

Enhancing Cocoa Agroforestry in Ghana through an integrated Geographic Information (GIS) based monitoring system.



**Submitted to
Institute for Global Environmental Strategies (IGES)
Japan**

Prepared by



**Conservation Alliance
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LIST OF ACRONYMS

- CA: Conservation Alliance
- CRIB: Cocoa Research Institute of Ghana
- GPS: Global Positioning Systems
- IGES: Institute for Global Environmental Strategies
- KCA: Kakum Conservation Area
- KNP: Kakum National Park
- RSN: Rural Support Network
- SDM: Satoyama Development Mechanism
- ToT: Trainer of Trainers

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BACKGROUND

Ghana maintains a unique position as the world's second largest producer of cocoa beans, after Ivory Coast. Cocoa plays a critical role in Ghana's economy since the most important export crop hit a record high of 1 million metric tons in 2011/12. According to the Bank of Ghana, cocoa bean and products export receipts for the first quarter of 2011 was \$859.4 million, accounting for about 61 percent of total export earnings. In spite of a decrease in quantities exported after 2011 owing to several challenges including climate change, cocoa remains a major source of income for most rural poor especially those living in close proximity to forest resources. Cocoa farmers within the Kakum conservation landscape have practiced sustainable farming long before the start of the century. They have sustained their production landscape through the use of taboos and practices to protect specific ecosystems like riverine forests, headwaters, burial grounds, sacred groves and other traditional/religious places. Within various communities in the project landscape, the use of clan animal totems which have been and still are revered and protected by traditional law with religious and spiritual underpinnings is still relevant. Many tree and animal species were also conserved through traditional closed seasons, which were imposed to give some respite to the resources and allow for procreation. Hunting or fishing was tabooed for certain periods prior to the celebration of their annual festivals 'Bakatue') or sacrifices.

However, the role of nineteenth century colonialism and social science which caused many national policies to ignore and sometimes malign indigenous knowledge weakened these traditional systems. In spite of this development, there is evidence to suggest that the integrity of the ecosystem could be traced partly to the adherence of traditional practices in biodiversity conservation.

It therefore became necessary to promote agroforestry techniques and good agricultural practices within the project landscape to mainstream interventions into the already existing traditional practices if success is to be achieved.

It is estimated that there are about 85 farming communities, with around 1,400 households, within a 5km radius of the Kakum National Park. Farmers typically maintain about 4 to 8 acres of cocoa and 2 to 3 acres of food crops, occupying areas that used to be part of the elephants' natural habitat. About 53.2 percent of the Kakum Conservation area is occupied by the Kakum National Park. Land covered by mainly cocoa farms makes up about 30 percent of the area, and a limited amount of food crops are produced under these cocoa farms. Cocoa is thus, the main source of livelihood for over 80% of the inhabitants.

The over dependence on pesticides, reduction of shade on farms, destruction of wildlife and other related poor farm management practices have adversely affected the ecological health of most cocoa farms. This has been made worse by reduction in effective traditional farming practices and the absence of effective monitoring to assess the effects of current production systems within the landscape. Recent efforts to equip farmers to adopt sustainable production practices alongside monitoring of farm performance has become critical. The project has thus made significant gains in improving the ecological health of cocoa farms and neighbouring forests through monitoring.

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1.0 INTRODUCTION

In 2016, Conservation Alliance (CA), Cocoa Research Institute of Ghana (CRIB) and Rural Support Network (RSN) with funding from the Institute for Global Environmental Strategies (IGES) through the Satoyama Development Mechanism (SDM) implemented an integrated package program for cocoa farmers within the Kakum Conservation Area (KCA). The package included training farmers on good agricultural practices, farm management practices & capacity building on biodiversity conservation, community based monitoring and mapping systems. This report presents the objectives, activities, outcomes and recommendations of the project.

1.1 Project Objectives

- i. Enhance target farmers knowledge and adoption of good agricultural practises.
- ii. Enhance farmers' knowledge and skills on biodiversity conservation.
- iii. Promote economic and financial incentives for producing certified cocoa.
- iv. Develop and implement a GIS based monitoring system for project tracking and impact assessment.

2.0 PROJECT ACTIVITIES

The success of the project depended substantially on achieving a strong sense of identification with and commitment to its intended outcomes on the part of the participating local communities and the project implementing partners and stakeholders. Additionally, it was also considered essential to establish productive and trusting relationships among the various partners and key community members to enhance success.



Plate 1: A cross-section of community leaders at the Project Launch.

