

COMMUNITY ECOSYSTEM MANAGEMENT PROJECT (CEMP) OF THE ATEWA RANGE FOREST RESERVE IN GHANA

PROJECT FINAL REPORT

JUNE, 2015



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Preface and Acknowledgement

This is the final report of the Community Ecosystem Management Project (CEMP) of the Atewa Range Forest Reserve in Ghana which discusses the actions and achievements of the project. The project was implemented between 2014 and 2015 with financial support from the Rufford Foundation based in United Kingdom. The findings in this report do not in any way reflect the official position of the funders, Rufford Foundation.

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Kingsley Bekoe Ansah, 2015

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Introduction

Atewa which covers an area of 232 km² provides the microclimate condition necessary for agricultural activities such as cocoa farming; absorbs and stores green-house gases including carbon dioxide thereby contributing to the mitigation of global warming. The mountains of the forest reserve is the headwaters for three important water bodies in Ghana which supplies drinking water to two thirds of the population of the capital (Accra). Many other food, medicinal and spiritual benefits are derived from the forest reserve. Recently, the area has become a hotspot due to the alarming rate of forest degradation. Atewa faces encroachment from illegal timber loggers, mining, overexploitation of the non-timber forest products which threatens the habitat and survival of the many endangered plants and animal species. The Government of Ghana (GoG) developed a management plan for the reserve in 2006 but the competing claims to the reserve has increased resulting in further degradation. National NGOs have also had several deliberations with the aim to halt the decline in condition of the forest reserve. The challenge however is that none of these actions have adequately dealt with and situated any action in the context of the conditions and needs of the communities that fringe Atewa.

The project titled “Community Ecosystem Management Project (CEMP) of the Atewa Range Forest Reserve in Ghana” was therefore developed by the project team and funded by Rufford Foundation in the United Kingdom to first develop and test community based tools and systems to help communities to identify and assess ecosystem services of Atewa in relation to their sustainable use. The second objective is to undertake a participatory process to develop management plans based on the assessment results, potential synergies and conflict of use of the services provided by Atewa. The final was to document the lessons learned from the implementation of the project and share with stakeholders to inform the wider public and also policy decision making regarding Atewa. The project was implemented from April, 2014 to May, 2015

This report summarizes the project results and the key issues that arose during implementation. The report is presented in three parts. The first part captures the reconnaissance survey and baseline study results undertaken in the first few weeks of the project. The second part describes the approach and methods used in developing the ecosystem assessment tools and the results of the survey. The final part summarizes the outcome of the district stakeholder’s workshop and the management plan developed.

Phase I: Identification of project communities and reconnaissance survey

Stakeholder/Expert meetings

This phase of the project took place in the first few weeks. Meetings were held with the District Manager of the Forest Services Division in charge of the Atewa Range Forest Reserve. He enumerated the challenges of managing Atewa to include frequent by poachers for wildlife and chainsaw operators for timber. The issue of illegal mining in some of the forest reserves were mentioned as rampant and affecting the health of biodiversity of Atewa. He also noted that due to the inadequate financial resources available to the district office for effective patrols and law enforcement, it was necessary for the forest reserve to be elevated to the status of a national park to attract the necessary financial resources need to ensure effective protection. It was noted that the Wildlife Division of the Forestry Commission has the required and necessary technical expertise to be able to provide effective protection of the reserve once the elevation is attained.

The Municipal Chief Executive of the East Akim Municipal Assembly was also engaged during the initial stages of the project implementation. He expressed his support to collaborate with the project team to ensure the successful implementation of the project.

Through the discussion with the district manager, the pilot communities of the project were also selected. They are Akyem Bansa, Akyem Bomaa in the Atewa district Akyem Apapam, Kyebi Akwadum and Akyem Sagyimase in the East Akim Municipal Assembly.

Baseline survey

Another key aspect of the first phase of the project is the baseline survey. The survey covered issues relating to the population of the community, their main economic activities, community based organizations in operation and customary institutions and platforms available for discussing issues relating to the conservation and sound management of Atewa. Through such survey, the project team was able to design the community meetings to fit into existing traditional/customary systems to ensure the sustainability of the interventions after the project has been completed.

The results of the baseline survey is presented below

Kyebi Akwadum

The estimated population of the town is about 3500. Traditionally, the town is headed by Odikro (caretaker chief). The Community Based Organizations (CBOs) operating in the community are

- a. Nyamebekyere cocoa farmers Association. Potential members pay an initial registration token of 50 Ghana cedis (GHc) and monthly dues of 1GHc. They have membership strength of 23. They have executives and a constitution that guides their activities. They do not have any official collaboration with service providers at the district level with the exception of the Ministry of Food and Agriculture through the Agric extension officers. They have an active membership and executive body.
- b. Akwadum chainsaw operators. They have a membership of 22. They have no constitution and formal registration procedure. They have strong executives who provide day to day administrative and management functions to the group. They have no links to any service providers at the district level.

The taboo day in the community is Thursday. On this day it is forbidden for any economic activities to be undertaken. These are usually the days when community members discuss developmental issues in the community and also engage in communal labour to support any community intervention/activity. The other taboo days relate to customary occasions like Aday days (Awukudae and Akwasidae). Also the community does not have any ohum days where people are expected to stay away from engaging in activities in the forest. In terms of finding out the knowledge of the community on the benefits of Atewa, they reckon that they do not use the Atewa forest for any spiritual purpose. There are some special species of butterfly in the forest. Atewa is also source of River Ayensu, Densu and Birim.

Akyem Apapam

The community has a population of about 3015. The community is headed by a chief. However for about a year there hasn't been a chief after the demise of the former. The community is therefore now being headed by a designated elder who acts as the chief. The community is very close to the forest and also close to the source of River Densu and Ayensu. The major occupation is farming and illegal small scale mining commonly referred to as galamsey. It has been noted that more youth are venturing into galamsey. A number of community based organizations are operating in the community. They include

- a. Pusheebos: It has a membership of about 15. The majority of the membership is males. They help spearhead all community actions in the town. They do not have any formalized registration and have no constitution. They meet on sundays at 3pm and pay monthly dues of 1GHc. They have a strong executive board.
- b. Apapam Birimtifi cocoa farmers union: they are an association of cocoa farmers. They meet fortnightly on thursdays at 10am. They pay monthly dues of Ghc1.50 cedis. The amount paid is distributed as follows: Ghc 1cedi is allocated for the local association and the Ghc 0.50 is allocated for the national cocoa farmers union. They have a membership of about 60. They do not have links to service providers at the district level. They only benefit from government mass cocoa spraying. They have taboo days to be tuesdays and all other mandatory

customary holidays. The community mentioned that some of the environmental benefits they get from the forest include clean air and it serves as windbreaks.

Kyebi Sagyimase

They have a population of about 2700. The town has a major entrance into the forest. The head of the community is a sub chief. The major occupation is farming. There are also hunters and chainsaw operators in the community.

- a. There are number of community based organizations operating in the community. There are about six different cocoa farmer groups. They are Sagyimase 1, 2, 3 and Nyamenehene, Nyametease and Nyamebekyere cocoa farmers union. Each group has its set of rules and regulations and also leaders. Some are organized and some are not. Some have strong executives and others do not. However the youth leader is the head of all the groups and periodically the all the groups come together to engage with district stakeholders for example Agriculture extension officers.
- b. SOS – (Nyamebekyere givers association). It is a group born out of Save Our Soul organization (a non-governmental organization). They meet fortnightly on thursdays at 3pm. They pay monthly dues of GHc 2. They are very organized and have a strong executive body. They have links to the SOS and periodically they go to Asiakwa to have meetings. They have a membership of 32.
- c. Nhyira chainsaw operators. They have a membership of 10. They are not very organized and the executive body is not very strong. They pay monthly dues of GHc 15. They meet on thursdays at 9am.

The taboo day in the community is Thursday. There are also customary holidays including Adae and Ohum days. Some of the environmental benefits from the forest include windbreaks, clean air, inducing of rainfall and also keeping a cool micro climate.

Bomaa

The town has a population of about 2200. The head of the town is a sub chief. The major occupation is farming. A few are hunters. There are a number of community based organizations operating in the community. They include:

- a. Amajaro cocoa farmers union: the group is made up of only cocoa farmers. They have executives but they are not very active. They have a constitution and their registration system is not well organized. They have a membership of 38. They pay dues of GHc1 per month. They meet fortnightly on sundays around 3pm.
- b. Ahoho group (immigrants group): they have a membership of 25. The group is not strong. They pay dues of GH 2. They provide help for one another. They meet on sundays around 3pm.

