

Smallholder agricultural carbon projects in Ghana

Benefits, barriers, and institutional arrangements

Working Paper No. 30

CGIAR Research Program on Climate Change,
Agriculture and Food Security (CCAFS)

Jean Lee



RESEARCH PROGRAM ON
**Climate Change,
Agriculture and
Food Security**



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Contact:

CCAFS Coordinating Unit - Faculty of Science, Department of Plant and Environmental Sciences, University of Copenhagen, Rolighedsvej 21, DK-1958 Frederiksberg C, Denmark. Tel: +45 35331046; Email: ccaafs@cgiar.org

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Abstract

Climate mitigation projects that involve smallholder farmers may provide solutions for decreasing agriculture's role in global greenhouse gas (GHG) emissions. Farmer involvement in the development of agricultural climate change mitigation projects is essential if projects are to be sustainable and to ensure projects do not compromise farmer livelihoods and food security. This paper profiles four ongoing agricultural carbon projects in Ghana with in depth comparative analysis highlighting their differences and similarities.

The purpose of this research was to provide a snapshot of the current state of climate mitigation projects in Ghana that are reducing agricultural GHG emissions while also helping smallholder farmers support their livelihoods and adapt to climate change. The projects use a variety of incentive mechanisms to promote on-farm conservation measures, including tree planting and conservation agriculture. The projects aim to provide both short-term and long-term benefits; however, participation requirements pose barriers for some farmers. Institutional arrangements (e.g. contracts, land tenure, farmer organizations) can affect the costs, risks, barriers, and incentives farmers encounter in participating and benefiting from climate mitigation projects. Future research and attention to project design has the potential to clarify the role of carbon markets and certification in agricultural mitigation projects and ensure that benefits are distributed fairly.

Keywords

Climate change; agriculture; Ghana; mitigation; smallholder farmers

About the authors

Jean Lee is a PhD Candidate at the Rubenstein School of Environment and Natural Resources and the Gund Institute for Ecological Economics at the University of Vermont, 617 Main St., Burlington, VT 05405, USA. Jean.Lee@uvm.edu

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Introduction

Climate mitigation projects that involve smallholder farmers may provide solutions for decreasing agriculture's role in global greenhouse gas (GHG) emissions while also increasing food security and promoting sustainable livelihoods for smallholder farmers. Farmer involvement in agriculture climate mitigation is essential if projects are to be sustainable and if we are to ensure projects do not compromise farmer livelihoods and food security.

This working paper is the result of primary research conducted in Ghana in 2011. The purpose of this research was to investigate climate mitigation projects to provide a snapshot of the current state of projects that are reducing agricultural GHG emissions while also helping smallholder farmers adapt to climate change.

The primary objectives of this paper are:

1. To provide snapshots of four agricultural carbon projects that three nongovernmental organizations (NGOs) have implemented in Ghana, including sketches of institutional arrangements, types of mitigation intervention, and distinctive features of each project;
2. To highlight institutional arrangements (e.g. contracts, land tenure, farmer organizations) and how they affect the costs, risks, barriers, and incentives farmers encounter in participating and benefiting from climate mitigation projects; and
3. To identify some of the key lessons learned from the project site visits and how they serve to identify future research needs in the area.

Background

Agricultural emissions & current practices

Agriculture accounts for 10-12% of global anthropogenic GHG emissions (Smith et al. 2008).

The role of agriculture in climate change cannot be ignored when discussing climate mitigation strategies. While the net flux of CO₂ may be small, CH₄ and N₂O emissions represent 52% and 84% of global CO₂ emissions, respectively (De Pinto et al. 2010).

Mitigation options in agriculture fall into three major categories: reducing emissions, enhancing removals, and avoiding emissions. All can be achieved through various sustainable land management (SLM) practices (Smith et al. 2008).

Different countries and programs implement agricultural climate mitigation projects in different ways. Agroforestry and conservation tillage are two common management practices promoted by projects developers. Conservation agriculture entails reducing tillage, retaining adequate crop residues, and practicing crop rotation to save on water usage, fossil fuel emissions, and fertilizer application. Agroforestry involves planting trees on cropland. Project developers promote agroforestry because in addition to carbon sequestration, it provides multiple benefits to the farmer (e.g. food, timber, fuel wood, or medicine).

SLM practices can increase soil fertility and improve soil structure, resulting in higher yields and greater ecosystem resilience (Mutuo et al. 2005; Verchot et al. 2007). However, the carbon sequestration potential in these systems is highly dependent on tree type and growth, as well as how much tree litter is returned to the system. This high level of uncertainty is one reason land based carbon projects are not as popular as carbon mitigation projects in other sectors (e.g. energy).

Why Ghana?

Ghana is heavily dependent on agriculture; agricultural exports account for 75% of the country's exports and 38% of its GDP (World Bank 2010). The Ghanaian government recognizes the importance of agriculture and the adverse impacts of climate change on agricultural production in the area, especially in the Northern region, where erratic rainfall in the past decade has already exacerbated food insecurity and poses additional challenges to development.

Ghana hopes to take advantage of the current funding opportunities to implement policies and projects that promote low carbon agricultural growth, and several projects in the country are piloting programs that address agricultural mitigation while also contributing to food security. However, many questions remain regarding the best strategies for implementing climate mitigation projects that not only reduce GHG emissions in agriculture but also contribute to improving smallholder farmers' livelihoods.

Need for smallholder involvement & barriers involved

Smallholders need to be involved in agricultural climate mitigation projects for projects to be successful and to have a positive impact on their livelihoods. Many researchers believe attention to project design and institutional arrangements are vital in creating successful projects that involve smallholder farmers (Boyd et al. 2007; Corbera and Brown 2008). Given the potential for carbon-related projects to benefit smallholder farmers, research on the types of projects and their defining characteristics is important for understanding how to build upon current projects and make future projects more successful.

Research methods

During the summer of 2011, I visited four¹ agricultural climate mitigation projects in two regions of Ghana. Projects were chosen based on inclusion of 1) activities that resulted in agricultural climate mitigation², 2) a livelihood or food security component, and 3) the involvement of smallholder farmers.

Project field visits were coordinated with staff in regional offices and through communication with local field staff. The duration of project visits lasted between two and five days. During project site visits, I conducted semi-structured interviews with project coordinators, field staff, and project volunteers. I also conducted semi-structured interviews and focus groups with participating as well as non-participating farmers to discuss their perceptions of the challenges and benefits of the project. I held separate as well as joint focus groups for men and women farmers. Local field staff often served as translators.

¹ Two of the four projects (CAP and ALP) are managed by CARE and PARED and are very similar in structure and design. In the report, I treat them as one project, unless otherwise noted.

² While not all projects are designed for the specific purpose of agricultural climate mitigation, all projects included here have activities that lead to climate mitigation, directly or indirectly.

I also met with program coordinators in the regional offices, located in Tamale and Accra, to get a program-level perspective on the projects and to ask for their opinions on research needs of the projects. These interviews provided the opportunity to clarify any discrepancies between what farmers said, what was observed, and what field staff told me.