Therefore, in the first quarter, this project begun consultations¹ with 20 target communities² to secure their inputs in the delivery of the project activities. These engagements afforded the project team the opportunity to fine-tune activities with the object of maximizing project outputs. The

project was then launched at a grand durbar at Bobi, one of the beneficiary communities. Traditionally, a durbar is a meeting of chiefs and elders and sometimes community members to discuss important issues, celebrate festivals or educate people or honor persons or gods or

¹ Series of meetings with the Local authorities, farmers and identifiable groups including women and youth in beneficiary communities. These meetings were to solicit the views of the local people and gain their buy-in and support for the project.

² Communities where members of Conservation Cocoa Association (CCA) operate in. CCA is a CA supported farmer Group in Ghana.

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outdoor a development project. As a way of attracting of large number of communities to the launch, the project team adopted the durbar model to officially announce the commencement of the Satoyama funded cocoa agroforestry project. (Plate 1). At the launch, project objectives, funding sources and activities to be undertaken and its expected impacts in the area were presented to the community representatives. The project team further highlighted the benefits of biodiversity to human life and called for the sustainable use of natural resources. At the end of the launch, the project received a high level of buy-in from farmers and support from the local authorities.

The project activities implemented are presented in accordance with the set objectives below.

Objective 1: Enhance target farmers knowledge and adoption of good agricultural practices.

Activities: Good agricultural practices have been identified as viable means of empowering farmers to generate the best out of their farm business while maintaining the integrity of the environment. After affirmation of the commitment of the farmers and a go ahead from local authorities the following activities were undertaken to achieve objective 1 of the project.



Plate 2: A cross-section of Lead farmers at a training.

During consultative meetings at the community level, 40 innovative farmers including women and youth from the 20 communities ³were selected by the farmers with assistance from project team to serve as lead farmers in the project. The lead farmers were selected based on a set of criteria including ownership of cocoa farms, good performance, willingness to adopt best practices, willingness to share knowledge with other farmers, accessibility to farms and ability to read and write. A meeting with the 40 lead farmers (28 males and 12 females) was held and their responsibilities was well

spelt out to them. The selected lead farmers accepted the responsibilities assigned them and agreed to commit to the project. They were then trained on Group Management and Trainer of Trainer techniques (Plate 2 and Annex A).

³ Bobi, Antwikwaa, Paaso, Somnyamekodru, Tawiah Nkwanta, Camp, Anthony, Nsuaem, Afeaso, Nsutem, Nyamebkyere, Abeka Nkwanta, Pepekrom, Antokrom, Dorymu, Akwaayaw, Mangoase, Osamkwa, Tweapease, and Jerusalem.

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In developing an effective training material for farmers, a comprehensive assessment of their level of knowledge on the given subject matter is key. Thus, an initial assessment of farmers' knowledge and skills in best agricultural practices was carried out by a team led by the socio-economic expert in Conservation Alliance (CA). A cocktail of approaches including interviews, farm visitations, one-on-one interactions with some farmers and group discussions were used to secure information to guide the conduct of training (Plate 3). The assessment revealed that while some farmers had some knowledge and skills in best farm practices, majority of them especially women and youth farmers' had limited knowledge and skills on GAP. Based on the assessment, training materials and schedules were developed to address major shortcomings of the farmers (see Annex B). Critical care was taken to highlight the needs of women and youth farmers. The assessment revealed the widespread use of the traditional method of land preparation including slash and burn for crop production. While the farmers acknowledged the adverse impact of the slash and burn method on biodiversity, they (farmers) committed themselves to adopting the innovative approaches (zero burning) offered by the project to enhance the ecological health of their farms.



Plate 3. A CA Field Officer visits a farm at Anthony.



Plate 4: A cross-section of farmers been trained by a leader farmer.

During the period, series of training sessions were held for the lead farmers by CA and CRIB to equip them with knowledge and skills in cocoa extension in order to support the neighboring farmers. The trainings took the form of classroom learning and on farm demonstrations. Lead farmers were trained on farm management⁴, integrated pest management, fertilizer application, record keeping and group management. The lead farmers' were supervised to train additional 246 cocoa farmers (Plate 4). Records of such trainings were kept by the lead

farmers and the project team to monitor progress and address lapses. Elements of traditional

⁴ Pruning, chuppon, mistletoe removal, mulching instead of burning, weeding and thinning.