The taboo days of the community is sundays and all customary traditional holidays. The community mentioned that some of the environmental benefits they receive from Atewa include windbreaks, inducing of rainfall, giving of clean air.

Akyem Bansa

The town has a population of about 3500. The town is headed by a chief. The town has a sacred grove where all the kings (chiefs) of Akyem are buried. A number of community based organizations operate in the community. They include:

- a. Progressive youth club: they are made up of men and women. This group was basically constituted to help each member to raise financial capital to support their livelihoods. They have 54 members. They have very active executives, strong constitution and formal registration processes. They meet fortnightly on sundays at 5pm.
- b. Nagody Allah: this is also known as progressive youth. Meet weekly on tuesdays at 10am. They have 13 members. The group has developed constitution and formal registration process.

The taboo day in the community is tuesday as well as all traditional/customary holidays. The community mentioned that some of the environmental benefits they receive from Atewa include clean air, wind breaks and rainfall.

All the communities have information systems and this makes community mobilization easy. Information is passed to the operators of the information system and the announcement is made. The best day to meet the community members is on the taboo days since no one goes to the farm.

Phase II: Summary of community meetings and results of ecosystem assessment

The phase comprises of the development of concepts, systems and tools for identifying and quantifying ecosystem services of Atewa with regards to the five project communities. The product from this stage feeds directly into the district stakeholder's workshop to consider actionable issues and develop plans to implement them looking at the synergies and potential conflicts among stakeholders in the sustainable use/conservation of Atewa. It is important to note that through the community sensitization meetings, the level of awareness on the drivers of deforestation and destruction of Atewa has been fully appreciated. The communities have also received information on the various laws that govern forest management in the country. The communities have resolved to engage in sustainable forest management practices and also protect Atewa in order to continue to enjoy especially the non-use values/benefits provided by Atewa. About 250 community members (160 males, 90 females) from the project communities have directly received the awareness and this is expected to provide benefits to over a thousand community members indirectly through its ripple effect.

The benefits and alternative livelihood options each community wants to engage in in order to reduce the pressure on the forest reserve is presented in the table below.

Community	Benefits derived from Atewa	Alternative livelihood options
Akyem Bansa	Source of water (Rivers Densu, Birim Ayensu)	They wish to have seedlings to plant in their farms
	It induces rainfall	Animal rearing
	Source of bushmeat	Financial support for small and medium business set ups
	Source of Non-timber forest products (NTFPs)	They however requested for a bore hole for the community to improve the water quality and quantity which the community uses
Akyem Apapam	NTFPs	Animal rearing
	Source of water (rivers Densu, Birim Ayensu)	Seedlings for tree planting
	It induces rainfall Serves as wind breaks	Creation of factories for jobs
		Resuscitation of cocoa farming
Akyem Sagyimase	Windbreaks	Allocation of part of the reserve for farming
	Windbreaks	Technical school (crafts)
	It induces rainfall	Allocation of some portions of the forest reserve for Taungya farming
	Clean air	Extension of forest boundary
	NTFPs	Creation of jobs
Akyem Akwadum	Reduces intensity of the sun	
	Timber	Financial support for business
	NTFPs	Creation f petty jobs like factory jobs
	Clean air	Pineapple /banana farming (should be revamped)
	Reduces intensity of sun	Animal rearing (grasscutter/ snail)
	Source of some rivers	Allocation of some portions of the forest reserve for Taungya farming
	Windbreak	
	Special species located in the forest	

Ecosystem assessment and sustainable use limits of benefits from Atewa Range Forest Reserve

Through community meetings, the project team developed a tool for assessing the ecosystem services of Atewa in relation to the project communities. The questionnaire developed was used to collect information from respondents in all the

project communities in addition to information collected during the community meetings.

The East Akim municipality is located in the central portion of Eastern region with a total land area of approximately 725 km². It used to be the second largest of the 15 districts in Eastern region until 2004 when the Atewa district was carved out of it. The municipality is bordered by six districts namely Kwahu South district to the north, Atewa district to the north-west, Kwaebibirim district to the south-west, Fanteakwa district to the east and New Juaben municipality and Suhum-Kraboa-Coaltar district to the South. The municipal capital, Kibi, is 55 km from Koforidua, 105 km from Accra and 179 km from Kumasi.

The result of the analysis presented below informed the discussions at the district stakeholder's meeting.

Demographic and statistics on Respondents of assessment

Majority of the respondents interviewed were male (74%) as shown in figure 1.

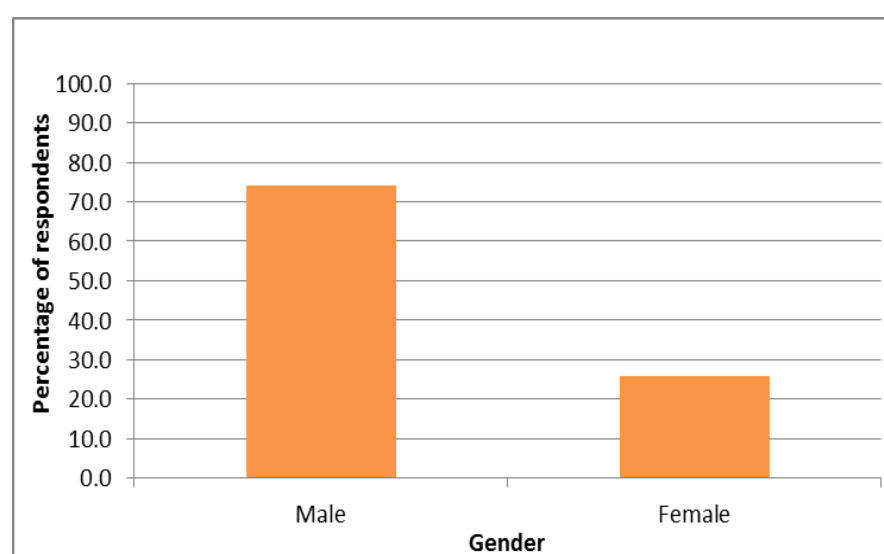


Figure 1: Gender of Respondent

Majority of the respondents are above the 40 years (66%) while a small number of respondents are below the age of 20 years (2%) as shown in figure 2.

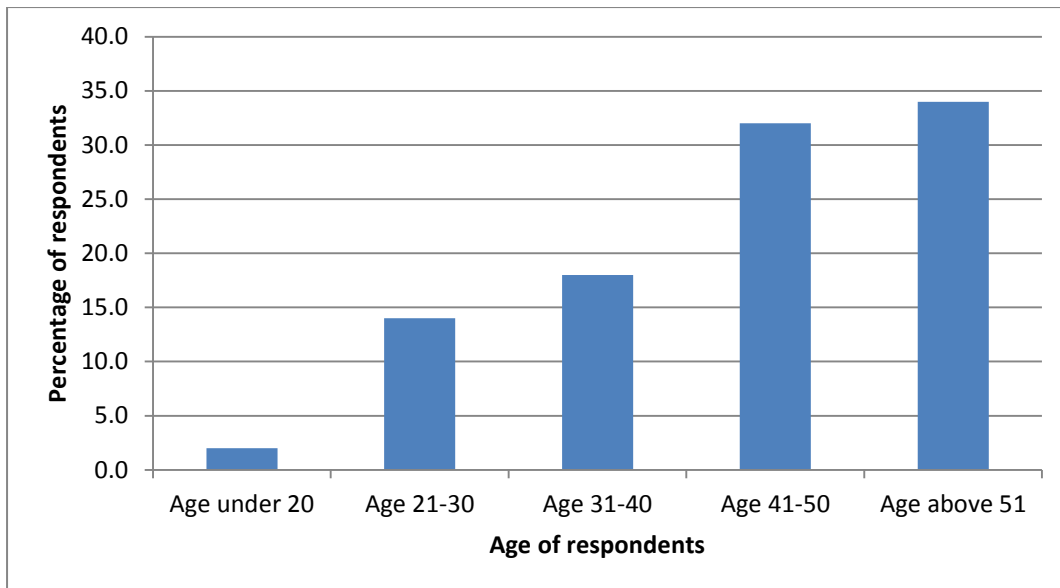


Figure 2: Age distribution of Respondents

In terms of the educational level, majority of the respondents have had secondary education and a significant number of them have had no formal education (see figure 3).