The projects

An overview of project characteristics project is provided below and summarized in Table 1.

Project types

The four projects can be characterized into three categories based on their primary emphasis: avoided deforestation (Rainforest Alliance's Training, Extension, Enterprises and Sourcing (TREES) program's Forest, Climate & Communities Alliance), livelihoods and food security (CARE International's Conservation Agriculture Program (CAP) and Adaptive Learning Program (ALP) projects), and tree planting (A Rocha Ghana's Climate Stewards Tree Planting program). The only project with an explicit climate mitigation focus is the Climate Stewards program by A Rocha Ghana; the project has multiple goals of contributing to climate mitigation, livelihood improvement, and biodiversity through planting native tree species. However, the TREES program also has a carbon component as a REDD+ pilot project.

Agroforestry practices

Both the TREES program and the Climate Stewards program encourage agroforestry practices, though for different purposes. The TREES program encourages tree planting on cocoa farms to provide shade for the cocoa trees and to create buffer zones near streams. In the TREES program, project staff promote tree planting as a way to improve ecosystem health and increase the productivity of the soils and, most importantly, cocoa yield. The Climate Stewards program, on the other hand, encourages agroforestry practices only in the beginning of their tree planting program, mainly as a way to maximize land use and provide extra food and income for the farmers while the trees are still young. As the trees get larger, the shade prevents the crops from getting the sunlight needed for growth, and farmers can prune the trees for firewood or cut the trees down for timber.

Table 1 Project characteristics

Project Name	TREES Program Forest, Climate and Communities Alliance	Climate Steward Tree Planting Program	Conservation Agriculture Program	Adaptive Learning Program
Lead Organization(s)	Rainforest Alliance	A Rocha and A Rocha Ghana	CARE International and PARED	CARE International and PARED
Project Type	REDD+ pilot project with multiple goals of sustainable land management and agroforestry	Agroforestry and community tree plantations	Food security and livelihoods	Food security, livelihoods, climate change education
Mitigation Intervention	N/A; project is a REDD+ pilot project (though mitigation would occur through boundary tree planting and agroforestry practices)	Carbon sequestration through tree planting	N/A; though project promotes conservation agriculture as a livelihood strategy	N/A; though project promotes conservation as a livelihood strategy
Monitoring	Activity based monitoring in initial stage of project	A Rocha staff monitors tree growth every 2 years	Staff visits 1-3 times a week, results based monitoring	Staff visits 1-3 times a week, results based monitoring
Incentives	SAN certificate, tree seedlings, farmer field schools, increased productivity	Alternative livelihood strategies	Free food, seed, and herbicide, ruminants, extension agent support	Free short duration crop seedlings, free drought and flood resistant crops
Short-term Benefits	Premium for cocoa beans associated with SAN certification, projects tries to help secure land titles	Additional income from land clearing, soybean seeds, beehives	Less labour needed for food production	Free seedlings with introduction of new crops
Long-term Benefits	Carbon credits, increased productivity without expansion	Timber harvest, enterprise development	Less labour needed for food production, increased productivity, increased food security	Resilience to climate change
Barriers	Must own farm to participate	Older farmers have a difficult time working on both their farmland and community plantation	Farmers need money to purchase herbicides to configure conservation agriculture	Lack of effective coordination at district level, funding cycles
Risks	Time required to weed and attend farmer field school	Fire may destroy trees	Initially, farmers thought program might not work so they did not want to adopt new practices	None; land ownership determined by chiefs or head of clans

Incentive mechanisms

Rainforest Alliance's Sustainable Agriculture Network (SAN) certification works with farmers and eventually hopes to have farmers own the SAN certificate. This is particularly worth noting because this means more benefits will go towards the farmers because Rainforest Alliance will no longer be an intermediary. In addition, if the farmers hold the certificate, then they can decide how they want the benefits distributed. This is in contrast to other certifications (e.g. Fair Trade or UTZ), where the agency certifying the farmers gets to decide the benefits they offer the farmers.

CARE's approach to working with the local community is also unique. Instead of working directly with the farmers, CARE chose to fund staff at a local NGO, Partners in Rural Empowerment and Development (PARED). PARED staff said CARE chose to implement the project this way because PARED has more experience in the area and the farmers trust PARED.

Uncertainty & costs

Uncertainties regarding how to measure carbon and high transaction costs involved in certification have prevented all programs from implementing or delivering a carbon component. CARE International's Conservation Agriculture Program considered the possibility of payments for soil carbon, but abandoned the idea because they did not think the payment amount would be significant enough to justify the extra costs of monitoring and measuring. However, the program still took soil samples for their own reference.

A Rocha's Climate Stewards program could not complete the Climate, Community and Biodiversity Alliance (CCBA) certification process due to the high cost (110,000 British pounds/\$177,000 USD). Because their carbon is not certified, they are not able to sell their carbon on the market and instead rely on voluntary contributions. Lastly, Rainforest Alliance's TREES program hopes to pay farmers for carbon sequestered in the near future. However, project staff recognized that many uncertainties surrounding REDD+ exist, and the payments will be dependent on upcoming negotiations on how Ghana will define its forests.

Intended versus de facto project design

Both the Climate Stewards project and the TREES project made adjustments to their project design after implementation.

Originally, Climate Stewards had outlined a specific payment plan involving five types of benefits every four years for the next 20 years. They originally intended to offer eight forms of benefits every two and a half years, but after the project started they did not have the resources to do so and had to renegotiate contracts with the farmers. A Rocha staff thought it would provide the community with most benefits if they gave the community beehives. A Rocha had previously promised farmers payments for the trees and did not clarify what type of payments (most interviewed farmers thought payments meant monetary payments), so they had to explain to farmers the reasons for not paying them money and instead giving beehives to farmers.

The TREES program underwent a “significant re-engineering of priorities” (field staff) after realizing they could not address the issue of deforestation without also addressing cocoa, as cocoa is the dominant cash crop in the region. Originally, the SAN certification was not part of their project, but they recognized they could not ask farmers to not deforest the land without providing alternatives (e.g. improving productivity through sustainable land management). Now the SAN certification program occupies a large portion of project activities because of the importance of cocoa farming in the area. Also, the project originally included a non-timber forest product (NFTP) component, but project staff quickly realized that there was a conflict, because Ghanaian laws prevent any harvesting of indigenous species that are not planted by an individual. Thus, the project added a component of boundary planting and registering the trees with the government so communities could use the trees when they were grown.

Funding

Project staff at all projects expressed frustration with the funding cycles and how the cash flow often did not line up with planting seasons. For example, the Climate Stewards program missed a planting season because they ran out of money to purchase seedlings. PARED staff said that it was often difficult to start and complete a project in a three-year time frame, because the scoping period to learn of farmers’ needs often occupies a significant portion of time during the beginning of the project.

Institutional arrangements

The following figures outline the institutional arrangements for each of the projects.

