New Planting Procedure - Summary of Assessments

RSPO Roundtable on Sustainable Palm Oil	BENSO OIL PALM PLANTATION PLC. ADUM BANSO ESTATE	SCSglobal SERVICES
NPP Reference Number:	SCS-RSPONPP-000479	
Country of the NPP submission:	Ghana	
RSPO Membership Number:	2-0017-05-000-00	

Section 1: General Information

Guidance Note: In this section, the growers need to provide all the necessary information in relation to the new development projects. This includes the type of assessment conducted, location of the project, the type of permit currently obtained, the rights to use the land information, and all relevant information. The land clearing plans will be included in this section as well.

Benso Oil Palm Plantation (BOPP) is a subsidiary of Wilmar Africa Limited which is a subsidiary of Wilmar International (Wilmar). Wilmar is a major agribusiness group and one of the leading global producers, processors and merchandisers of palm oil and lauric oils. The company operates in more than 20 countries located in 4 continents across the world. Being one of the global leaders in the agricultural commodities business, Wilmar is committed to ensuring that its operations meet international best practices as well as social and environmental sustainability requirements, including that of the Roundtable on Sustainable Palm Oil (RSPO). In line with this commitment, BOPP attained RSPO certification for its operations in 2014 and was the first oil palm company in Ghana and the second in Africa to achieve that feat.

As part of BOPP's strategy to expand its supply base and enhance rural livelihoods, the company has been supporting local communities to establish oil palm plantations through an out-grower scheme such as the Adum Smallholder Oil Palm Project (ASHOPP) established in 2019 for the Treboum, Dominase and Mpeasem communities in the Mpohor District of the Western Region of Ghana. The project has an additional livelihood component which includes pig rearing, bee keeping and baking to help the beneficiaries earn income.

Following the success of ASHOPP, the Adum Banso community expressed interest in partnering with BOPP to use a 748.44 ha *(out of which 610.39 ha is the total planting area)* land for the establishment of oil palm as an out-grower project under the name "Adum Banso Smallholder Oil Palm Plantation (Nana Kwandoh Brempong III Estate)". The proposed site is Adum Banso stool land, which is partly fallow and partly used for food and cash crop farming by community members. The 748.44 ha *(out of which 610.39 ha is the total planting area)* land is part of about 1,213.9 ha of land leased to Asubonteng Brothers Limited (ABL) under two leases in 1976 and 1981 for 50 years each to be used for oil palm plantation development. Although the two leases have not expired, both the Asubonteng family and Adum Banso Chief have resolved to seek new investors for the land (thus, the partnership with BOPP) under a joint negotiation and benefit agreement.

The project will follow the ASHOPP model. Although BOPP is not acquiring the site for the project, it will serve as the technical partner and off-taker. Also, BOPP will facilitate fund acquisition for the project. The project is expected to commence in June 2024.

In line with BOPP's commitment to sustainability and RSPO certification requirements, BOPP intends to carry out the proposed out-grower project according to RSPO requirements for new plantings. In fulfillment of these requirements, BOPP has carried out the required various stakeholder engagements and Free Prior and Informed Consent (FPIC) processes. Additionally, the company has undertaken the required assessments which include:

- Integrated High Conservation Value – High Carbon Stock Approach (HCV-HCSA)
- Social Impact Assessment
- Land Use Change Analysis
- Greenhouse Gas Assessment
- Soil Suitability and Topographic survey and
- Environmental Impact Assessment

The results of these assessments and the stakeholder engagements and FPIC are summarized in this report.

The proposed NPP area is in the Mpohor District of the Western Region of Ghana. The size of the NPP area is 748.44 ha *(out of which 658.31 ha is the total planting area)* calculated based on the WGS 1984 coordinate system (Geodesic) and is located between 1.94048° West and 1.90346° West, and 5.03284° North and 5.06989° North. Figure 1 below shows the location of the NPP area.

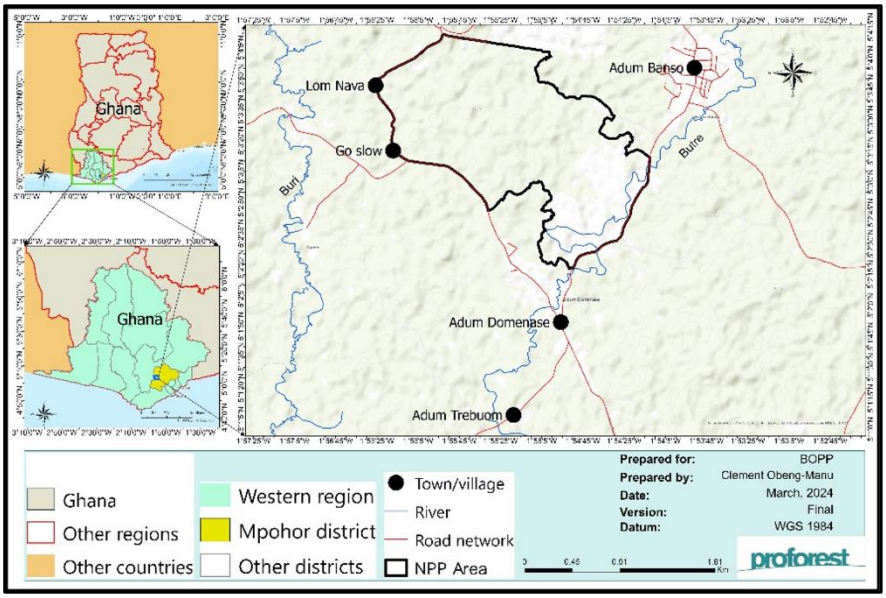


Figure 1: Location map of the assessment area

In line with responsible business practices, BOPP has obtained all regulatory permits required for the operation of its business and development of the NPP area. These are outlined below in Table 1.

Table 1: List of regulatory permits

No.	Permit/License	Issuing Authority	Number	Validity period

1	Certificate of Incorporation	Office of the Registrar of Companies -Ghana	C-8570	N/A
2	Certificate to commence Business	Office of the Registrar of Companies-Ghana	C-8570	N/A
3	Tax Identification Number	Ghana Revenue Authority	C0003546268	N/A
5	Environmental Permit	Environmental Protection Agency	CA 698/LG/PL/01	13/03/2023

The development of the NPP area will follow a planting schedule as follows:

Table 2 NPP area planting schedule

Phase	Year	Hectares
I	2024	100
I	2025	300
III	2026	210.39
Total Planting Area		**610.39**
NB: Plantable area is the total NPP area of 748.44 less the HCV and Conversation management area, community land for food of 94.48 Ha and Cocoa and Rubber areas of 43.57 ha.		

Section 2: Maps

Guidance Note: Please include the following maps here with minimum 300 dpi resolution

- *Boundary Maps owned by the company*
- *Proposed NPP area Maps*
- *Proposed NPP area Maps overlay with HCV and HCS areas*