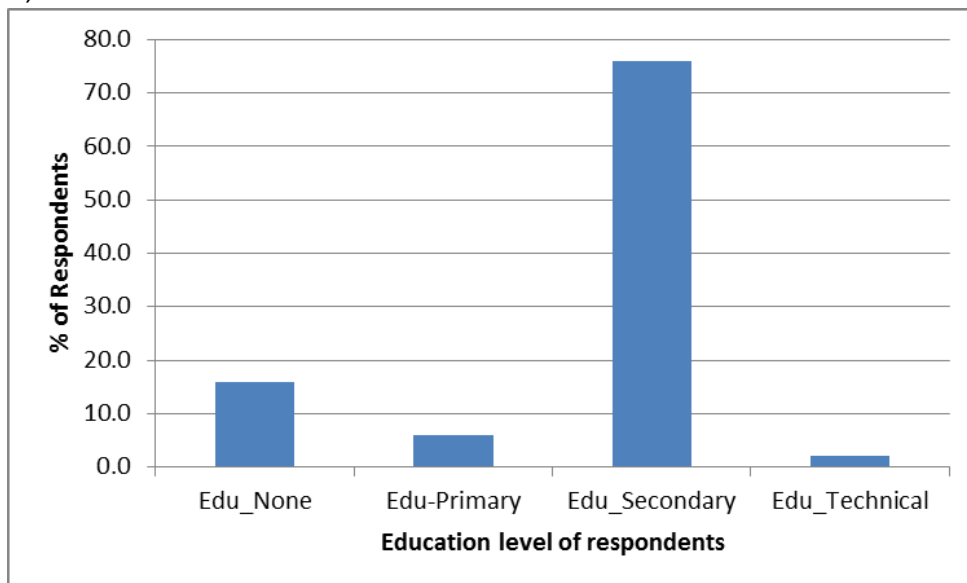


Figure 3: Education level of respondents

The experience of respondents with farming was also assessed as this has influence on decisions regarding the use of the forest reserve. It is understood that most farmers have the tendency to encroach the forest reserve for farming purposes. Most of the respondents had farming experience of more than 6 years (see figure 4)

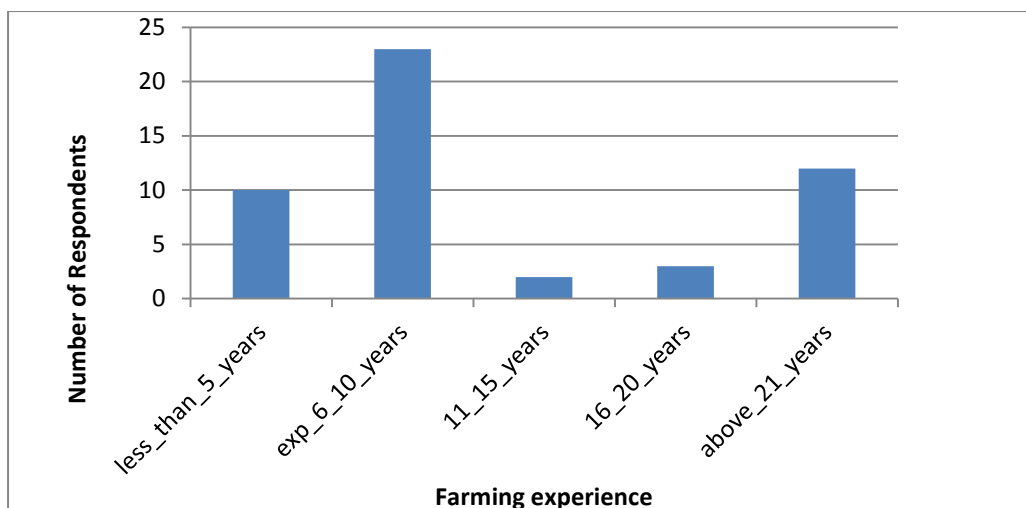


Figure 4: Farming experience of respondents

Ecosystem assessment and benefits from Atewa

Through the community meetings and questionnaire, the ecosystem benefits that fringe communities get from Atewa were enumerated. They include hunting, leisure and relaxation, for swimming, cultural and spiritual relevance. The communities also harvest forest products from Atewa (see figure 5).

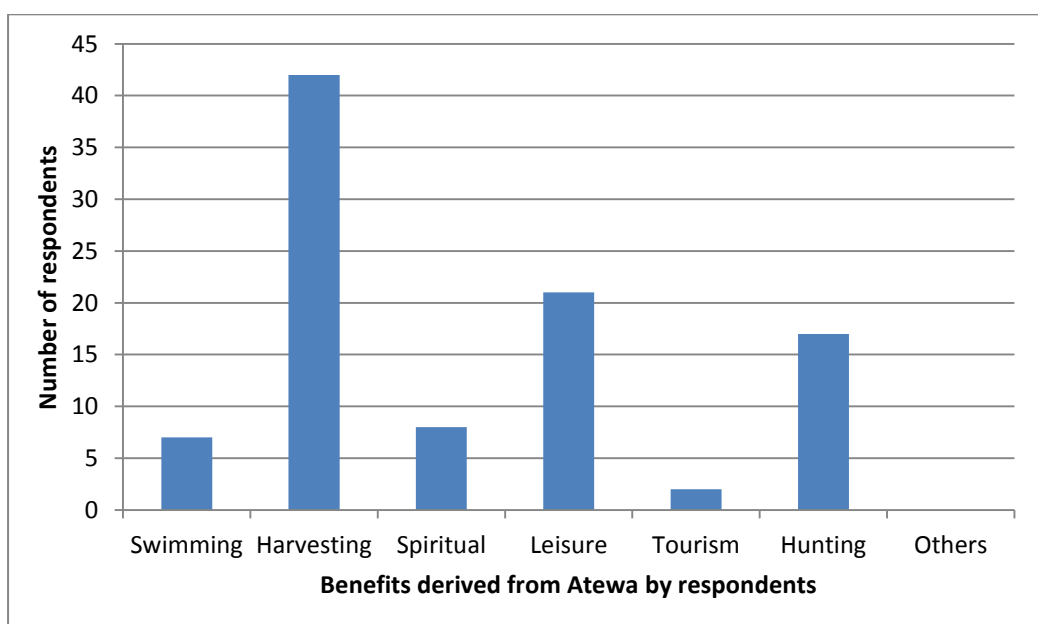


Figure 5: Ecosystem benefits respondents derive from Atewa

The ecosystem services of Atewa were assessed based on the list/criteria (see Table 1) through questionnaire administration.

Table 1: List of ecosystem services, indicators and units of measurement from literature review

	Typology of Main service types	Specific Example for Atewa used in assessment	Indicator for assessment (flow/use indicator)	Unit of measurement
PROVISIONING SERVICES				
1	Food	Bushmeat	Amount of game captured	Kilogramme per hectare (kg/ha)
		Snails	Amount of snails collected	Kg/ha
		Honey	Amount of honey harvested	Kg/ha
		Mushroom	Amount of mushrooms collected	Kg/ha
		Fruits	Amount of fruits collected	Kg/ha
2	Water			
3	Raw Materials	Timber	Harvested wood (in solid)	Cubic meters per hectare (cm ³ /ha)
		Fuelwood	Harvested wood fuel (in dry weight)	Kg/ha
		Rattans	Harvested rattan (in dry weight)	Kg/ha
		Wood for mortar	Harvested wood (in solid)	kg/ha
		Pestle	Harvested wood (in solid)	kg/ha
		Cane	Amount of cane harvested	Kg/ha
		Twine	Amount of twine harvested	Kg/ha
		Chewing stick	Harvested tree branch or stem (in solid)	Kg/ha
		Sponge	Amount of sponge harvested	kg/ha
		Construction poles	Amount of tree harvested (in dry weight)	Kg/ha
		Chewing sponge	Amount of sponge harvested	Kg/ha
4	Genetic resources	Spices	Amount of spices collected	Kg/ha
		Herbs	Amount of herbs collected	Kg/ha
5	Medicinal resources			
6	Ornamental resources	Wrapping leaves	Amount of leaves harvested	Kg/ha
REGULATING SERVICES				
7	Air quality regulation	Cleaning of air (by capturing of fine dust)		
8	Climate regulation	Inducing of rainfall (by vegetation)		
9	Moderation of extreme events	Windbrakes		
		Prevention of flooding		
10	Regulation of water flows	Watershed protection		
11	Waste treatment			
12	Erosion prevention	Prevention of erosion		
13	Maintenance of soil fertility			
14	Pollination			
15	Biological control			
HABITAT SERVICES				
16	Maintenance of life cycles of migratory species			
17	Maintenance of genetic diversity	Gene pool protection		
		Intrinsic value		
CULTURAL &AMENITY SERVICES				
18	Aesthetic information	Aesthetic beauty		
19	Opportunities for recreation & tourism	Ecotourism		
		Recreation		
20	Inspiration for culture, art and design	Festival and rites		
		Royal mausoleum		
		Palace of a chief of Akyem		

21	Spiritual experience	Sacred groves
		Burial place
22	Information for cognitive development	Education and public awareness
		Research

Ecosystem services

Provisioning services

This refers to the tangible benefits that can be derived from the forest. The provisioning services of Atewa identified are food, raw materials, medicinal resources and ornamental resources. The provisioning services were broadly grouped into timber products and non-timber forest products (see table 2).