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practices such as the protection of water bodies within farms, observance of 'no-farming' days and protection of certain tree species because of their ecological and traditional significance were incorporated into the training programme. This integrated form of modern and traditional form of biodiversity conservation improved the ease of adoption.

Outcome

At the end of the fourth quarter, a total of 40 lead farmers were trained and these lead farmers also trained 246 farmers from 20 Communities. These beneficiary farmers received training on good agricultural practices and other technical assistance from the project team which has increased their knowledge and skills and is helping them to increase productivity of their farms. Farmers whose average yield stood at 3 bags of cocoa per acre at the start of the project, recorded a significant increase of between 5-7 bags per acre by the close of the project. These significant increases are credited to the project intervention. Additionally a number of wildlife species such as birds and small mammals were reportedly seen on most farms indicating an increasing health of such farms.

Challenge

The project team identified 20 cocoa farms at strategic sites within communities to serve as demonstration farms for the farmers. While periodic visits were also made to a number of farms to ascertain their performance, the location of other farms did not allow for more frequent visits.

Objective 2: Enhance farmers' knowledge and skills on biodiversity conservation.

Activities: Biodiversity supports the lives of humans on earth. In the first quarter of the project,



Plate 5: During a biodiversity conservation sensitization at Anthony.

Rural Support Network (RSN) conducted an assessment of the knowledge and skills base of the target farmers on biodiversity conservation. Biodiversity conservation education activities were developed based on assessment conducted (Annex B). It was apparent that the communities had some knowledge on biodiversity conservation due to the work CA has done within the area over the years however, some gaps were identified. Training activities on ecosystems and community wellbeing, national laws on the extraction of forest products and importance of

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biodiversity based on the identified gaps were developed in the second quarter and its implementation followed through to the fourth quarter (Plate 5). Biodiversity awareness was created through group discussions at the community level and also at lead farmers' training sessions. During the education special attention was given to the importance of their existing conservation practices which includes the use of taboos⁵, the sacredness of totems⁶, the need to



Plate 6: A community nursery at Afeaso.

keep some water bodies unpolluted for the safe dwelling of the gods' of the land and the role of the forest in providing the habitat of gods'. Reflecting on the importance of biodiversity by linking it to their cultural beliefs and practices enhanced the acceptance of the education by the beneficiary communities.

In addition, shade tree establishment and its importance to cocoa and biodiversity were also discussed. For this activity, RSN assisted the farmers to establish community nurseries

where native tree species were raised and transplanted in the second and third quarters (Plate 6). The species nursed included *Ceiba pentandra* (onyina), *Terminalia superba* (ofram), *Terminalia ivoriensis* (emire), *Triplochiton scleroxylon* (wawa), *Khaya ivorensis* (mahogany) and



Plate 7: Farmers mounting a chili pepper grease fence on their farm.

Alstonia boonei (alstonia). The tree establishment received a good deal of enthusiasm from farmers whose knowledge on biodiversity conservation and the importance of trees on farms were enhanced. Additionally, indigenous species raised were trees that play significant role in the traditional beliefs of the people. Within the project area some indigenous people consider Mahogany as a 'good luck' tree if you have it on your farm hence farmers were eager to source these trees

⁵ Usually every Thursday for most communities within the project landscape, farmers are forbidden to go to the farm for any farming activity. This tradition is to ensure that the farm and all biodiversity around take a rest to rejuvenate.

⁶ Some animals are considered sacred and killing of such animals is forbidden. Anyone who disobeys this customs is severely sanctioned through fines, public shaming or excommunication with the community. Such animals include crested porcupine, fruit bat, eagle and many others.

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from the community nurseries and plant on their farms.

The coexistence of wild animals and humans always breeds some level of conflict among these two different species. Farmers whose farms are closer to protected forests suffer destruction of their farms by wild animals and in the case of KCA by elephants. In the absence of an effective technique to ward off wild animals from farmer's farms, their destructive activity most of the time gets them killed. The farmers were therefore trained on effective crop raiding prevention techniques including chili pepper grease fences, use of loud noise and scarecrows to ward off wild animals from farms (Plate 7). Beneficiary farmers were happy that these measures were effectively helping them safeguard their farms.

Outcome

Over 200 farmers were sensitized on biodiversity conservation. Community nurseries were established in 20 beneficiary communities to provide tree seedlings to help increase tree cover on farms and degraded areas fringing the Kakum National Park (KNP). Beneficiary farmers now have a clearer understanding of the role of wildlife and native tree species in maintaining the ecosystem and the need to ensure that they are conserved.