Boundary Maps owned by the company

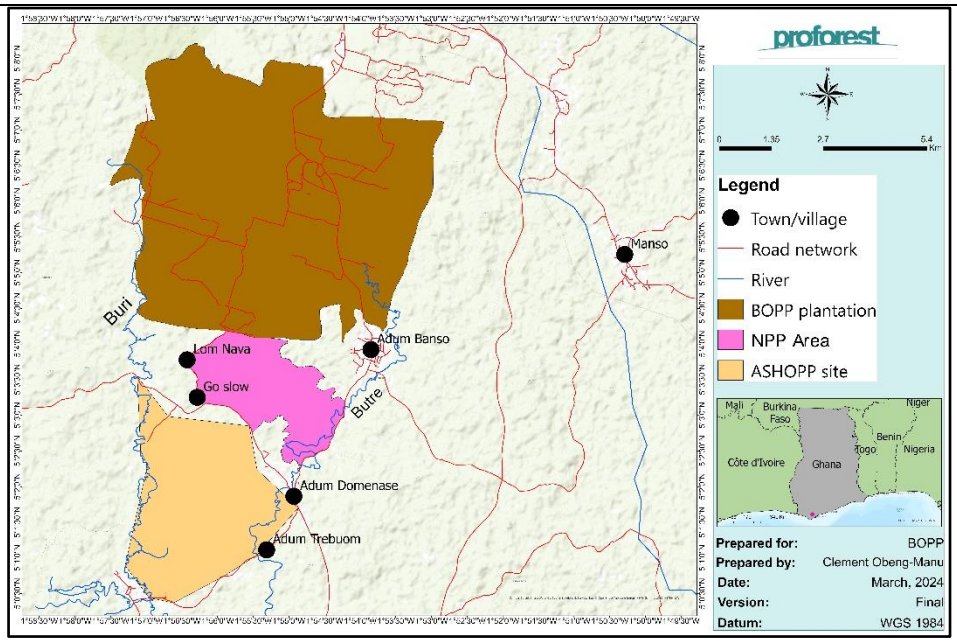


Figure 2: Boundary Map of the NPP area

Proposed NPP area Maps

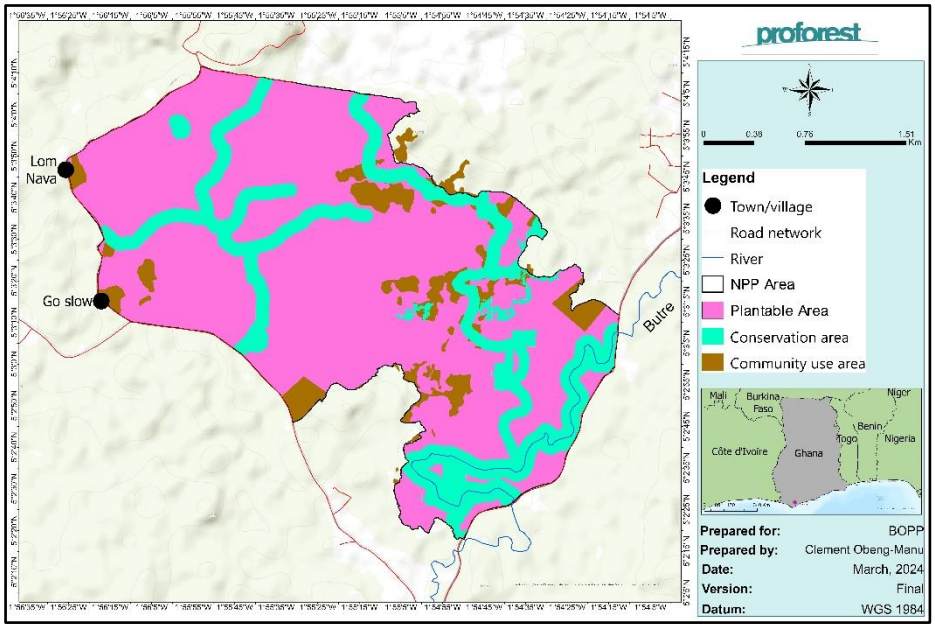


Figure 3: Map of proposed planting schedule and area

Proposed NPP area Maps overlay with HCV and HCS areas

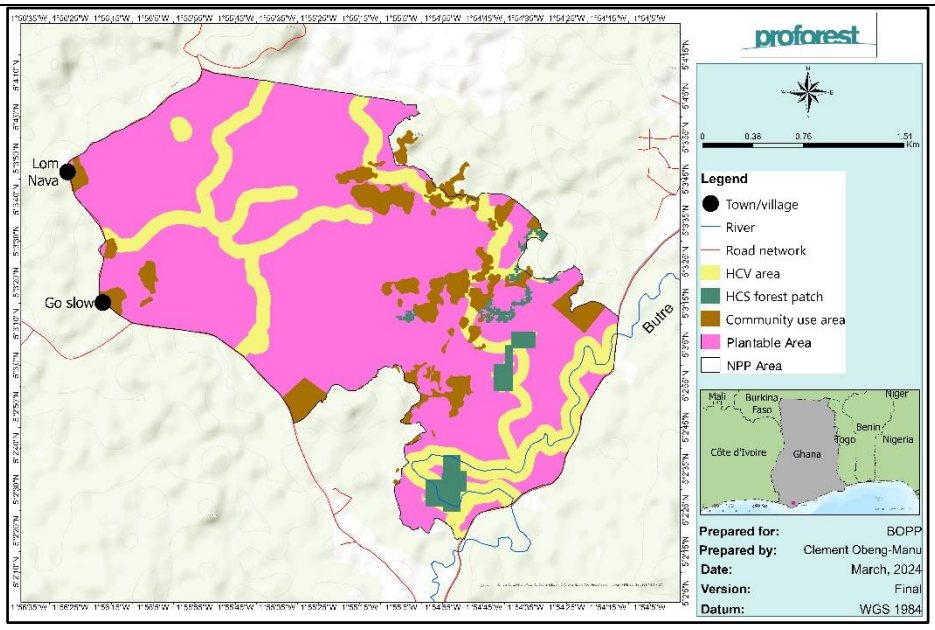


Figure 4: Map of new plantings overlay with HCV and HCS areas

Section 3: SEIA

Guidance Note: This section is where the summary findings of SEIA is captured. References and pictorial evidence are recommended. What are the methodology(ies), people involved in the process, date of assessment and findings? Note: Should an assessment carried out by internal staff, just fill the name of the staff and his/her designation.

SOCIAL IMPACT ASSESSMENT

Date of assessment: 27th June to 2nd July 2022

Name of Assessor: Frederick Antwi

Assessor Designation and Company: Consultant/Proforest

Details of persons involved in various aspects of the assessment are found below in Table 3:

Table 3: SIA Assessment Team

Name	Role	Institution	Relevant Expertise
Frederick Antwi	Team lead/Community consultations and participatory mapping of HCVs	Proforest	Social methods, stakeholder engagement, participatory mapping
Stephen Doso Jnr	Consultations with district and regional stakeholders, community participatory mapping of HCVs	Proforest	Stakeholder engagement, participatory mapping, agroforestry
Clement Obeng-Manu	Community consultations and participatory mapping of HCVs, GIS related work	Proforest	GIS, Forestry

Dr Albert Adu Gyamfi	Household Survey Team Lead	Kwame Nkrumah University of Science & Technology (KNUST)	Social methods, stakeholder engagement,
Ebenezer Akakpo	Household Survey Team Member	KNUST	Social methods, stakeholder engagement,
Amanda Quarshie	Household Survey Team Member	KNUST	Social methods, stakeholder engagement,

Methodology

Review of Maps of the NPP area and Scoping

Maps of the NPP area were reviewed to provide a basis for defining the limits of the impacts of the proposed smallholder project. The review of maps was supplemented with field visits to the NPP area to provide a better understanding of the geographic scope of the area, the affected communities, current land use, and identify key social issues. Undertaking a scoping exercise helps the assessment team to undertake preliminary consultations with key stakeholders to understand issues pertaining to the NPP area and to highlight key areas to focus on during the main assessment.

Review of available literature

As part of the preparatory work for the social impact assessment of the NPP area, relevant documents were reviewed to obtain background information and understand the social context of the proposed project area. The reviewed documents provided the assessment team with secondary data and background information on the local communities within the scope of the project. These include the local economy of the communities, vegetation types, demographic, and cultural attributes of the people in these communities. The documents reviewed include but not limited to:

- National Population and housing Census report (2021)
- BOPP-Treboum Smallholder project SIA report
- Report on Master Plan for oil palm development in Ghana
- National Land Policy
- National Buffer Zone Policy
- Environmental Protection Act of Ghana (Act 490 of 1994)

Key Institutional Consultations

Regional and district level stakeholders relevant to the proposed smallholder oil palm project were consulted during the scoping and the main assessment. They include the Forest Services Division (FSD) of the Forestry Commission (Western Regional and Tarkwa District offices), Mpohor District Assembly and the Departments of Food and Agriculture and Social Welfare in the Mpohor District. Conservation Foundation, a Non-Governmental Organization (NGO) which operates in the area was also consulted for their independent views and potential impacts of the proposed oil palm project in Adum Banso. The institutional consultations involved the adoption of semi- structured interviews which generally allows for focused, conversational, two-way communication between the interviewer and the interviewees. For such high-level consultations, this approach is helpful because several important issues (not planned ahead of time for discussions) tend to be raised for further discussions.

Field Surveys and Community Consultations

The study adopted standard household survey, community consultations, focused group discussions and key informant interviews in data collection. A household was defined as the number of persons that may not necessarily live under the same roof but share the same means of livelihoods and respect the authority of a common head. The field survey and community consultations focused on four communities that were identified to be potentially impacted by the proposed smallholder oil palm development through a purposive sampling approach. These communities are Lomnava, Go Slow, Dominase and Adum Banso. The survey and community consultations were held to:

- understand the socio-cultural structure of the communities i.e., the local governance structure and the interrelationships that exist.
- have a profile of social amenities or infrastructure in terms of education, health, recreation, and sanitation in these communities.
- have an idea of the socio-economic activities of the communities in the proposed development area and how it could be impacted by the proposed development and
- understand the profile of key community level stakeholders.

Plate 1: Focus group discussion (women) at Adum Banso

In relation to the household survey, mathematical projection models consisting of geometric growth and exponential models were used to extrapolate population of Adum Banso and Dominase (for 2022) because the available population figures were dated 2010. Go Slow and Lomnava are hamlets, so their entire population was used. The population of Adum Banso and Dominase were extrapolated to be 5,543 and 2,980 respectively in 2022. Their respective sample sizes were then calculated as 373 and 353 respectively[1]. In all, 220 households were surveyed using simple random sampling technique with the breakdown as follows: Adum Banso – 123, Dominase- 90, Go Slow – 6 and Lomnava – 1. Tables, charts, and cross tabulations were used to descriptively assess the demographic and socio-economic characteristics of the communities within which survey was conducted.

[1] In computing the sample size, the assessment team employed the sampling strategy of Yamane (1967), which is mathematically expressed as $n=N1+N(e2)$, Where n = sample size, N = household population size, and e = level of precision. Because the survey used a simple random sampling technique, a high level of precision was employed (5%). This helped to fairly represent the entire population in the study without biases.

Impact Identification and Significance

The significance of the impacts associated with the proposed projects was determined after potential impacts were identified through field surveys and stakeholder consultations. The significance of impacts was determined by identifying their magnitude, extent or location, reversibility and duration.

In general, magnitude of an impact is expressed in terms of severity (i.e. major, moderate, or minor). The extent of an impact is used to define the geographic area within which an impact is confined. Thus, an impact may be precise, localized, regional, national, or international. Social impact is considered reversible when the impact can be corrected, and it is irreversible when it cannot be corrected, and could continue even upon adoption and use of mitigation measures. The duration of an impact is used to express how long a specific impact lasts. An impact may last for a short term (temporary impact) or an extended period (long-term impact). An impact is considered permanent when it is long term and cannot be reversed. Although reversible, a temporary impact may span several days, weeks or months.

