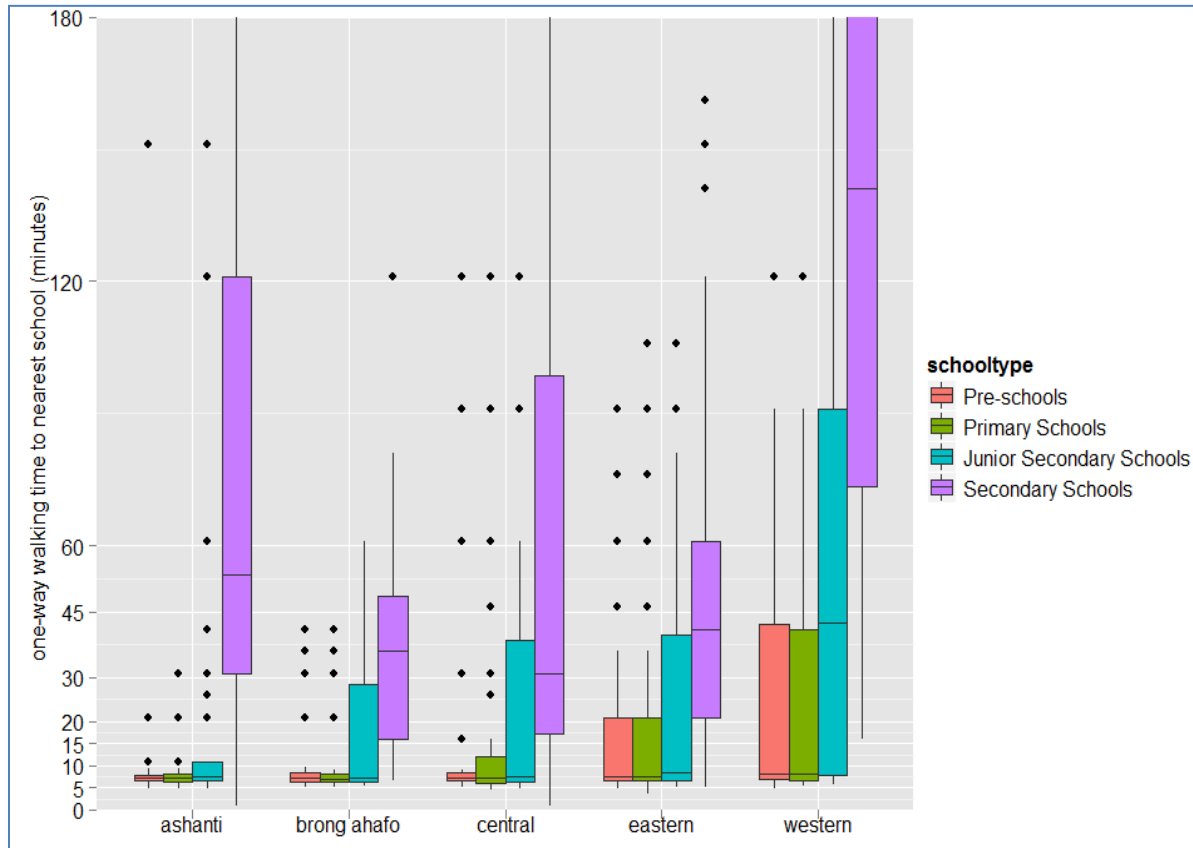
SCHOOLS

Figure 57 below shows the types of schools located in the surveyed villages. Overall about 70% of villages have a primary school in the vicinity. Almost none of the surveyed villages have a local secondary school.

Figure 57: Schools Located in Villages

The travel times to the closest schools are displayed in **Figure 58**. While primary schools are within a close distance of almost all villages, the closest secondary school is far away. About 91% of children enrolled in school walk to their school, 4% take a bus, 3% travel by a car, taxi, or motorcycle, and 0.3% bicycle. About 10 % of households report that their children attend a boarding school.

Figure 58: Travel to School

In addition to the village leader and household survey, we also conducted a survey of the headmaster of the school in most of the surveyed villages (in 276 overall). This school survey also included a spot survey to assess the conditions at the school. Most of the surveyed schools were government run, mixed gender, primary schools.

Figure 59 below, reports data on the student-to-teacher ratios in these surveyed schools by region (as reported by the headmasters) along with data on the number of students per room. Overall most schools have one teacher for every 30-40 students, and most classrooms have 40-50 students.