A Rocha Ghana

Climate Stewards Tree Planting Project

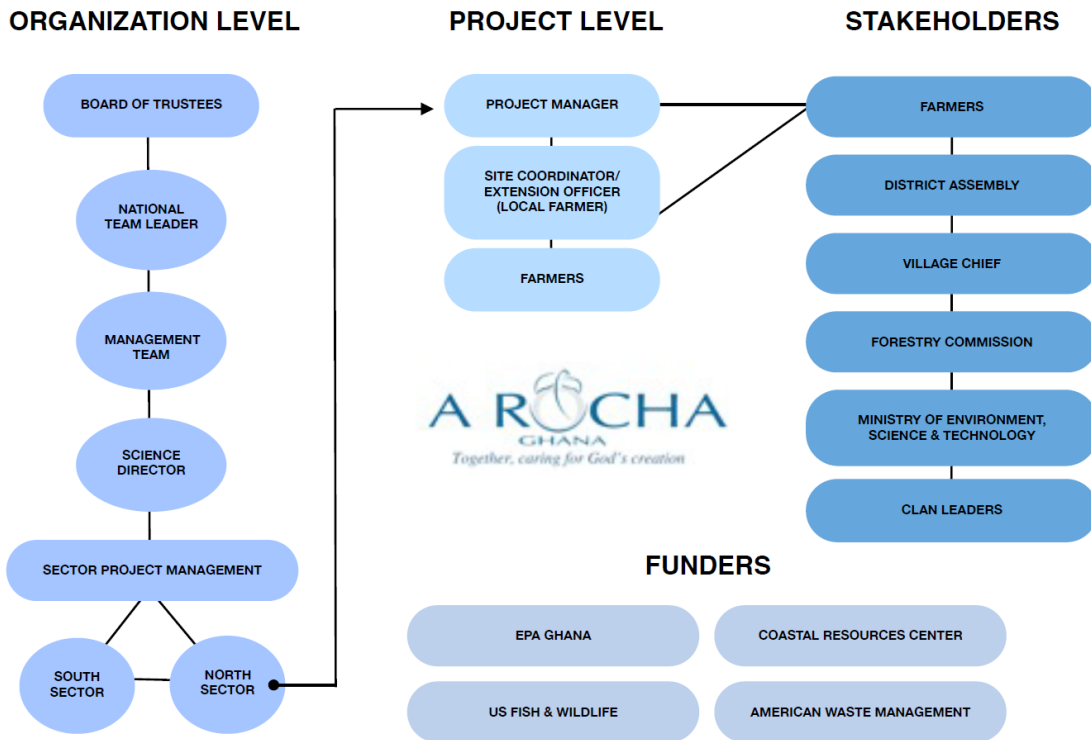


Figure 1 Institutional arrangements for Climate Stewards Tree Planting Project

Forest, Climate & Community Alliance

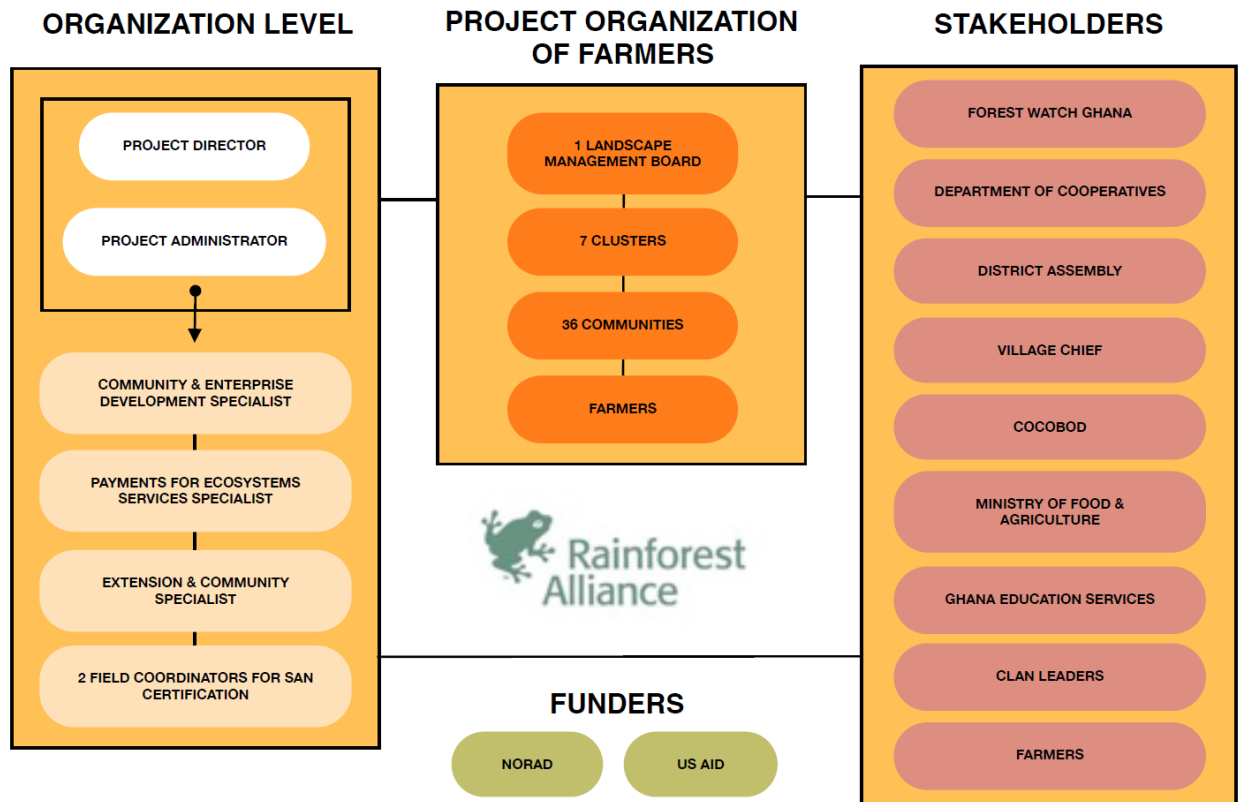


Figure 2 Institutional arrangements for TREES Program's Forest, Climate & Community Project

Example of a cluster

Asemaneye Cluster has five communities:

- Eteso—125 farmers (divided into 4 groups)
- Nkra—64 farmers
- Asemaneye—170 farmers (divide farmers into 6 groups, lead farmers meet with groups 2 times a week)
- Bremang—120 farmers
- Dominebo—120 farmers