Current, future use preference and frequency of use

The results show that communities extract timber and non-timber forest products from Atewa (see figure 6).

Table 2: Broad category of provisioning services extracted from Atewa

Non-Timber Forest Products (NTFPs)	Timber products
Bushmeat	Timber
Snails	Fuelwood
Honey	Wood for making mortar
Mushroom	Pestle
Fruits	Construction poles
Rattans	
Cane	
Twine	
Chewing stick	
Chewing sponge	
Spices	
Herbs	
Wrapping leaves	
Spices	

Specifically, forest fringe communities extract less of timber, wood for mortar, rattans, sponge and construction poles. The most extracted provisioning services from Atewa include fuelwood, snails, mushroom, chewing stick and chewing sponge. It is not strange that the most extracted services are for food (mushroom, snails), for cleaning purposes (chewing stick and sponge) and for energy (fuelwood). Fuelwood, bushmeat, fruits and twines are used more frequently than other services provided by Atewa (see figure 8). These are used most often and the communities are not economically empowered to procure suitable alternatives hence their over dependence on these services.

In terms of the broad categorization of forest products, the use of NTFPs is higher than that of timber products. This is consistent with the legal status of the forest

reserve (conservation status) and thus there is less timber extraction done in the reserve, also by fringe communities.

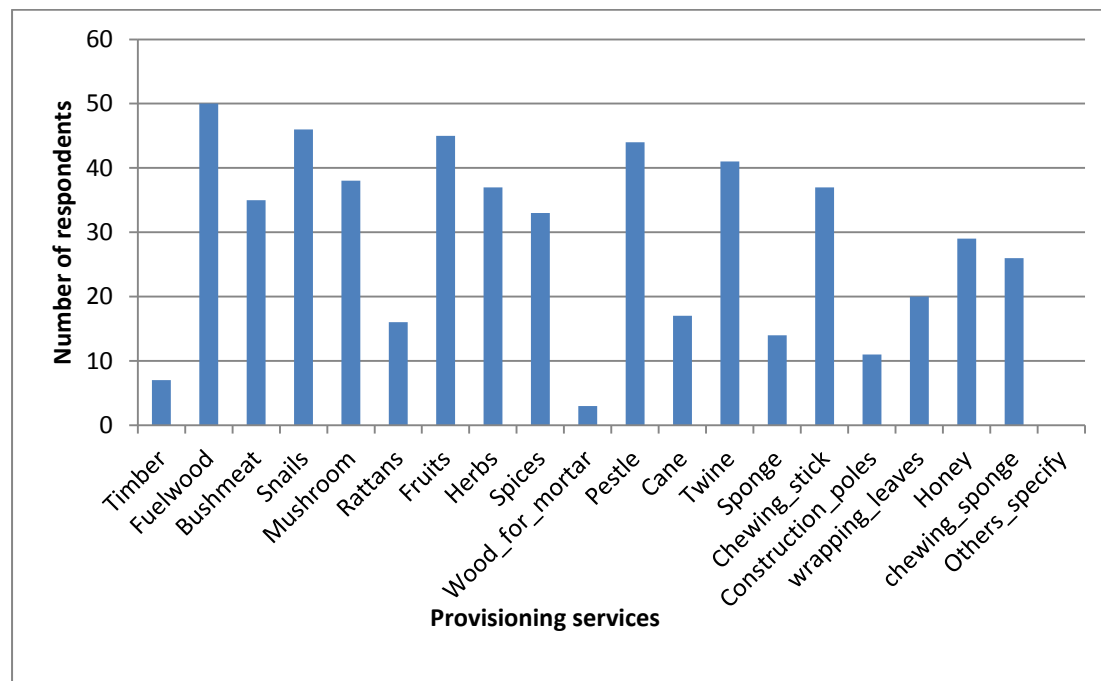


Figure 6: Current use of provisioning services by respondents (of communities fringing Atewa)

It is interesting to observe that the communities prefer to use more of the timber products (including timber, wood for mortar and construction poles) in the future than they are currently using.

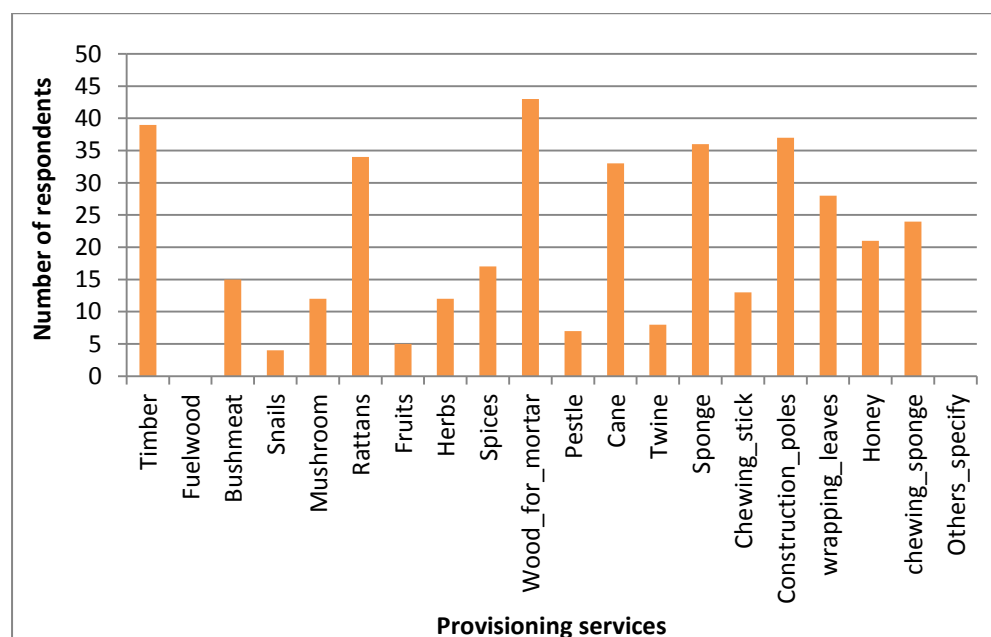


Figure 7: Future use preference of respondents with respect to provisioning services of Atewa

This could be due to population increase in the future among other reasons. This raises a number of issues including assisting community members including the supporting the communities to engage in community plantations to meet the demand for timber products in the future. This would reduce the pressure on Atewa by the fringe communities.