Figure 59: Conditions in Schools by Region

Student Teacher Ratio by Region

Students Per Room by Region
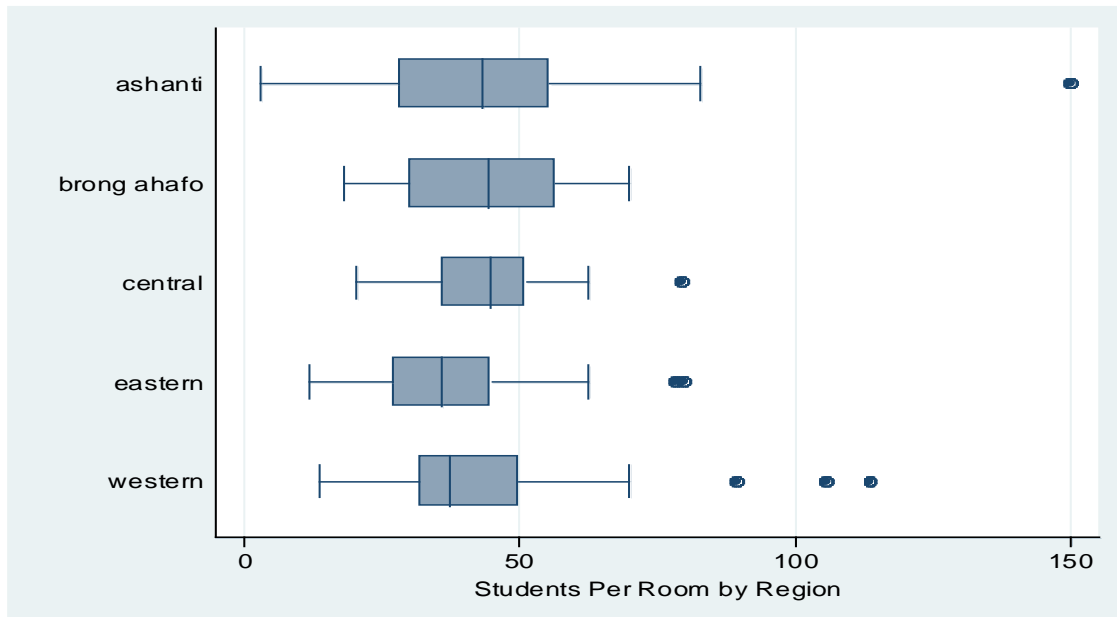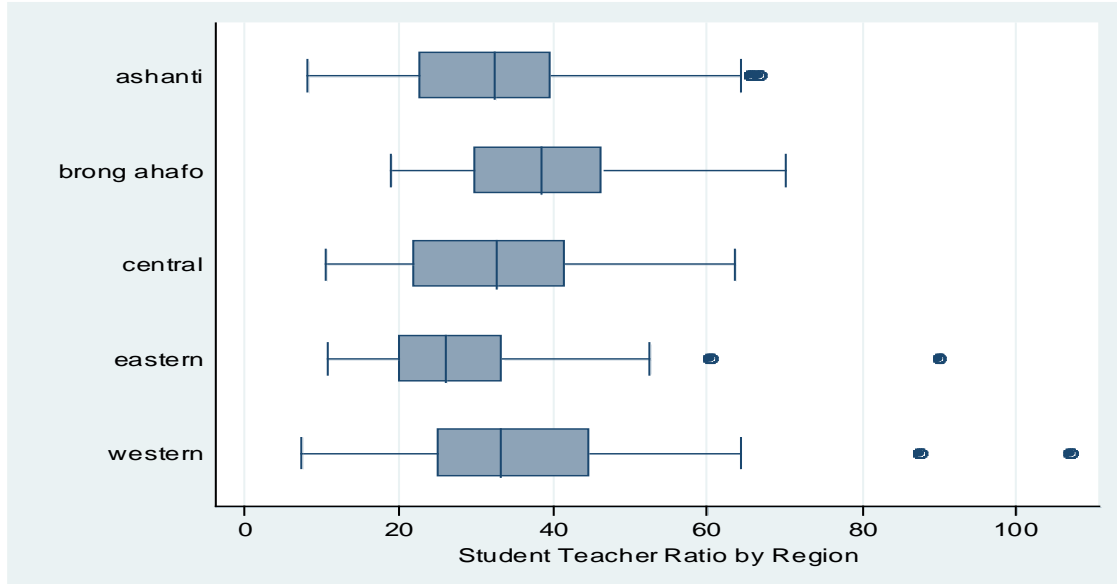
ABSENTEESIM

We asked the headmasters at the schools what share of enrolled students, if any, miss school on a typical day. The reported absenteeism rates are displayed in the **Figure 60** below. Overall, the median absenteeism rate is around 18%. To obtain a second measure of absenteeism, we also asked a teacher at each school to report how many students should have attended his or her class that day and how many students were actually in attendance: the results were very similar.