Conservation Agriculture Program & Adaptive Learning Program

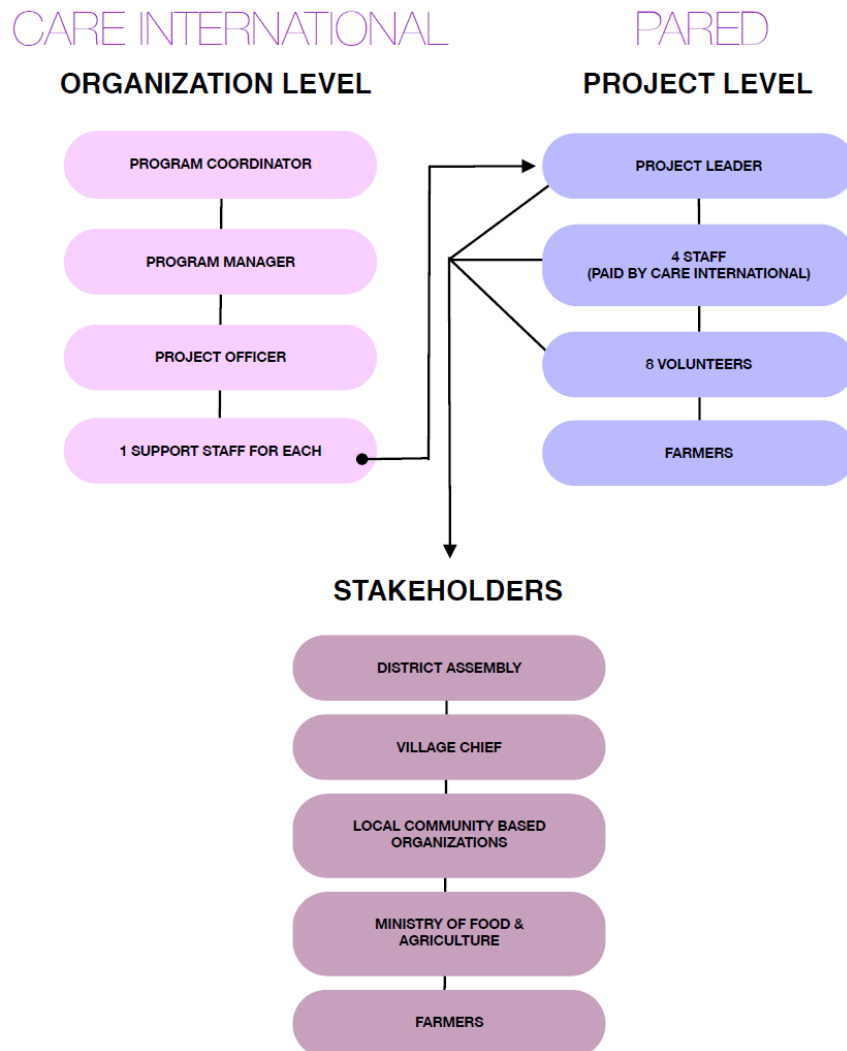


Figure 3 Institutional arrangements for Conservation Agriculture Program and Adaptive Learning Program

Comparative analysis

Participation & benefits

Barriers to participation in payment for ecosystem services projects fall into three major categories—eligibility to participate, ability to participate, and desire to participate (Engel et al. 2008; Pagiola et al. 2008). Many carbon projects mimic payment for ecosystem services projects in their design. Thus, to better understand the possible barriers to eligibility and ability to participate, I asked project staff how they reached out to communities and also asked community members how they heard about the project. To understand potential institutional factors, I asked specifically about land tenure and contracts. I also asked about aggregation strategies that would reduce the time and transaction costs associated with the project. Transaction costs related to aggregating smallholder farmers are often cited as a barrier to smallholder participation (Smith and Scherr 2002; Grieg-Gran et al. 2005). In order to understand farmers' desire to participate, I conducted structured and semi-structured interviews.

Outreach strategies & site selection

PARED spread the word about the project primarily through district assembly meetings and worked with community representatives and district assemblies when deciding on which communities to choose for the programs. As two project staff members said, “we cannot ignore the district assemblies. They are very important in the area.” However, some communities did not know about the project, and PARED said that they did not have the resources to reach out to all the communities, so not all communities in the area knew how to apply for the project. For those that did apply and met the qualifications (food insecurity, dedicated farmers), PARED worked with community representatives and district assemblies when deciding which communities to choose for the programs. No communities were disqualified, but many groups did not get chosen because of lack of funds.

Climate Stewards and TREES also worked with district assemblies. The TREES project tried to reach everyone in the community through announcements at public meetings, funerals, weddings, and any other community event. The TREES project wanted to work specifically in areas where there was potential for avoiding deforestation; thus, many participating communities bordered government reserves.

A Rocha staff tried to choose communities that had strong leadership and communities with a reputation for their ability to settle disputes and conflicts quickly. In addition, A Rocha projects did not work with communities where insecure land tenure might be an issue. Before working at a site, A Rocha and Rainforest Alliance both make sure the chiefs have approved of the activities in the area and understand the purposes of the project.

Risks: time & labour

Project staff at all programs said that farmers faced little to no risk in participating in the program, though they also acknowledged the increased demands on farmers' time for tree planting and weeding. In the TREES program, those that wanted the SAN certification were required to attend farmer field schools, plant trees, and in the future separate certified beans from regular beans during both the harvesting and drying process. Farmers in the Climate Stewards program were also required to clear land in preparation for tree planting. Even though they were compensated the going rate for their time (45 Ghana cedis/\$30 USD per acre, about 1-2 days' worth of work), many complained that the compensation was not enough. Elderly men or women in the community said they did not have enough energy, citing "I am getting old and I cannot farm like I used to. Sometimes other people help me."

Benefits offered

All programs offered short-term as well as long-term benefits. For example, farmers that adopted practices saw increases in crop yields and spent less money on fertilizer and firewood. The project advertised long-term benefits such as increased food security, more on-farm enterprises, and timber revenue from planted trees. Project staff perceived this strategy as important for encouraging farmers to join the program, and farmers also mentioned that the initial benefits of free food (CAP) and free tree seedlings and soybean seeds (Climate Stewards and TREES) were incentives that initially encouraged them to join the program.

While all programs tried to emphasize improved livelihoods as the main benefit of participation, participants of the Climate Stewards and TREES programs had (and still have) hopes of monetary payments for planted trees. Farmers in the TREES program who are undergoing the SAN certification process also expect premiums for cocoa beans grown with sustainable land management practices. Participants in all programs said they felt more "togetherness" in the community and thought that community members cooperated more with each other than before.

Farmer retention

Project field staff in the Climate Stewards and TREES programs struggled to keep farmers engaged in the program. Both the TREES project and the Climate Stewards project cited over 100 households at initial meetings but only 25-30 dedicated households after 1-2 months of meetings. Strong leadership appears to be an important factor for the communities that stayed engaged over the long term.

A Rocha initially worked with four communities in the region, but one community stopped participating because they lost interest in the Climate Stewards project. The interviewed farmers said they did not think it was worth their time because they were not seeing immediate benefits. From the perspective of A Rocha staff, the community did not want to work hard and thought everything in the program was free.

The TREES program had a similar problem of retaining farmers with the SAN certification process; many farmers went to the initial meetings and subsequently dropped out. Farmers often dropped out because Rainforest Alliance did not offer free herbicides or monetary incentives immediately (many other companies working with cocoa farmers offer free herbicides, cell phones, t-shirts, etc., as ways to encourage the farmers to sell their cocoa beans to the company).

