



FARMER LIVELIHOOD ASSESSMENT

PRESENTED TO GENERAL MILLS - NOVEMBER 2020



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Executive Summary

- The Farmer Livelihood Assessment (FLA) is a study framework developed by PUR Projet, inspired by DFID Sustainable Livelihood Framework. It aims at capturing social and economic realities of farming households of communities involved in General Mills' Cocoa Ecosystem and Livelihoods project, with three main objectives:
 - **Objective 1:** Assess how household objectives are supported through project activities
 - **Objective 2:** Draw attention to key considerations for project implementation purposes
 - **Objective 3:** Provide a program baseline with economic and social data to be able to better assess project impacts.

- **The communities of interest of this study will be anonymized and named A and B.** These two communities are located in the Central Region of Ghana, on the edge of the Kakum National Park. These are the communities that have been selected to benefit from the Cocoa Ecosystem and Livelihood Program, funded by General Mills and implemented by PUR Projet. In these two communities, a survey was carried out from March to May 2020, and 128 individual interviews were conducted across both communities, resulting in the collection of complete socio-economic data for a total of 70 households.

- The study reveals that **most of A and B households are highly dependent on cocoa production**, despite having relatively small farms with low levels of equipment and productivity. Few households sell other crops, and 63% of households have no, or very low, income outside farming activities.

- **Households' first immediate objective is to generate more cash to invest further into their cocoa production:** buy more inputs, more equipment, that have the potential to increase cocoa yields. Farm profits would be further invested in side-businesses or in the education of children, who generally send financial supports to their families. Cocoa-related capital is, and will remain, the main way out of poverty for households in the region for the foreseeable future.

- **Objective 1:** The project activities have the following objectives:
 - **Protecting the forest:** The main risk of deforestation lies in cocoa-driven agricultural expansion into the mature bush surrounding the communities, as community members do not encroach the nearby Kakum National Park and avoid entering except for occasional honey or medicinal resources fetching. The Park, however, is a source of conflict, as wild animals coming from the protected area cause damage to cocoa parcels, and the cocoa communities do not benefit from its large tourist flows.
The project activities of Improved Cookstoves and Environmental Awareness activities, combined with the resources provided by Agroforestry, aim to decrease further the need to enter the Park. The project activities also aim to protect the bush area surrounding the village by limiting the need for cocoa expansion. This study identified that the development of additional ecotourism activities and businesses in collaboration with the Park authorities are options to be explored to create a beneficial relationship between conservation and economic development.
 - **Agroforestry and Income diversification:** Agroforestry will increase the resilience of cocoa parcels and has the potential to stabilize cocoa yield, but additional alignment between cooperatives and cocoa buyers to improve Good Agricultural Practice training, to **increase the cocoa production over the short term**, would also benefit

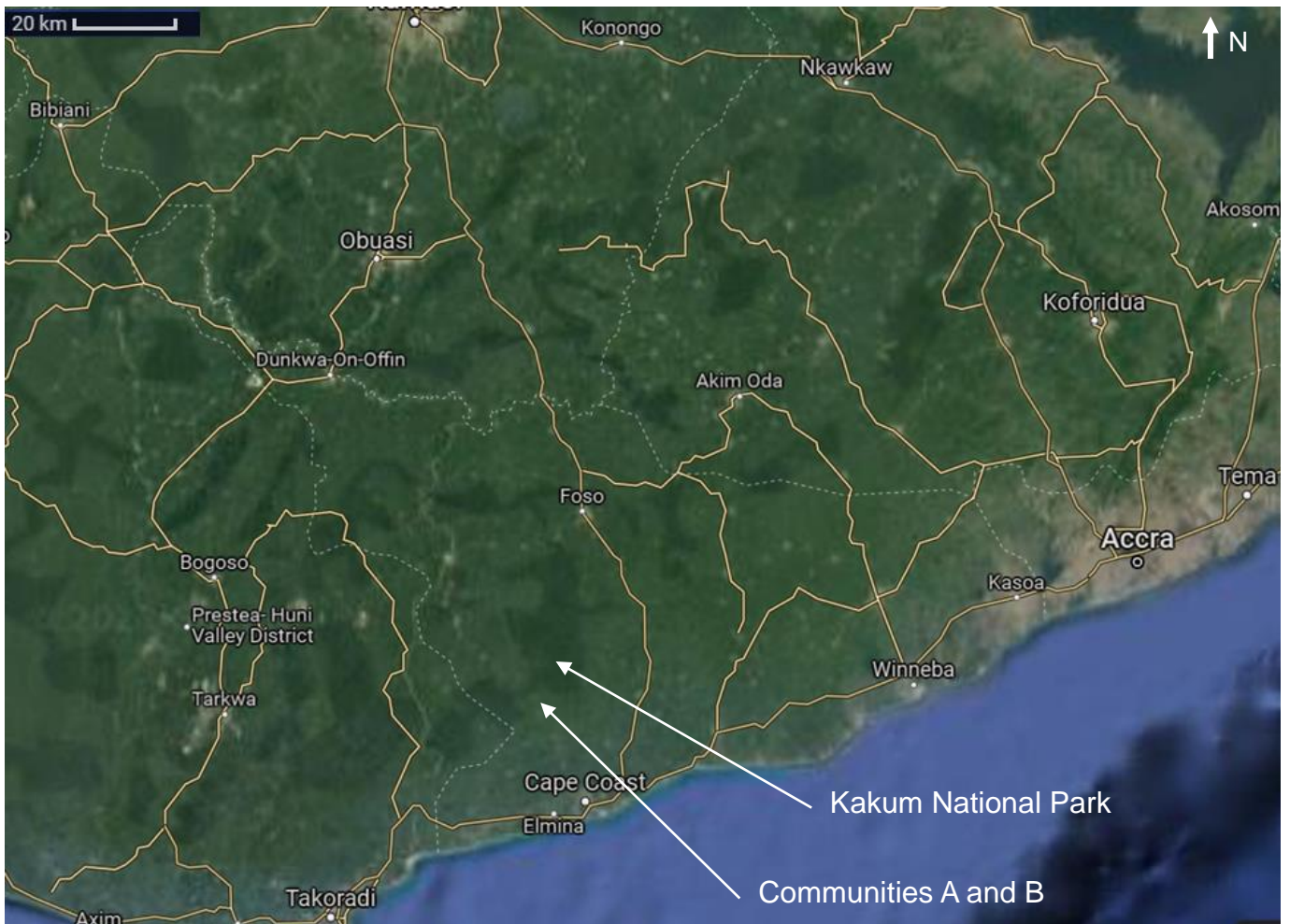
the whole project, by addressing producers' immediate needs. Both **agroforestry and beekeeping** can generate additional income, which could be reinjected in the local economy as cocoa investments, but also at the community level for community needs (e.g. investment for a shared vehicle).

- **Objective 2:** Unclear tree tenure rights for farmers, a lack of access to local markets, and the crucial need for a community approach in terms of benefits sharing have been identified, through this study, as the main considerations when implementing our agroforestry and beekeeping activities. Fortunately, a strong preexisting sense of community and sharp interest in project activities are real assets in A and B, as are the evolving innovations and policies around tree tenure. Close attention should be paid to women-headed households and households with small farms, as they are most vulnerable: they sell less cocoa, and therefore have lower incomes than households with larger farms. This study has also identified the importance of youth-centered activities during training as cocoa communities are aging, with young people leaving the communities to go to cities, as they do not see rewarding opportunities in cocoa farming.
- **Objective 3:** The baseline social and economic data has been assessed at the individual, household, and community levels, and the midline study (in five years) will be assessed against this baseline. As the baseline cocoa year (2020) was exceptionally bad, the midline will adjust conclusions accordingly. The collection of economic data for many of the households will also enable our project team to closely monitor households with specific needs.

Context

In the context of the General Mills Global Responsibility Policy, and as a signatory of the Cocoa & Forest Initiative (CFI); General Mills Inc. has committed to accelerate the preservation and rehabilitation of forests and to improve farmer livelihoods in its source cocoa-producing regions of Côte d'Ivoire & Ghana.

To support Pillar 1 of the CFI, 'Forest Protection & Restoration', General Mills has engaged PUR Projet to design, implement and monitor the impacts of several activities including agroforestry, clean cookstoves, beehives, and awareness-raising activities. These activities are all embedded within the "Cocoa Ecosystems and Livelihood Program". In Ghana, these activities are being implemented in the Central Region, in two communities called A and B (they have been anonymized for the purpose of diffusion - approximative location indicated in Figure 1).



These activities aim to achieve different outcomes:

- 1- **Diversify incomes** for beneficiaries
- 2- **Increase reforestation through agroforestry**
- 3- **Increase the protection of the forest** and bush by communities

Figure 2 below presents the project's **Theory of Change**

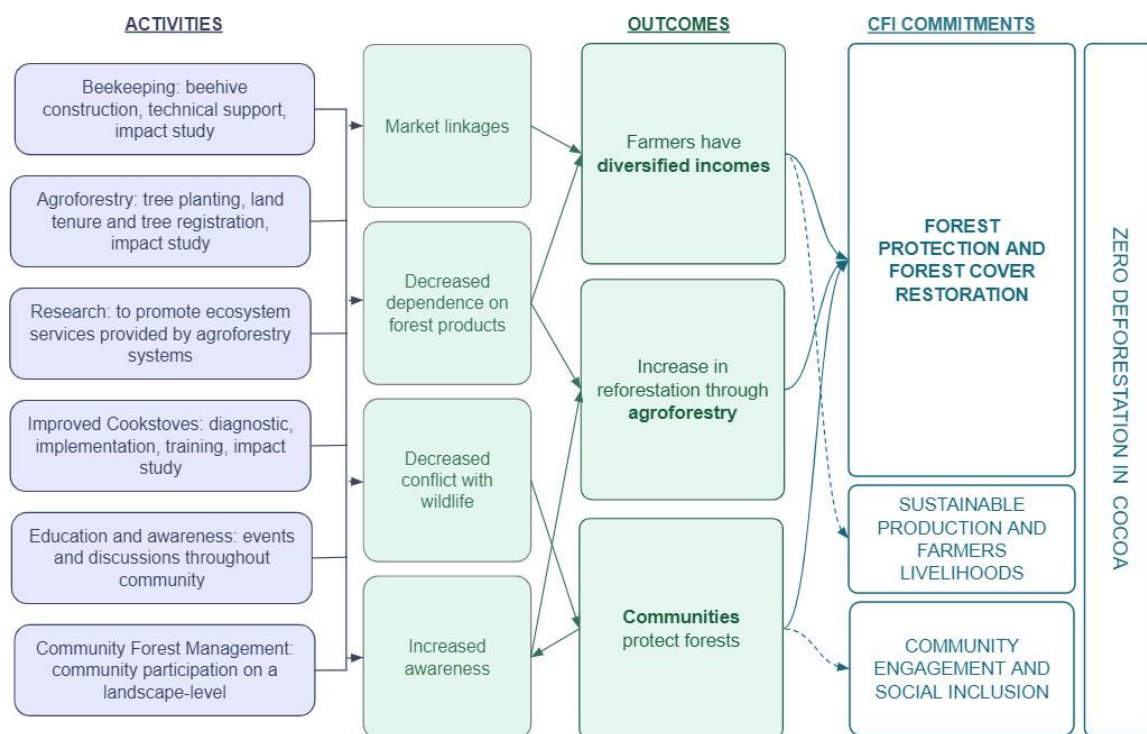


Figure 2: Theory of Change for the Cocoa Ecosystems and Livelihoods Program in Ghana

For each activity in the Cocoa Ecosystem and Livelihood Program, PUR Projet has set ambitious targets for the 2020-2022 period of the Program. Targets for activities include:

- **Beekeeping: 175 beehives** will be installed, farmers will be trained and assisted in their access to markets
- **Agroforestry: 37, 000 trees** will be planted, with **370 farmers trained** on agroforestry practices, and assisted on tree tenure
- **Improved Cookstoves: 500 cookstoves** will be installed, for **500 beneficiary households**
- **Education and Awareness:** all participating farmers will receive environmental awareness training through events and discussions.
- Selected leaders will engage in **landscape-level community forest management** discussions and events.

Fundamental to all activities and the Program is improving farmer livelihood to support long-term forest protection and restoration. To best cater to activity design and Program implementation in this new region, PUR Projet needed to understand and assess the current livelihood of farmers, and thus conducted a **Farmer Livelihood Assessment**.