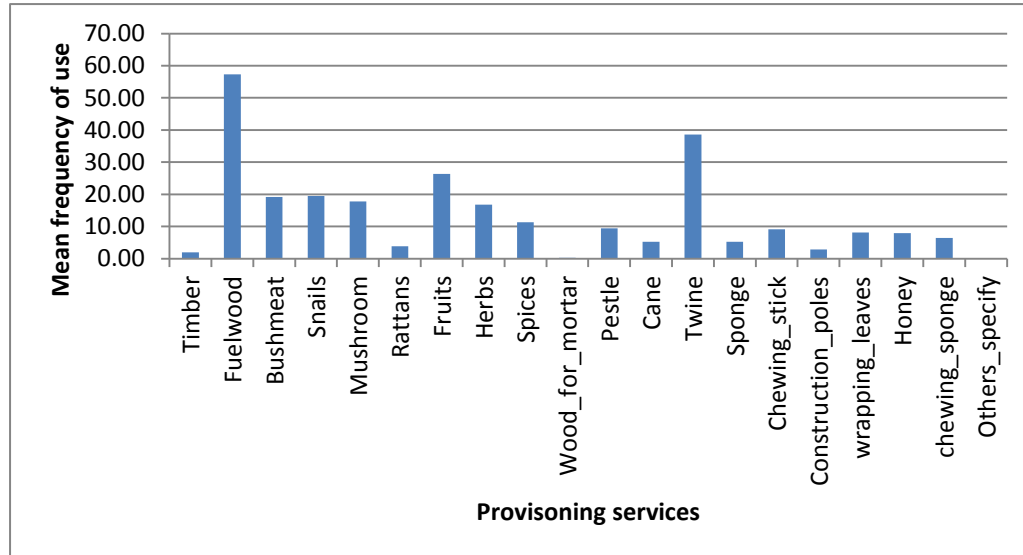


Figure 8: Mean frequency of use of provisioning services of Atewa by respondent

Quantity of use of provisioning services

The quantity of provisioning services used by households in communities fringing Atewa was also estimated from the survey tools developed and administered.

The equation used for estimating the population mean (with 99% confidence interval) for each service type (Ott & Longnecker, 2010) is:

$$U \text{ (upper and lower, service type)} = \bar{y} \pm \delta/\sqrt{n}, \quad \text{Equation 1}$$

Where U is the population mean for the service type; \bar{y} is statistical mean for the service type, δ is the statistical standard deviation for the service type, n is the total number of observations, upper refers the upper limit of the estimated population mean interval and lower refers to the lower limit of the estimated population mean interval.

The 99% confidence interval values (for upper and lower limit) of the NTFP service types and that for the timber products were then estimated.

Based on the population mean computed for each service and the total for the sub-group categorization, the quantity (given by the upper and lower limit) of each service type used by the population was calculated. This is done by multiplying the population number by the upper limit or lower limit (of the interval) of the mean for each service and also for the total by the formula:

$$\text{Amount used (service type)} = U \text{ (upper, service type)} \times X, \quad \text{Equation 2}$$

Where X is proportion of the population (of the communities that fringe Atewa and between the ages of 15 and 70 years)

The population living around Atewa and are assumed to depend primarily on the reserve and therefore extract at least one type of service was estimated. This was done by first assuming that this population is rural. Then the total rural population of the two districts (West Akim and Kwaebibirim).

Table 3: Computed total population fringing Atewa (from the two districts using data from the 2010 national population and housing census)

	Rural population from the two district (X values)						
	Factor	Age Under 20	Age 21-30	Age 31-40	Age 41-50	Age Above 50	Total
Total of the 2 districts	1	16641	24081	18760	15150	21484	96119
Total of the 45 communities	0.106	1775	2568	2000	1616	2291	10250

The quantity of the NTFP service type extracted per household per hectare of Atewa is presented in figure 9.

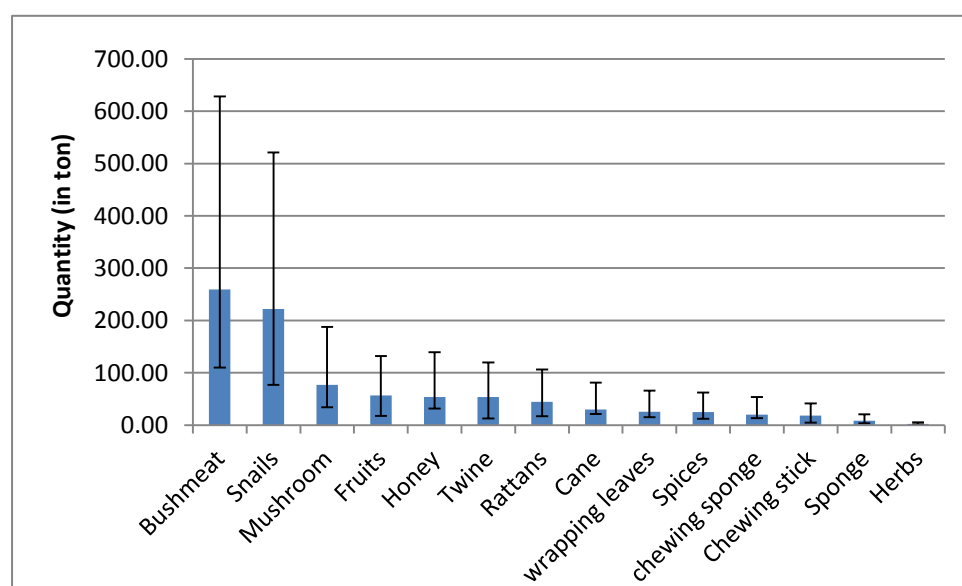


Figure 9: Quantity of Non-timber forest products extracted with mean interval (of total population of communities fringing Atewa)

Using the Equation 1, the maximum and minimum amount of each service type extracted by the population was computed the quantity of the NTFP service type extracted and timber products per household per hectare of Atewa is presented in figure 9 and 10 respectively.

The results show that about 1.400 ton per year (with 99% confidence interval) of other timber products except timber itself is extracted from Atewa representing a consumption of about 0.059 ton per ha per year for every household in the

communities surrounding Atewa (Figure 10). The amount of timber that is extracted is about 350,000 m³ per year.

A total about 1.300 ton per year (with 99% confidence interval) of NTFPs are extracted from Atewa Range Forest Reserve. A single household extracts about 55 kg per year of NTFPs from Atewa. The NTFP that is used most is bushmeat, accounting for about 370 ton per year. The NTFP which is used least from Atewa are herbs with a total of about 3 ton per year.

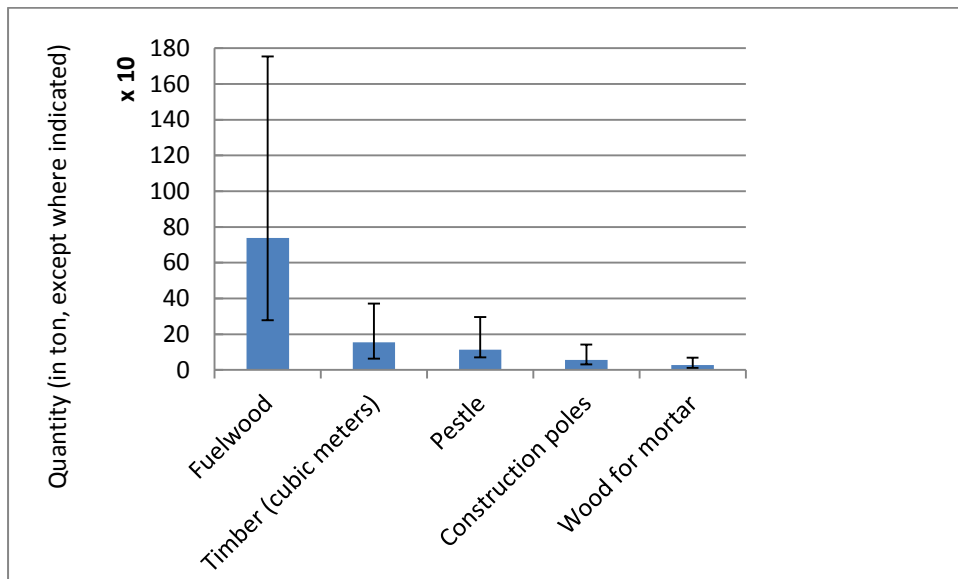


Figure 10: Quantity of timber products used with mean intervals by communities fringing Atewa (of the total of all households)

Cultural/Amenity services

Cultural/amenity services of Atewa were enumerated as palace of the chief, royal mausoleum, burial place for inhabitants of the communities. Atewa is also used for spiritual attachments such as for performing festivals, recreation, and ecotourism and as sacred groves (see figure 11).