Challenge

Other farmers who were not direct beneficiaries of the project were interested in sourcing tree seedlings from the community nurseries however, the project could not supply the seedlings required.

Objective 3: Promote economic and financial incentives for producing certified cocoa.

Activities: In the second quarter of the project, the project team assessed the current economic and financial incentives farmers could access to produce certified cocoa. A team from UTZ and



Plate 8: A Certification Team engaging a group of farmers at Pepekrom.

Rainforest Alliance (RA) certification bodies were invited to engage the farmers on their requirements and standards (Plate 8). Farmers received extensive information on the benefits of producing cocoa under certified standards and its benefits to their ecosystems. Additionally, farmers were trained on the financial benefits they can accrue from producing certified cocoa in the form of premiums. Majority of the requirements of the certification standards were in agreement with the existing traditional practices for instance leaving a 5 meter buffer around water bodies' requirement of the RA Certification standard aligned with the local practice of farming a distance away

from water bodies because they are revered as gods'. These consistencies between the standards and the cultural practices of the area made the offer to be trained in certification easily accepted

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by many farmers within the project landscape. An experience sharing trip was organized for



Plate 9: A shot of a demonstration farm at Bobi.

beneficiary farmers to visit the farms of other farmers within the landscape who were producing certified cocoa (Plate 9). Beneficiary farmers were excited about the field visit as they saw high yielding and ecologically healthy farms. The farms visited were planted in lines at regular intervals and with hybrid cocoa provided by Cocoa Research Institute of Ghana (CRIG). The farms had clean boundaries and were well kept. Some farms near water bodies, marshy areas roads, park boundary and other sensitive ecosystems were zoned out at a distance (about 5 meters) and the zones close to these sensitive areas had signs of 'No Spray Zones' boldly mounted in addition to warning tapes tied to cocoa trees by the farm owners. Additionally, farmers had signs that read 'No hunting' to warn other farmers not to hunt wildlife on the farms (Plate 10). These were all requirements of the certification bodies tailored to protect biodiversity.

A group of the farmers who opted to be enrolled on the Rainforest Alliance (RA) certification

programme were trained on ways to fulfil the requirements of the certification standards. At the end of the fourth quarter, over 80% of the farmers have their farms in readiness for certification audit. Arrangement are being made with the RA certification audit team to audit the farmers to secure a certificate to sell their cocoa as RA certified cocoa. The less than 20% of farmers whose farms were not ready for audit are being assisted by the lead farmers to improve on their farm activities and prepare their farms for audit.



Plate 10: A 'No hunting' sign mounted on a beneficiary farm at Antwikwa.

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Outcome

More than 80% of target farms are ready for Rainforest Alliance Certification Audit. Securing the certificate connotes improvement in the ecological health of the farms and qualifies the farmers to sell their cocoa beans as certified cocoa. The lead farmers are helping other farmers to bring their farms to the level where they can be audited and certified.

Challenge

Some farmers consider the premium from the production of the certified beans as too small to justify the investment in meeting the certification standards.

Objective 4: Develop and implement a GIS based monitoring system for project tracking and impact assessment.

Activities: To achieve this objective, the project team, farmers and two GIS experts worked together to develop some Global Information System (GIS) based monitoring tools to help track the impact of the project. This activity was done at the landscape, community and farm levels.

At the landscape level, the project team obtained a landscape map (fig 1) showing the location of communities in relation to the Kakum National Park (KNP). This was necessary to help zone out the landscape, design appropriate intervention and compare project impact. The rate of adoption of most forest-related interventions and the conduct of communities are often influenced by proximity to the forest. Communities that tend to be closer are careful to maintain