Figure 60: Absenteeism as Estimated by Headmasters
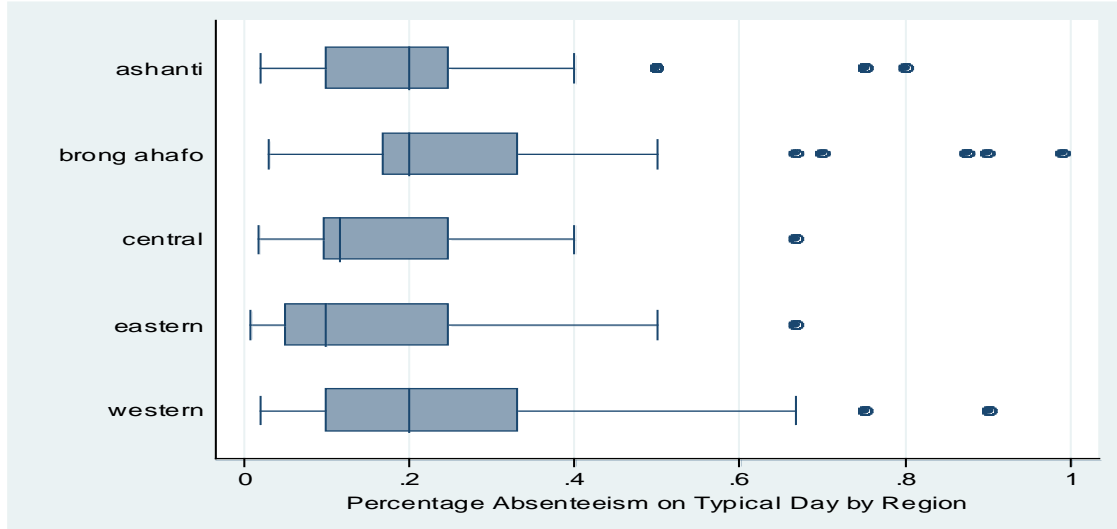
We also asked headmasters about the three most important reasons for the absenteeism. The reported reasons are displayed below in **Figure 61**. The most commonly identified reason is "work on household farm" (listed by 54% of headmasters); 50% of headmasters who report this also list this as the most important reason for absenteeism. These findings patterns are roughly consistent across regions.

Figure 61: Reasons for Absenteeism
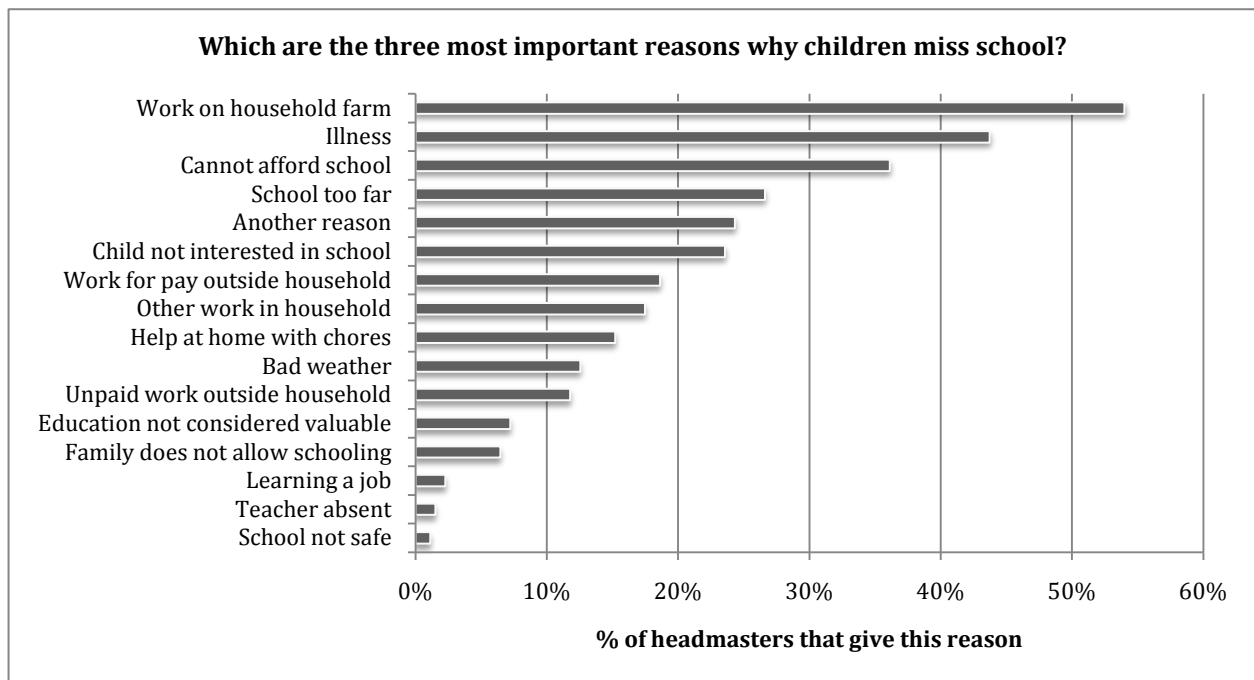
MOST IMPORTANT PROBLEMS

We asked both the village leaders and the heads of farming households about what they consider to be the most important problem that their village is facing right now and also the most important service that they think the village needs. The results are shown in **Figure 62** below. The responses of the village leaders and the household heads are quite consistent. Both leaders and farmers think that access to better roads is the most pressing issue: about 30% consider this the top priority. The second and third most pressing issues are education and health, respectively, followed by access to water and electricity. Very few leaders or farmers consider agricultural services a top priority. (Note that we randomized the ordering of the different answer options in the survey to avoid reporting effects.)