At this stage, the evaluation of the importance or significance of the impact depends on the characteristics of the expected impact and its importance in decision-making. Thus, the significance can be low (impacts have medium to short term ramifications on the social or natural environment), medium (threat is real but not substantial and reversibility is possible over a period of several years) or high (impacts have long term effect on the social or natural environment). Once an assessment is made, the impact significance is rated using the matrix below:

Table 4: Matrix for deriving the significance of Impacts

Location	Reversibility	Duration	Significance
Precise	Reversible	Short term	Low
		Long term	Medium
	Irreversible	Short term	High
		Long term	High
Local	Reversible	Short term	Low
		Long term	Medium
	Irreversible	Short term	High
		Long term	High
Regional	Reversible	Short term	Medium
		Long term	High
	Irreversible	Short term	High
		Long term	High
National	Reversible	Short term	Medium
		Long term	High
	Irreversible	Short term	High
		Long term	High

Findings

Key Institutional Consultations

A summary of outcomes from the engagements with institutional representatives are detailed below in table 5:

Table 5: Outcome of key institutional consultations

Stakeholder/ date	Summary of comments, questions and/or concerns
Ministry of Food and Agriculture - District Crops and Extension Unit – Patrick Bright Adaboe) 28-06-2022	● The Ministry of Food and Agriculture in the district owes a responsibility to the local communities, who are predominantly farmers cultivating crops such as cassava, rice in swamp areas, maize, vegetables as their main livelihood. These crops are sometimes intercropped with cash crops, predominantly oil palm, rubber, and cocoa. ● The District Crops and Extension Unit has been playing the liaison role between BOPP and the local communities and will continue to do so due to their direct engagement with farmers. Currently, the NPP area is under-utilised and not a major production site for any crop. Converting it to oil palm will increase the productivity per unit land area. ● The Department acknowledged the immense contribution and benefit of the additional livelihood options as part of the Treboum project (ASHOPP) in the catchment area, and therefore urged BOPP to replicate same as part of the proposed Adum Banso Smallholder Oil Palm Plantation. Among them were employment and sustained income from additional livelihood businesses. ● The Department has expertise in the implementation of additional livelihood activities, hence BOPP should collaborate with the Department to implement the project and also provide extension services.
Social Welfare and Community development (Simon Sarfo – Department Head) 28-06-2022	● The Department acknowledged challenges such as illegal mining which is high due to high unemployment rates among the youth; teenage pregnancy and high cost of living due to influx of people into the area. The illegal mining activities have led to chemical pollution of water bodies in the catchment area which poses high risk to human life. ● The district has very low internally generated funds and communities don't like self-help initiatives. This project will improve the socio-economic conditions of beneficiary communities and by following the additional livelihood (AL) model of the Treboum project (ASHOPP), living conditions will be enhanced. ● The department is willing to collaborate with BOPP in rolling out AL options including bread making, beekeeping, soap making, poultry, mushroom. Communities should be involved in the selection of options that they think are feasible.
Forest Services Division - Tarkwa Joseph Aggrey, Range Manager (Dompim Range) 29-06-2022	● The division is mandated to sustainably manage forest reserves. However, Rare, Threatened, and Endangered trees outside forest reserves are still protected by the division. ● Farmers who may have economic trees on their farms mainly Ofram, Emire, Odum may apply and be granted permit to fell under supervision. However, if a farmer applies and that tree happens to be a restricted (protected tree) they are not allowed to fell. Most of these trees are used as seed trees. ● There are no sacred grooves in the Adum Banso area. ● The officer recommended for enrichment planting to be done in Conservation and buffer areas. This can be done as shelter belt or fire belt around the conservation areas. ● The division also stressed the need for monitoring the areas earmarked for conservation. The division can support by deploying forest guards around the Benso

	area. Communities must be sensitized on the need to keep these conservation or buffers areas. ● The outfit admitted challenges in executing their duties, notably means of transport since their work involves movements to protect the forest resources. ● Illegal mining even within reserves and chainsaw activities remain serious threats to the forest reserve.
Forest Services Division, Tarkwa, District Manager, (Vincent Appiah) 29-06-2022	● The Tarkwa office manages reserve areas. The off-reserve areas in the landscape including the NPP area falls under Takoradi FSD. Tarkwa FSD can still collaborate in managing the conservation areas as they have officers the project area. ● For off reserves, anyone interested in trees will have to get consent from the farmer; get permit from FSD and pay compensation if farmers crops are destroyed during the felling process. The office does not have much control on off reserves. So, if any species of conservation concern is found, sensitization must be done, and the farmer must be compensated for the conservation. ● Local based committee can be formed to protect the area. ● Trees such as Kokrodua, Edinam, Odum, Kusia, Sapele, Hyedua which are going extinct can be planted to enhance the area. These are called restricted species, and one must get special permit to be felled. ● Sign board and pillars can be erected to demarcate the areas. ● Cartographer confirmed that the NPP area falls under Takoradi. However, their forest area is closer to the site, hence has more presence there. ● Tarkwa and Takoradi FSD can collaborate to render any support to sustainably manage the identified conservation areas. ● The office can recommend species that thrive well in the NPP area for enrichment planting e.g., the Dahoma-Mahogany association.
Asubonteng family 29-06-2022	● Asubonteng family consents to the project and want to give the land out. The project is rather delaying. All the family members are in support and eager for the project to commence. ● The Chief of Adum Banso has engaged the family representative to discuss the project and the family is willing to send a documented consent. ● At the meeting, it was agreed that the Adum Banso Chief will draft the agreement for it to reviewed by the family and then finalised.
Forest Services Division, Takoradi, District Manager (Charles Nketiah) 29-06-2022	● Official activities are mainly geared towards management of reserves. ● There are admitted farms within forest reserves leading to illegalities. Farmers connive with illegal chainsaw operators to log trees for money. ● Off-reserves are managed by the Department of Agriculture. FSD only comes in to manage trees in areas that fall under timber concessions. There are no timber concessions currently in the project area. ● The forest reserves include endemic and protected trees. Hence, some of the reserves have areas designated as Globally Significant Biodiversity Areas (GSBAs). ● Threats to the survival of these national assets include chainsaw, farming and Illegal small-scale mining (popularly called “Galamsey”). ● To properly manage the identified conservation and buffer areas, there needs to be collaboration between FSD and BOPP to provide more seedlings for enrichment

	planting and to sensitize communities in the catchment area on the need to preserve for example the high carbon stock areas.

Community Consultations

Below is table 6 containing summary notes of the consultative sessions with the communities, chiefs and elders and women focus group discussions held specifically at Adum Banso and Dominase.

Table 6: Summary notes of community consultations

Stakeholder	Summary of comments, questions and/or concerns
The Chief of Dominase, Elders, community members and some farmers 27-06-2022	● The Chief mentioned hunting is done in the NPP area. Animals killed include grasscutters and rats. ● The chief stressed the need for a well-documented benefit sharing agreement between him and the Adum Banso Chief. ● On identification of HCV 4 and 5, the community mentioned rivers and streams in the NPP AREA, namely Butre, Anwiawia, Mrehua, Atedja, Fia and Afiafi which some are used for drinking and for pesticide application on farm. They indicated that there are no cultural sites within the NPP AREA. ● FPIC processes have been initiated but must be completed and well documented. Community members are well informed about the proposed project and negotiations will begin when the smallholder project is given the needed support to be carried out. ● Community members who are into oil palm farming on the NPP AREA should be part of the smallholder oil palm project. ● Cocoa and rubber farms on the NPP AREA will not be touched or included. ● Chief requested for copies of the proceedings for future reference. The chief however was encouraged to make use of his community secretary to take minutes in all dealings or engagements for future reference. ● There will not be compensation for annual food crops, e.g., cassava, plantain, etc. Affected farmers will be given time to harvest before the project commence. ● Perennials like oil palm have been enumerated by BOPP, but compensation is yet to be paid to farmers. ● Generally, there is support for oil palm development on the NPP AREA.
Lomnava community members 27-06-2022	● FPIC processes have been initiated and the people aware of the project. ● They acknowledge the land belongs to the Chief of Adum Banso which was leased to them. ● Had a sixty-year lease which has expired and yet to be renewed. ● Community members could not give an indication of the size of their land. ● Large tracts of their leased land have been used for cocoa and rubber and therefore will be excluded from the proposed smallholder oil palm project. ● According to them, they pay yearly rent (an amount between 600 to 800 cedis) to the Adum Banso Chief which is legally binding. However, community could not produce the document for inspection.

	● HCV 3 (a rare ecosystem- a rock from which water gushes out and used by the community). This was mapped. Community collects shrimps and crabs from this water source. ● Non-Timber Forest Product (NTFP's) e.g., mushrooms very much available within the NPP AREA and other areas when is in season. ● Concerns raised about potential chemical pollution of a stream in the NPP AREA (Atedja) used for domestic purposes. The community members requested for a borehole to be drilled for them. ● Are we also going to benefit from the smallholder project as affected farmers in the community? ● The household has about 200 oil palm trees. ● BOPP has done enumeration of oil palm within the NPP AREA, but no compensations has been paid so far. ● The Chief of Adum Banso and BOPP should allocate a parcel of land for food crop farming purposes. ● Community members mostly women are involved in making cassava dough and selling at Mpohor and Mile 5 markets.
Go Slow 27-06-2022	● Most of the community members in Go Slow are not affected but rather a section of the community (called Kyenkyenase) is affected mostly by this proposed smallholder project. ● Presence of HCV 5 i.e., Atedja stream found in the NPP AREA which the Kyenkyenase community use for domestic purposes. ● BOPP should allocate a parcel of land for food crop farming. This will enable the women to continue with vegetable production which gives them income to support their subsistence. ● BOPP should support to sink a Borehole in the community. The water fetched from existing borehole at Go Slow is dirty and unwholesome. According to the community members the drilling did not go deep enough. ● What are we going to get from BOPP now they are taking this land from us? ● Odikro (caretaker chief) stressed the need for a portion of land to be allocated for food crop farming. ● Former Odikro's son reiterated, they still pay rent to Adum Banso chief every year. He added they own about 10 acres (35 to 40 poles) of land which has been used mainly for oil palm and rubber. ● The current Odikro insisted on the need for further consultations with affected farmers. ● There is no school in the community. Children walk about 1.6 kilometres to school at Mempeasem.
Adum Banso Community 28-06-2022	● BOPP has initiated FPIC processes, and the community members are aware of the proposed project. However, it needs to be well documented. ● HCV 3 example wetlands and swamps potentially present in the NPP AREA. ● HCV 5 is also present in the NPP AREA. They mentioned rivers such as the Butre, Anwiawia, Mrehua. ● The community members do fish in these water bodies, but this is not the main source of protein for community members. ● Medicinal plants, mushrooms in the NPP AREA but also available at other places.