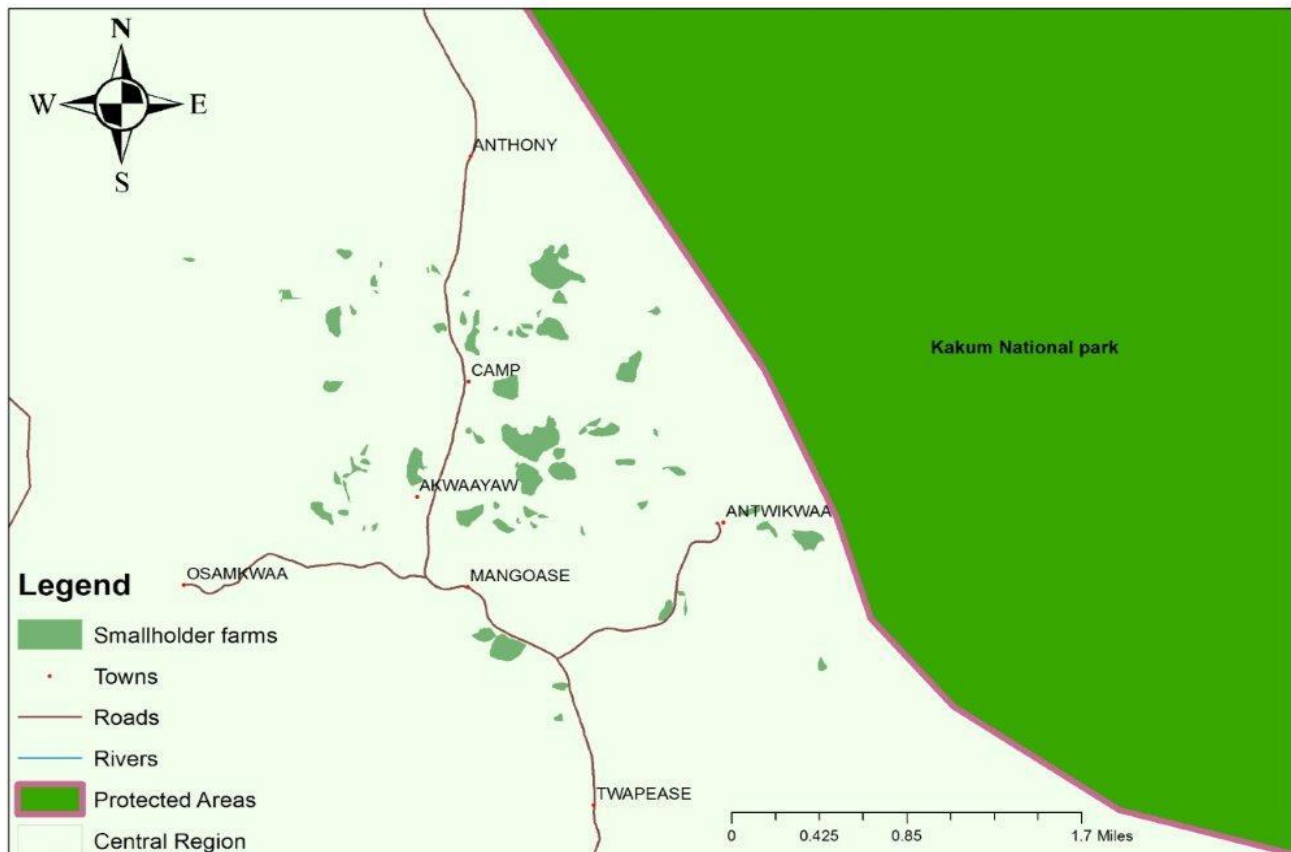


Figure 1: Landscape level map of the project area showing some communities.

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the integrity of the forest in order to maximize benefits from the provision of ecosystem services. Such farms also risks being destroyed by elephants and the farmers are quick to adopt any mitigating measures. The results of the monitoring shows that the level of biodiversity increases towards the forest.

Communities' with culturally significant natural features like waterbodies and sacred groves among others were well noted. The monitoring exercise also looked at the extent to which the project has helped to deepen the sense of ownership and protection of these traditional sites.