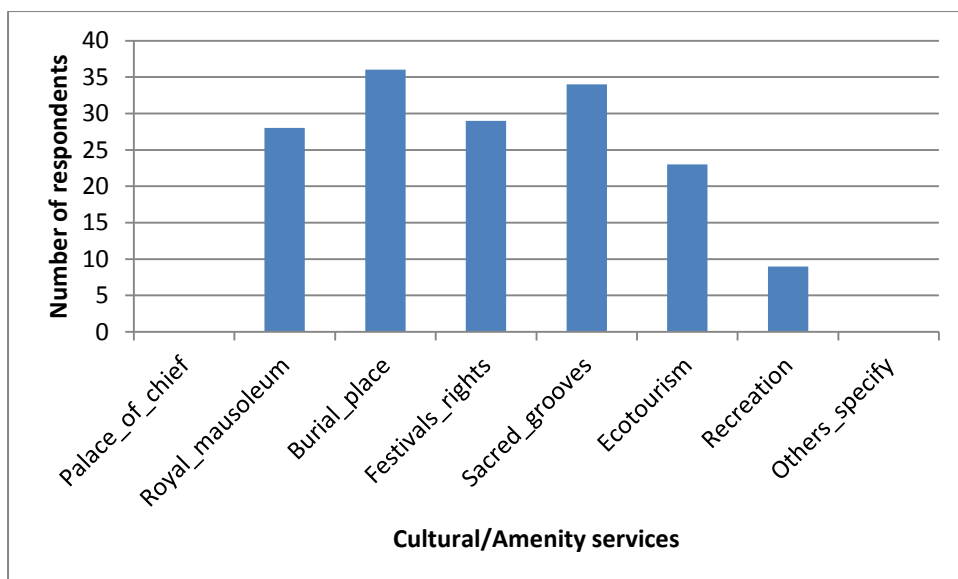


Figure 11: Current use of cultural services of Atewa by respondents

The most preferred cultural/amenity services by respondents in the future are for recreation, ecotourism and palace of the chief in the communities (see figure 12). This shows that there could be strong acceptance for developing Atewa into an ecotourism location and where the flora and fauna species will be well protected and communities can also gain from employment and other related economic livelihood enhancement programmes.

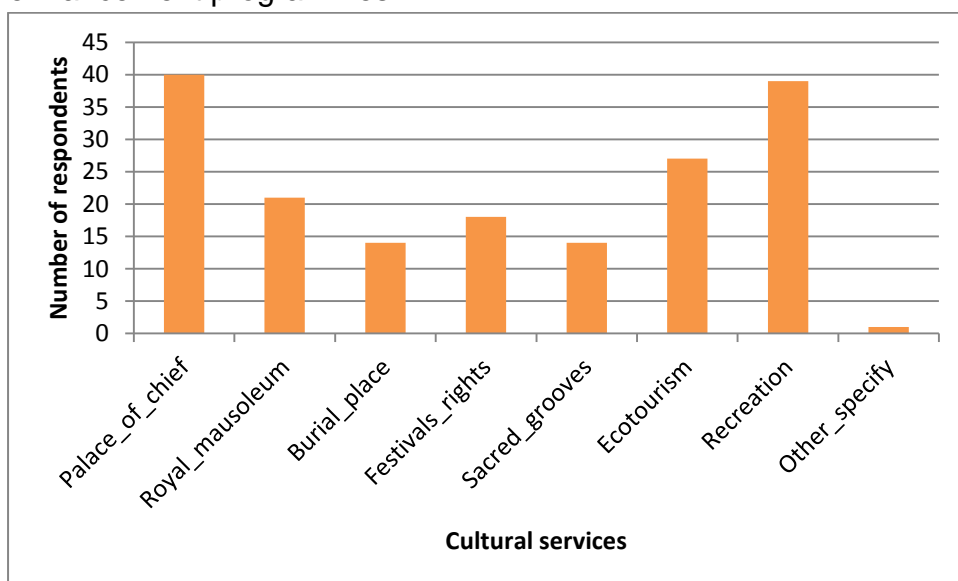


Figure 12: Future use preference of cultural services of Atewa by respondents

Habitat Services

The habitat services of Atewa assessed are public awareness or education, research, gene pool protection, intrinsic value among others. The results show that communities fringing Atewa regard Atewa for most for educational purposes, research and for its intrinsic value. This is consistent with aspirations of elevating the

standard of the forest reserve into a national park. The non-extractive use of the reserve will be consistent with a policy direction of pure conservation of the reserve.

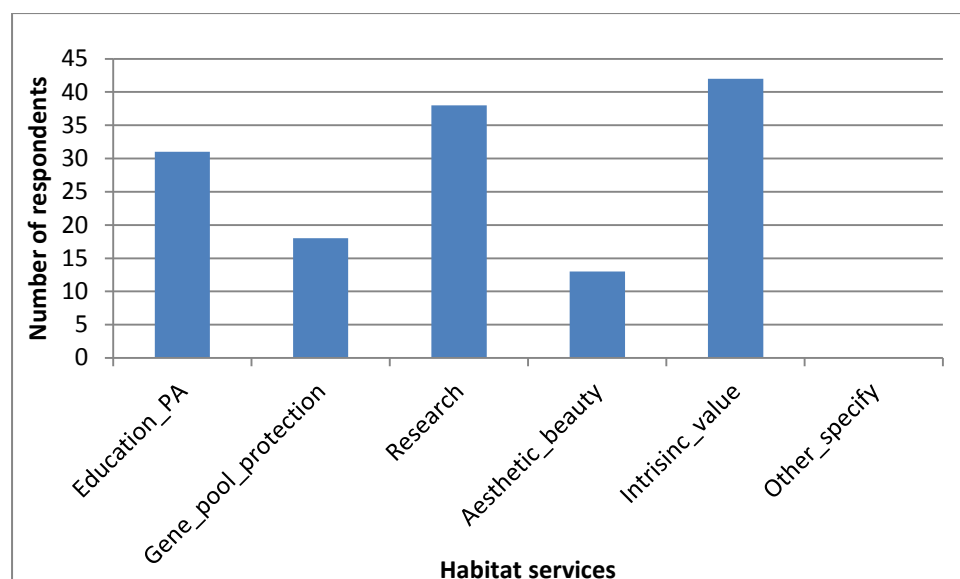


Figure 13: Current use of habitat services of Atewa by respondents

In terms of future preference for habitat services of Atewa, the communities regard Atewa for gene pool protection, aesthetic beauty and education (see figure 14).

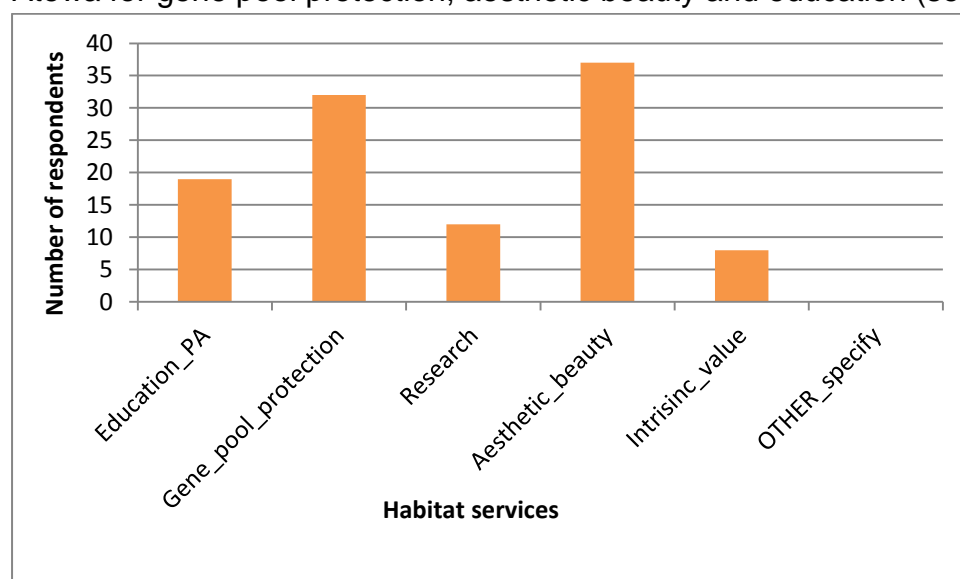


Figure 14: Future use preference of habitat services of Atewa by respondents

Regulating Services

The regulating services of Atewa assessed include watershed protection, prevention of erosion and prevention of flood (see figure 15). These are also the regulating services regarded most by respondents interviewed in the study. Other services assessed are use of Atewa as windbrakes, for inducing rainfall and improving the general microclimate of the area suitable for agriculture and for carbon sequestration.