	● Hunting is done in the NPP AREA and community. Animals killed include grasscutter and rats. ● The community confirmed the proposed NPP AREA is owned by the Adum Banso stool. ● Some farmers raised concerns of unclear boundaries and possible inclusion of individual farmlands close to the NPP AREA. ● The community supports the smallholder project because they think it can generate employment for the youth in the community. ● However, there are concerns that a parcel of land either be allocated within the NPP AREA or elsewhere to be used for food crop farming. ● On additional livelihoods, they mentioned BOPP could support affected farmers with livestock rearing and training on vegetable production e.g tomatoes, garden eggs, pepper etc which can give farmers regular income. ● Proposal for BOPP to institute a transparent and fair scholarship system for wards of affected farmers.
Focus Group Discussion with Women (Adum Banso) 28-06-2022	● Ten community standpipes are faulty, and women go through much difficulty in getting water for household chores. The community water and sanitation committee responsible for management of these standpipes have not been effective with the tokens received when people fetch at the pipe, leading to losses and their inability to fix the faulty pipes. ● Women depend on individual hand dug wells in peoples house, which sometimes gets locked by owners. ● Sections of the community for example K1, Sumakrom and Abuom need boreholes drilled for them. ● Due to frequent power outages in the community which affects water been pumped from the pump station to the 20-seater KVIP built by BOPP, the facility cannot be used when water is not available. This may lead to open defecation if the water flow challenges are not addressed. ● The women stressed the need for portion of land to be allocated for food crop farming. Without this, they stressed they were going to starve.
Head of family (Abusuapanin), Queen mother and Elders of Adum Banso 28-06-2022	● Proposed NPP AREA is still under two leases – 1976 which will expire in 2026 and 1982 to expire in 2032. Anybody farming on the land is operating illegally. ● BOPP being RSPO certified and the need to conscientiously follow thoroughly all these social and environmental requirements. ● Overview of the various teams i.e., SIA (which includes the survey team), Flora and Fauna and the GIS teams to enable the chiefs appreciate the volume of work underway. ● Farmers will be allocated plots in the smallholder project. ● Memorandum of understanding (MOU) drafted in agreement with the Asubonteng family (Leasee) but yet to be signed and copy given to BOPP and other relevant parties. ● The smallholder project to be named after Nana Kwandoh Brempong III, the Chief of Adum Banso. ● The leases of Lomnava and Go Slow have long expired and yet to be renewed. ● The question of chief allocating a plot within the NPP AREA or elsewhere could not be established. To be subject to further discussion. ● The Abusuapanin encouraged the teams to speed up their work and enable the project to commence.

Focus Group Discussion with Women in Dominase 29-06-2022	• Women support the smallholder project but also believe a parcel of land be allocated for food crop farming. • Women group called for additional livelihood support in the 1-4 years of the plantation establishment before fruiting and harvesting begins. Livelihood support options suggested including soap making, livestock rearing, making of pastries etc. • They requested for BOPP to institute a scholarship scheme to award scholarship to wards in school as part of their corporate social responsibility.
Dominase Community 29-06-2022	• Community generally aware of the proposed development. • There are still farmers with oil palm which has not been enumerated yet. • There are parcels of land which does not fall within the 'Asubonteng land' which the Chief of Banso has included in the NPP AREA, according to one John Alexander Nkrumah. Hence the need to clarify all boundaries issues with farmers who own lands close to the NPP AREA. • About ten farmers indicated their cocoa and rubber farms within the NPP AREA has not been mapped yet. • The community seem very divided with some in support of the project and the other party feels the land should be left for food production. Apparently, the latter group are beneficiaries of the Treboum smallholder project. • Community members stressed the need for portion of the land to be allocated for food crop farming. • Support for additional livelihoods as was done for the Treboum project to be replicated here early enough to serve as relief for affected farmers. • BOPP should facilitate a meeting between Chief of Banso and Dominase to agree on benefit sharing. The community and its elders want that assurance that they will benefit from the upcoming project.

Household Survey

Age and Sex composition of Respondents

The survey comprised a total of 874 individuals (from 220 households across the 4 communities) out of which 53% were females and 47% were males as shown in figure 5 below.

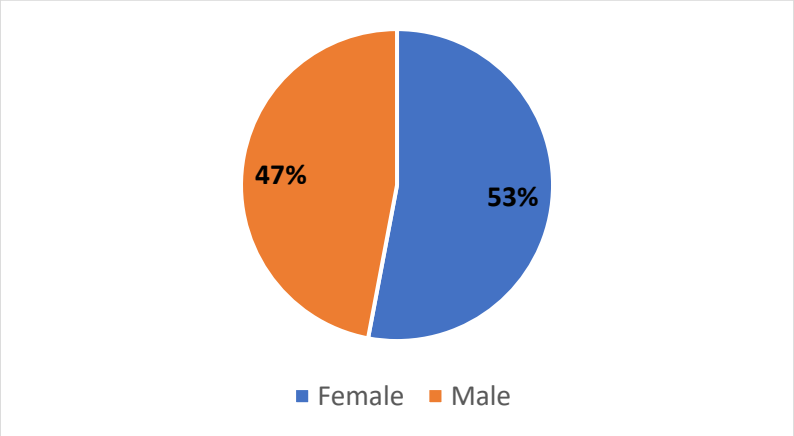


Figure 5: Gender disaggregation of Respondents

Persons aged from 5-9 years represent the majority (10.8%) of household members. Following this is those between the ages of 20-24 years (10.1%). The aged (65+) and the young (below 15 years) constitute 32.1% of the total population of the 4 communities. The communities have a youthful population, with a large proportion (67.9%) within the working age cohort (15-64 years). The overall age-dependency ratio of the communities is 32:100 (32%). Thus, for every 100 persons within the active-age population, 32 persons (within the young and aged cohorts) depend on them. This is lower than the national age-dependency ratio of 66.94%. Figure 6 shows the age structure of households surveyed.

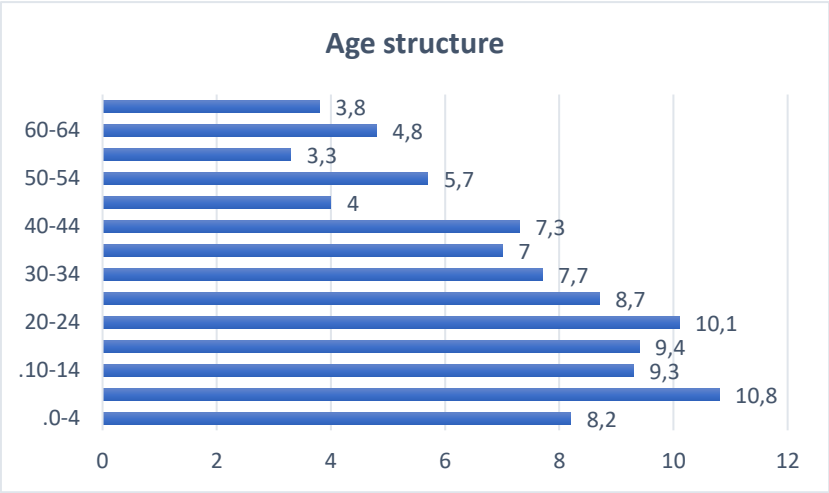


Figure 6: Age structure of households

Education and Literacy levels

Figure 7 below indicates a relatively high basic educational level (nursery through to Junior High School) attained by 65% of the sampled population. 120 respondents had attained Senior High School education representing 14%; and post-secondary education accounted for 2%. The remaining 13% have had no formal education. This implies that at least half of the inhabitants possess basic literacy skills.

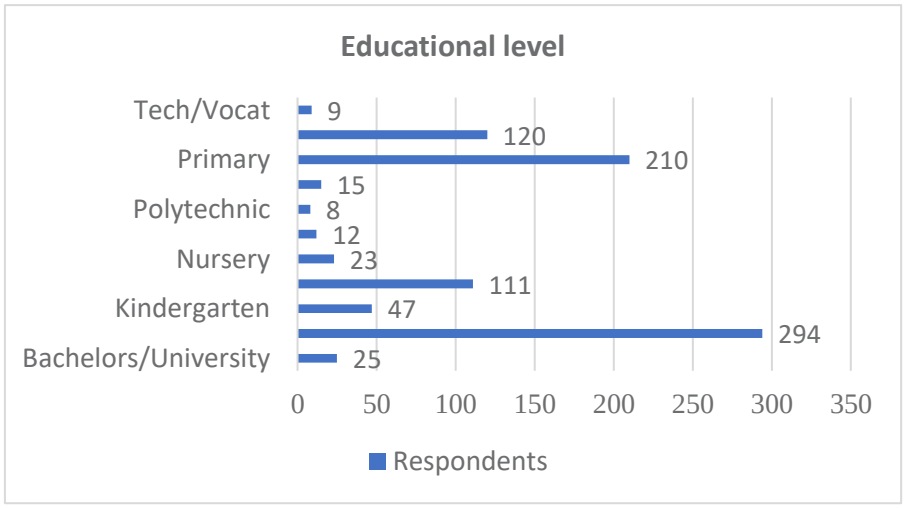


Figure 7: Educational level of Respondents

Primary Occupation and Source of Income

Figure 8 shows that majority of household members are students (representing approximately 34%). 19% rely on farming as their primary source of income. About 4% engages in artisanal mining while 8% are involved in artisanal jobs (e.g. tailoring, carpentry, hairdressing etc.). Wage earners represent 3% and consists of individuals employed by BOPP.