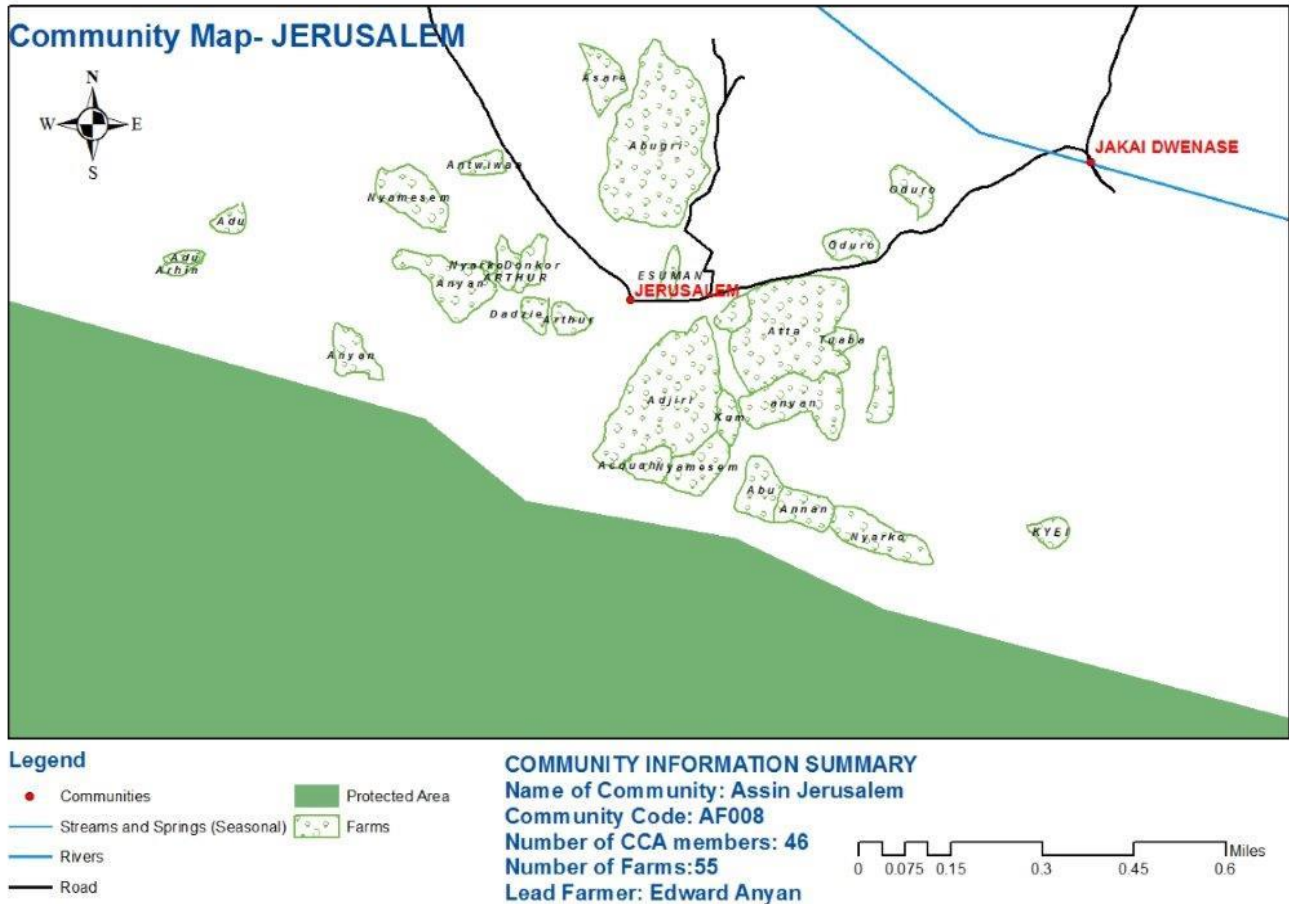


Figure 2: Map of Jerusalem a beneficiary community.

At the community level, a map of farms within each community was developed. This was to help the team closely monitor the impacts of the project at the community level. For instance, *figure 2* shows the location of farms within the *Jerusalem* community. The information made it easy for the team to identify farms that were closer to the KNP and this helped to select the appropriate farms for the project intervention. Communities that are closer to the forest boundary and whose livelihoods depend on the forest are often receptive to initiatives like the Satoyama project that contributes to maintaining the integrity of the environment. This assertion helps the project team in determining sites where emphasis ought to be laid.

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At the farm level, maps of selected farms showing cocoa trees, shade trees, natural habitats, paths and others were developed. Copies of these maps were kept by the farmers and the project team. For instance, figure 3 shows the map of a farm belonging to Ekua Anama, a beneficiary woman farmer from Antwikwaa. The map provides information on size and age of the farm as well as the number and distribution of shade trees on the farm. This information enabled the project team support Ekua Anama to take advantage of the community nurseries and increase the number of trees on her farm since the farm has less than the recommended nine shade trees per acre of cocoa farm. In other instances, farmers with uneven distribution of shade trees on their farms were advised to thin out and plant new trees at areas without trees. Farms with sensitive natural features like rivers, marshy areas were supported to protect these areas by maintaining buffers around them to ensure they are not contaminated by the agrochemicals used on the farm. This exercise saw 128 farmers improve the conditions of their farms.