1. Methodology

1.1. Approach: The Farmer Livelihood Assessment

PUR Projet believes that a project and its activities will have the highest impact when rooted in the community beneficiary needs, and embedded into a holistic vision of the objectives, constraints, and opportunities influencing beneficiaries and their livelihoods. To acutely capture this vast quantity of information available from a study of this kind, PUR Projet developed the Farmer Livelihood Assessment (FLA) in 2019, that seeks to infer key project considerations from the analysis of local farmer livelihoods. The FLA aims to:

- assess **how community and household objectives** will be addressed through project activities.
- **draw attention to key project considerations: by identifying the risks** and assets for adoption, implementation, and success of project activities and the key contextual specificities associated with different communities/population groups benefitting from the project
- provide a **useful program baseline on key economic and social data**, which fit into the holistic project Monitoring & Evaluation (M&E) framework. This Baseline could be assessed against the same study during and after the project intervention.

The Farmer Livelihood Assessment is adapted from the *Sustainable Livelihoods Framework*, developed by the DFID in 1999 (DFID 1999) and used by international institutions such as the UNDP (2017). The Sustainable Livelihoods Framework provides a method to think about livelihoods through a holistic lens, dividing the complexities of the livelihoods study into different categories of information (see Figure 3 and the description of categories below). To better analyze the specific issues/goals addressed by our activities, we added a strong focus on farm economics to the Sustainable Livelihoods Framework and issued direct project recommendations when relevant.

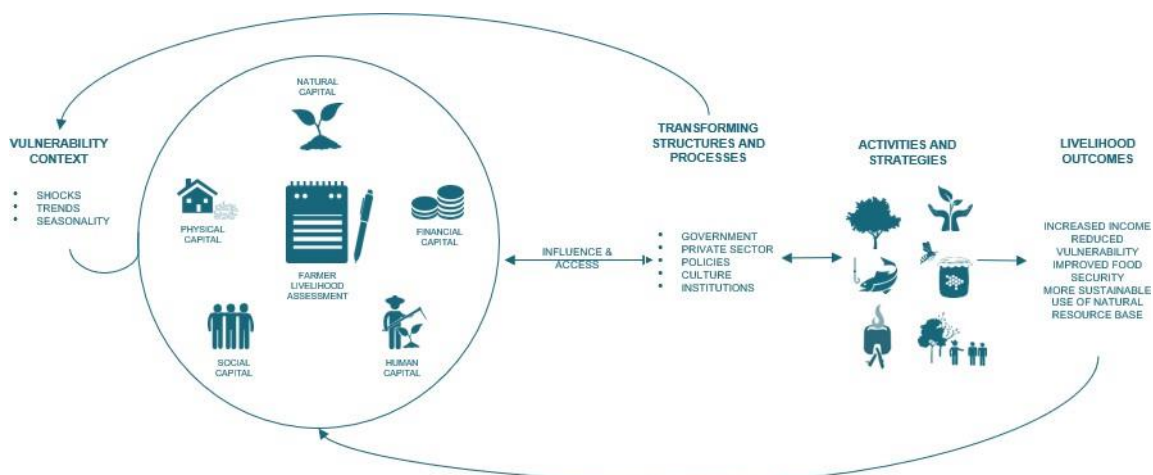


Figure 3: The Sustainable Livelihood Framework - inspired from UNDP 2017

The Farmer Livelihood Assessment thus includes the following Sustainable Livelihood Framework categories:

- **Vulnerabilities:** Vulnerabilities are the threats affecting the communities' livelihoods (climate change, fluctuating prices, etc.) Vulnerabilities were identified in the project planning phase and have led to the development of the project and are summarized in Section 2.1.

- **Livelihood Assets (or “capitals”)** are the assets on which can communities/households rely on to live and thrive, while facing these vulnerabilities. We explore if these dimensions are assets or limiting factors for project activities. They are presented in Section 2.2 and are divided into five categories:
 - ✓ **Human Capital**, which includes knowledge, skills, health, education levels, ability to work of the households
 - ✓ **Social Capital**, which includes connections with power (vertical) and with other community members (horizontal): social networks, community structures, trust, etc.
 - ✓ **Natural Capital**, which includes the use and availability of land, forests, water resources, etc.
 - ✓ **Physical Capital**, which includes basic infrastructure, tools, equipment, transport, energy, sanitation.
 - ✓ **Financial Capital**, which includes savings, regular inflows of money, available income.

- **Transforming Structures and Processes:** which are the macro structures and processes shaping the use of assets by communities. Transforming Structures and Processes include policies, institutions, actions of external NGOs, the influence of the private sector, existing markets at the local, regional, national, and sometimes action at the international level. Transforming Structures and Processes also can influence vulnerabilities both positively and negatively, transforming community members’ use of their assets. Transforming Structures and Processes had also been identified in the project planning phase and are summarized in Section 2.3.

Livelihood Strategies: Based on the assets, the existing & future vulnerabilities, and the structures and processes shaping the livelihoods, community members adopt certain strategies, in which project activities need to be embedded. For example, having additional income, cultivating additional crops can be a way to cope with increased vulnerability. Spending money on weddings and funerals can increase the ability of community members to rely on neighbors when times are difficult, and therefore increase social capital. These livelihood strategies are presented in Section 2.4, and place focus on rural community economics, as the Project activities should directly fit into the households farming systems. Following a standard methodology for Agricultural economics (FAO, 1997), this Section thus covers:

- ✓ **The production data of farming activities**, in particular the “cash crops”, that are mainly cultivated for selling (cocoa, rubber, palm oil, etc.), but also subsistence crops (fruits, vegetables) and animals, mainly cultivated for auto-consumption.
 - ✓ **Costs associated with farming** and how farmers choose to invest their resources:
 - the material (the equipment necessary to farm production, for example, motorcycle or sickles), for which we depreciate the value over time and amortize the cost over the utilization period
 - the inputs, used for the crops, including fertilizers and pesticides
 - the labor (both paid – hired people, and unpaid – family or community time)
 - ✓ **Calculated final indicators on Farming.** We studied the economics for the main crop (cocoa), and side crops including:
 - The main crop yields
 - The main crop net profit /ha
 - The other crops-related incomes
 - ✓ **Other family incomes** (outside farming: side jobs, money received from family members)
 - ✓ **Other family expenses** (food, education, health, housing, weddings & funerals, etc.)
- **Livelihood Outcomes:** This last section entails the final objectives of the livelihood strategies, both at the household and at the community level. Livelihood outcomes can include higher income, higher food security, better education for children, etc. (see Section 2.5).

1.2. The Study Process

The table below provides a brief overview of the steps of the FLA study process.

Study step	Details
Choosing the Modules	A multi-module survey including all FLA dimensions has been developed by PUR Projet. After assessing the goals of the General Mills' Cocoa Ecosystems and Livelihoods Program, PUR Projet selected models of interest for the context of the project and the country. Specifically, for the Cocoa Ecosystems and Livelihoods Program, an exhaustive approach has been selected, as General Mills has shown interest in multiple socio-economic dimensions of the livelihoods.
Hiring a local team	An appropriate local consultant was hired locally to conduct the survey. His profile showed great experience in conducting interviews, notably on agricultural livelihoods in the Central Region of Ghana. Additionally, he demonstrated adaptability and autonomy in the field. PUR Projet also hired a local Project Officer (Kwame Kusi Asumaduto) to manage Program activities from within the country.
Adapting the survey to the local contexts	The survey was then adapted to the local context, crops, currencies, with a preliminary desk review. The survey was developed on an app called Open Data Kit (ODK). Questions were coded on a document under the XLS format, that was then uploaded on an ODK Platform (in this case ONA.IO). The form will be shared with General Mills upon request.
Field training	A PUR Projet Central Officer (Pierre Cadelon) spent two weeks in the field, one to connect with the community and the second to train the consultant on the tool, refine the survey to best adapt it to the local context, and to run the first round of interviews with the consultant (See Figure 4)
Farmer Interviews and Data Collection	The survey was then conducted in the two communities of interest, B and A by the consultant, with the close, yet remote, supervision of the PP Officer. The filled forms were uploaded to the platform each evening by the consultant, and our Officer had the opportunity to review the data weekly.
Data Cleaning	After the data collection phase, the consultant cleaned the Excel file, including spotting outliers, ensuring consistency between participant interviews, and regrouping the farmers into households, under the direction of PUR Projet
Analysis	<p>The analysis was run by PUR Projet on Excel for basic statistics at two levels: the individual level and the household level. A further analysis was then run with RStudio for Student's t-test, Chi-2 test as well as linear regression models, that allow for the quantification of the difference between groups (communities, groups of households, gender, etc.) and to show a correlation between variables (for example age of a parcel and its yield).</p> <p><i>At each difference or correlation studied, the significance of this correlation was assessed with the calculation of a number called the "p-value". If the p-value was inferior to 0.05, we can tell that there is at least a 95% chance that the difference or the correlation observed did not happen "by chance" and is statistically "significant", which is the closest we have from "real". For example, the average yields seemed to be different between the two villages. To know that this difference is "real" and not due to chance, we then ran a statistical test (in this case the "t-test") with the calculation of a p-value. If the p-value was inferior to 0.05, we concluded that the difference is "significant".</i></p>

1.3. Sampling and interview set up

In coordination with the consultant, PUR Projet chose a hybrid sampling method for the interviews, drawing upon systematic and snowball sampling methods. The **systematic method** targets interviewees within the list of all possible interviewees, that was built as the fieldwork was progressing. The **snowball sampling method** consists of finding new interviewees among the acquaintances of the past interviewees. When he was able to, the consultant interviewed all members of the same household at the same time. The advantage of this mixed approach is its flexibility: while not having a list of community members before, **the consultant was able to interview a large representative sample of farmers, with representativity across the communities.**

Overall, **128** Individuals representing 85 Households were interviewed. Out of these 85 Households, **70** were “completed”: meaning that all members of the households representing an “economic force”, i.e. those who contribute to the households’ incomes, were interviewed.

The “completed” households were estimated by the consultant to represent **60% of farming households** in the two communities.

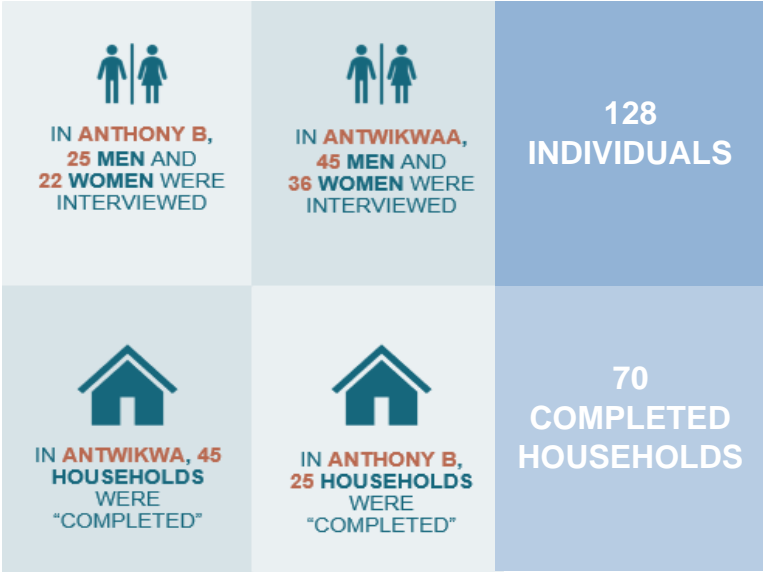


Figure 4: Picture of a survey conducted in A in March 2020

2. Results

This livelihood analysis is broken down into the different SLF (Sustainable Livelihood Framework) categories of information. Key implications for the Project activities are developed throughout the report and are **summarized in Section 3**.

2.1. Cocoa households' vulnerabilities

Ghanaian cocoa farmers, including in the communities involved with this project, are exposed to the following three main threats, among others: changes in climate, fluctuations in commodity price levels, and the loss of productivity of their cocoa parcels. These elements enhance cocoa farmers' social and economic vulnerabilities.

2.1.1. Climate Change can destabilize cocoa production in Ghana

Climate change is posing vast threats to the region. As of today, the average temperature in the region is 26°C with average precipitation from 1,150 mm to 2,000 mm of rain per year. However, recent climate projections indicate a possible rise in temperature with an average of up to 30°C, and a reduction in rainfall (as low as 1,100 mm per year in the project region).

Research and farmer experience have repeatedly demonstrated that cocoa cultivation is sensitive to climate change, especially to increasing temperatures in the dry season and to the decreasing water availability (Schroth et al 2016). A recent study conducted in Ghana estimated that 90% of current cocoa regions are becoming less suitable for cocoa cultivation (Läderach et al 2013).

Dependency of cocoa production enhances the vulnerability factor for farmers; however, alternatives are scarce in the region. In addition, many farmers have become reliant on cocoa, as monoculture cocoa production enables farmers able to raise larger capital when times are good when compared to farmers with "diversification only": as cocoa is supported by government structures, cocoa farmers are overall wealthier and more able to cope with changes to come (Friedman et al 2018).