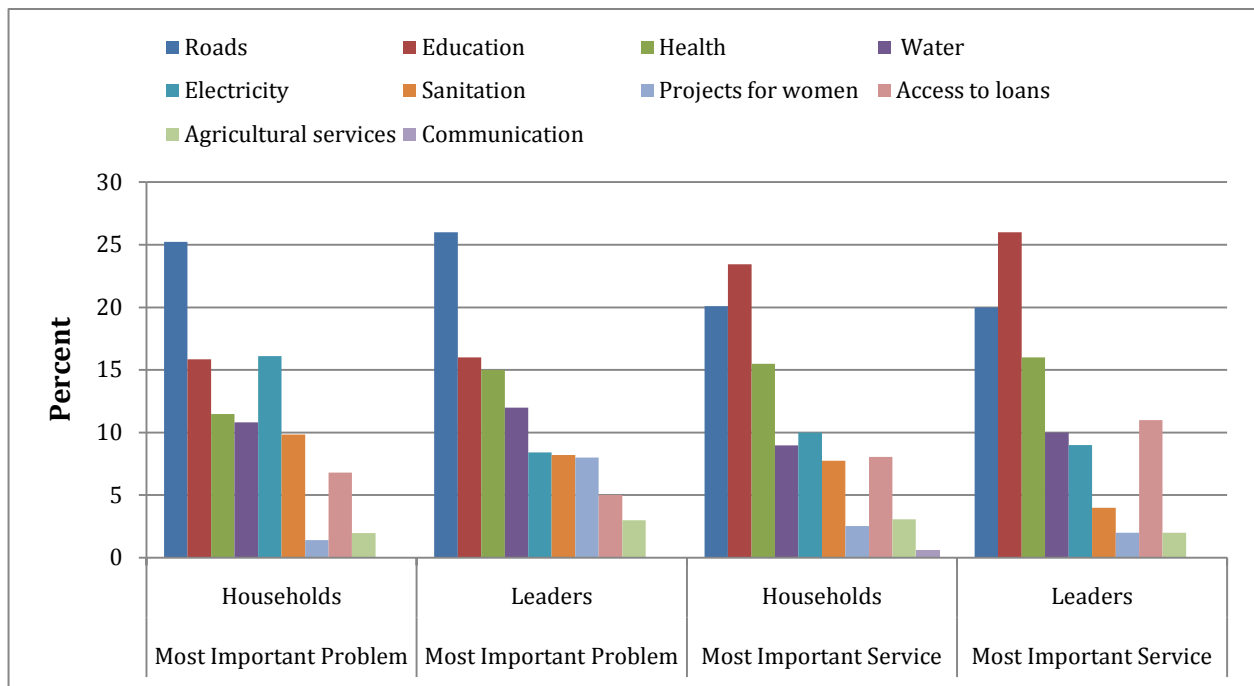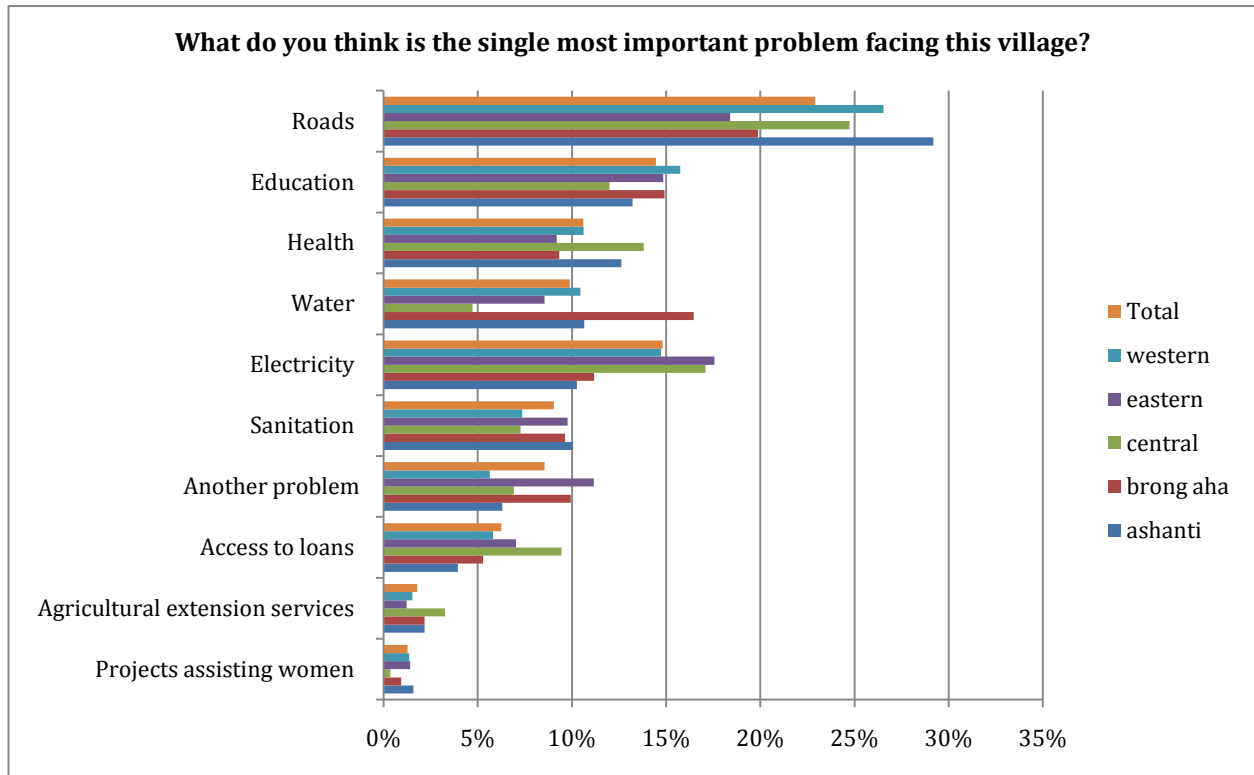**Figure 62: Most Important Problems and Services Needed**

Figure 63 shows the needs as assessed by the household heads across regions. We can see that the priorities are quite similar across regions, with a few exceptions (for example water seems to be a more important priority in Brong Ahafo than elsewhere, roads are somewhat less important in the Eastern region, etc.).