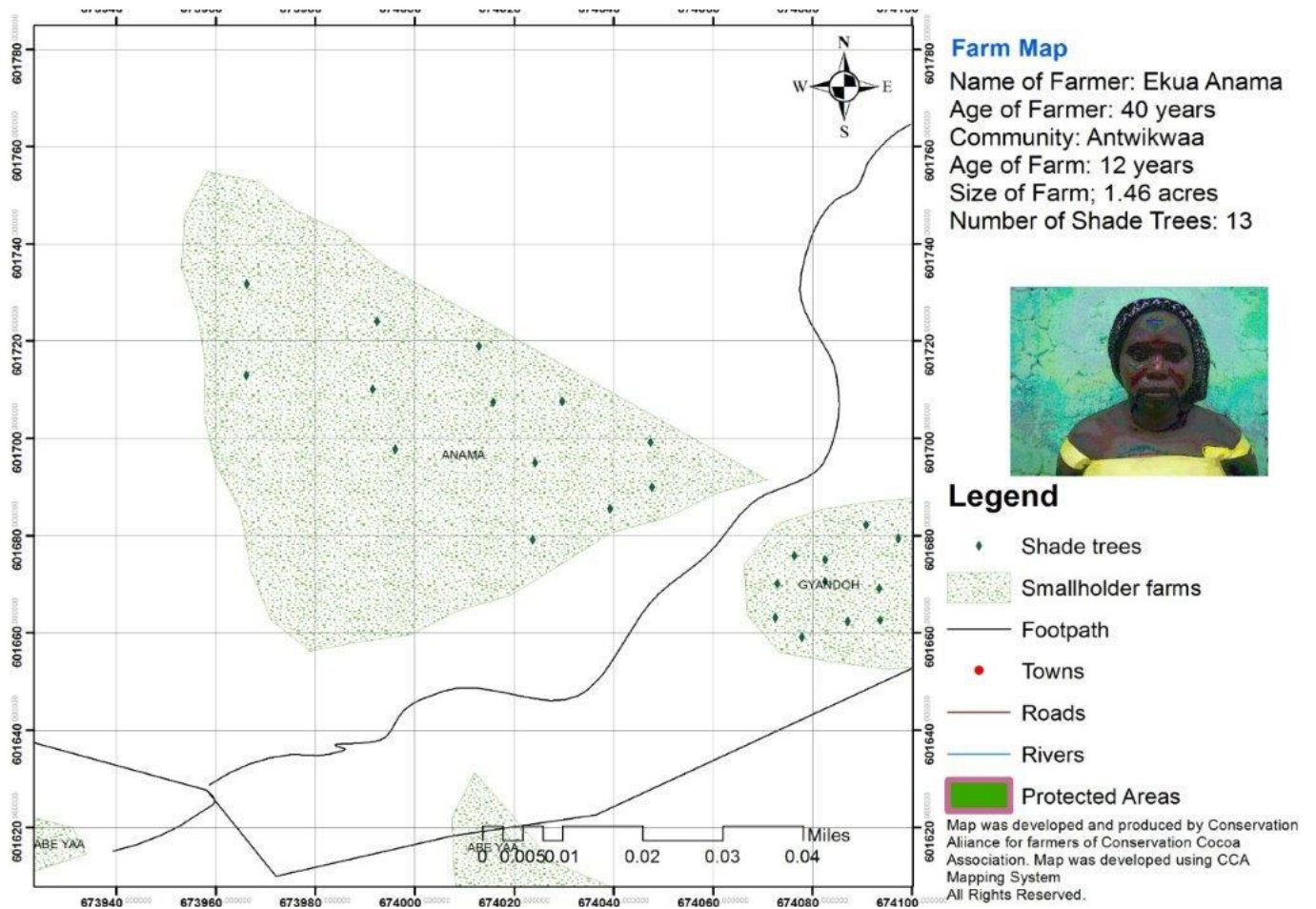


Figure 3: Farm map of a beneficiary farmer.

Periodic visits to farms were made by the project team at various stages of the project. A total of eight visits were made by the project monitoring team. At the end of each visit, a meeting was held with farmers to point out gaps and advise on ways to improve the management and health of the farms. A database on farm size, location, productivity, and number of shade trees obtained from the farm mapping and monitoring visits were collated and made available to the beneficiary

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farmers. Periodic updates of the information was done to help track the progress of the project and the possible expansion of farms of beneficiary farmers into protected areas.

Outcome

Farms of 20 farmers were mapped. Over 1600 seedlings of shade trees were sourced from community nurseries and planted on beneficiary farms. This has substantially increased the number of shade trees on beneficiary farms. Most farmers acknowledged the significant improvement in the yields and ecological health of their farms.