In both the TREES and Climate Stewards programs, strong community leaders were vital in keeping the community engaged and interested. In the Climate Stewards program, the community leader is a respected teacher in the community, and he said he often talked with the farmers in his community and reminded them of the long-term benefits of timber. He indicated that he encourages the farmers, often telling them “we get the tree seedlings for free, and if we plant them we can get benefits like timber in 20 years. I tell them this is free anyway, so we need to keep on working and get more benefits.”

Similarly, a community board member in the TREES program (who was also a clan leader) encouraged farmers to stay with the certification program, reminding them that the long term benefits of increased soil fertility mattered more than the short-term incentives of free cell phones and t-shirts. He acknowledged it was difficult at times, because “we see something we can have right away. We do not know when we will see the increased price for this new

cocoa³. We do not know how we will divide it. But I think it is better than a free t-shirt.”

Local project staff also acknowledged the importance of strong community leaders in keeping community members interested in the project.

In contrast, CARE International’s CAP project did not cite any problems with retaining farmers. This may be due to the extensive time field staff spent in the community to understand what the farmers wanted and needed before implementing the project. Both A Rocha and Rainforest Alliance approached the community with a predetermined project in mind and asked the community if they were interested, whereas CARE spent a year working with farmers to identify their needs and work with them to figure out what technologies were feasible. Project focus and goals might also make a difference. CAP’s main project focus was food security, whereas TREES and Climate Stewards had other goals of avoided deforestation (as a REDD+ pilot project) and tree planting for above ground carbon sequestration, respectively.

³ “New cocoa” refers to the SAN certified cocoa the farmers grow that they expect to be paid a higher price for.

Farmers' perceptions of the programs

Climate Steward Tree Planting Program (A Rocha and A Rocha Ghana)

Farmers cited benefits such as shade provided by the trees and the feeling of pride when walking to their farms, saying “it is not as hot now” and “I feel pride when I see how large the trees have grown.” However, farmers also expressed their displeasure with the fact that they were not paid for their trees (even though payment for trees was not included in the contract). They wanted additional items such as boots and donkey carts for their farms. They also wanted to be able to decide what benefits they should get in return for the trees.

“I feel pride when I see how large the trees have grown.”
- *Male farmer in the Climate Stewards program*

TREES Program Forest, Climate and Communities Alliance (Rainforest Alliance)

Farmers at the farmer field school were happy that Rainforest Alliance staff were meeting with them once to twice a week and were available to answer questions they had about cocoa farming. “We can always call them and see them, and they teach us new things.” They were also happy about the enterprise development component of the project and were hopeful that the trees they planted will eventually generate income for the community.

Conservation Agriculture Program and Adaptive Learning Program (CARE International)

Farmers generally seemed positive about the program, citing examples of goats, herbicide, and timesaving labour as the major benefits of the program. Focus group exercises showed that farmers thought the expensive herbicides were a major challenge in continuing with the program. They also wanted to learn more ways to make money on the farm.

“It is not as hot now when I walk to my farm.”
- *Female farmer in the Climate Stewards program, referring to the shade provided by the trees planted through the program*

Gender issues

All projects recognized the importance of involving women, but none specifically targeted women. Projects have limited capacity to lead sweeping reforms on land tenure systems or entrenched sexual prejudices. Thus, projects try to foster changes in attitude on a more local level; they include gender sensitization as part of their program outreach, hold separate focus groups to understand women's needs, and try to work within existing structures to include women.

The TREES program tried to encourage women to join the leadership board, but women often cited household duties as reasons for not taking on a leadership role on the community board. The TREES program tried to balance this by including enterprise development (e.g. piggery or poultry farming) as a component of their project, and they hope the enterprise development will benefit women more because these activities do not require women to travel or be away from home for extended periods of time.

In the Climate Stewards program, both men and women are allowed to plant 1 ha of trees. While A Rocha encourages women to plant trees, women's names are not on the contracts because women traditionally do not own land.

CARE takes measures to ensure women physically receive at least 50% of the benefits they distribute (free ruminants, free food) and holds separate focus groups to understand women's needs.

Attention to institutional arrangements

Local institutions

All projects try to work with the existing community structures and build upon them. For example, all projects work closely with the district assemblies. Additionally, CARE tries to build the capacity of the local government by working with a local organization—PARED—and involving members of the Ministry of Food and Agriculture (MoFA) and providing the funding for them to reach out to half the communities.

Rainforest Alliance TREES staff also invites government cocoa extension agents in their trainings so the government cocoa extension officials feel involved. While the government cocoa extension officials are supposed to conduct the majority of the trainings with the farmers, many of them do not. TREES staff said that this was fairly typical because the government officials do not have the resources to reach all the communities.⁴ Project staff also stated “they do not do their job but no one keeps them accountable” and “Cocobod⁵ does not care that the extension officers do not work with farmers because other NGOs will.” Farmers also agreed that the extension officers they worked with were all Rainforest Alliance staff. Rainforest Alliance included government extension officers in this project to prevent any accusations from the government that the organization is trying to intervene with national agencies.

Other projects cited similar reasons for involving local ministries and staff. They do not want to be perceived as intervening with government roles and responsibilities, so they make sure government officials are informed of the work the project carries out in the area. In addition, all projects work with the local district assemblies, both to promote their project and to reach out to community members.

Land tenure

All projects took measures to ensure participants had secure land tenure. Secure land tenure was important because the project did not want land disputes after farmers started adopting

⁴ I did not have an opportunity to speak with government official in the region, so I do not know their reasons.

⁵ Cocobod is a government entity that aims to “encourage and facilitate the production, processing and marketing of good quality cocoa, coffee and sheanut in all forms in the most efficient and cost effective manner, and maintain the best mutual industrial relation with its objectives.”

practices. Because village chiefs and clan leaders often control the land, project staff would make sure the chiefs were informed about the project before starting work in the area. The TREES program also helped farmers secure land tenure as part of its governance goals (see project profile). A Rocha also worked with the district assemblies and local chiefs to establish bylaws on land.

Conclusion: Lessons learned & recommendations for the future

Agricultural carbon projects have the potential to provide more benefits for farmers if projects could effectively access the carbon market and address the high transaction costs and methodology issues with monitoring carbon. While the CARE project conducted a baseline of soil carbon profiles, it was for their records and documentation, not for the carbon market. Neither the TREES project nor the Climate Stewards project conducted baseline studies due to the cost and the uncertainty over whether the baselines would make a difference in their project. While the four projects have different primary goals, they share the common commitment to improving the livelihoods of farmers. As many agencies continue to implement projects with goals of climate mitigation that also involve communities, we can draw from some of the insights gained from the projects as we move forward. In the sections below, I provide recommendations for both the project design and the implementation process.

Project design

Long-term funding

Project staff from all projects said the funding for the project was not sufficient or realistic for meeting project goals. Often, projects are funded on a 3-year cycle, but farmer outreach takes significant time, which then shortens the time and funds available for actual implementation and follow-up. In addition to securing long-term funding, funding should be consistent so project staff does not encounter situations where they miss outreach opportunities during planting seasons due to lack of funds.