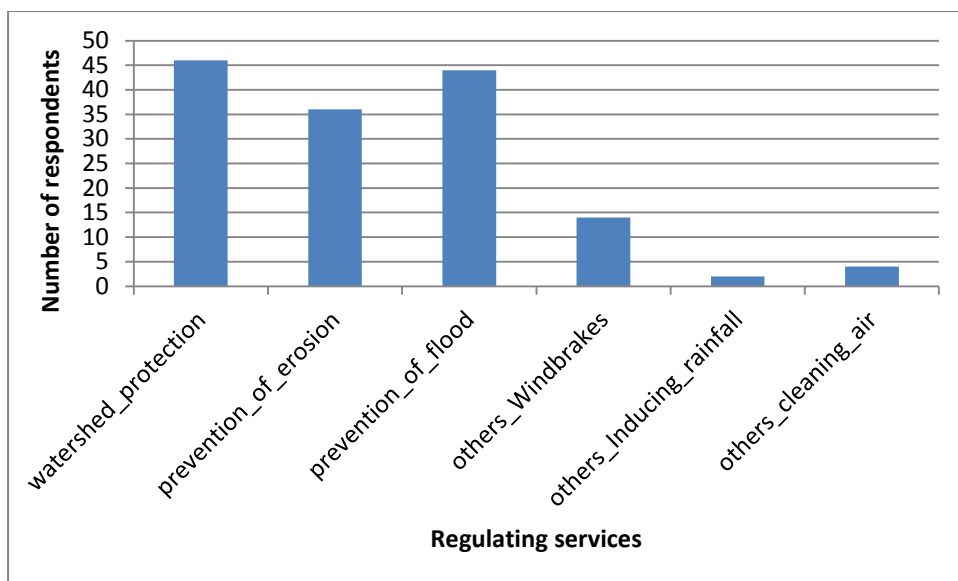


Figure 15: Current use of regulating services of Atewa by Respondents

In terms of future use preference of the regulating services of Atewa, respondents significantly put emphasis on the watershed protection, prevention of erosion and flood services/benefits from Atewa (see figure 16).

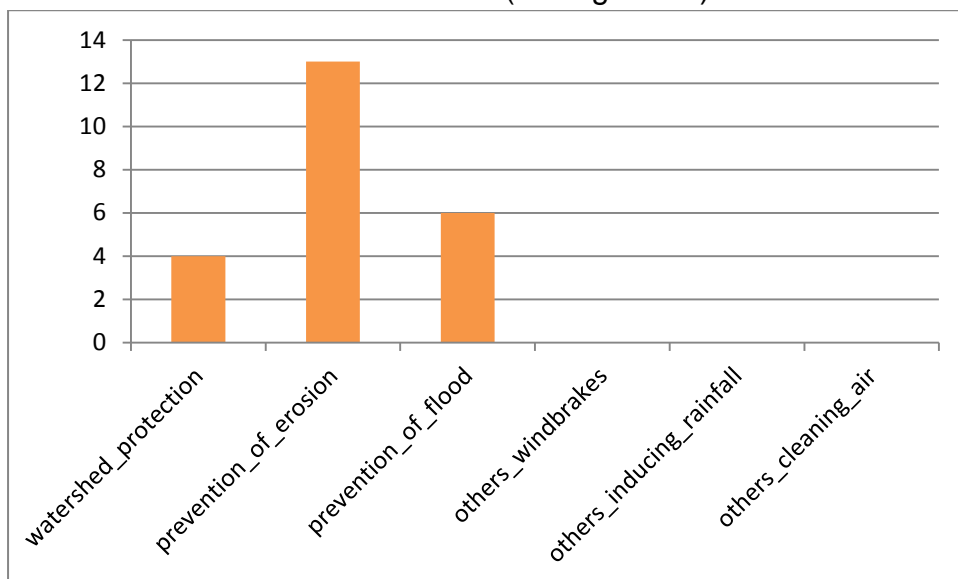


Figure 16: Future use preference of regulating services of Atewa by respondents

District Stakeholder's workshop

The workshop took place on 29th May, 2015 at the Municipal Assembly hall, West Akim, Kibi. Representative of the Municipal Chief Executive, Godwin Fiamor Webu, Assistant Director was present at the meeting. Others present include the representatives from the planning office. Key message from the MCE is to embrace the concept of ecosystem approach to protecting Atewa and the idea of the project to make its impacts long lasting. Welcome further collaborations with all stakeholders

including civil society organizations. The total number of participants at the workshop was 21 (male = 19, female = 2).

Action points from the meeting

- **Assembly support for SMEs:** The Business Advisory Center (BAC) is responsible for provision of tailor-made skills training for small and medium scale enterprises development in the district. The Municipal Assembly options of funding from the internally generated fund (IGF) and assembly common fund to provide specific skills to community based organizations and community groups in order to earn some gainful employment and reduce the pressure on the Atewa. The community also got to know the existence of BAC and were tasked to inform the larger community population and to actively seek information from the BAC and collaborate with them to enhance their livelihood
- **Awareness creation:** Suit of awareness creation packages targeting stakeholders at different scales. The community sensitization has proved essential and critical to inform the communities on the importance of Atewa for the immediate and distant regions. This needs to be sustained. Environmental clubs need to be formed and sustained at the various first and second cycle institutions in the municipality to provide the school children with the requisite information on how to protect the environment especially at Atewa since these would be the future managers of the forest reserve. This will go hand in hand with the community sensitization for especially the adults of the fringe communities. The Municipal Assembly sub-committees on Education, Environment and Agriculture will collaborate to work on the modalities and actual funding support instrument to make it sustainable on the long term. The assembly members and the staff of the Municipal assembly will put this information across to the leadership of the assembly to determine the implementation modalities going forward
- **Alternative livelihoods:** Alternative livelihood options that are developed for the community members should be viable, sustainable and profitable. The basic concept behind such assertion is that in order for people who are engaged in illegalities and destructive practices on Atewa and earn decent income to stop they need to earn comparable income with the alternative livelihoods. This will serve as true incentive and will encourage them to stop destructive and illegalities in the reserve. The alternative livelihood options include fish farming, pineapple farming and tree planting (community forest plantations). This action of course goes hand in hand with the strict law enforcement.
- **Start-up capital for SMEs:** NGOs and other civil society organizations should develop proposals for skills training and providing the requisite start-up capital for the alternative livelihoods. Their intervention in the area should not be restricted to only awareness creations and capacity building.

- **Strengthened Traditional authorities:** The traditional institutions should be strengthened (through additional legislation at the local and national levels) to make laws and have greater and direct responsibilities for the protection of Atewa. Traditional knowledge that is beneficial and forward-looking should be repackaged and used for the protection of Atewa. The chiefs and Municipal should take the lead responsibility to make this proposal to government.
- **Political will:** The government should have the political to clump down on illegal mining and not granting any mining or logging lease in the forest reserve. Government should also commit the required financial resources and strengthen institutions for the protection of Atewa.
- **Local forest guards:** The community should be directly involved in beneficial activities to protect the reserve. The setting up of community watch-dog (community forest guards) to protect the area was proposed. In the event that Atewa is elevated to the status of a National Park the workforce (labour) for guards to protect the reserve should be sourced from the fringe communities. This provides a win-win situation by providing gainful employment for community members and thereby directly involving them in the protection of the reserve. It is provides relatively affordable labour for the financiers of the project. There is thus shared ownership, trust and responsibility for the protection of the area in a Private Public Partnership (PPP).
- **Large scale business set ups:** The meeting proposed that government should explore options and consider setting up businesses in the community that can provide employment for especially the youth and this will prevent them from engaging in illegalities in the forest reserve. It was diagnosed during the meeting that a key driver to destruction of Atewa was poverty and unemployment. Value chain agriculture based industries especially in oil palm could be considered. This could provide employment to many people along the value chain.