Figure 63: Most Important Problem by Region

What do you think is the single most important problem facing this village?

Legend:
- Total
- western
- eastern
- central
- brong aha
- ashanti

ASSESSMENT OF CHANGE IN LIVING CONDITIONS

We also asked village leaders whether they think living conditions in their villages have improved or worsened over the last year: see **Figure 64**. About 60% say that conditions are worse now than a year ago and this pattern is consistent across regions. Less than 19% say that conditions have improved.

Figure 64: Assessment of Change in Living Conditions

Living Conditions in Village Compared to last year:
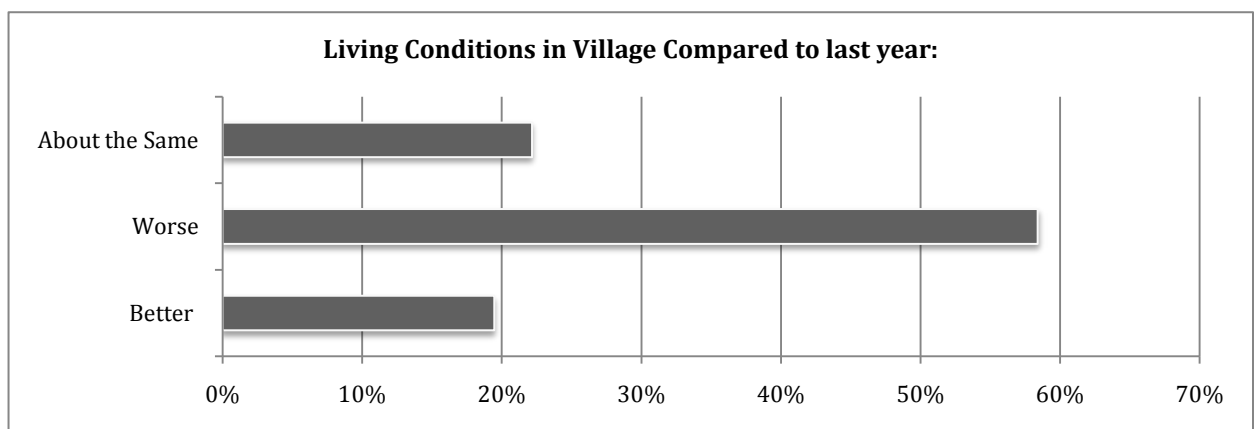
When asked about the reasons for the worsening of the living conditions in the village, most village leaders pointed to declining cocoa yields, a decrease in people's incomes, and a decline in crop prices, as can be seen in **Figure 65** below.

Figure 65: Causes of Decline in Living Conditions
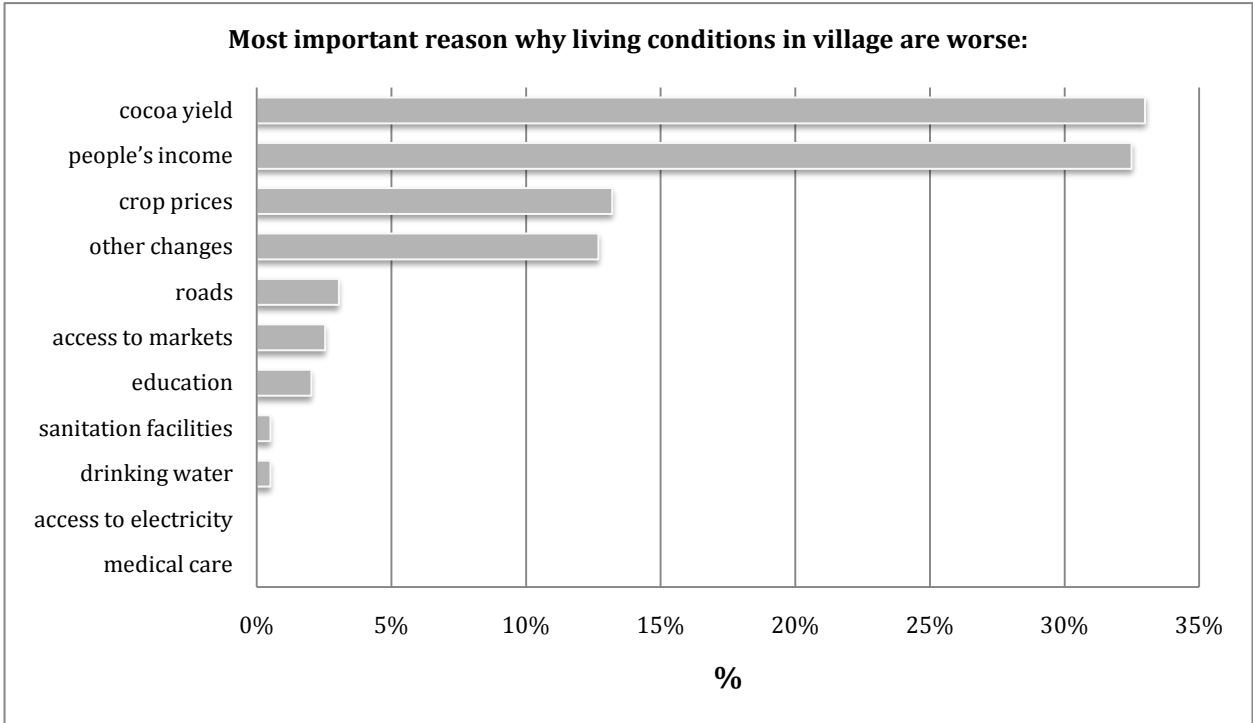