Partnering with local institutions

All of the visited projects worked closely with district assemblies and took steps to actively work with and involve the local community institutions. All projects worked with chiefs and clan leaders and made sure the project had their approval. This attention to and respect for local governance systems is important for facilitating communication and effectively reaching local communities. While local projects have limited capacity to change Ghana's national policy regarding land or tree ownership, working with local district assemblies provided

alternative methods to secure rights for community members. Projects in the future should strive to strike a balance between relying on the district assemblies to provide information and leaving decision making up entirely up to the district assemblies, as district assemblies may have biases or partiality towards certain communities.

Offering multiple benefits

Farmers are more likely to join and stay in the program if they understand the benefits of the program and if the program offers direct benefits to their livelihood; farmers need both short-term and long-term incentives. The TREES program had to undergo “significant re-engineering” in order to be feasible in a cocoa growing region, because avoiding deforestation would not be possible unless staff addressed the main source of livelihoods—cocoa—for the farmers. Similarly, the Climate Stewards program needed to balance tree planting with crop production, providing free seeds, and promoting agroforestry practices alongside tree plantations.

“We did not think [conservation agriculture] would work, even though they showed us on one plot. But I see my neighbour, it works for him. Then I want to join, and I have more [yields] than before.”

- Farmer in CAP program,
Nalerigu, Northern Region, Ghana

Implementation process

Communication and monitoring

Projects should be clear about the expectations and the types of benefits the program provides so farmers do not leave the program due to dissatisfaction with the incentives offered or a perception that the project staff intentionally misled them.

Meeting with farmers on a weekly basis may also encourage farmers to stay with the program. Contracts with farmers are important, but it is just as important to ensure farmers understand that words like “benefits” do not necessarily mean money. Also, it is important that projects do not promise what they cannot deliver or raise farmers’ hopes, especially if projects have a carbon component that is dependent upon the status of international negotiations or the fluctuations of the market.

Building local capacity

Both the TREES project and the Climate Stewards project worked with farmers to build their capacity and asked farmers to create groups and elect community representatives. Electing representatives that are respected community members and effective communicators is a key to success; field staff of both projects believes that dedicated community leaders with long-term goals are key to encouraging other community members to stay with the program. In addition, dedicated leaders can help resolve conflicts within farmer groups (e.g. who should use the herbicide sprayer) and save the project staff the time required for mediating community conflicts. The CARE project works with existing farmer organizations, which saves both time and money for the project.

Future research needs

While the initial phases of many climate mitigation projects are coming to an end, many questions remain. If we are to harness the potential of carbon markets in the agriculture sector, more research is needed on ways to decrease the costs of carbon certification, as the high costs and convoluted policies of certifying carbon prevent many projects from tapping into the benefits the carbon markets could provide. In addition, project developers need to be clear about the purpose of establishing baselines and implement low cost monitoring and verification systems that satisfy carbon buyers, while also ensuring that farmers benefit from the additional time spent on monitoring. Lastly, projects should explore different types of benefit distribution mechanisms—whether distributing to a group to then distribute to individuals or distributing to individuals directly—to ensure benefits are distributed fairly and both men and women receive benefits. Climate mitigation projects are not the silver bullet to achieving both food security and agriculture mitigation, but if implemented with attention to the local context, these projects can serve to benefit farmers in regions that already face the adverse impacts of climate change.

References

- Boyd E, Gutierrez M, Chang M. 2007. Small-scale forest carbon projects: adapting CDM to low-income communities. *Global Environmental Change* 17(2): 250-259.
- Corbera E, Brown K. 2008. Building institutions to trade ecosystem services: marketing forest carbon in Mexico. *World Development* 36(10): 1956-1979.
- De Pinto A, Magalhaes M, Ringler C. 2010. Potential of Carbon Markets for Small Farmers: A Literature Review. IFPRI Discussion Paper 01004. Washington, DC: International Food Policy Research Institute. (Available from <http://www.ifpri.org/publication/potential-carbon-markets-small-farmers?print>) (Accessed on 5 October 2012)
- Engel A, Pagiola S, Wunder S. 2008. Designing payments for environmental services in theory and practice: An overview of the issues. *Ecological Economics* 65(4): 663-674.
- Pagiola S, Rios A, Arcenas A. 2008. Can the poor participate in payments for environmental services? Lessons from the Silvopastoral Project in Nicaragua. *Environment and Development Economics* 13(03): 299-325.
- Smith P, Martino D, Cai Z, Gwary D, Janzen H, Kumar P, McCarl B, Ogle S, O'Mara F, Rice C, Scholes B, Sirotenko O, Howden M, McAllister T, Pan G, Romanenkov V, Schneider U, Towprayoon S, Wattenbach M, Smith J. 2008. Greenhouse gas mitigation in agriculture. *Philosophical Transactions of the Royal Society B: Biological Sciences* 363(1492): 789.

Appendix 1: Basic project information

Project Name	TREES Program Forest, Climate and Communities Alliance	Climate Steward Tree Planting Program	Conservation Agriculture Program	Adaptive Learning Program
Lead Organization(s)	Rainforest Alliance	A Rocha and A Rocha Ghana	CARE International and PARED	CARE International and PARED
Project Type	REDD+ pilot project with multiple goals of sustainable land management and agroforestry	Agroforestry and community tree plantations	Food security and livelihoods	Food security, livelihoods, climate change education
Location	Juabeso and Bia, Western Region, Ghana	Larabanga, Northern Region, Ghana	Nalerigu, Northern Region, Ghana	Nalerigu, Northern Region, Ghana
Climate	Humid tropical forest with an average annual precipitation of 1600mm	Semi-arid, Guinea savannah woodland with average annual precipitation of 1144mm. Erratic rainfall beginning in late April to late October. Peak rainfall in June/July.	Semi-arid with one rainy season from May to October. Average annual precipitation of 750-1050mm	Semi-arid with one rainy season from May to October. Average annual precipitation of 750-1050mm
Predominant Farming System	Slash and burn agriculture for cocoa farming. Fallow period used to be 5-10 years, but now it is under 5 years. Subsistence farming of plaintain and cassave.	Smallholder farmers practicing shifting cultivation. Field were typically left fallow for 5-10 years, though recently fallow periods have decreased to under 5 years	Smallholder farmers practicing crop rotation, mixed cropping, livestock rearing	Smallholder farmers practicing crop rotation, mixed cropping, livestock rearing
Start & End Date	2010 to present	January 2007 to present	May 2008 to May 2011	May 2010 to present
Area and Households Covered	24000 ha, 36 communities, 20-100 households per community	40 ha in the Northern Region, 3 communities, 20 households per community plant trees	3200 ha, 35 communities, 1600 households	2000 ha, 4 communities, 100 households
Additional Site Information	Project area is bordered by two government owned forest reserves	Project area is bordered by Mole National Park	CAP targeted 10 communities and these 10 communities reached out to an additional 25 communities	

Contact Person	Atsu Titiati atitiati@ra.org	Daryl Bosy darylbosu@yahoo.com and Seth Appiah-Kubi seth.appiah-kubi@arocha.org	David Sumbo David.Sumbo@co.ca re.org or Cyril Yabepone Cyril.Yabepone@co.care.org	David Sumbo David.Sumbo@co.ca re.org or Cyril Yabepone Cyril.Yabepone@co.care.org
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Appendix 2: Project profiles

A Rocha Ghana: Climate Steward Tree Planting Program

Location

Larabanga, Northern Region, Ghana

Dates

January 2007 to present

Climate

Semi-arid, Guinea savannah woodland. Unimodal rainfall pattern, average annual precipitation 1144mm. Erratic rainfall beginning in late April to late October. Peak rainfall June/July, prolonged dry spells from August to early April

Predominant Farming System

Subsistence farming on smallholder family owned farmlands. Farming practices mainly involves shifting cultivation and fields are left to fallow for a period of 5-10 years. Recently however, these fallow periods have decreased to under 5 years. Land is owned by family clans and apportioned to individual family members upon request at very small scales.