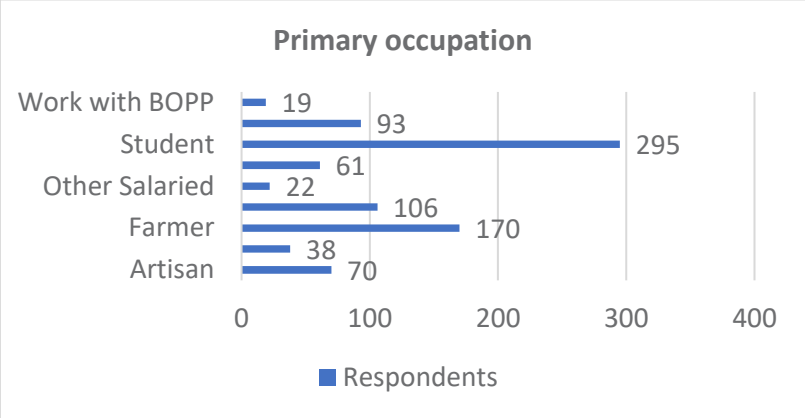


Figure 8: Occupation of Respondents

Land Size, Usage and Accessibility

Majority of households (62.7%) do not farm within the NPP AREA with the remainder (37.3%) using between 2 and 4 acre parcels of land within the NPP AREA for cultivation of food crops notably plantain and cassava. Availability of alternative lands aside the NPP AREA for community members to potentially use for farming was also assessed. The survey revealed that majority of the households (60.5%) have lands outside the NPP AREA which are mostly used for the cultivation of cash crops notably cocoa and oil palm. The land sizes cultivated in this instance are large ranging between 5 to 10 acres. The remaining 39.5% of the respondents indicated that they do not have access to alternative lands outside the NPP AREA. Figure 9 shows responses to ownership of land outside the NPP AREA. Compared to crop production, animal rearing is low and done by about 31.3% of respondents with majority from Adum Banso. Animals reared include goat, poultry, sheep, pigs, rabbits and are mainly owned by male household heads.

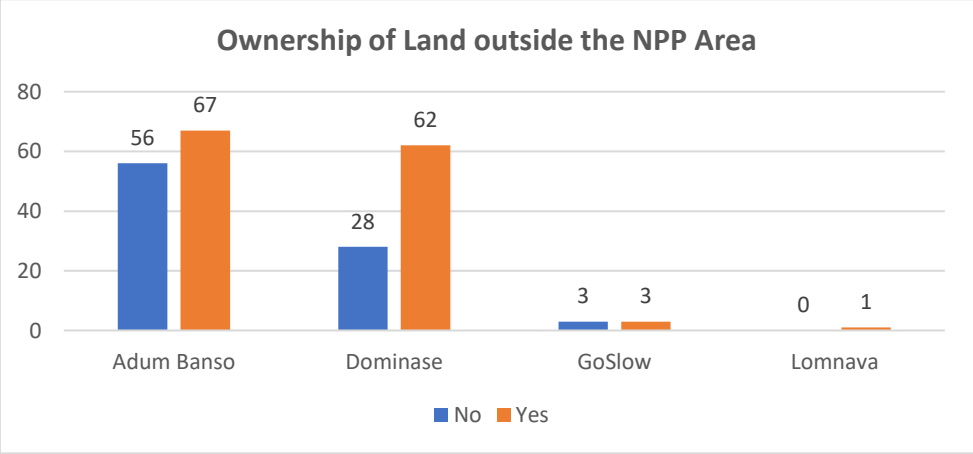


Figure 9: Ownership of land outside the NPP AREA

Access to Healthcare

In accessing healthcare, the survey primarily tried to establish the kind of health facilities that are patronized by members of the various households across the four communities. Majority of the people prefer primary healthcare centres (52%). In respect of the factors influencing the choice of a facility, majority of households indicated easy access to the facility and the credibility of the healthcare provider. Also, majority of the respondents who prefer the primary healthcare centres are from Dominase and Adum Banso. The other least patronized health facilities include private hospitals, pharmacy and chemical shops, traditional healers, and government hospitals. Other respondents also patronize private health care offered by BOPP because the facility is much more equipped compared to public clinics or Community – Based Health Planning and Services (CHPS) compounds. These respondents stay in Adum Banso and Dominase. Some households also resort to self-medication instead of going to the hospital.

Access to Social Infrastructure

Health facilities are easily accessible across the four communities except that they are ill-resourced (with the exception of the BOPP clinic). 56% of households interviewed indicated that, on average, it takes 15 minutes or less to access a health facility. 32% indicated 16 to 30 minutes. The remaining 12% need to travel for more than 30 minutes to get health care.

In accessing secondary education, none of the four communities has a Senior High school, hence must rely on the district capital for higher education. On average, it takes less than an hour to access the nearest secondary school according to the survey results. Also, 23% of households surveyed spend between 0-15 minutes to access public transport and 5% spend 16-30 minutes. The other 72% spend above 30 minutes to access public transport.

Apart from households interviewed in Go Slow and Lomnava, the remainder can access pipe-borne water for their daily activities and for consumption under 15 minutes. In their case, Go Slow and Lomnava depend on streams like Atedja and Bosamanka which has its source in the NPP AREA. These streams can also be accessed within 15 minutes.

Impact Significance

Table 7: Significance of the impacts of BOPP Adum Banso Smallholder Oil Palm Plantation.

Impact	Extent of Impact	Reversibility	Duration	Significance
Positive Impacts				
Direct and indirect forms of employment (Youth employment)	Local/ Regional	Reversible	Long term	Medium
Reliable source of income for project beneficiaries	Local/ Regional	Reversible	Long term	Medium
Support to community development	Local	Reversible	Long term	Medium
Additional livelihood support	Local	Reversible	Long term	Medium
Improvement in water and sanitation	Local	Reversible	Long term	Medium
Training and capacity building	Local	Reversible	Long term	Medium
Health services	Local	Reversible	Long term	Medium
Protection of HCV and HCS areas	Local/Regional	Reversible	Long term	Medium

Potential Negative Impacts				
Potential reduction in farmland for food crop farming	Local	Irreversible	Long term	High
Potential reduction in Non-Timber Forest Product	Local	Irreversible	Long term	Medium
Potential impact on food sufficiency and affordability	Local	Irreversible	Long term	High
Potential pollution of water bodies and air	Local	Reversible	Long term	Medium

ENVIRONMENTAL IMPACT ASSESSMENT

Date of assessment: August 2022

Name of Assessors: Lebene T. Ledi (Ms.), Beatrice Juma and Windy Akorfa Azasu

Assessor Designation and Company: Consultants/Maiden Environmental Services

Methodology

The approach and methodology adopted for the environmental impact assessment study involved:

- Site visits
- Sampling of water sources
- Air and noise monitoring around the proposed project site
- Consultations with stakeholders
- Literature reviews, and
- Data analysis

Findings

Stakeholder Engagements

Engagements were conducted with key stakeholders namely traditional authorities, affected farmers and relevant institutions. Table 8 below is a summary of the engagements.

Table 8: Summarized outcomes of engagements with key stakeholders

Stakeholder	Summary of comments, questions and/or concerns
Traditional Authorities (Adum Banso and Dominase)	● Dominase and Adum Banso are under the jurisdiction of the Mpohor Traditional Council. The proposed project site belongs to the Chief of Adum Banso and has been given out to the people of the community as a means of livelihood. The people who are predominantly farmers give some of their returns to the area chiefs. ● A complete and fully signed agreement is underway and committees responsible for issues regarding compensations and other matters relating to the farmers in the community would be set up. ● The Chiefs expressed satisfaction with the proposed project. They were elated that BOPP has had a very good track record of managing their plantations and developing surrounding villages especially Adum Banso and Benso.

	• The Chiefs also appealed for the youth to be offered employment under the proposed project.
Affected farmers	• The farmers admitted that the farmlands were owned by the Chief of Adum Banso. • The Chief and Elders approached BOPP to express interest in partnering them to implement the project because of how the communities had benefited from previous projects. • The farmers were invited by the Chief to inform them about the proposed project and encouraged them to negotiate with BOPP for a compensation they deemed fit and on other terms. • Concerns were raised over the possible loss of their farmlands but were reassured of the development BOPP will bring.
Head of District Development Planning, Mpohor District (Madam Isha)	• The project will create a stable livelihood for the residents. • There must be compensation for the farmers who will lose their cash crops because of the project. • All land litigation issues must be dealt with thoroughly before commencement of the project. • The project should generate jobs for the community.
Town and Country Planning department, Mpohor District (Madam Sophia Dela)	• A meeting should be held with the District Chief Executive to formally introduce the project to him and all departments of the District Assembly. Arrangements should also be made for a visit to the project site. • She further advised that the management of BOPP should endeavour to establish and maintain open communication with the District assembly.
Head of the Department of Agriculture in the District (Mr. Enoch Koranteng)	• Oil palm gives a suitable vegetation cover for the general area and as such is a good choice. • The project will lead to less competition among the people as they will be growing the same crop • The project will enhance the social life of farmers
District Chief Executive (Hon. Ignatius Asaah Mensah)	• The Project will lead to developmental projects across the communities and enhance their standard of living. • It will lead to employment creation and subsequently less theft in the communities. • The implementation of the Project will potentially lead to increased demand for amenities by the communities. • He also indicated that letters will be sent to other institutions who were deemed to have an influence on the project to bring forth their comments and reviews. These included the Environmental Protection Agency in Takoradi, The Forestry Commission in Takoradi and The District Assembly Offices in Mpohor.