Most important reason why living conditions in village are worse:

FARMER TRAINING

We asked farmers whether they have received any extension services over the last year. The results are shown in **Figure 66** below. Few farmers reported receiving training. About 12% of farmers report that they received training from a non-governmental organization and another 12% said they received training from the Ministry of Food and Agriculture (respondents could give multiple positive responses). About 9 % of farmers report COCOBOD as the source of training. Training by NGOs is most common in the Central region (24%) and least common in Brong Ahafo (6%). Most farmers that received training reported 1-3 training sessions during the year. When asked about what kind of training they received the farmers that did receive training report that they mostly received farm maintenance training: see **Figure 67**.

Figure 66: Farmer Training

In the last 12 months, have you received any training from [SOURCE]?

Legend:
- Other
- Other farmers
- Cooperatives
- LBC
- COCOBOD / CRIG
- Ministry of Food and Agriculture
- NGOs

Categories: overall, western, eastern, central, brong ahafo, ashanti

Figure 67: Type of Training

What kind of training did you receive from [SOURCE]?

Legend:
- COCOBOD / CRIG
- Ministry of Food and Agriculture
- NGO

Categories: Child labor sensitization, Health and safety, Applying fertilizers/pesticides, Farm maintenance, Deforestation and environment, Crop diversification, Planting and farm expansion, Accounting/business/entrepreneurial
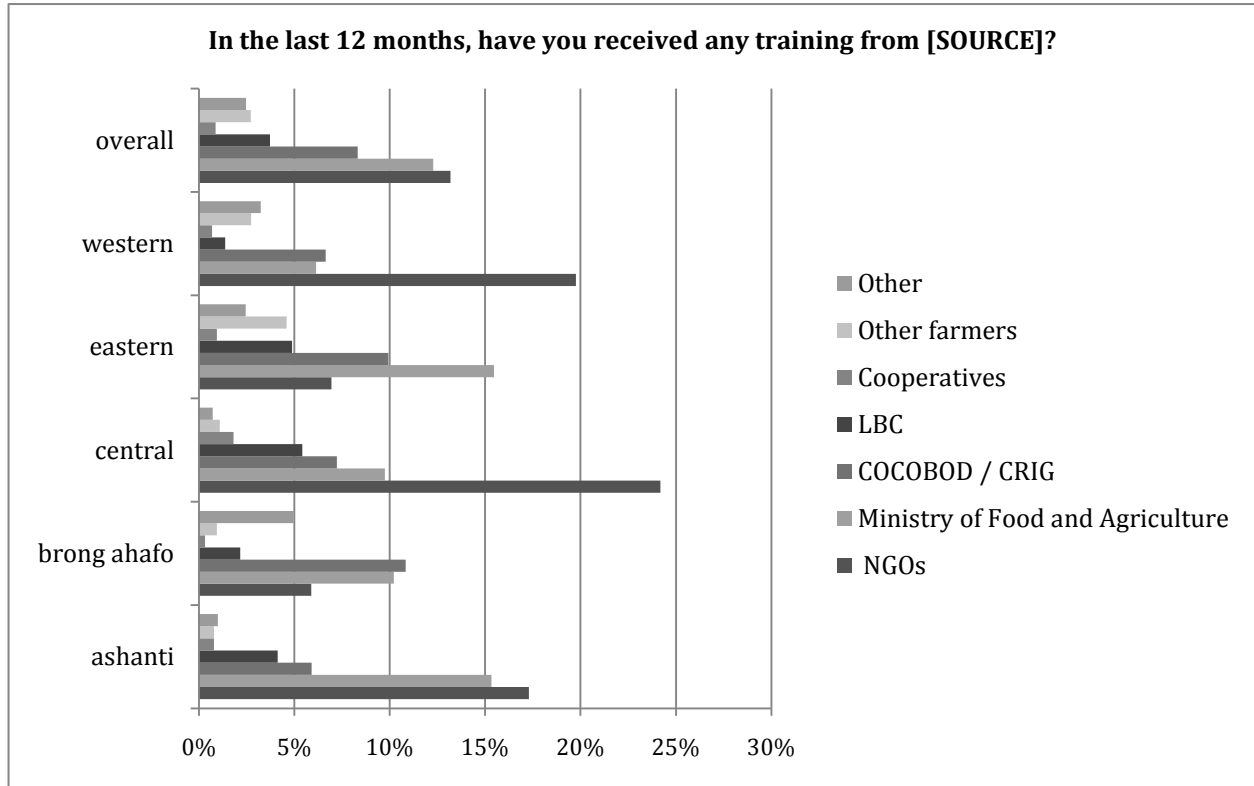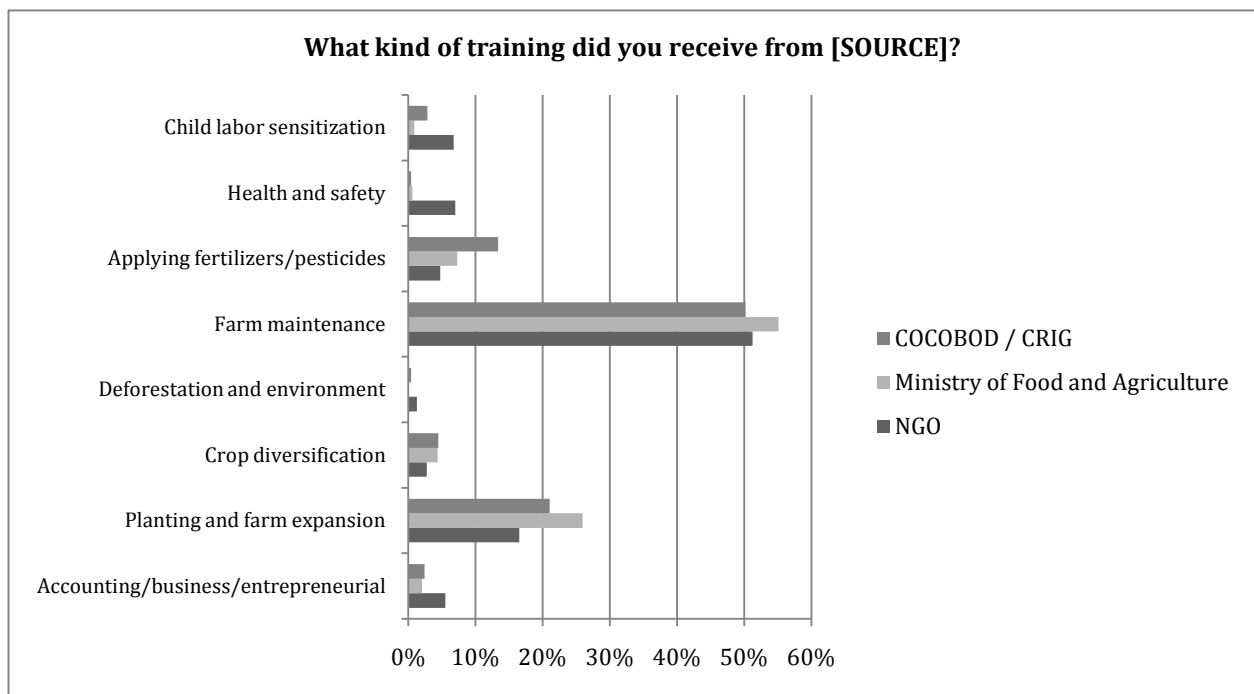
DEVELOPMENT PROJECTS