2.1.2. Cocoa farmers are highly vulnerable to cocoa price fluctuations

The cocoa price level is a major challenge for cocoa producers- it is the major driver for their livelihoods yet is out of their control. The cocoa price is controlled by a government body called the Cocoa Marketing Entity (CME), which is the only entity that can legally sell cocoa on the world market. The CME negotiates directly with international cocoa buyers, which have a large potential of supply and thus generally wish for a Ghanaian cocoa price reduction. Following this negotiation, and after deduction of costs of inputs (some campaigns of input spraying are government-paid) and of transport (to pick up the cocoa directly in the villages), the farmgate price is paid to cocoa farmers. As a result, farmers are highly vulnerable both to the government agreed price and its fluctuations (in 2019 for example, cocoa prices dropped by 30% because of overproduction (Fooddive 2019)), and to the deduction of government expenses for inputs and transport, which are services that are not always delivered.

To limit price fluctuation for farmers, the government and the cocoa international buyers agreed in 2019 on a floor minimum price paid per metric ton (\$2,600 per ton) and on a living income differential of \$400 per ton for farmers who earn less than \$1 a day. This policy has increased the overall farm gate price by 5.2% in 2019, after years of falling, and was a much-anticipated development by cocoa farmers (Reuters 2019).

However, this new policy framework has shown several limits:

- While a minimum price better protects farmers when the world market cocoa price is falling, it also prevents them from benefitting from an increase in price (Bymolt 2018).
- External factors have the power to destabilize the agreement between cocoa buyers and the government. The COVID-19 situation has, for example, triggered a sharp decrease in

cocoa sales, and therefore in market cocoa prices, threatening the government-buyers agreement validity. Although the farmgate price of cocoa should not decrease below its 2019 value, recent information showed that the premium will fall short by \$120/ton (Guardian 2020), which further increases the vulnerability of cocoa farmers.

2.1.3. Aging cocoa parcels and decreasing productivity

Ghana has seen a major increase in cocoa production in its rural areas in the 1990s and 2000s' cocoa boom. Along with a massive, encouraged settlement of young farmers and the creation of new farms, the use of inputs was largely supported by the government through mass spraying campaigns (Ruf 2007). When cocoa is cultivated intensively, as it has been since the 1990s, the overall productivity period lasts approximately 30 years, with a peak of production after 12-13 years of production (Obiri et al 2007). Therefore, unless cocoa plants are replanted and unless the soil fertility is increased with additional organic or synthetic inputs, many Ghanaian cocoa farms may now start reaching the end of the cocoa cycle started in the 1990s and 2000s, and overall cocoa yields will start to decrease (Wessel 2015). The exhaustion of cocoa parcels and the loss of fertility tends to lead farmers to expand on remaining patches of forest – perpetuating deforestation (Amiel 2019) and increasing the need for inputs further.

2.1.4. Social Vulnerability

Ghanaian cocoa farmers are even more vulnerable to the three above mentioned factors when they lack resources to face changes when they occur. Indeed, most cocoa farmers are self-employed and have small farms (of 2 to 5 hectares), with relatively low yields (average at 0.42 tons/ha). This results in low incomes, low capacity of extension, and low ability to invest in the purchase of fertilizers, equipment, and pesticides that would in return increase their productivity and their gains. They are also unable to spend time and resources to find alternative sources of income, and purchase insurance for when yields are low (ICI 2017). Even when times are “good” and yields are high, selling cocoa can be challenging: another study using the Sustainable Livelihoods Framework found that cocoa farmers were also facing inflation and corruption in the internal cocoa markets (Peprah 2015).

These structural and long-term causes force cocoa farmers into a vicious cycle: inconsistent, low income leads to further poverty. As a result, 45% of cocoa farmers live below the World Bank poverty line, and 80% of them live below the living income line, which is defined as the sufficient income to cover for a decent standard of living (Waarts 2019, Asamoah 2013).

This economic vulnerability goes hand in hand with a social vulnerability. As communities lack resources, they are unable to invest in their own infrastructure such as schools or health facilities. Additionally, younger generations are becoming less interested in cocoa farming, making labor scarce for cocoa farm work. Some groups are particularly vulnerable: it is the case of women and women-led households, that own fewer cocoa farms and earn only 21% of the income from the cocoa-made in the household (ADB 2015) – this study will allow for further exploration of gender considerations.

Implications for the project:

As identified in the planning phase, the Cocoa Ecosystems and Livelihood Program activities aim to address these vulnerabilities by diversifying incomes and providing resilience to the cocoa parcels:

- 1- Well-chosen Agroforestry systems have the potential to increase soil moisture content by up to 129%, and thus increase resilience to droughts (Kyereh et al 2017)
- 2- By providing other sources of income, Agroforestry and Beekeeping, farmers become less vulnerable to cocoa price fluctuations, and have opportunities invest in a diversity of income strategies
- 3- Agroforestry supports a longer cocoa production period (Figure 5 below represents the evolution of yields for different cocoa agricultural systems: full sun, shaded, traditional with multilayer). This last dimension of Agroforestry is strongly expected from farmers that already planted trees (Van Duijl et Toose 2012).

Understanding the nature of community assets and subsistence strategies will provide us with crucial elements to address these vulnerabilities through the informed design of our Project Activities.

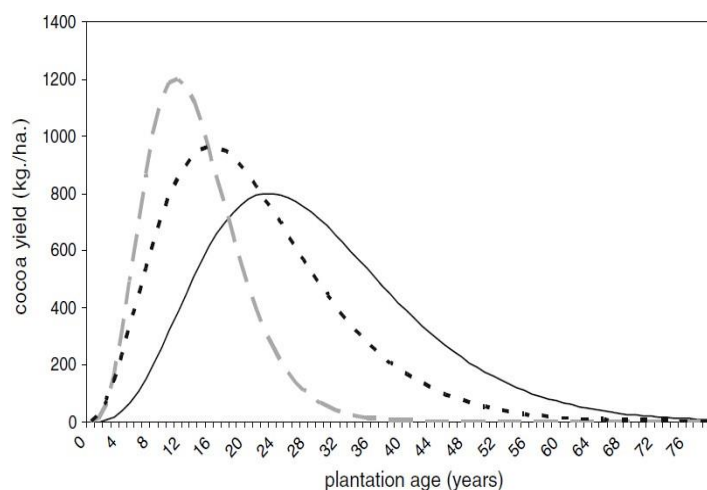


Figure 5: Derived cocoa yield pattern for different agricultural systems – from Obiri et al, 2007

(_ _ _) Full sun hybrid cocoa
 (- - -) Shaded hybrid cocoa and
 (plain line) Traditional cocoa with multilayer shade

2.2. Cocoa household capital

In the following paragraphs, study results for each of the household capitals are summarized with implications for the project design and implementation: risks, success factors, considerations for future monitoring, and vulnerable groups. When communities, or gender groups, differ significantly on topics, the significance of this difference is indicated. These project-informing considerations are also summarized in **Section 3.**)

2.2.1. Human Capital

Human Capital includes the assets related to the household members: Who is in the household? Who supports the household financially with their work on the farms? Who is educated? These elements contribute to a deepened understanding of the community's ability to engage in new activities and to engage in the impacts of activities.

Household Composition



On average, households have **5 members**, and parents have an **average of 5 children**, including some who live outside of the household. On average, **2 to 3 family members** live outside the household; these members either have their own households or live with the other parent when couples are separated.

The majority (**55%**) of households have two members **that are “economic forces”** of the households, meaning that they earn money or can work on farm-related activities. Yet, **41%** of households have only one economic force, and more than half of these households are led by women (**31% of total households**), that are divorced or are widows.

The households are farming households, as most of the “economic forces” of the households have their own land and work on it: only 9% of interviewees do not have any land to farm.

Beyond farming, women are responsible for most of the housework: they spend on average 50% more time on domestic work than men and spend overall 30% more time engaging in work overall (domestic and farming) than men (Vargas Hill & Vigneri, 2011).

Implications for the Cocoa Ecosystems and Livelihoods Project:

96% of households have between 1 and 2 economic forces, the majority of which engage in farming activities; however, women have additional household tasks.

PUR Projet understands that adding new activities such as agroforestry and beekeeping will need to fit in existing household schedules, and attention will be paid to not place an additional burden on women, by choosing times when women are available (for example avoiding to set up activities before meals, when women are supposed to be cooking), especially for women empowerment activities. Additionally, the improved cookstoves activity aims to reduce the time women need to spend on domestic tasks (UNDP 2014).

As some family members live outside the households, notably grown up children, the flow of money from one household to another can be significant (see 2.4.3). Positive financial impacts of the project may thus not directly have repercussions on further investments for the activities themselves (for example buying inputs): the beneficiary may choose to help members of their own families.

Age



Interviewees were on average 42 years old, with a relatively minor dispersion of ages: It seems that individuals of the same age immigrated in the project areas approximately at the same time.

Implications for the Cocoa Ecosystems and Livelihoods Project:

The average age of 42 years old resonates with the result of a similar study in cocoa communities in Ghana, that estimates the average age of farmers was 45 years old (Kuklinski and Adhuze, 2013). When comparing with the median age in Ghana (20.5 years old), it unveils a Ghanaian reality: few young people take over cocoa farms, as they see their parents working long hours without seeing substantial results. PUR Projet recognizes that the education and awareness activities can play a major role in engaging youth, by incentivizing youth from the communities to participate.

Additionally, it is important to consider that implementing new cocoa practices, including agroforestry, may present challenges with older farmers who may not want to change practices any more (Obeng and Weber, 2004), in contrast to young farmers who may find agroforestry more beneficial due to its long-term benefits. Attention will be paid to best fit the activities to their existing systems of beliefs, which may progressively change thanks to a transformative approach.

Origin



Analysis of interviewees origins found that most of the people interviewed were **not born in the villages**, and arrived in approximately 1996, shortly before the Ghanaian cocoa boom in the 2000s (Ruf 2007)

In A, almost all interviewees came from the Central Region and from the same districts of **Gomoa** and **Agona**, which leads to the hypothesis that some first newcomers attracted relatives and acquaintances, that joined the communities to support the farming activities.

In B, most interviewees are from **other regions** in Ghana (see Figure 6 opposite).

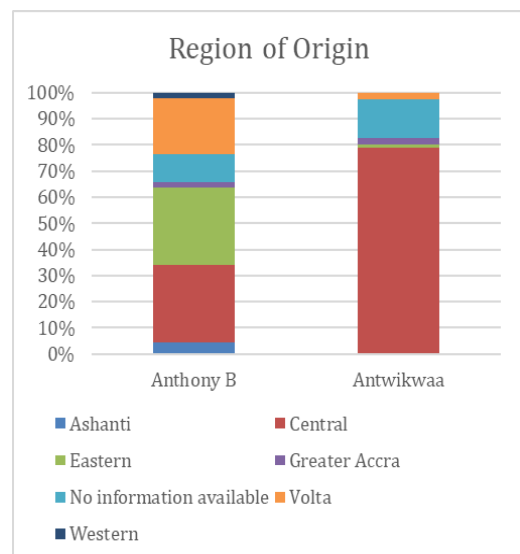


Figure 6: Origin of interviewees

Implications for the Cocoa Ecosystems and Livelihoods Project:

*Research (Brandt et al 2013, Smith Dumont et al 2014) indicates that migrant populations tend to have less knowledge on local tree species and their ecological impacts on cocoa trees and are less sensitive to natural area protection. Communities' knowledge of their environment will be further explored, to ensure that species are carefully chosen for the **agroforestry activity**, but also that **environment awareness activities** are properly implemented.*

Education of interviewees



Most interviewees have at least attended (yet not necessarily completed) Junior Secondary School. However, 20% of interviewees from A have never attended any classes (see below Figure 7 and Figure 8). **Women are notably overrepresented in the category of interviewees without education:** almost 40% of women did not go to any school, compared to only 7% of men (significant difference).