The assessment identified potential adverse environmental impacts likely to occur from implementation of the project. Table 9 summarizes these impacts the study identified at various stages of the implementation of the project.

Table 9: Potential adverse environmental impacts

Environmental Parameters	Duration/Phase	Impacts

Ecological	Pre-construction & Construction	● Loss of Biodiversity
Soil	Construction & Operational	● Erosion ● Loss of soil organisms ● Degradation of soil by machinery and human activities ● Introduction of chemicals
Air Quality	Construction & Operational	● Use of machinery and vehicles that produce fumes will increase parameters such as CO, NO_x etc. ● Felling of trees also displace surface dust into the atmosphere increasing TSP and PM.
Noise	Construction	● Constant use of machinery by employees on the field will lead to higher levels of noise
Water Quality	Construction & Operational	● Possible effect of fertilizers from erosion and leaching
Waste	Construction & Operational	● Empty fertilizer and nursery polybags ● Empty chemical containers ● Empty fresh fruit brunches
Health and Safety	Pre-construction, Construction & Operational	● Animal attacks ● Accidental spills ● Vehicular accidents ● Human error accidents

Table 10 highlights the significance of the various potential adverse impacts

Table 10: Significance of potential adverse environmental impacts

Impact	Type	Nature	Duration	Magnitude	Significance
Biodiversity	Direct	Negative	Permanent	Moderate	Low
Soil cover	Direct	Negative	Permanent	Moderate	Moderate
Air Quality	Direct	Negative	Permanent	Low	Low
Noise	Direct	Negative	Temporary	Moderate	Low
Water Quality	Indirect	Negative	Temporary	Low	Low
Land-use	Indirect	Negative	Temporary	Low	Low
Sanitation	Indirect	Negative	Permanent	Low	Low
Socio-economic	Direct	Positive	Permanent	High	High
Health & Safety	Direct	Negative	Permanent	Low	Low
Road Network	Indirect	Negative	Permanent	Low	Low

Section 4: HCV-HCSA Assessment; OR ALS HCV and Standalone HCSA assessment

RSPO Note: A reference should be made to the full report. All the related maps should be included here. What are the methodology(ies), people involved in the process, date of assessment and findings? Note: Should an assessment carried out by internal staff, just fill the name of the staff and his/her designation.

ALS Satisfactory Date Obtained (ALS HCV & HCV-HCSA assessment): 29 January 2024
Link to HCV-HCSA assessment report: https://hcvrn.egnyte.com/fl/0VuPYLwwbR#folder-link/1129?p=c5508583-4a2c-44b1-b59c-78433c44e83a and https://highcarbonstock.org/forest-conservation-monitoring/assessment-reports/

HCSA peer review completion date and link to HCSA summary report (HCSA website): 29 January 2024

Name of Assessor: Stephen Doso Jnr

ALS Number: ALS22003SD

Details of persons involved in various aspects of the assessment are found in tables 11-13 below:

Table 11: Lead Assessor and GIS expert

Name	Role	Institution	Relevant expertise (e.g. plant taxonomy, hydrology, etc.)	Relevant country or regional experience (including language proficiency)
Stephen Doso Jnr	Lead assessor (ALS22003SD)	Proforest	Stakeholder engagement, participatory mapping, agroforestry, environmental management	Uganda, Sierra Leone, Cameroon, Nigeria, Ghana (English)
Clement Obeng-Manu	GIS and remote sensing expert (HCSA registered practitioner)	Proforest	GIS, forestry	Tanzania, Uganda, Liberia, Nigeria, Ghana, Netherlands (English)

Table 12: Environmental and social experts in the assessment team

Name	Role	Institution (if relevant)	Relevant expertise (e.g. plant taxonomy, hydrology, anthropology, participatory mapping etc.)	Relevant country or regional experience (including language proficiency)
Stephen Doso Jnr	Environmental Expert	Proforest	Stakeholder engagement, participatory mapping, agroforestry, environmental management	Uganda, Sierra Leone, Cameroon, Nigeria, Ghana (English)
Frederick Antwi	Social Expert	Proforest	Social methods, stakeholder engagement, participatory	Ghana (English)

			mapping	
Dr. Augustus Asamoah	Fauna team lead	Proforest	Avifauna, wildlife and forest ecology	Cameroon, Sierra Leone, Ghana, Nigeria, DRC, Uganda (English)

Table 13: Flora Inventory Team

Name	Position
Seth Kankam Nuamah	Team leader
Salim Mohammed	Species identification technician
Alfred Fosu	Measuring assistant

Assessment Timelines

Table 14: Timeline of the assessment

Process Steps	Main activities	Timeline									
		2022								2023	
		Feb	Mar	Apr	May	Jun-Jul	Aug-Sep	Oct	Nov – Dec	Jan-Jun	Jul
Pre-assessment	Due diligence, data and information collection and review from BOPP										
	Analysis of information including feedback to client										
Scoping study and initial stakeholder consultations	Scoping (field) study at the NPP AREA (Adum Banso)										
	Preparation of full HCV-HCS assessment proposal and development of assessment methods										
Participatory field assessment	Botanical and fauna survey including ecosystem assessment at the NPP AREA (Adum Banso)										
	Participatory mapping and identification of social HCVs at the NPP AREA (Adum Banso)										

	Community consultations										
	Consultations with government agencies, experts, and NGOs										
Data analysis drafting of report	Validation and analysis of field data (including patch analysis)										
	Preparation of draft report										
Final stakeholder and community consultations	Presentation of preliminary findings to stakeholders at Mpohor District Assembly Hall, Mpohor.										
Preparation of final report	Finalisation of report										
HCV Quality Panel review	Submission to HCVN for review										

Methods and results

Social Methods

A combined approach of reviewing relevant available literature and conducting community consultations, focus group discussions, participatory mapping, and district and regional level key informant interviews were employed to gather information for the social aspects of the assessment.

Literature review and use of secondary data

Desk-based review of relevant secondary data was done. This entailed a systematic literature review based on previous studies or work done in the area/landscape. The literature reviewed include:

- Report on master plan for oil palm development in Ghana.
- Social Impact Assessment for the Adum Banso Smallholder Oil Palm Plantation (Nana Kwandoh Brempong III Estate).
- Published articles on oil palm in Ghana and Africa.
- Report of High Conservation Value (HCV) and High Carbon Stock (HCS) Scoping Study for Benso Oil Palm Plantation
- Land tenure study report for the Adum Banso Smallholder Oil Palm Plantation Project
- 2021 and 2010 Population and Housing census for demographic and socio-economic baseline data

Stakeholder consultations

Meetings with affected communities and relevant institutions were carried out to obtain information on social aspects of the assessment. The selection of affected communities to be engaged followed the criteria below:

- communities that are within the landscape and have rights within the concession area i.e., are listed in the land tenure and use report (see report attached in Annex 9 of Integrated HCV-HCSA assessment report).

- All communities located within the NPP AREA and/or approximately within a 5 km buffer of the NPP AREA with user rights in this area.

The communities selected were Adum Banso, Dominase, Go Slow and Lom Nava (Figure 10). These communities were informed ahead of time for the meeting and efforts were made to have all sections of the community including chiefs, elders, women, men, youth, aged, farmers and hunters represented. The meetings in the communities presented avenue to solicit the concerns and inputs of the communities on the proposed project and validate some of the primary data. Free Prior and Informed Consent (FPIC) for the proposed project was also verified from all the affected communities during the community consultations.

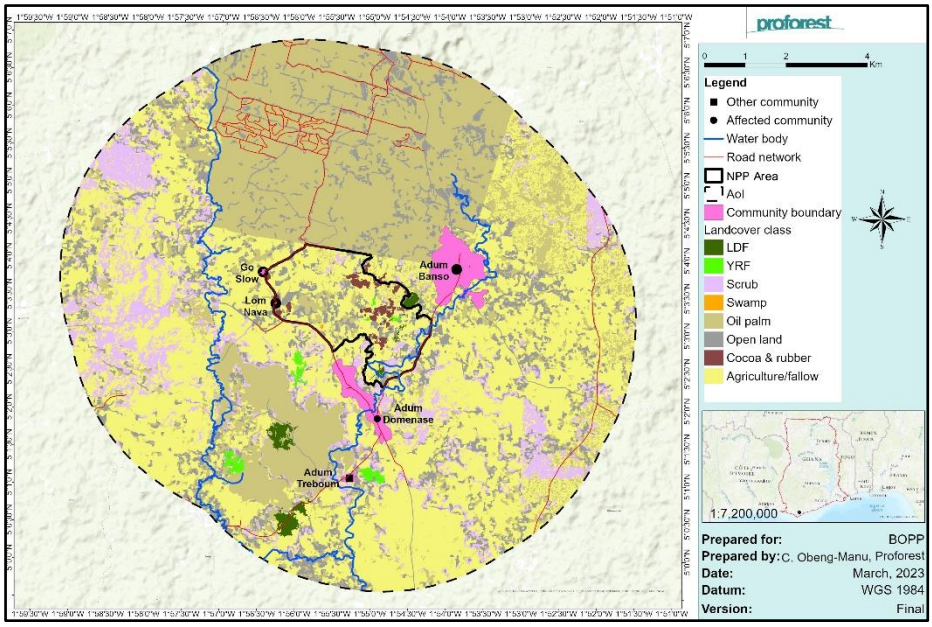


Figure 10: Map showing the affected communities

Institutional consultations were conducted during the scoping and full assessment phases. These consultations were in the form of interviews with the departmental heads or representatives of the various institutions in their offices. The institutions consulted were the Departments of Food and Agriculture, Social Welfare and Community Development of the Mpohor District Assembly, Forest Services Division at the Regional and District levels (Tarkwa and Takoradi) and Conservation Foundation (an environmental NGO).