We also asked whether there had been any development projects active in the village in the last 12 months. The results are shown in **Figure 68**. The most common projects are health education (about 35% of villages), followed by school construction (24%), and construction of water sources. About 31% of villages surveyed had no development project (of any kind) in the last 12 months (see **Figure 69**).
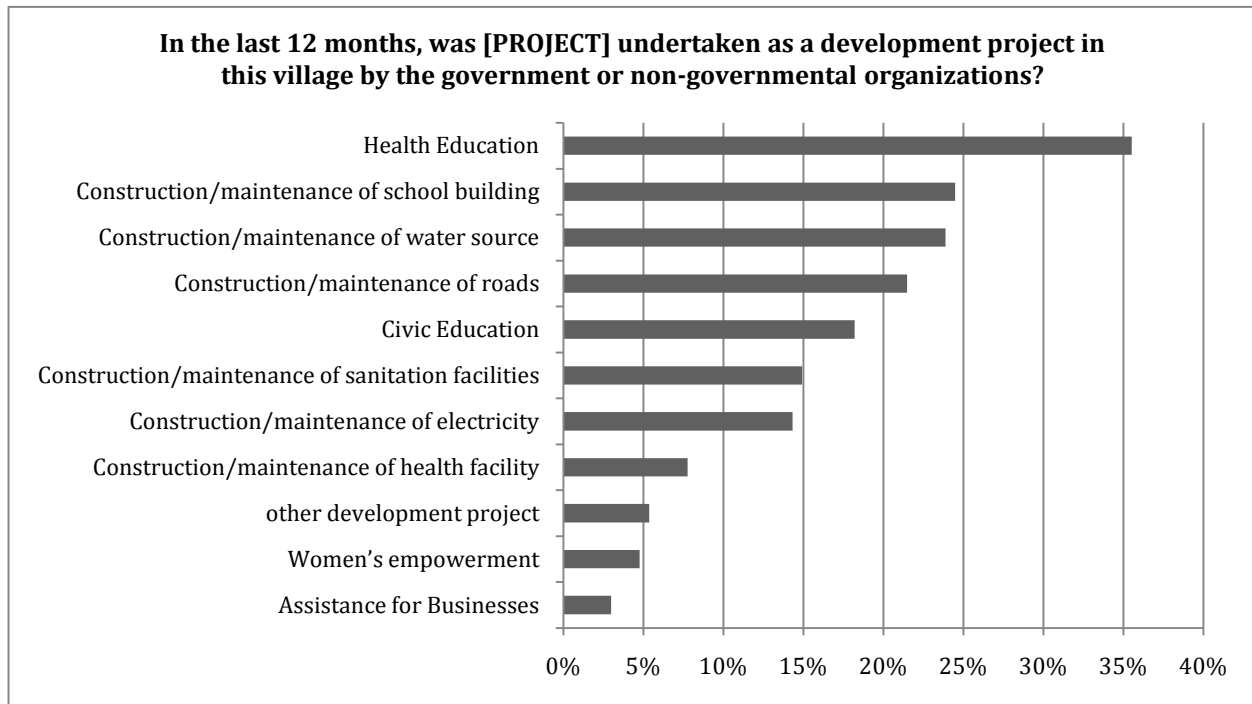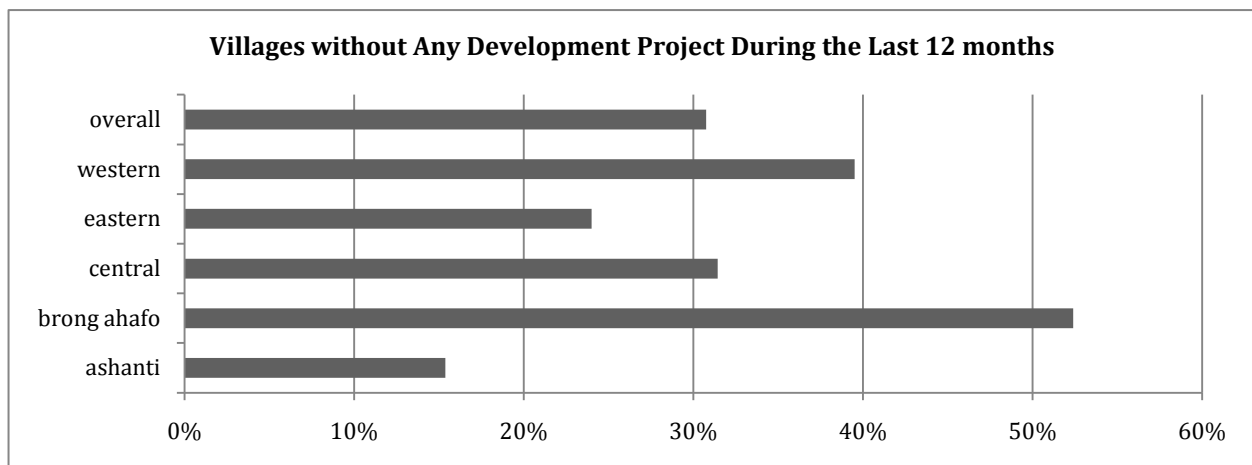
Figure 68: Development Projects

Figure 69: Villages Reporting No Development Projects

KNOWLEDGE OF FAIR TRADE

Only 9% of the farmers had heard of Fair Trade certification (254 farmers). Of these, the majority of farmers are in the Eastern (90) and Western (108) regions. Smaller numbers report that they have heard of other certification schemes such as Rainforest Alliance, UTZ and organic certification.

ATTITUDES TOWARD COCOA FARMING

Only 22% of farmers reported that their children plan to continue in cocoa farming. This fraction was very similar across regions, ranging from 19% in Ashanti to 27% in the Eastern region. Only 40% of farmers said that they wanted their children to continue in cocoa farming (this percentage ranged from 21% in the Western region to 52% in the Eastern region). The reasons given most often by farmers for why they think their children should not continue in cocoa farming were (1) "the work is too hard" and (2) "there are better opportunities in other fields".

About the International Growth Centre

The IGC offers independent advice on economic growth to governments of developing countries. Based at the London School of Economics and in partnership with Oxford University, the IGC is initiated and funded by the UK Department for International Development (DFID).

The IGC has active country programmes in Bangladesh, Ethiopia, Ghana, India, Pakistan, Sierra Leone, Tanzania, Mozambique, Zambia and Rwanda and supports over seventy individual research projects on issues of governance, human capital, agriculture, infrastructure, trade, firm capability, state capacity, macroeconomics and political economy.

The IGC is directed by a Steering Group consisting of an Executive Director (Gobind Nankani) in collaboration with a Deputy Executive Director (Mark Henstridge) and two Academic Directors, one from LSE (Robin Burgess) and one from Oxford University (Paul Collier). The Steering Group also includes Chang-Tai Hsieh from the University of Chicago, Timothy Besley at LSE and Stefan Dercon at Oxford University.

The organisational structure of the IGC spans a London hub, country offices in partner countries, a group of 10 research programmes with participation from academics in world-class institutions, a network of policy stakeholders in the developing world and a range of public, civil society and private sector partners.

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