Area Covered & Number of Households

Planted sites cover 40 hectares of land and project engages about 60 different households

Introduction

Project works with farmers to encourage tree planting on degraded farms. AR encourages communities to work together to create larger tree plantations (on average 26 acres per community at 160 trees per acre/400 trees per hectare). Community will be responsible for maintaining for 40 years. Tree plantations consist of native species: mahogany, kpok, dowa dowa, ceiba, and cashew.

Institutional Arrangements

Organization: Board of Trustees → National Team Leader, Management Team, Science Director → Sector Project Management → North Sector Management, South Sector Management

Community: Project Manager → 1 site coordinator for 3 plantations

Other stakeholders: District assembly, village chief, Forestry Commission—A Rocha works with local authorities and district assemblies to develop bylaws to govern the area.

Mitigation Interventions

Tree planting is the main intervention. A Rocha has a target of 400,000 trees to sequester 150,000 tons of CO₂ over 4000 hectares. They currently work with 110 hectares in Ghana (in Northern and Southern regions). Project has no current means to calculate carbon sequestered, though they conduct yearly measurements of tree height and width and record the survival rate of trees.

Incentives

A Rocha provides the following incentives for farmers: 1) payments for clearing land, 2) free seeds (maize and soya), 3) free tree seedlings for plantations, 4) non-monetary compensation to farmers based on tree survival over the next 20 years. Recently, the project gave out beehives to all participants, though in the future benefits will be distributed according to tree survival rate.

Distinctive Features

- A Rocha tries to encourage women to speak and take leadership roles in community
- A Rocha is trying to get CCBA certification, but the cost of certification is prohibitive.
- A Rocha does not promise farmers monetary payment for the trees. Instead, they offer payment for trees in non-monetary forms.
- A Rocha also sensitizes communities on the effects climate change and effects on climate change
- Project also wanted to incorporate a community based natural resources management aspect but has failed because community is not interested.

Farmer Participation

A Rocha works with community and establishes a MOU with community and works with farmers who are serious about their work and would be able to commit. Communication via cell phones and meetings as necessary. Farmers can talk to site coordinator or project manager directly.

Cost Reduction Measures

Aggregation: A Rocha encourages group formation and works with community to identify a site coordinator who can organize farmers. AR negotiates MOU with them as a unit

Contracts

MOU with community outlining how much A Rocha will pay for clearing land and what they will provide for community (money for clearing land, digging ditches to prevent fire, tree seedlings, soybean seeds, and non-monetary payment), as well as communities' responsibilities (planting and caring for trees—e.g. weeding and fire prevention). Recently, A Rocha had to renegotiate the contracts with the community to include beehives as a form of payment for trees.

Property Rights

A Rocha does not work with the community unless there is clear ownership of land. A Rocha drafts benefit-sharing agreements with the community and outline the percentage the chief of the clan should receive because tree planting takes place on communal clan land.

Barriers

- Farmers need hire labourers to clear the land (while farmers should be clearing the land themselves, some will use the money A Rocha offers and try to hire day labourers)
- If farmers are older they have a harder time working on both plantation and farm
- Education—many farmers do not realize the long-term benefits

Risks

Risk of fire destroying trees

Benefits

Short term: soybean seed (farmers can sell harvest for profit), beehives

Long term: timber harvest, other enterprise development

Women

Women also get 1 acre of land to plant trees and A Rocha encourages women to join the program. However, women's names are not on the MOUs even if the farm is under the care of women, because women traditionally do not own land.

Research needs relevant to CCAFS

- Small funding for research areas—have the seeds A Rocha provided actually improve sustainable food supply?
- Establish linkages between tree seedlings and food production—how much does A Rocha actually help with livelihoods?
- How can A Rocha work more with policy?

CARE International: Conservation Agriculture Program (CAP) and Adaptive Learning Program (ALP)

Location

Nalerigu, Northern Region, Ghana

Dates

CAP: May 2008 to 2011; ALP: May 2010

Climate

Semi-arid with one rainy season from May to October. Rainfall varies from 750 to 1050 mm.

Predominant Farming System

Smallholder farmers practicing crop rotation, mixed cropping, livestock

Area Covered & Number of Households

CAP targeted 10 communities and also helped in reaching out to an additional 25 communities, thus reaching a total of 1600 households. ALP covered 4 communities and a total of 100 households. Smallholders own an average of 1-3ha of land.

Introduction

CAP: conservation agriculture program promoting no tillage, crop associations, and permanent soil cover in 10 communities. This project has ended and an evaluation workshop was held on June 22, 2011, in Tamale, Ghana.

ALP: works with farmers to identify their needs, implement innovative measures that would build resilience to climate change. ALP currently works with 8 communities to tackle underlying causes of vulnerability and poverty reduction and build capacity of local institutions through partnerships. The project has conducted a climate vulnerability analysis, hazard mapping, and poverty assessment.

Institutional Arrangements

CARE works with PARED (Partnership in Rural Economic Development, a local NGO) and the Ministry of Forestry and Agriculture (MoFA) to implement the project. CARE believes local NGOs have the capacity to work more effectively and have more legitimacy with the constituents. CARE monitors PARED's work.

CARE: Program Coordinator → Program Manager → Project Officer → Support staff

PARED: 1 Project Leader → 12 staff for monitoring and extension (4 paid by CARE, 8 volunteer staff). PARED works directly with chief and farmers, no site coordinators

Other stakeholders: Village chiefs, elected district assembly members, CBOs, local NGOS, MoFA

Mitigation Interventions

CAP and ALP was and are not intended to achieve any mitigation practices; the projects are primarily focused on livelihoods and food security. CARE did not look at carbon baselines.

Incentives

ALP: drought and flood resistant crops, short duration crops (shorter grower season needed)

CAP: free food, seed and herbicide in initial stages, free goats for enterprise development

Distinctive Features

- PARED takes measures to ensure women receive at least 50% of the benefits
- CAP: CARE uses PRA approach and worked with the famers for a year to a year and a half to determine farmers' needs, build capacity, and ensure buy-in.
- CAP and ALP: Projects need support of village chief, chief helps mediates conflicts in community (e.g. who gets to use the herbicide sprayer)

Farmer Participation

CARE uses PARED staff to reach out to all the villages and advertises the project in larger gatherings where most communities are present. Farmers were consulted prior to project implementation and CARE and PARED held many focus groups to identify farmer needs.