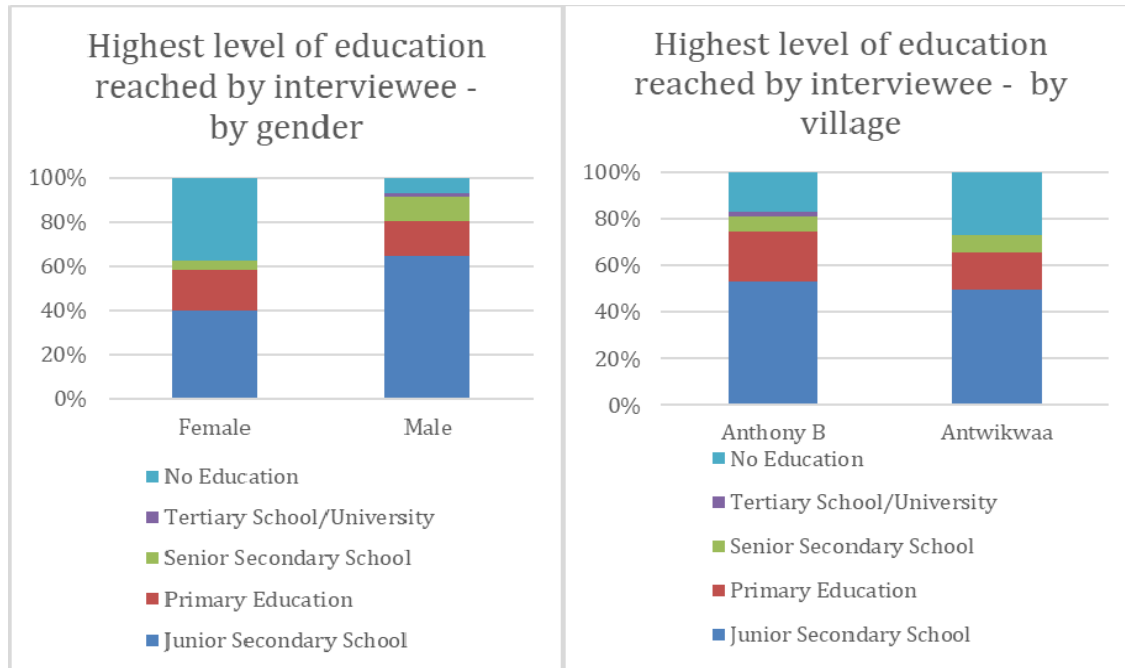


Figure 7: Level of education of interviewees, by gender Figure 8: Level of education of interviewees, by village

Implications for the Cocoa Ecosystems and Livelihoods Project:

Education is one of the key development objectives for rural communities, to increase their autonomy in household economics and their access to other fields of work than farming. It is worth noting that education levels seem to be negatively correlated with the willingness to adopt agroforestry (Obeng and Weber, 2014), possibly in reason of a higher trust in existing agronomic systems from existing education curricula.

Women are, on average, less educated than men and may be less “independent” when it comes to literacy or calculation. When considering our gender approach, especially for households with isolated women, it is key not to exclude women because of inadequate activity timing and program.

Education of children



Although our analysis did not focus on education, nor was aimed at evaluating risks of child labor, the interviews indicated that all children were going to school at least until 15 years old.

Even though the highest level of education available in a radius of 7 miles is **Junior Secondary Schools** (12-15 years old), present in both communities, many families also have children attending **Senior Secondary School** (16-18 years old), up to **42%** of families in B.

4 households in A have children going to University (see Figure 9).

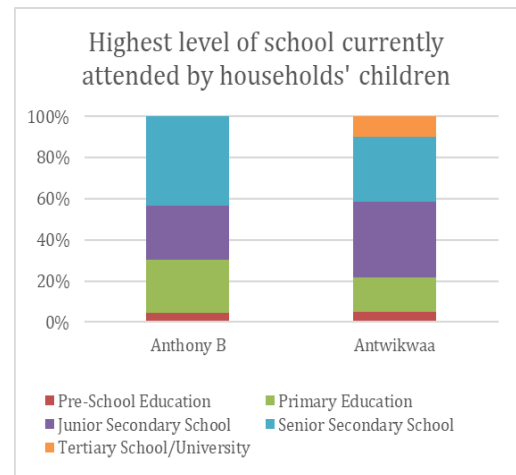


Figure 9: Highest school level currently attended by children within each household, by village

Implications for the Cocoa Ecosystems and Livelihoods Project:

Education is a major expense for most households (see part 2.5.4), and of high importance to cocoa farmers (see part 2.6.1): they wish their educated children to receive well paid jobs, so that they can also support the family in times of need.

*The project is not directly targeting the education of children, but as seemingly all children attend school, joint workshops with teachers in existing Junior Secondary Schools of both communities could be a platform for the **education and awareness building activity**.*

2.2.2. Social capital

Social Capital refers to the social resources which individuals can rely on: the assets (and sometimes constraints) related to the connections with other individuals within the community and its extended network, hierarchical (vertical relationships) and with other community members or with individuals with common interests (horizontal relationships). Social networks and community structures create trust, which fosters resilience to vulnerability factors, but also sometimes hinders household development, as social structures can also place an additional burden on individuals (for example through traditions).

Community structures



Although our study's essential focuses did not include social capital, as this dimension is less correlated to the project objectives, we asked for information about the formal structures in which individuals were active, as existing structures may enhance project implementation. In the previous community meetings, we had unveiled at least four types of community structures: church groups, a youth club, a women's association, and village councils.

Surprisingly, the majority of interviewees did not declare to participate in any specific formal community structure (**77% of respondents**), but bias in question understanding also may have prevented our consultant from capturing an acute picture of involvement (to the question "Do you belong to any community group?", farmers may not have considered "I go to church" as an appropriate answer).

Regardless of involvement in existing community structures, observations by our consultant revealed a strong sense of community in both villages. Most of the interviewees cared for the future of their villages, speaking with the use of “we” instead of “I” and using the lexical fields of community work.

Implications for the Cocoa Ecosystems and Livelihoods Project:

Even if formal structures may be less significant for community members than initially thought, the observed strong sense of community, along with strong family structures, have the potential to leverage impact for community members not directly targeted by project activities.

*An important note is that our consultant warned us that approximately 20% of interviewees **appeared to not be informed of the project**. Usually, the members of the community councils that are involved in the project feasibility and socialization phases (part of the project planning process) oversee the spreading information to other members: In June 2019, 50 people of each village were involved (feasibility) and in February 2020, 30 people of each village were involved (socialization). As misunderstanding of projects by beneficiaries can be frequent in development, it encourages us to be vigilant with respects to the communication on the project activities. Hiring a local Project Officer who regularly visits and engages the communities, has enhanced more awareness and greater communication with the communities.*

With the initiation of the beekeeping program, community members have developed a Cooperative, which will create a formal structure for communication, collaboration and marketing. PUR Projet is currently exploring the opportunities to support the development of Cooperatives.

A close relationship with cocoa buying cooperatives



Cocoa buyers are cooperatives buying cocoa from the community farmers. The two communities do not have the same “cocoa buyer profile” (See Figure 10), the difference being statistically significant. For example, cocoa buyer Adwumapa is overrepresented in B. Nyonkopa, which is the local General Mills cooperative partner, is relatively well installed in both communities (one-third of beneficiaries).

beneficiaries).

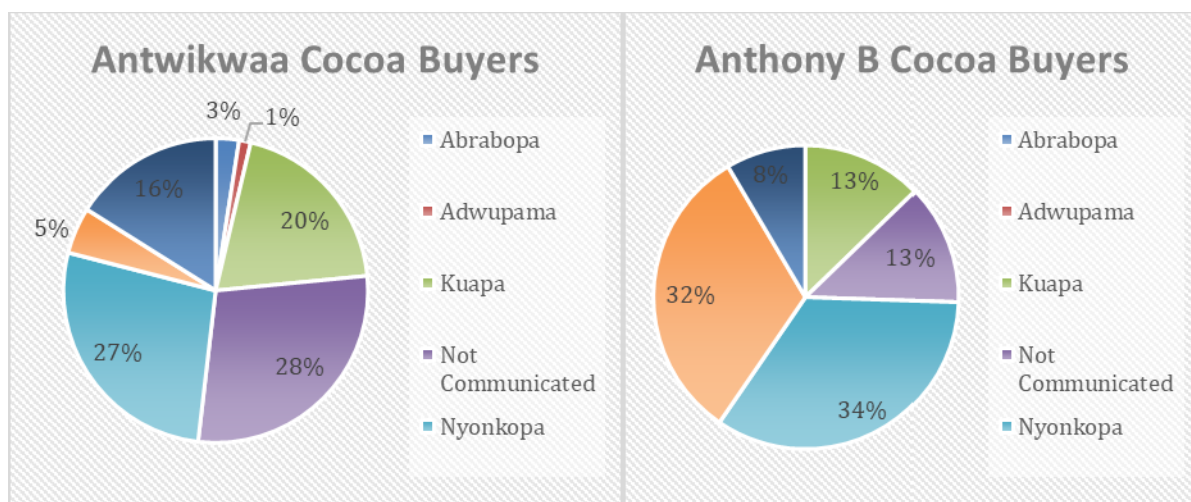


Figure 10: Main cocoa buyers for all interviewees in the two communities

Implications for the Cocoa Ecosystems and Livelihoods Project:

Cocoa farmers supply a number of buying cooperatives. PUR Projet's community approach, rather than relying on cocoa buying cooperatives, in selecting program participants will ensure a fair distribution of the project value among all beneficiaries. Yet, having exchanges with all cocoa cooperatives ahead of project implementation will improve PP's coordination of activities with existing initiatives of cooperatives on the agricultural systems.

Cocoa buying cooperatives often play a key role in the structuring of communities around farming activities, and sometimes support community members in the launch of community based initiatives "outside farming": Nyonkopa has for example launched the "Nyonkodo farm plan", providing life insurance for farmers' spouses, as well as scholarships and pension benefits (Business Ghana 2017).

In addition, cooperation with buying cooperatives can enhance engagement of farmers and tackling of issues at a landscape level, as cooperatives often have the similar approach across communities on the same territory.

2.2.3. Natural capital

Natural Capital refers to assets from natural origins. Water, forest, and agricultural land are key to livelihood development.

Community water sources



While B's interviewees have a borehole (within a 5-minute walking distance on average), A inhabitants only have access to river water, which is a 26- minute walking distance, as their borehole is damaged. Only 15% of interviewees in A seem to have access to a small well, at a 15-minute walking distance. As a result, inhabitants of A use the river's water for all uses, including bathing, cooking, drinking, building, and irrigation (for only two households).

Implications for the Cocoa Ecosystems and Livelihoods Project:

Lack of availability and proximity water, especially for A, can be a challenge for agroforestry. In the first years, trees need to be watered, when the soil is dry. Partnering with an entity to refurbish the bore hole would maybe be an opportunity to both anticipate needs for the project – use of the bore hole for domestic uses could free up the river for nursery/seedling irrigation activities, and address a deep community issue. PUR Projet welcomes a discussion with Care International to share this insight.

Natural areas



Both communities are very close to **Kakum National Park**, where entry is prohibited, and the park is patrolled. Intruders face severe consequences from a fine to jail time. According to our feasibility study in June 2019, some individuals may fetch wild honey from natural hives or medicinal herbs (Non-Timber Forest Products - NTFP), and a similar study highlights the substantial collection of NTFP by fringe communities of the Kakum National Park in general (Amoah 2012) - showing that illegal entry is the norm when entry becomes prohibited and no alternative subsistence means are provided to support farmer livelihoods.

The FLA study did not provide quantitative data of the community members' entry and resource use in Kakum National Park: as the entrance is known to be illegal, the bias in the answers is significant. If NTFP may be collected by community members, cocoa expansion on the Park is unlikely as the high protection levels discourage any sign of entry.

Within the boundaries of the law, farmers do not benefit from the opportunities provided by Kakum National Park and its high tourist flow – the literature specifically points out their lack of awareness of the possibility to benefit from ecotourism (Appiah-Opoku 2011). Respondents see the Park as a constraint, as conflicts with wildlife occur frequently when elephants intrude into the cocoa parcels and cause significant losses in cocoa plants. A study led in cocoa communities at the edge of Kakum National Park counted 19 elephant raids on A's parcels in one year (Brako Dakwa et al 2016).

A households have access to a small **community forest**, separate from Kakum, which is a 30-minute walk from their houses. Visitors and tourists sometimes pay the community council to be able to visit it and see two specific items, either the “magical snake” or “the magical stone”. The money collected seems to be used to pay for community expenses (such as community school expenses).

Implications for the Cocoa Ecosystems and Livelihoods Project:

Farmers do not use **Kakum National Park** for cocoa expansion, but community members may fetch NTFP in the Park, because of a lack of alternatives. Conflicts with wildlife and the absence of opportunities within the Park's legal framework contribute to a negative perception of the Park's high level of protection. The Cocoa Ecosystems and Livelihoods activities of agroforestry and beehives aim to provide NTFP to community members closer to their homes and decrease **conflicts with elephants, reducing the need for farmers to enter the National Park**. Interestingly, the proximity of the forest reserve is, according to several research works, typically an enhancing factor for the adoption of agroforestry by farmers (Obeng and Weber, 2014).

Ecotourism would also be a path to benefit from Kakum National Park large touristic flows, particularly for the sale of honey and wax. A nearby village, for example, used local arts and music to attract tourism and generate revenue (Appiah-Opoku 2011).

Finally, the mainstreaming of the deforestation objective could be targeted towards “non-reserve” lands, i.e. “bush”, mainly deforested for expansion of cocoa. In the objective of having a clearer overview of deforestation risks, we could also conduct a deeper deforestation analysis based on Global Forest Watch (and other satellite) data and field observations.