Management/Action Plan

Issue	Implementable action	Time	Responsibility	Stakeholders/Community
Assembly support for SMEs	Business Advisory Centre (BAC) to provide specialised training and support to community based organizations to improve their livelihoods	June, 2015 to May, 2016	Planning officer of MA, community representatives at workshop (to their assembly representatives	All project communities, Municipal Assembly (MA), Business Advisory Centre (BAC)
	Project communities to use their Assembly representatives to ask for information on the technical and financial assistance available to them at the Assembly to improve their	June, 2015 to May, 2016		

	livelihoods			
Start-up capital for SMEs	NGOs and other civil society organizations to develop proposals for providing skills training and start-up capital to improve livelihoods of Atewa fringe communities	June, 2015 to December, 2015	NGOs (including A Rocha)	NGOs, MA
Alternative livelihoods	Develop and implement viable, sustainable and profitable alternative livelihoods for fringe communities	August, 2015 to May, 2016	MA, NGOs, BAC	NGOs, MA, BAC
Awareness creation	Develop awareness packages	June, 2015 to August, 2015	Assembly sub-committees on environment and mining and education, NGOs	MA, NGOs, Assembly sub-committees on environment and mining and education
	Collaborate with Municipal Assembly sub-committees on environment and mining and education to put proposals for funding in Assembly plan and budget	August, 2015 to December, 2015		
	Explore options, form and engage environmental clubs to provide awareness and information to pupils of first and second cycle schools with the support of other NGOs	August, 2015 to May, 2016		
Strengthened Traditional institutions	Explore options of enacting additional legislation to provide support and incentives for traditional institutions to enact bye-laws and put in place structures/systems that protect Atewa	June, 2015 to May, 2016	MA, NGOs	MA
Political will	Advocate and lobby government to enforce recommendations on elevating the status of Atewa to a national park	June, 2015 to May, 2016	NGOs (including Forest Watch Ghana and A Rocha)	MA, Central government, NGOs
Elevation of status of Atewa to national park	Document experience and lessons from the project to provide additional evidence to support policy options of the elevation of the status of Atewa to a national park	June, 2015 to August, 2015	Project team (Rufford team)	MA, Central government, CONAMA (Coalition of NGOs Against Mining in Atewa), A Rocha
	Advocate and lobby	September,	CONAMA,	

	government to enforce recommendations on elevating the status of Atewa to a national park	2015 to May, 2016	Forest Watch Ghana	
Local forest guards	Design options of engaging the community members as local forest guards to feed into a national park concept	June, 2015 to December, 2016	NGOs, MA, private investors	MA, Central government, Private investors, NGOs
	Lobby and advocate for the options/concept of community involvement to any PPP arrangement	Jan, 2016 to June, 2016	NGOs	
Large scale business set ups	Liaise with government to explore options of setting up large scale enterprises and factories to provide employment to fringe communities	June, 2015 to May, 2016	MA, private investors, civil society organizations	MA, Central government, Private investors, civil society organizations

The meeting concluded with remarks from the leader of the project team Kingsley Bekoe Ansah. He enumerated the next steps for the project which includes writing the report and distributing to the all stakeholders.

Conclusion

The project has made significant impacts in terms of raising the awareness of the project communities fringing Atewa on the policies, laws, rights and responsibilities of communities and each single member for the better management and protection of the forest's flora and fauna. It has also contributed to increasing the profile of the reserve to especially donors, governments and all other stakeholders for the right action to be taken to protect the reserve from the many competing pressures on its unique biodiversity and existence. This work will in no doubt feed into national level discourses championed by A Rocha Ghana and other NGOs to finally have a long term policy, legal and institutional framework for the conservation/sustainable use of Atewa to benefit present and future generations. It is the hope of the project team that subsequent continual phases of the project will receive the same level of support from donors including Rufford Foundation in United Kingdom.

Annexes

Annex I

Programme for the workshop

- Opening and Introductions
- Address by Municipal Chief Executive
- Introduction to CEMP and funders of project
- Recap of issues from community meetings/Planning (synergies, conflicts and collaborations)
- Any Other Business
- Conclusion and Way forward
- Closing

Annex II

Details of community contact persons

Name/Designation	Community	Contact Details
Assemblyman	Kyebi Akwadum	0246227890
Boateng	Kyebi Akwadum	0265160707
Kwakyewaa	Kyebi Akwadum	0261175099
Bro Joe (Unit committee chairman)	Akyem Apapam	020532059
Yaw Brako (Pushee boy)	Akyem Apapam	0546232321
Sis. Mary	Akyem Apapam	0244215589
Collins Broni (Assemblyman)	Akyem Apapam	0207824120
Emmanuel Tabi (Assemblyman)	Akyem Sagyimase	0247896109
Nana Mrantehene	Akyem Sagyimase	0244184725
Sis.Ageiwaa Phylis	Akyem Sagyimase	0542457158
Dominic (Town mobiliser)	Akyem Sagyimase	0546637207
Wofa Yaw Nkrumah	Bomaa	0240825589
Nana Aboagye (Kurontihene)	Bomaa	0540761771
Twumasi Koranteng	Bomaa	0508003512
Agyapong	Akyem Bansa	0543215135
Asamoah Emmanuel	Akyem Bansa	0544486238
Foster Aboagye	Akyem Bansa	0542052038
Daniel	Akyem Bansa	0542457013

Annex III: Household questionnaire for ecosystem assessment

Household questionnaire

ECOSYSTEM SERVICES ASSESSMENT AND SUSTAINABILITY ANALYSIS OF ATEWA **HOUSEHOLD QUESTIONNAIRE**

INTRODUCTION

Dear Respondent

This is a project titled: Community Ecosystem Management Project (CEMP) of the Atewa Forest Reserve funded by the Rufford Foundation in the United Kingdom to analyse the benefits/products (ecosystem services) that is provided by Atewa Range Forest Reserve (Atewa) to help in the sustainable management of the forest reserve. When we talk about sustainability we mean the present use (now) and the future use of the benefits/products continuously without destroying the capacity of Atewa to provide the benefits/products. This study will therefore help to assess the current amount of services available and different use of the services, the conflicts and potential collaborations that can be developed between the different users and where maximum use can be achieved while reducing the challenges between different stakeholders. The information that you provide will be handled as confidential and used for research purposes only. I would therefore be very grateful if you could spend a few minutes to fill in this questionnaire for the study.

Please mark with an **X** where appropriate

Information given will be treated with confidence and used only for the purposes of this survey!

Date:		Interview No:	
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A: Demographic and Socioeconomic characteristics

A1	Sex of Respondent	Male		Female	
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A3	Age (years)	
	Under 20	
	21-30	
	31-40	
	41-50	
	Above 50	

B1: Farm experience

What is the number of years since you (Head of HH) have been farming? Please tick as appropriate

B1/1	Less than 5 years	
B1/2	6-10 years	
B1/3	11-15 years	
B1/4	16-20 years	
B1/5	Above 21 years	

B2: Other occupation?

C: Benefits of Atewa

C1	What are the activities you carry out in Atewa	
	Activity	
C1/1	Swimming	
C1/2	Harvesting of goods	
C1/3	Spiritual	
C1/4	Leisure	
C1/5	Tourism	
C1/6	Hunting	
C1/7	Other (please specify)	

C2: Regarding the services of Atewa, please tick as appropriate

C2a	Provisioning	Current use (X)	Would like to use (X)	Quantity (Kg)	Frequency (per month)	C2b	Cultural/Amenity	Current use (X)	Would like to use (X)	Quantity (kg)	Frequency (per month)
C2a/1	Timber					C2b/1	Palace of a chief of Akyem				
C2a/2	Fuelwood					C2b/2	Royal mausoleum				
C2a/3	Bushmeat					C2b/3	Burial place				
C2a/4	Snails					C2b/4	Festivals and rites				
C2a/5	Mushroom					C2b/5	Sacred groves				
C2a/6	Rattans					C2b/6	Ecotourism				
C2a/7	Fruits					C2b/7	Recreation				
C2a/8	Herbs					C2b/8	Aesthetic beauty				
C2a/9	Spices					C2b/9	Education and public awareness				
C2a/10	Wood for mortar					C2b/10	Research				
C2a/11	Pestle					C2b/11	Others (specify)				
C2a/12	Cane										
C2a/13	Twine					C2c	Habitat				
C2a/14	Sponge					C2c/1	Intrinsic value				
C2a/15	Chewing stick					C2c/2	Gene pool protection				
C2a/16	Construction poles					C2c/3	Others (specify)				
C2a/17	Wrapping leaves										
C2a/18	Honey					C2d	Regulating				
C2a/19	Chewing sponge					C2d/1	Watershed protection (hydrological value)				
C2a/20	Water for drinking					C2d/2	Prevention of erosion (localised)				
C2a/21	Others (specify)					C2d/3	Prevention of flooding (localised)				
						C2d/4	Others (specify)				