PARED staff visit farmers once every two weeks or as needed. Farmers notify PARED if they want advice about the farm.

Cost Reduction Measures

Aggregation: CARE with existing farmer groups and spreads word of the project through groups.

Funding: CARE funds a local non-governmental organization PARED (Partners in Rural Empowerment and Development). PARED has more experience in the area and can more effectively reach out to local communities.

Contracts

Farmers do not sign a contract with CARE or with PARED. However, farmers do have agreements with each other regarding whose turn it is to use the herbicide sprayer or whose turn it is to get a goat. No carbon payments were promised in this project.

Property Rights

Farmers need to have land in order to participate in the program; secure land tenure is not necessary. Women can also own farms. The project always makes sure the chief knows about the project before they start working with the farmers to decrease the chances of property disputes.

Barriers

A major barrier to farmer participation is not lack of knowledge of the project or ability to participate. Rather, the project does not have the resources to include everyone. Some farmers cannot implement the practices on-time because they lack equipment (e.g. farming tools, herbicide sprayer).

Incentives

ALP: drought and flood resistant crops, short duration crops (shorter grower season needed)

CAP: free food, seed and herbicide in initial stages, free goats for enterprise development

CARE considered payments for soil carbon sequestered, but they abandoned the idea because it was too expensive to monitor soil carbon and there was no methodology in place for them to use.

Risks

Farmers could adopt practices but not have money to buy herbicides and abandon practices

Benefits

Short term: free food, free herbicides, free ruminants

Long term: saving time on the farm (less labor required), enterprise development, farm support

Women

CARE makes sure women receive at least 50% of the distributed benefits (e.g. goats or food). CARE also holds separate focus groups to understand women-specific needs. Women do not feel like they are doing more work on the farm than before and think the practices save them time. They also believe the enterprise development will benefit them in the long run.

Rainforest Alliance: TREES Program Forest, Climate & Communities Alliance

Location

Jauabeso and Bia, Western Region, Ghana

Dates

2010 to present

Climate

Forest zone, mostly rainy and humid, Humid tropical forest with an average of 1600mm rainfall.

Predominant Farming System

Slash and burn system for cocoa farming (off reserve area), bordered to the right by two forest reserves. Cocoa is main cultivator crop, plantain and cassava, but not on a large scale, Land is owned by family clans and apportioned to individual family members upon request at very small scales

Area Covered & Number of Households

36 communities (20 - 100 households per community), 24,000ha

Introduction

REDD+ pilot project with six main goals: 1) forestry management, 2) governance, 3) cocoa certification through SAN, 4) enterprise development, 5) REDD+, 6) cross cutting themes. Project works with 36 communities in the area, of which 13 are in the process of being SAN certified and the others are doing tree planting and/or enterprise development.

Institutional Arrangements

Project: Project Director → Administrator → 3 specialists → 2 field coordinators
(3 specialists: Extension and Community specialist, PES specialist, Community and Enterprise Development specialist; 2 field coordinators: support the SAN certification)

Community: 36 communities (5 elected community members per community) → 7 clusters
(5 communities per cluster, each community elects 1 out of 5 to join the cluster board) → 1

landscape management board with 14 members (cluster will elect 2 members for the landscape board)

Other stakeholders: District Assembly, Cocobod, Ministry of Food and Agriculture, Ghana Education Services, Forestry Commission, Department of Cooperatives, Forest Watch Ghana, chiefs

Mitigation Interventions

Mitigation is not directly addressed in the project, though project encourages tree planting. Rainforest Alliance wants to first address issues of productivity and better practices, which will indirectly address mitigation. They have not conducted any baselines.

- SAN certification: Rainforest Alliance provides farmers with tree seedlings if they do not have the obligatory 8-10 trees per acre and free farmer field schools on cocoa production.
- Boundary/enrichment planting Communities have planted trees around sacred groves and near the reserve. Rainforest Alliance has currently distributed 4000 tree seedlings and has goals of planting 40,000 native species on fallow land in the next 3 years.

Monitoring: Regular monitoring will start in August 2011, currently activity-based monitoring so far (see what farmers are doing on their farm)

Incentives

- 1) Premium associated with Sustainable Agricultural Network certification
- 2) Productivity: higher yields; farmers need to maintain and increase productivity on their farms.

Distinctive Features

- Project began as an avoided deforestation project and project staff quickly realized that they could not address deforestation without also addressing cocoa production, so project added a certification component.
- Rainforest Alliance eventually wants the farmers to hold the SAN certificate, so they are training the farmers and trying to get 2000 farmers to register as one group so benefits can go directly to farmers (they cannot hold the certificate because of a conflict of interest).

Farmer Participation

Daily/as needed community level meetings, monthly cluster meetings, bi-monthly landscape meetings. Landscape board coordinate activities with the communities and ultimately gets to decide what to implement in the community

Cost Reduction Measures

Aggregation: Rainforest Alliance has 2 lead farmers per community and extension works with lead farmers and landscape board

Funding: Rainforest Alliance also working with OLAM (buyer of cocoa), who provides personal protective equipment and hopefully some funds for certification

Contracts

Rainforest Alliance signs a MOU with farmers who are getting certified (farmers agree to practice SAN practices, RA agrees to provide training and seedlings)

MOU includes: 1) Size of farm; 2) owner name and caretaker name; 3) age of cocoa trees; 4) sharing mechanism among caretaker and owner (2/3 of the premium will go to owner, 1/3 to the caretaker, owner pays for inputs); 5) past production trends and yield; 6) main food crops planted; 7) number of shade trees on farm; 8) documentation of uncleared land adjacent to farm; 9) last sprayed chemicals.

Property Rights

Must own farm to participate. Most farmers own their own farm. Women can also own farms. The governance aspect of the project tries to help farmers secure land, register their trees (planted trees will not belong to the government)

Barriers

Rainforest Alliance tries to minimize barriers to participation by reaching out to communities in various ways—attending community meetings, making announcements at Sunday church services.

Risks

Time spent weeding and attended farmer field school

Benefits

Short term: premium payments

Long term: carbon credits and payments, increased productivity without expansion

Women

Rainforest Alliance tries to make sure women are involved at all levels, but it is difficult because women are busy with cooking and taking care of the families, so more men are involved. Rainforest Alliance estimates that around 10% of the community leaders/management board is women. Culturally, women do not really speak up in meetings even when encouraged, so enterprise development might be a better way to work with communities

SAN Certification

UTZ and Fair Trade use the premium payments for beans for community benefits (70%) (schools, roads, etc.), as well as individual farmers (30%). Rainforest Alliance gives the benefits (the premium) directly to the farmer and lets the farmers decide.

- Farmers sell to OLAM at fixed price
- OLAM sells to Cocobod
- Cocobod sells beans at premium to buyer
- Cocobod marketing division takes a percentage of premium
- Cocobod gives rest of premium to certificate holder to redistribute to community



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