Participatory Mapping

Participatory mapping was used to identify HCV 4, 5 and 6 categories in the NPP AREA, and subsequently help establish management areas for these HCVs. This was carried out for all affected communities. Participatory mapping proceeded in the following stages:

- Stage 1 involved showing a copy of the NPP AREA map to all affected communities to arrive at a common knowledge on the location of the community during the meeting.
- Stage 2 followed with discussions of key resources, religious and cultural values and their locations within the NPP AREA. Community members were tasked to point the location of these identified resources on the map of the NPP AREA which were marked and formed the basis to discuss and agree on what is present (eg., waterbodies) and their relative locations.

- Stage 3 involved the community nominating 2 or 3 persons to assist the social team to visit the site of the identified resource or cultural value to observe and collect GPS coordinates of the land use, feature or value for mapping purposes.

At the end of this exercise, primary data collected via the participatory mapping approach was simplified into a geo-referenced map of HCV 4, 5 and 6 values for validation during the final consultation meetings with the communities.

Limitations to social studies

- The main limitation to the household survey was the unavailability of current population and housing census data for the affected communities as the district level results of the 2021 population and housing census conducted by the Ghana Statistical Survey was yet to be published at the time of conducting the social survey. The population of the two bigger communities (Adum Banso and Dominase) were therefore obtained through population projection from year 2010 to 2022 because the available population figures were in 2010. Mathematical projection models consisting of geometric growth and exponential models were used to extrapolate the population of Adum Banso and Dominase. The actual population for Lomnava and Go Slow were however obtained through community engagement as these are very small hamlets.
- For the participatory mapping exercise, the Fia stream could not be mapped due to heavy rains during the fieldwork and limited time for the fieldwork. The assessment team recommended that BOPP must collaborate with the local communities to map this stream.

Results

Pre-assessment phase

Following the signing of the contract for the Integrated HCV-HCSA assessment, the assessment team engaged the management of BOPP to obtain relevant background information and data on the proposed smallholder oil palm plantation project. This due diligence was conducted to ascertain whether BOPP fulfilled 4 required preconditions prior to the assessment. The table below is a summary of the due diligence conducted.

Table 15: Outcome of Due Diligence study

S/N	Precondition	Due Diligence
1	Commitment to environmental and social safeguards	BOPP is committed to environmental and social best practices for all its operations, including partnerships such as this smallholder project. These commitments are contained in BOPP's Environmental Policy and Wilmar's Human Rights Policy and No Deforestation, No Peat and No Exploitation (NDPE) Policy.
2	Moratorium on any land clearing or land preparation until the proposed Integrated Conservation and Land Use Plan (ICLUP) has been completed	BOPP, as a Wilmar subsidiary, is committed to complying fully with the RSPO New Planting Procedure (NPP) including obtaining approval for the ICLUP and getting RSPO approval for the NPP report before commencing land preparation. This is contained in the Wilmar NDPE Policy. BOPP indicated that they are committed to complying fully with this commitment as was done for the Adum Smallholder Oil Palm Project (ASHOPP). BOPP explained through their engagement with the assessment team that parts of the NPP AREA have been under cultivation by local farmers for several years, growing food crops (mainly cassava, plantain and maize) and cash crops (cocoa, rubber and oil palm). The farmers have been informed of the proposed project and told not

		to clear any new lands for farming by the chief and elders of Adum Banso. BOPP also stated that they will not sanction any new land clearing by the farmers.
3	Demonstrated legal right over or permission to explore Area of Interest	A review of the land tenure assessment report and other relevant documents submitted by BOPP confirmed that the NPP AREA is Adum Banso stool land which forms part of a 1,213.9 ha land leased to ABL under two lease documents in 1976 and 1981 for 50 years each. Although the two leases have not expired, both the Asubonteng family and the Chief of Adum Banso had resolved to seek new investors for the land under joint negotiation and benefits agreement. This followed a court action on the 1,213.9 ha land leased to ABL and an out-of-court settlement in November 2012 in which both parties agreed that the land reverts to the Chief of Adum Banso and the Chief can lease it out to a new tenant under joint assessment, negotiation, and mutual agreement on a proportionate share with Asubonteng family. The assessment team sighted and reviewed copies of the indenture, out-of-court settlement between the Chief of Adum Banso and the Asubonteng family and the letter from the Chief of Adum Banso to BOPP expressing interest to use the NPP AREA for the smallholder project.
4	FPIC process has been initiated with full disclosure of the proposed project with all potentially affected communities and stakeholders, and the process for negotiation and consent going forward has been agreed, with representatives appointed through a fair process	The land tenure assessment report and minutes of meetings submitted by BOPP provided evidence of stakeholder consultations between BOPP and community leaders and members. The land tenure assessment report also showed participatory mapping with some affected farmers. A letter from the Chief of Adum Banso to BOPP expressing interest on behalf of the community to use the NPP AREA for the smallholder project was provided to the assessment team. A steering committee comprising of elected community representatives has been inaugurated which will among other things serve as the communities' representative on the project and facilitate communication between the communities and BOPP for the project implementation. BOPP also provided the assessment team with the minutes of the election and inauguration of the steering committee.

- FPIC gate

From the due diligence conducted, the assessment team concluded that BOPP has met all the preconditions. Hence, the team proceeded to conduct the scoping study.

Scoping

Table 16 below shows a summary of the consultations conducted during the scoping study. The consultations revealed that all the affected communities and the Asubonteng family were aware of the proposed smallholder oil palm plantation project, including its benefits and negative impacts. Concerns were raised on impacts on land availability for food crop farming which needs to be addressed.

Table 16: Outcomes of engagement with Experts/stakeholders during the scoping study

Name/Date	Title/role	Organisation/social group	Key concerns & recommendations
Simon Safo 09/03/2022	Social Welfare Officer	Department of Social Welfare, Mpohor District	● The main social issues in the district include child labour and teenage pregnancy. ● Additional livelihood options should include vegetable cultivation, bee keeping, beads and soap making. There is a ready market for vegetables in the district. ● Illegal mining (Galamsey) activities occur around the streams in the district and sometimes there is encroachment on farmlands. ● Recommended that the scoping team consults Conservation Foundation, an environmental NGO active in the district.
Philip Doi 09/03/2022	Extension Officer	Department of Agriculture, Mpohor District	● The main crops cultivated in the district are arable, including maize, cassava, plantain and cocoyam. ● Due to the project, the affected farmers may lose their food crop cultivating areas and their livelihoods. Recommended that alternative lands be considered, or alternative livelihoods provided for the affected farmers like the Treboum outgrower project (ASHOPP). ● Stated that the project will not have impact on food security in the district as there are more farmlands available. ● Compensation should be paid for crops affected. ● Praised the Treboum outgrower project for being beneficial, especially the additional livelihood options (piggery, poultry, etc.). He indicated that the beneficiaries are earning a lot from the project. ● The Department plays a role in the Treboum project through marketing of produce from the additional livelihoods and providing veterinary services, including vaccination. ● The Butre River flows through the landscape. Not aware of any cemetery or cultural site with the NPP AREA.
Clement Omari	Regional Manager District	FSD, Western Regional Office & Tarkwa District Office	● Studies must be conducted to determine the tree species, waterbodies, and environmentally sensitive areas in the NPP AREA. ● Buffer areas and swamps should not be planted.

Vincent Appiah 09/03/2022	Manager		● Trees can be planted to protect the waterbodies. ● Ground truthing must be done to map the area. ● Land tenure issues should be taken seriously. ● FSD does not have control over off reserve areas, except when there are economic trees to be harvested. However, if the project decides to set aside areas for conservation, they can play a role if invited.
O.Y. Owusu Sekyere 09/03/2022	Executive Director	Conservation Foundation	● Work undertaken in the district includes the establishment of Community Resource Management Areas (CREMA). ● Threats to conservation in the district include illegal logging and illegal mining. Illegal mining has contributed to pollution of waterbodies in the district. ● Swamps and other sensitive ecosystems should be protected. He is aware that BOPP protects these ecosystems in their operational areas. ● Some parts of the district/landscape still have good forests even outside the forest reserves. ● Not aware of any community forests or sacred groves within the district and around the project area. ● Non-timber forest products (NTFPs) obtained from the landscape include bamboo and snails. ● Land ownership issues should be taken seriously. Believes BOPP will do the necessary due diligence. ● If the project is well planned and includes alternative livelihoods, it will be very beneficial.
John Kwesi Asamoah Bro. David Botwe 09-03-2022	Member and representative of family Church brother of John Kwesi Asamoah	Asubonteng family	● The Asubonteng land was acquired from the Chief of Adum Banso under two 50-year leases, comprising 1000-acre land in 1976 and about 1,900 acres in 1981. ● The land was acquired by their father for oil palm plantation and has been in the family's possession since his death. ● The lease agreement required payment of annual rent to the Chief of Adum Banso, but they stopped paying after the company collapsed. ● There was a court issue on the land, however, they agreed with the Chief of Adum Banso to have an out-of-court settlement. The agreement was that

			Asubonteng will exit the land, and both parties will get a new investor for the land under a benefit sharing agreement. A new lease will be prepared for the new investor. ● Copies of the out-of-court agreement were not present at the time of engagement, however, he promised to provide copies to the assessment team. He also indicated that copies can be obtained from the Chief of Adum Banso. ● He indicated that he has consulted with the rest of the family, and they are open to the proposed smallholder project once they will also be beneficiaries. ● They expect the Chief of Adum Banso to invite them for negotiation on the benefit-sharing agreement. ● Their only asset on the land currently is the dilapidated mill. There are no oil palms from their plantation. ● They are aware that some farmers (about 70) are on the land cultivating food crops and rubber.
See attendance sheet in Annex 2 of Int. HCV-HCSA Assessment report 10/03/2022	Community members and affected farmers (representatives from Go Slow included the community leader)	Dominase and Go Slow communities	● They indicated that they have been informed about the proposed project. ● Crops they cultivate within the NPP AREA include oil palm, cocoa, rubber, cassava and pineapple. ● They were informed about crop compensation, and they have eagerly been waiting for the compensation to be paid. Food crops including plantain and cassava were not discussed as part of the compensation. ● They were informed that areas with cocoa will not be included in the project. However, some cocoa farmers volunteered that they want their cocoa farms included. ● They gave their consent to the project but requested that part of the land be reserved for crop farming. ● Waterbodies within the NPP AREA include Anwianwia and Manyamanoma streams and the Butre River. They use the streams for drinking when they visit their farms and for fishing. ● Indicated that there are no shrines or cultural sites within the NPP AREA.