It is also to be noted that the community members have rights on all land apart from the National Park: meaning that a landowner has the right to expand their parcels on **natural bushland**, which are sometimes old enough to be qualified as “forests”. This is where the risk of deforestation lies,

although few lands could still be qualified as “bush”, as most of it has already been converted to cultivated land (mainly for cocoa and palm oil) in the last twenty years.

Access to land



Access to land is crucial for self-sustaining livelihoods and represents one of the major assets for productive farm systems.

Size of parcels: On average, a household owns **5.01 acres** of land (2.03 hectares), that on average consist of **2 to 3 parcels of 2 acres each** (0.8 ha). It must be noted that these averages present a large standard deviation (5.7 acres, for example, for the total farm size), and therefore cover a large diversity of land (See Figure 11). Men often cultivate most of the land of the household, as the total surface of land cultivated by men is on average **two times larger** than the land cultivated by women, with a significant difference (pvalue=0.01): In Figure 11 below, the majority of the men (in orange) own more than 5ha, whereas the majority of women (in blue) own less than 5ha of land. However, literature indicates that women inherit more and more cocoa farms, offering some hope for land-owning equity in the future (Friedman et al 2018).

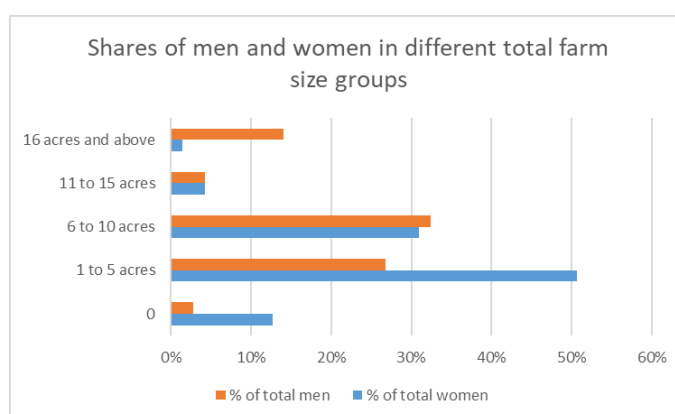


Figure 11: Total farm size, by gender

Age of parcels: Parcels are on average **16 years old** but have only been cultivated for **9 years** by farmers. This means that the parcels could have been created before the settlements by farmers: when first farmers arrived in the 2000s, attracted by rich soils and land availability, they could have farmed much of the land, while the population increased a second time, recuperating some of the lands. The average age of 16 years old would take the parcels close to their productivity peaks (see Figure 5 in part 2).

Tenure regime of parcels: Only 45% of farmers own the parcels that they cultivate (mostly without land tenure certificate): others use the parcels freely, or practice the “Abunu” renting (24% of farmers use Abunu as the main parcel tenure regime): This traditional way of renting land is widely adopted in Ghana: an owner lends their lands to a farmer who farms it, lives from it, gives 50% of their production to the owner, and can own half of the land after a decided term.

Implications for the Cocoa Ecosystems and Livelihoods Project:

The characteristics of parcels in this study are aligned with regional averages: Cocoa was installed shortly before the Ghanaian cocoa boom, parcels are small (2 ha), often far from the house (35 min walking distance), and mostly cultivated by men.

Dispersion and small size of parcels can be challenging for shade tree planting and management: tree-related activities will have to be site-specific based on space availability and boundary-sharing features, as trees are not the priority for most farmers when space could be allocated to more cocoa plants.

Although it seems that the different tenure regimes do not influence farm management activities (Otsuka et al 1999), it may influence the adoption of tree planting activities. The “security” status of the contracted land tenure is positively correlated with adoption of agroforestry (Insaïdoo et al 2012, Arbuckle 2005). As such, farmers with inherited lands under informal circumstances would be less likely to engage in tree planting, because they operate under customary rights, and because investment in tree planting must be done in consultation with community chiefs. Information tenure for farmers and content on how to plant trees depending on the different tenure regimes, will be included in the education and awareness raising activities.

2.2.4. Physical Capital

Physical capital regroups the main “physical” assets of a household: equipment, energy, roads, and is both an asset for the project activities and a key indicator of the household wealth and resilience.

Farming Equipment



All farmers are equipped with sickles, cutlasses, and sometimes scythes: It appeared that one of the interviewees had access to mechanized pruner or sprayer. This very poor level of farming equipment is a major and persistent limiting factor for cocoa productivity (Dormon 2004), although recent initiatives both from the private sector and the public sector (Africa Business Communities 2020) have emerged to deliver motorized pruners and slashers to farmers.

Equipment of households



Some specific exhaustive methods exist to assess the wealth of households (such as the livelihoods standard measurement, which is a method estimating the development based on the owning of assets). Due to this survey’s time constraints, we only asked for information about the ownership of key goods that appeared to be of most importance for households. In Figure 12 below, ownership rates for these goods are presented for both communities: Overall, households have “basic goods” (a mud house, a bed, access to a phone), but often lack resources to afford “comfort goods” (such as an individual latrine, a tv, a fan, bricks for the house structure).

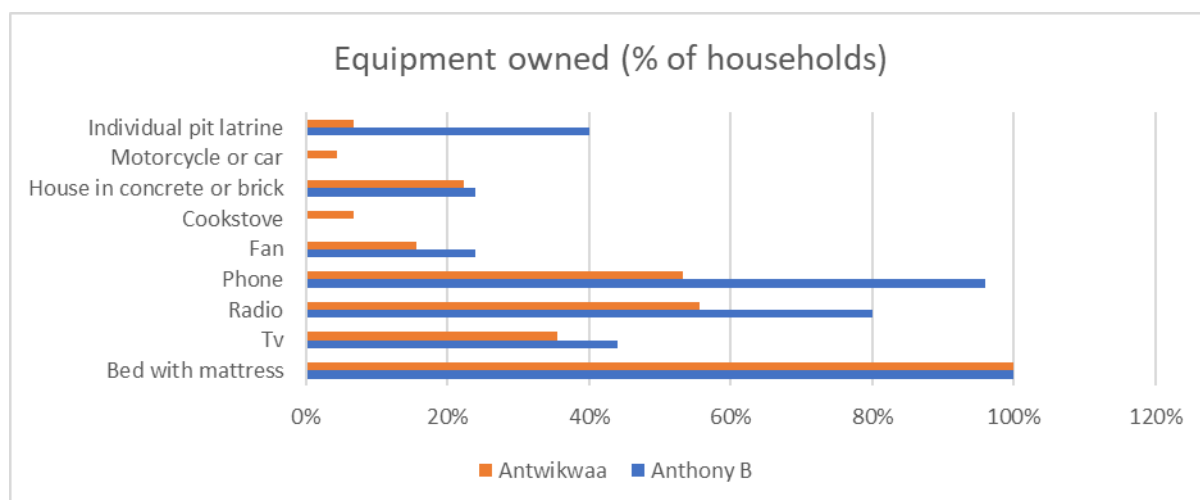


Figure 12: Percentage of households which own specific equipment, by village

Implications for the Cocoa Ecosystems and Livelihoods Project:

While the project does not include trainings or external inputs distribution, being aware of existing and future development projects conducted within the communities is useful to ensure the complementarity and additionality of our project activities. Over time, the agroforestry design will aim to replace some external inputs through nutrient cycling.

In terms of community equipment, both communities have access to electricity, but access to water is a daily challenge (especially for A), and the sandy roads serving the villages are in poor condition (especially for B). Regarding institutions, both communities have Junior Secondary Schools, although lacking accommodation for teachers, but no other “public” facilities. Members of both communities need to go to nearby cities (such as Cape Coast) to receive medication and health care.

External Assistance



All interviewees claim that they do not receive any financial assistance, but **half of the interviewees** claim that they have been receiving assistance for inputs, that are mostly distributed by **the Ministry of Food and Agriculture**. For 70% of individuals that received inputs, the government conducted “mass spraying”, meaning that three to five community members were responsible for spraying chemicals in all the other community members’ farms (and were paid by the government). The other 30% receiving inputs had to hire people themselves for the spraying.

Implications for the Cocoa Ecosystems and Livelihoods Project:

Directly relating to project activities, farming equipment would enhance cocoa productivity and could also be used for tree management. PUR Projet will explore this opportunity with the community. A motorcycle (or the car) is a strikingly absent item for respondents, and a strongly desired one. Combined with bad roads, the access to markets for crop selling is not fostered – and neither is the access to health facilities and to possible job opportunities. Identification of these needs could be integrated into the social enterprise trainings that will be given through the awareness raising activities.

2.3. Transforming Structures and Processes

The use of the assets described in part 2.2 is shaped by existing structures and processes at the macro-level, which can positively and negatively impact both the achievement of the households' objectives and the success of the Cocoa Ecosystems and Livelihood Project activities. In this Section, we will place the focus on the key impacting regional and local dynamics and structures.

2.3.1. The “tree tenure” issue, a limit to Agroforestry

While Ghana's Constitution grants land ownership to farmers under customary leadership structure (80% of the land is owned through customary rights), it gives the Government the right to manage naturally occurring resources for economic gain. Farmers thus encounter difficulties in legally maintaining ownership over the trees they have nurtured for years on their parcels, especially for naturally occurring trees on which farmers do not have ownership rights. This may also be the case for planted trees which are old enough to be differentiated from naturally occurring, especially since the legal classification between natural or planted trees lacks clarity. As a result, the government and its affiliated timber companies have the right to collect timber on parcels and are only compelled to compensate financially for any damage done to the farms, while paying social responsibilities (5% of the stumpage fees) through the funding of community development projects (US AID 2018). Although the Forestry Commission, which is the legal and operative government arm for forest management, is moving in the direction of a tree benefit-sharing framework (Tree Commission 2016), this approach has not yet yielded results, all the more since communities do not know their rights and what to request of timber companies.

Furthermore, while similar endeavors have set the path for “legal” ownership on trees (such as tree registration procedures with the help of NGOs and private cocoa companies), there is still a significant amount of illegal timber harvesting partially influenced by farmers' inability to own trees. Such farmers will negotiate with known chainsaw operators to harvest nurtured trees for a fee, which is usually very low.

Overall, the lack of perspectives on tree ownership disincentivizes farmers to plant shade trees on their parcels, and cause distrust between communities, timber harvesters, and the Forestry Commission in Ghana.

Implications for the Cocoa Ecosystems and Livelihoods Project:

The legal framework is a major barrier for tree planting and sustainable cocoa management: Conversations with existing initiatives that attempt to assign tree ownership to cocoa farmers and with the Forestry Commission have been engaged.

PUR Projet is actively engaging on tree and land tenure discussions with Cocobod, the World Bank and other organizations to gain clarity and help farmers understand their rights. Tree and land rights will be a large focus of the education and awareness building activity.

2.3.2. Cooperatives and Government at the service of cocoa production

Cocoa buyers' cooperatives: As seen in Section 2.2.2, cocoa farmers have their main buyers, often cooperatives, that register the farmers they buy from, and can choose to implement projects and programs with them. Most of these buying cooperatives, such as Nyonkopa, directly train the farmers on Good Agricultural Practices, and sometimes supply them with inputs, and implement community-based development programs, such as pension schemes with farmers.

Government cooperatives: In addition to the cooperatives implemented by cocoa buyers, the Ghana Cocoa Board (COCOBOD), has shown a proactive approach in shaping government-led cooperatives in the last two years. This new model of cooperative would provide producers with further assistance on reducing pest attacks and implementing Good Agricultural Practices.

Government: Cocoa production was, and still is, encouraged by the Ghanaian government. The government implements plans on input distribution but also directly lobbies for a high cocoa price in international discussions with cocoa buying companies and traders (see part 2.1.2).

Implications for the Cocoa Ecosystems and Livelihoods Project:

These structures enhance the protection and capacity building of cocoa farmers, on dimensions that generally do not fall under PUR Projet's scope of work, such as agricultural practices, inputs, and cocoa farmgate price. As these are elements that are likely to impact the project activities and their outcomes, their understanding is key. PUR Projet is actively collaborating with these organizations to proactively understand government-induced changes and adaptively manage activities.

2.3.3. Impact of the Pandemic

COVID-19 has had two main impacts on cocoa farmers. The first one is the decrease in available migrant labor, as Ghanaian borders have been closed for 5 months. As a result, farmers have had trouble finding workers to support them with the pruning and the weeding of cocoa plants (Financial Times, 2020). The second impact is the sharp decrease in cocoa sales, as seen in part 2.1.2.

2.4. Livelihood Strategies

Based on existing assets and existing transforming structures, farmers choose to adopt certain livelihood strategies. Orientation towards cocoa cultivation is clear in A and B, but farming systems are overall underperforming, leading households to lack resources for investment in their farming productions (cocoa-related inputs for example) and in the future (education, house improvements).