Challenge

The project could not map out the farms of all beneficiary farmers due to logistical and budgetary constraints.

3.0 CONCLUSION

The project on the whole has been very successful and has recorded significant increase in productivity and ecological health of farms. The mainstreaming of the project intervention into the existing cultural practices of the project area aided in the adoption of the good agricultural practices that the project sought to promote. Also, the project provided opportunity for some farmers to access RA certification audit and premium. Additionally, the knowledge and commitment of communities to conserve biodiversity has also been significantly increased. Other farmers from the beneficiary communities express their delight each time they visit farms of beneficiary farmers. The impacts of the project is highly visible when one visits beneficiary farms. The increase in the yield of farms continues to serve as an incentive for farmers to continue with the skills and knowledge they have acquired through the project.

4.0 RECOMMENDATIONS

Based on the significant impacts of the project it is therefore recommended that:

1. The project should be up-scaled to increase the number of beneficiaries in order to intensify productivity, reduce farm expansion and promote biodiversity conservation in the landscape.
2. Initiative within protected areas should incorporate traditional systems of biodiversity management into agricultural production landscapes.
3. Traditional sites such as sacred groves located within agricultural landscape should be protected.

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ANNEX

Annex A: Lead farmers training attendance list

NO.	NAME	COMMUNITY
1	Anthony Carr (M)	Paaso
2	Rose Nsowa (F)	Paaso
3	William Sessa Baidoo (M)	Nsuaem
4	Ama Kaya (F)	Nsuaem
5	Seth Assan (M)	Pepekrom
6	Ransford Aduam (M)	Pepekrom
7	Justice Narh (M)	Somnyamekodru
8	Akua Adua (F)	Somnyamekodru
9	Kojo Arhin (M)	Afeaso
10	Kwame Boadi (M)	Afeaso
11	Paul K. Narteh (M)	Antokrom
12	Faustina Narteh (F)	Antokrom
13	Tetteh Peter (M)	Tawiah Nkwanta
14	Mary Donkor (F)	Tawiah Nkwanta
15	James Otoo (M)	Bobi
16	Godwin Ativor (M)	Bobi
17	Thomas Ahatse (M)	Anthony
18	Vida Kwarteng (F)	Anthony
19	John Quainoo (M)	Camp
20	Alex Dadzie (M)	Camp
21	Yaw Tawiah (M)	Akwaayaw
22	Ama Auah (F)	Akwaayaw
23	Yaw Kwarkye (M)	Mangoase
24	Grace Quaye (F)	Mangoase
25	Robert Kojo Assan (M)	Osamkwa
26	Alex Amoah (M)	Osamkwa
27	Kweku Arthur (M)	Nsutem
28	Nana Yaa Boah (F)	Nsutem
29	Listowel Nkrumah (M)	Antwikwaa
30	Kofi Gyandoh (M)	Antwikwaa
31	Louis Baidoo (M)	Tweapease
32	Esi Nkrumah (F)	Tweapease
33	James Addea (M)	Abeka Nkwanta
34	Kwame Nyarkoh (M)	Abeka Nkwanta
35	Kofi Asiedu (M)	Dorymu
36	Yaa Nkrumah (F)	Dorymu
37	Edward Anyan (M)	Jerusalem
38	Yaw Nyamekye (M)	Jerusalem
39	Odei Yeboah (M)	Nyamebikyere
40	Asi Ago (F)	Nyamebikyere

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Annex B: Training materials, Manuals and Guides used in GAP trainings:

- i. STCP Training Curriculum
- ii. CCE Curriculum
- iii. **Asare, R. and David, S.** 2010. Implementing guide for planting, replanting and tree diversification in cocoa systems. International Institute of Tropical Agriculture, Ghana. Forest & Landscape Working Paper No. 46-2010.
- iv. **Richard Asare.** 2005. Cocoa agroforests in West Africa: a look at activities on preferred trees in the farming systems.
- v. **Asare, R. and David. S.** 2011. Good agricultural practices for sustainable cocoa production: a guide for farmer training. Manual no. 1: Planting, replanting and tree diversification in cocoa systems, Sustainable Tree Crops Programme, International Institute of Tropical Agriculture, Accra, Ghana. July 2011 version
- vi. Training in Agroforestry- A toolkit for Trainers (World Agroforestry Centre)

References used as basis for discussion at biodiversity education and awareness creation at communities included:

- i. The Ghana Forest and Wildlife Policy, 2011
- ii. Wild Animals Preservation Act. 1961