2.4.1. A and B as real cocoa communities

Cocoa as the main source of livelihood and the main “cash crop”

Almost all interviewees cultivate cocoa as the main crop, and especially **93%** of the men interviewed cultivate cocoa (**76%** of women). Cocoa is thus at the center of the community households' livelihood strategies: it represents on average **83 %** of total crop sales, **70%** of all cash incomes (when including all cash-generating activities, including side jobs), and **60%** of all incomes (when including the economic value of the production of subsistence crops and animals for auto consumption – see 2.4.4).

Although Palm oil and rubber receive increasing interest from farmers as “cash crops”, they remain minor: Out of 70 households interviewed, only **7** cultivate palm oil (representing 10% or less of their incomes), and **2** cultivate rubber (representing 25% and 46% of their total incomes)

Implications for the Cocoa Ecosystems and Livelihoods Project:

The dependence of farming incomes and total household incomes on cocoa is high – creating a high vulnerability of the households to climate, price, global loss of fertility of cocoa parcels, although it remains the most rewarding strategy for capital production.

Relevance of additional revenue generating activities that support ecological resilience, such as the crop-selling from agroforestry and beekeeping, is thus confirmed.

Despite its central role in the livelihood strategies, cocoa farming remains unproductive

When calculated on an individual basis, the cocoa yield average for the year 2019 is very low: **233.1 kg/ha** for both communities (no significant difference between villages). These considerably low yields, when compared with average yields of the region (**300 to 400 kg/ha** from a research paper by ODI 2017) can be explained by two reasons:

- A relative uncertainty around the age of parcels, some of which may be older than what farmers declared, and thus less productive?
- The exceptionally bad weather conditions last year: farmers reported to our consultant intense rainfall, saturating the soil with water, leading to a poor harvest.

Despite these uncertainties, most cocoa farmers also declared that their production decreased over the last years, likely due to unpredictable weather events and overall loss of fertility (see part 2.1)

Implications for the Cocoa Ecosystems and Livelihoods Project:

Last year’s cocoa yield data do not, by themselves, enable us to draw significant conclusions. Yet farmers statements converge on the observation of a decreasing trend in cocoa yields in the past 5 years. Agroforestry has the potential to mitigate impacts of climate change, and to increase parcels’ fertility, thus stabilizing yields over the long term. If the evolution of cocoa yields were to be monitored, the baseline would need to be informed by cooperative registries. Cooperative registries would include each farmer’s production by year and/or monitor the yield of a small sample of farmers on a regular basis.

Overall, cocoa yields are a key driver for community livelihoods in this area, and therefore poverty alleviation. A recent study (Espa 2017) showed that increased cocoa yields in cocoa communities close to Kakum National Park would increase school attendance, as well as households’ food security, and the capacity for households to purchase consumer goods such as a TV for example..

By improving the resilience of cocoa parcels, increase income diversification and stabilizing cocoa yields over the long term, Agroforestry can play a key role in supporting livelihoods.

When comparing the sales of cocoa on an individual basis, the difference between men and women is striking: **men sell on average 2.5 times more cocoa than women** (4700 GHC on average for men, compared to 1840 GHC for women).

High expenses and low margins

Expenses for cocoa make up an average of **81%** of farming costs for cocoa farmers – which also clearly indicates that farming strategies are orientated toward maximizing cocoa production. These expenses were used to purchase inputs (**35%** of cocoa expenses), to hire labor to work on the parcels (**51%** of cocoa expenses), and to purchase equipment (**24%** of cocoa expenses). Cocoa yields appear to be correlated with the amount of money invested in inputs (pesticides). Inputs are indeed a key factor for cocoa yields improvement (Yahaya 2015, Aneani et al 2011) and appear to be the main limiting factor for cocoa productivity in A and B. Hired labor is also important and seems to be used more efficiently on smaller farms – hired laborers often also live in the communities or on the f

Implications for the Cocoa Ecosystems and Livelihoods Project:

Inputs and Available Labor force are key needs for farmers (they are also in Objectives - 2.5). Neither their distribution, nor their use, are in the project scope, but their monitoring is key in understanding cocoa productivity. A literature review on the drivers of cocoa yield show that cocoa yield is, in West Africa, negatively correlated with farm size, as resources are used less efficiently, but positively correlated with input use and labor time on the parcels. Material remains a minor expense – yet an investment in mechanized equipment and in transport means (motorcycle) could improve cocoa farming significantly, by reducing the amount of time spent on the farms, while benefiting management of planted shade trees (in pruning for example).

Exchanges with cocoa buyers and cooperatives, that implement and support cocoa agricultural practices, will be key in our strategy to support cocoa livelihoods in general.

Cocoa related activities: Time is also a major expense

What are the major time and labor requirements in cocoa farming? We had the opportunity to ask the farmers about each activity related to cocoa: how much time it takes, how they do it, and with whom.

The phases from **harvesting** to **transporting**, including the **breaking of pods** – seem to be the **most time-consuming phases of the process** (see Figure 13).

The “unpaid” time needed to conduct these activities should not be neglected. Cocoa farmers declared that on average **46** unpaid days are spent per ha (calculated on the rate of 8 hours worked per day), and **64 unpaid days** on average on all cocoa parcels. Not only do farmers spend time on these activities but they are also often helped by other community members who they help in return (and thus spend time on others’ parcels as well). Additionally, farmers are largely assisted by family members, especially their partner.

Women, who have on average half as much land as men, yet still spend the same amount of time as men on cocoa farms, by helping their husbands. It has therefore been estimated in similar contexts in Ivory Coast that women carry out **68%** of the cocoa farming labor, while only receiving **21%** of the final income (African Development Bank 2015).

As for “paid time”, it is often a major expense for cocoa farmers: **46%** on average of individual farming expenses are for labor hiring for cocoa (especially for spraying, harvesting, and land clearing activities), but they can represent up to **100%** of farming expenses. Additionally, cocoa-related hired labor represents on average **23%** of total household expenses.

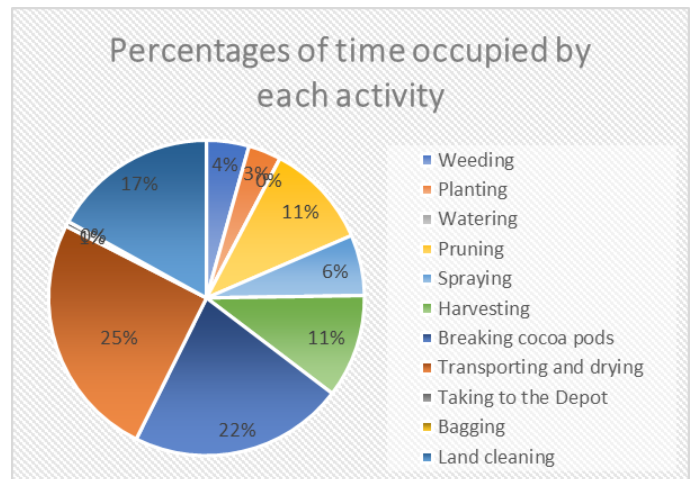


Figure 13: Percentages of time spent on the different cocoa activities by farmers on their parcels (in total: hired and family labor included)

Implications for the Cocoa Ecosystems and Livelihoods Project:

Family and community work are key in cocoa production, and the time spent by community members should be recognized. There is always a cost to farmers: either it is the family time that will not be spent on other activities, or it is time exchanged against time for other parcels, or it is time paid. Agroforestry activities and related trainings on tree caring should be embedded into existing cocoa time frameworks and carefully consider the following questions: When do farmers have time? When is it the best time to plant, prune? How can agroforestry beneficiaries rely on each other the way they do for cocoa activities?

Women’s time seems to be an adjustment variable for cocoa production. Project activities, especially agroforestry, should seek not to add any time burden on farmers’ partners, and, in the case of cookstoves, aim to reduce the time spent cooking.

Low profit and significant costs result in cocoa low profitability

After expenses are paid, the remaining net profit for cocoa farmers is quite low and differs according to gender. For men, for which reported production data was higher, the **cocoa net profit/ha** for 2019 was **577.5 GHS/ha**, A similar exercise by Yahaya et al (2015) gave a similar cocoa net profit at

621.24 GHS/ha. The relative lower net profits/ha for A and B can be explained both by exceptionally low yields and possible overestimation of expenses for hired labor during the interviews.

Women are, again, structurally disadvantaged: *as their land size is lower, they also have a lower yield and a lower cocoa margin.* Moreover, since men usually have control over the gains of cash crops (Barrientos, 2013), women receive little to no incomes from cocoa cultivation.

Overall, when looking at the *cocoa-related net profit per day*, similar studies estimated the cocoa earnings of an average Ghanaian farmer to range between **0.40** and **1 USD** per worked day. This number is far below the poverty line of **1.90 USD** a day, and even further below the living income in Ghana of 2.50 USD. To increase the resilience of their households, some farmers choose to have side farming activities, cultivating other crops (see Section 2.4.2) or side jobs, outside the farming system (see Section 2.4.3).

2.4.2. Other farm-related incomes bring resilience at a minimal cost

The value of gardening

Beyond cocoa, palm oil, and rubber, other crops are also cultivated. Gardening is mostly carried out by women, who cultivate an average of **three crops**. These crops include cassava, plantain, sugar cane, yam, orange, tomato, pepper, garden eggs, are often cultivated in small quantities, and are mainly grown for household-consumption, while marginally sold on the local markets (notably for cassava, plantain, yam).

Households often own or borrow chicken and sometimes goats. Chicken are valued for their eggs (they often have one very productive year in their lives), and meat and goats provide meat. Yet, no animal is raised for selling, and the animals are mainly used for as auto consumption.

Overall, auto-consumption of crops and animals should not be underestimated, as they also constitute “avoided costs”, and therefore can be valued monetarily: we make the hypothesis that by engaging in auto-consumption activities, the households do not need to buy them from the markets. As a result, auto-consumed crops account for **13%** of total crop value, and auto-consumed goods (including animals) account for **14%** of total household income on average, for less than **1%** of total expenses.

Implications for the Cocoa Ecosystems and Livelihoods Project:

Beyond the encouragement of crop diversification in our environmental awareness training, agroforestry could increase the households’ production of some fruits, such as oranges and pears. These crops could be used for auto consumption, but also sold, if the quantities reach a certain threshold. Indeed, as marketplaces are far from the villages, selling “side crops” is often not economically profitable for farmers under this threshold. Therefore, the business model of crop diversification will need to be co-designed with farmers.

2.4.3. Few income generating alternatives to farming

Households also rely partly on other sources of income than farming activities: these other sources of income increase their independence from farming activities.

On average, households have an income of **1291 GHC** from non-farming activities (which represents an average of **15%** of total household incomes for all households, and **26%** of incomes for the households that have other incomes). This average covers many different realities (see Figure 14). While some households benefit from lucrative activities such as teaching or owning a small shop, **63%** of households have little to no (below 1000 GHC) incomes from non-farming activities.

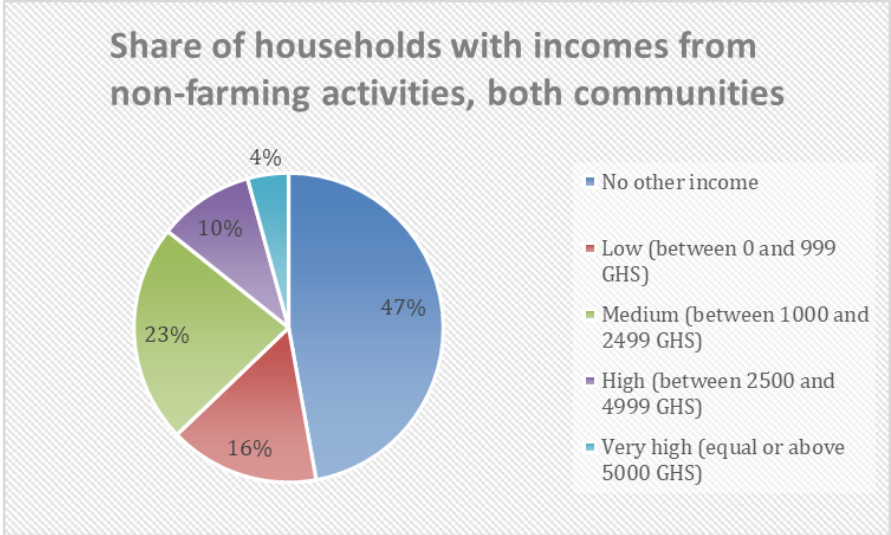


Figure 14: Share of households with incomes from non-farming

Overall, the types of side jobs vary from teacher, nurse, small shops, drivers, to employees in a nearby structure, etc. Those side jobs often originate from family members that are now living outside the household, and sometimes outside the village. Interviewees showed reluctance to reveal the exact amount of money they receive from members external to the household, but our consultant estimated the amount of money flow from children living outside of the household to be **1, 000 GHC** on average.

2.4.4. Overall, households have low-income levels in comparison with their expenses

On average, community households earn **7,800 GHC** (1350 USD) per year, including **60%** from **cocoa production** (Figure 15 below summarizes the main income sources at the household level). A similar study (KIT, 2018) showed that in Ghana, male-headed households earn **10,180 GHC** as opposed to women-headed households which earn an average of **7,794 GHC**. Again, our lower results (7,800 GHC on average) could be due to the exceptionally low yields in 2019, but they are in the same order of magnitude and indicate disparities between male-headed households and female-headed households.

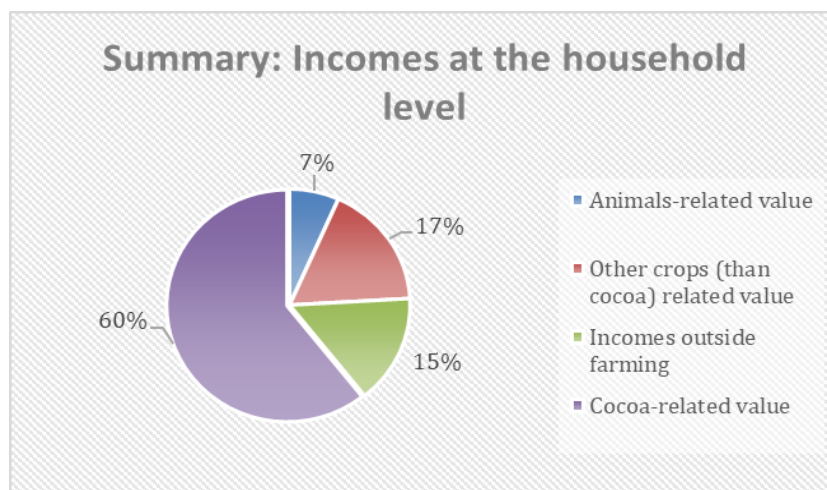


Figure 15: Average shares of the household “income” – by origin – Auto-consumption is here considered as an income

The average income level of households in the communities covers many different realities. Households headed by women differ especially from households lead by men: **Of the household interviewed, we found out that women-headed households have, on average, 50% less income than other households** (the difference being significant), even though the number of people in their households is similar.

Overall, all incomes combined do not meet household needs: the average living income benchmark, which estimates the net income required for a decent standard of living, is estimated to be **21,000 GHC** in a typical cocoa family in West Africa for male-headed households and **17,806 GHC** for female households (KIT 2018). **A and B, therefore, miss the living income benchmark by half**, both for male and female-headed households.

What are households able to afford with this income level?

An analysis of household expenses shows that on average, **23%** of household income is spent on cocoa, **less than 1%** is spent on farming other crops than cocoa, and **76%** is spent on the “functioning” expenses of the household. Interviews with farmers indicate that once basic household needs have been met, cocoa-related expenses are the adjustment variables, despite cocoa being the first source of income. Similar work with Ghanaian farmers has also shown that overall cocoa farming household expenditures, even when excluding input related expenses, exceed the household mean total incomes (KIT 2018). Shares of different types of expenses “outside farming” are displayed in Figure 16: **“Food” is unsurprisingly the main expense for households.**

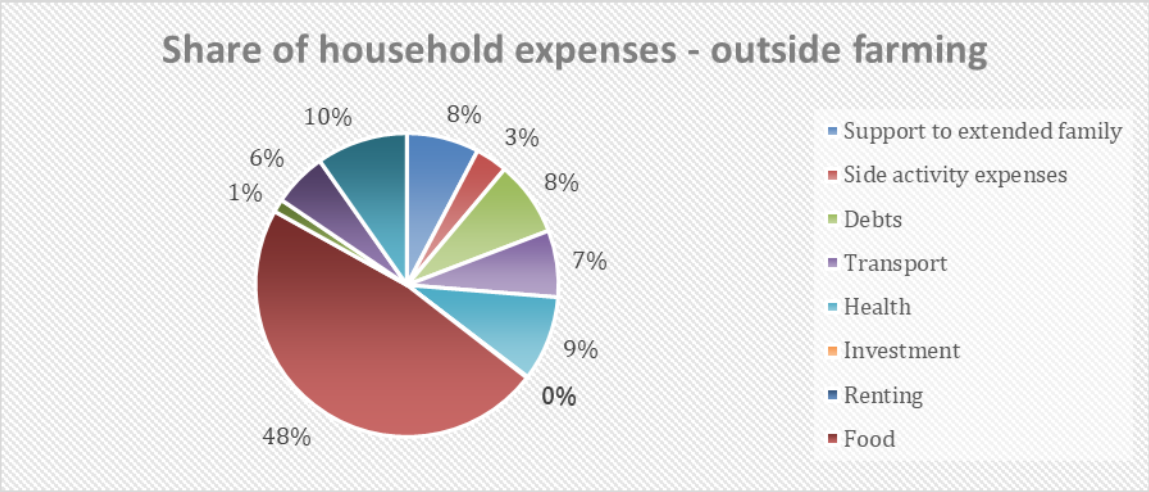


Figure 16: Average breakdown of expenses outside farming for households

Implications for the Cocoa Ecosystems and Livelihoods Project:

A and B are not wealthy communities. Few households have a stable secondary income source, which makes them vulnerable to possible shocks affecting cocoa production. At the same time, farmers with a secondary occupation are also less likely to adopt agroforestry, partly because of a lack of time available (Obeng and Weber2004).

Although women are key agents in cultivating crops, including other crops than cash crops, they tend capture less economic value from them: men largely own the farming capital. When designing activities, integrating women and providing support on capacity building around financial management and literacy to promote independence will be a key component of the project.

Agroforestry and additional farming activities such as beekeeping have the potential to increase household incomes. When assessing the economic impact of these additional revenue streams on the farmers, we recommend treating the information for each farm separately, and to aggregate the results at the community level in a second step.

2.5. Livelihoods Objectives

2.5.1. At the household level, the need for more incomes

From our interviews, receiving more short-term incomes appeared to be the priority for most interviewees: Most of the households declare to be aiming for more “cash”. These necessary additional streams of income would be needed primarily in the “off-season”, from March to May, after the first cocoa harvesting period and just before the start of the second harvest. When asked about the use of this money, most of the respondents mentioned “inputs”, whose use would increase their cocoa productivity.

Beyond the short-term needs, we can draw a hypothesis for the mid-term and long-term objectives of farmers. Kuklinski et Adhuze (2013) investigated the top 5 priority investments cocoa farmers would make if they were earning more money in the Ashanti region. The main expenditures chosen were housing improvement, the purchase of a sprayer, the purchase of a motorcycle/car, higher education for their children, and the start of the trade.

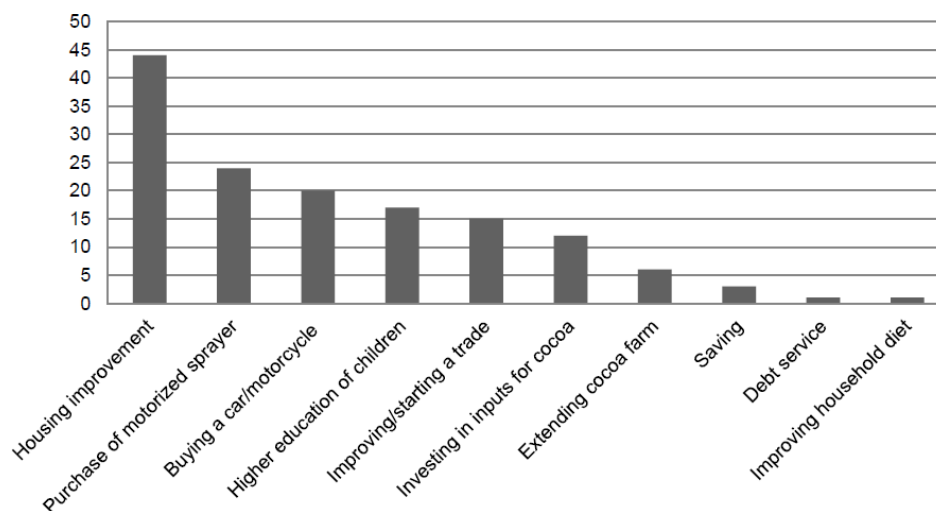


Figure 17: Priorities to buy or do when earning well (multiple responses could be chosen by farmers). From Kuklinski et Adhuze (2013)

Implications for the Cocoa Ecosystems and Livelihoods Project:

Income diversification and growth are key objectives for cocoa farmers. Farmers also want to increase their cocoa production by using more inputs and more elaborated equipment.

Investment in cocoa productivity is not an end goal *per se*: with more cocoa-related income, their objective is to have more resources to 1. Provide their families with better opportunities, notably through education and housing improvement and 2. Diversify their revenue streams to increase their resilience, for example by starting a new business.

2.5.2. At the community level

Most of the interviewees wished for developments inside their communities. Qualitative interviews highlighted community needs:

- **New teacher quarters** for both communities Junior Secondary School, that would ensure that teachers can stay overnight, deliver classes each day and that all children go to school, decreasing the risk of child labor. **The building of teachers' quarters, along with the provision of class material and books, is one of the recommendations of the International Labor Organization International Program for Elimination of Child Labor** in cocoa communities in Ghana (ILO 2015).
- **Closer health facilities**, as the current situation put community members at risk: Cocoa farming especially has overall underestimated negative impacts of the repetitive actions needed for cocoa farming. The strain put on farmers' minds and bodies translates into various diseases and injuries due to poor lifting techniques, cutting when weeding or breaking pods, biting from snakes, and a lack of protection when using agrochemicals. Overall, 52% of respondents in a study on cocoa farmers' health in Ghana reported that in the two years before the survey, they suffered from an injury that needed treatment (Muillerman, 2013).
- **The repair of the borehole in A.** It is estimated that six million people in Ghana rural areas do not have access to safe drinking water (WHO/UNICEF 2015). Initiatives from the International Cocoa Initiatives (ICI 2015) and cocoa companies have provided expert services to install new tanks or boreholes, and some projects have included innovative governance and payment systems, to empower communities in the management of their water systems (ICI 2015).

Implications for the Cocoa Ecosystems and Livelihoods Project:

If these dimensions are not directly addressed by the project, they could be part of a long-term reflection on the community development, through:

- Partnerships with other entities specialized in education, health, water (for example CARE)
- Adopting a community-based approach in the use of revenues generated from the activities, to address these community needs

3. Synthesis

By leveraging the tools of the Sustainable Livelihood Framework, the Farming Livelihood Assessment concludes that, if the project activities align with the households' key wishes for the future, several aspects could be further considered to ensure both activities' success and inclusivity.

3.1. Review of the project Theory of Change outcomes

3.1.1. Income diversification

The study enabled us to confirm the reliance of communities on cocoa cultivation. The shift to more lucrative crops such as palm oil and rubber is therefore not very common in the Project area, and few households have revenue-generating activities other than farming.

The Farmer Livelihood Assessment findings support the Cocoa Ecosystems and Livelihoods Project Theory of Change: income diversification and increase are crucial. Dependence on cocoa sales makes households vulnerable to price drops and to changing climate conditions. And if subsistence farming remains necessary to maintain resilience and to ensure that a large part of their food consumption does not need to be bought, households need a stable cocoa-induced capital, and additional income-generating activities. Beekeeping and the sale of Non-Timber Products from Agroforestry will provide short and mid-term incomes for benefitting households.

The overall increase in incomes will contribute to the household's welfare by:

- Enabling further investment in cocoa production:
 - o **Inputs**, that are a limiting factor regarding cocoa productivity, could be accessed by farmers. The use of inputs would have to be supported by training on sustainability in farming (training on alternatives to external inputs, and rates and period of input application)
 - o Capital: **Farming equipment** would be improved, to increase the efficiency of the time spent on the parcels
 - o **Labor**: Hiring more labor would both free time for farmers and their companions, and provide the communities with more employment opportunities
- Ensuring that households can meet their basic needs. In addition to the ability to pay for food, basic education, and transport, A and B beneficiaries expressed the need to further invest in their "human capital": having their children attend school after 15 years of age is an opportunity for them to build resilience for their families and invest in the future.
- Investing further in side-businesses (other than farming), that in return would also increase household incomes.

3.1.2. Increase of reforestation through agroforestry

Deforestation has been severe in the region: cocoa has expanded over previously forested land. The Cocoa Ecosystems and Livelihoods Project activities, particularly Agroforestry, will contribute to the reforestation of the region and fit into the intended regeneration of **landscape continuums** between the Kakum National Park and nearby forests. Furthermore, Agroforestry can provide a **longer-term resilience** to cocoa parcels, further limiting the need for cocoa expansion on forests.

3.1.3. Communities protect forests

Although Kakum National Park is not directly threatened by cocoa expansion, conflicts with wildlife are confirmed to be causing tensions and anger among farmers. Additionally, possible illegal collection of medicinal resources, honey, and fruits leave farmers to face retribution if caught,

further fueling negative perceptions of the Park protection status. Reconciling communities' interest in Park protection involves parallel workstreams to the project:

- Environmental Awareness activities will contribute to **raising awareness of the importance of having natural areas** for ecosystem services provision close to the village
- Installation of **improved cookstoves** within the households will increase available time for farmers, as well as decrease the pressure on surrounding natural areas (wood fetching)
- A decrease in the occurrences of **conflicts with wildlife through beekeeping** would further ease tensions between the community and the Park.
- Well-chosen **species** in the Agroforestry models can be key in **the supply of medicinal resources** and other **Non-Timber Forest Products**, decreasing the need for illegally entering the Park.
- **Participation in community-based projects** addressing the depletion of natural resources would further enhance both a community based and landscape-based approach for ecosystems restoration.

3.2. Key overall considerations for project activity

The use of the Sustainable Livelihoods Framework throughout the report enabled the identification of key risks and assets for the project, from which are drawn implications for the project design and implementation.

3.2.1. Resources for Agroforestry

Increasing the chances of success for agroforestry implies to maintain vigilance on a series of factors and adapt project activities when needed.

1- Agroforestry: Combining Agroforestry with a successful cocoa production

As the priority of farmers is to maximize their cocoa production, Agroforestry will have to be firmly embedded into cocoa agronomics, by:

- **Maintaining the space dedicated to cocoa:** As parcels are small and are the main capital provider for farmers, trees will be planted in the borders, pruned and/or will replace dead or sick cocoa trees
- **Embedding the agroforestry management activities within the cocoa activities schedule:** as parcels are far and cocoa is already a time-consuming activity, tree planting activities schedules will have to be directed and supported by farmers
- **Coordinating**, when possible, **with existing initiatives from cocoa cooperatives or the government agencies** (Cocobod, Ministry of Food and Agriculture) on Good Agricultural Practices and the necessary rehabilitation of aging cocoa farms. Ensuring that cocoa's productivity is maintained on the short and medium terms is a guarantee for the adoption of long-term strategies for cocoa resilience such as agroforestry.
- **Planting desirable species**, both to interact successfully with cocoa trees for water and nutrients exchange and to provide farmers with crops, medicinal resources, and timber (a list of desirable species has been established by Van Duijl et Toose 2012).

2- Agroforestry: Tree Tenure

Tree tenure, or rather the lack of tree tenure, is a **limiting** factor in the short term for both agroforestry implementation and sustainability. Farmers want the assurance of tree ownership early on although the process is still being defined by the government of Ghana. PP will be engaging **with the Forestry Commission** and other key forestry and tree tenure

institutions/organizations to explore the potential to support farmers to legally gain ownership of the trees they plant.

Additionally, **land tenure security**, through further understanding of the challenges met by farmers, and assistance to obtain certification could be an enhancing factor of the motivation of farmers for shade trees plantation. Tenants (who do not own the land) will be supported for the tree ownership.

3- Agroforestry: Adapting the training to the profile of farmers for successful onboarding

Community farmers are mostly migrant populations, from other parts of the same region for A and other regions for B, and **older** when compared to the average age in Ghana. Most farmers came to the region to cultivate cocoa in their 20s during the cocoa boom, and have kept cultivating cocoa since, while their children migrated to the cities to find alternative livelihoods. Therefore, despite a strong interest shown in tree planting, **a step by step approach will be necessary to embed these activities into a set of existing agronomic beliefs**

For **young people especially**, nurturing their interest would involve targeted and enhanced **incentives for cocoa production** in general: access to land, information, finance, but also shifts in perceptions of cocoa farming. As their education is higher, they are also the most skeptical of cocoa, including shaded cocoa (ODI 2017). Their relatively higher level of education can be leveraged to implement climate-sensitive cocoa farming models for the short to medium term.

4- Agroforestry: Access to information on trees

Evidence shows that access to information is a key factor for enabling the adoption of agroforestry, understanding the possible negative and positive impacts of shade trees, by species, and on training on good agroforestry practices. Both dimensions were addressed during the project design phase and will be strengthened as the activity's implementation progresses.

3.2.2. Enabling conditions for market access for income increase

Although both environmental benefits and increased longevity of the parcels are among the most desired impacts of agroforestry for farmers, there is a **recurring expectation that agroforestry will bring benefits in the form of an income increase and cash inputs**. Likewise, beekeeping activities would not only need to “deliver” on reducing conflicts with wildlife but also on short term increased income benefits.

Beyond the ability of implemented activities to deliver products such as honey, fruits, and timber, the possibility to move from auto-consuming to selling will depend on the access to markets, and thus on the two following aspects:

- **Transport:** Bad road quality, especially for B, and the community's lack of vehicles are limiting factors for the transport of the production to local markets. Options for the purchase of community vehicles, or **tricycles**, could be considered.
- **Quantities:** Productions are often auto consumed when the potential for value creation is not obvious for farmers. A cooperative model could increase quantities to be sold, and thereby positively influence farmers for market access.
- **Transformation:** The more goods are transformed and processed; the more margin can be earned. It may be possible to increase value from Agroforestry-produced fruits and honey through processing.
- **Buyers:** A **partnership with the Kakum National Park** and adequate marketing on the conciliation of communities' business and park protection could enhance the selling of produced goods, for example to tourists. Beekeepers can sell forest honey to tourists and organize cocoa parcels and apiary tours to interested people who may want to experience the local community and farmers' lifestyle.

- **Literacy:** Programs of financial and social literacy could overall benefit farmers in their attempt to build stronger businesses made by farmers: Having **continuous monitoring of household expenses and incomes** would enhance the construction of viable business models. Financial literacy will be included in the education and awareness events.

3.2.3. A community-based approach to address other community needs

Strong community needs and priorities were expressed during surveys, particularly on water access (repair and care of the boreholes), education (building of school quarters for teachers), and health care (access to closer facilities). Although there was a wide understanding among community members that PUR Projet would not address these issues, their resolution would enhance overall households' welfare. A few avenues can thus be explored:

- In A, the **repair of the borehole** could ensure the supply of A inhabitants in water for uses such as drinking, cooking, bathing, while streams could be used for nurseries. Then, in line with General Mills Water Policy (General Mills 2015), **the overall monitoring of water usage** would ensure the identification of key threats over water resources.
- A share of PUR Projet implemented activities benefits could contribute to **a community fund**, on the model of what has been practiced in A with the cash benefits of the community forest. As a large sense of community and strong family bonds exist in both villages, community-based revenue sharing may even be fostered. Community nurseries, likewise, could be strengthened by **community-based resource management**.
- The **direct partnership** of PUR Projet, or **indirect** partnership through General Mills action, with other entities (such as CARE) more appropriate to address these community needs.

3.2.4. Inclusion of vulnerable groups

The study could also enable the identification of specific households showing signs of vulnerability, or for which activities would need to be adapted.

The need for a gender-sensitive approach

Women are the economic forces of the households and are often mobilized to take care of their **land and crops**. However, when compared to men they show specific traits:

- They have on average **less education** and tend to rely on men for literacy or financial calculations.
- They own on average **less land**, sell fewer crops, and have less incomes than men
- They spend overall **more time on labor** than men; by helping the men on their parcels, but also by completing domestic household tasks.
- Women-led households have **less incomes** than men led households

A gender-sensitive approach could therefore include the following dimensions:

- **Encouraging and monitoring attendance** of trainings by women
- **Enhancing women participation** by consciously scheduling and designing activities
- **Encouraging the installation of trees and beehives** in women-owned parcels
- Prioritizing the installation of **improved cookstoves** in women-led households,
- **Partnering with entities specialized in literacy** for women (for example with CARE – CARE 2016) to increase their autonomy in the creation and use of resources.

Including lower capital households

Households with fewer assets have **less flexibility for their livelihood strategies**. It is especially the case of households with a **lower total farm size** (between 1 and 5 acres) and of households with **no livelihood strategies outside farming** (when less than 1,000 GHC generated through other strategies). These two categories of households could be especially targeted with **short-term benefitting activities** and both a massive fruit trees plantation at the borders of the cocoa farms, prioritization in the settlement of the first beehives could be options to explore. The list of these households will be integrated into the project design process and will participate to include all households interested in the project activities.

No information for the most vulnerable leads to even lower participation

At the time of the survey, at least **20% of beneficiaries** are very likely to have **no or partial information** on the project, an exhaustive visit of households may improve access to information and individuals' empowerment. Attention will also be paid to ensure that **members not part of community councils** are not voluntarily excluded from the project, and that are aware of the project design and implementation processes.

3.3. Setting up a Baseline and tracking progress

As the project moves forward, its impact will be assessed against the baseline information found in this report.

Income diversification

The consolidation of average households (and farms) - related KPIs has proven to be especially demanding concerning both the quality of answers provided and their variability. In particular, the difficulty in estimating time spent on farming activities and general household expenses has prevented the analysis from delivering key community KPIs. Therefore, **the comparison of future incomes and expenses for each household (rather than at the community level) will be preferred in the future**. Assessing each household data against future Midline data will thus enable to capture:

- 1- The **additional incomes related to Agroforestry crops** (Non-Timber Products) and beekeeping. On cocoa yields specifically, further monitoring of cocoa yields on a small sample could confirm that 2019 was not a good cocoa year, as well as the use of the cocoa buyers' registries.
- 2- The **additional expenses related to Agroforestry and beekeeping**, including the time spent¹

Fortunately, an indirect outcome of the study was the interviewees demonstrated the will to start to carefully track their incomes and expenses, as they felt frustrated by their difficulty in answering our consultant's questions. Additionally, **training in accounting** could benefit future monitoring.

The **Midline** and **Final study** could be planned respectively in 5 years and 10 years on a similar sample number, but we also recommend to conduct continuous monitoring (every 6 months) on a smaller sample of farmers, to tackle annual variability while minimizing study costs.

Environmental Awareness

When designed, **environmental awareness activities could incorporate a baseline** survey done at the beginning of the training program. The results will be compared with a survey done after the training, two weeks, and six months after the training. The survey, that could be anonymous, could include the following dimensions:

- 1- Information on the **use of nearby natural areas**
- 2- **Knowledge of plant and animal species**: on the cocoa parcels, in the surrounding bush, in Kakum National Park
- 3- **Knowledge of services** provided by ecosystems; including for climate change resilience, medicinal resources provision, soil fertility that are key in the region.

Protection of the forest

Knowledge of the state of forests surrounding the villages would add consistency to the overall zero-deforestation objective of the project, in line with the Cocoa Forest Initiative commitments. An **annual monitoring analysis of deforestation** through Global Forest Watch sets of data (or other interpreted sets of satellite imagery) will contribute to the fulfillment of this objective.

¹ A careful filtering of data will have to be included to remove outliers (where data appears to be inherently unreasonable).

4. Conclusion

The study confirmed key community facts identified previously in the project process and unveiled new ones. First, as communities are integrated into a **cocoa-based territory** animated by its own social, political, and economic realities, the reflection on topics such as the evolution of the **legislation on tree tenure**, the existing cocoa-based **structures**, the challenges in gaining **access to local markets** and the **emigration of young people** is important to gain a better understanding of the project's key success factors. At the community-level, the **strength and resilience of family and community structures** is a key asset for the project activities. At the same time, the study also draws attention to households that may not be integrated into these structures, and therefore be less visible: **alone women households**, recently arrived **migrants**, or simply households with **fewer assets** (land, side jobs).

Finally, the study raises strategic questions: Are **partnerships** with organizations specialized in sanitation or education possible and relevant? How can **benefits be fairly** distributed among community members? Despite these necessary considerations that will be worked on through the project, the relevance of project activities and the vibrant implication of community members were both reaffirmed and pave the way for the project success and fruitful research on its impacts.

As farmers were getting more informed of the project, the study contributed to raising their expectations. Quoting one of the interviewees; *“[PUR Projet] have good intentions for us to do well, I pray that the Lord protects them from the virus for them to be able to fulfill their plans for us; others came and promised but never fulfilled their promise but, I see this organization to be different especially with the training they gave us during the meeting, it helped me to understand a lot of things now. God bless them.”*

Fulfilling promises in development is always challenging. With continuous monitoring of our impacts and adaptive management to farmers' feedback, the Cocoa Ecosystems and Livelihoods Project aims to support to sustainable livelihoods for A and B, over the long-term.

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