			● Complained about the delay in payment of compensation and commencement of the project. BOPP representatives explained that compensation will be paid after the assessments have been finalized and they get approval for the project.
Nana Kofi Edusah II Okyeame Mensah 10/03/2022	Chief Linguist	Leadership of Dominase	● Confirmed that the land legally belongs to Adum Banso and that the Asubonteng family leased it from the Adum Banso Chief. ● Indicated that Dominase community members farm on the land. ● Part of the lands they use for farming has been used for the ASHOPP and now this project is also coming up on the remaining land. However, if they will be beneficiaries of the project, then they are happy about it and give their consent. ● Their concern is that there should be benefit sharing from the project for the two communities to live amicably. ● There is no shrine or cultural site within the NPP AREA. ● Hunting and collection of mushrooms and medicinal plants are not limited to a specific area within the landscape.
See attendance sheet in Annex 2 of Int. HCV-HCSA Assessment report 10/03/2022	Community members and affected farmers	Adum Banso community	● The NPP AREA is Adum Banso land. ● They have been informed about the project, and that the NPP AREA will be used for an oil palm smallholder project. Allocations will be made to community members. ● Crops they cultivate on the land include oil palm, cocoa, cassava and plantain. ● They have been informed that oil palm crops currently on the land will be compensated for. Cocoa and rubber will not be included in the project area. Food crops will also not be compensated for, they will be allowed to harvest them before commencement of the project. ● The oil palm farms have been inspected, enumerated and pictures taken of the farms. ● There is no forest on the land. ● Waterbodies within the NPP AREA include Anwianwia and Mrehua streams and the Butre River. They use the waterbodies for drinking,

			watering of crops and fishing. ● They are no shrines or cultural sites within the NPP AREA. ● A farmer inquired that he has planted trees on his cocoa farm and wanted to know what will happen to the trees. BOPP representatives responded that cocoa farms will be left and not included in the project, unless the farmer voluntarily offers to add the cocoa farm to the project. ● Another farmer inquired if sugar cane will be compensated for. BOPP representatives responded that it will not be compensated for, but the farmer will be allowed to harvest the sugar cane until the project starts. ● It was recommended that plot allocations under the smallholder project should be made for all the affected farmers. ● They expressed concern that they do not know when the project will commence and when their compensation will be paid.
Nana Kwandoh Brempong III and 3 Elders 10/03/2022	Chief	Leadership of Adum Banso	● The land belongs to Adum Banso and was leased to Asubonteng Brothers Limited under two leases in 1976 and 1981. The leases were for 1000 acres and 1,900 acres for a period of 50 years. Part of the land was used for oil palm plantation and processing until the company collapsed. ● The Asubonteng lease has not expired, however since the land is idle, they decided to use it for the smallholder oil palm plantation project. ● There was a court issue on the land which was resolved. The land was determined to belong to Adum Banso and the Chief can use it. ● They have engaged in several meetings with BOPP on their intention to do a smallholder oil palm project similar to the one in Treboum (ASHOPP). ● The land is not being leased out to BOPP. ● There is currently no signed agreement with BOPP. However, a letter of intent was sent to BOPP for the project. ● Asubonteng family has been informed about the proposed project, but no discussions have been held yet on benefit sharing.

			● Dominase and Go Slow will also benefit from the project, especially the affected farmers. ● The farmers on the land were informed that the land has been leased to Asubonteng family and any activities they carry out on the land is at their own risk. ● According to the chief, the farmers were informed about the proposed project three years ago and that any tree crops planted after that period will not be compensated for. They would however be allowed to harvest any annual crops they cultivate before the project starts. ● Waterbodies within the NPP AREA Mrehua and Anwianwia stream and Butre River. ● There is no shrine or cultural site within the NPP AREA.

Pictures of some of these consultations are provided below:

Plate 2: Meeting with Chief and Elders of Adum Banso

Plate 3: Engagement with Adum Banso community and farmers

- FPIC gate

The assessment team proceeded with the full assessment after the scoping study. The team arrived at this conclusion based on verification of the desk-based due diligence as well as on consultations with key stakeholders including the affected communities, Asubonteng family, relevant state agencies and an environmental NGO. BOPP and the leadership of Adum Banso had initiated FPIC with all the affected communities and the Asubonteng family, and they all granted consent for the project as well as for the full assessment.

Full assessment

The summary of the meetings with stakeholder institutions and communities are presented in Table 17

Table 17: Summary of stakeholder consultations

Expert/Organisation/ social group & date	Name/title/ role	Type of interaction	Concerns and/or recommendations
Dominase 27-06-2022	Chief and Elders	Meeting	• On HCVs, the chief indicated the presence of HCV 5. He added that the following rivers and streams run through the NPP AREA. They are Butre, Anwiawia, Mrehua, Atedja, Fia and Afiafi. Most of these rivers and streams are used for drinking purposes while on the farm and for pesticide application. • The community members fish in these waterbodies but they are not the main source of fish for the community. • The Chief and elders marked the location of the waterbodies on a printed map. • Hunting is also done in the NPP AREA and the landscape in general. Animals killed include grasscutter, squirrel and rats. • FPIC processes initiated with farmers. BOPP and Adum

			Banso Chief have agreed for Dominase to be part of the outgrower project. The Chief requested that BOPP should be transparent and facilitate a benefit sharing agreement between Adum Banso and Dominase. ● Go Slow, Lom Nava and Asubonteng lands belong to the Adum Banso stool. ● The Chief asked what benefits affected farmers will get from the project. BOPP explained that the affected oil palm farmers will be allocated plots under the project. ● Enumeration of oil palm farms has been conducted, but compensation is yet to be paid.
Dominase 29-06-2022	Community leaders, members and affected farmers (see attendance sheet in Annex 2 of Int. HCV-HCSA Assessment report)	Community consultation	● Community members raised concerns on food security due to reduction in size of arable land for farming food crops. ● HCV 5 present in the NPP AREA include rivers and streams such as Butre, Mrehua, Anwiawia. Hunting is done in the NPP AREA. Animals killed include grasscutter, rats and squirrel. ● There are no cultural sites (shrines, cemeteries, etc.) within the NPP AREA. ● BOPP has not paid any compensation yet. ● Mapping is yet to be done for some cocoa and rubber farms. ● Farmers who have land close to the NPP AREA raised issues about unclear boundaries, whether their farmlands are included in the said NPP AREA and the need to clarify. ● The women requested that BOPP should incorporate additional livelihood scheme in the early stages of project implementation to provide relief to affected farmers. ● Land should be allocated for food crop farming. ● Aside concerns raised, there is general support for the proposed outgrower project.
Adum Banso 28-06-2022	Community members and affected farmers (see attendance sheet in Annex 2 of Int. HCV-HCSA Assessment report)	Community consultation	● HCV 3 potentially present in the NPP AREA e.g. Wetlands and swampy areas. ● HCV 4 potentially present as there are some slopes. ● HCV 5 present e.g., Water bodies present include Anwianwia, Mrehua and Butre. Fishing done in the Butre, Anwiawia and Mrehua using '*Ntuma'* (a locally made basket from palm fronds that is used to trap fish) but not the main source of protein for the community members. ● They do not have any cultural site within the NPP AREA.

			They are mainly Christians. ● Medicinal plants are collected, and hunting is done in the NPP AREA. However, these resources are available in other places across the landscape. ● Some farmers wanted clarification on the boundaries of the NPP AREA and if it included their current farming areas. ● Community members requested that measures are taken to ensure that the right farmers are selected as beneficiaries of the smallholder project and the additional livelihoods component. ● They have been informed that plots with cocoa and rubber will not be affected by the project. ● Community members indicated that they support the smallholder project, but they want part of the NPP AREA to be allocated for food crop farming or alternative land be made available.
Go Slow 27-06-2022	Chief and community members	Community consultation	● Concerns over land for food crop farming raised. ● Odikro insisted on the need for further consultations with the affected farmers. ● Communities lack a lot in terms of social amenities, there is no light, portable water and school. ● Community requested for boreholes to be dug for them. Community depends on streams such as Atedja and Abobrobanka for their water needs. However, the Abobrobanka at Go Slow gets dirty when BOPP opens up its drains within their estate. ● They do not have any cultural sites. ● Call for implementing additional livelihood support scheme in early stages of project for affected communities. ● Generally, there is support for the project since it can generate employment and guaranteed income source.
Lom Nava 27-06-2022	Community members	Community consultation	● Community members were aware of the NPP AREA and the intention for it to be used for a smallholder project. ● Community indicated that there is a rock from which water gushes out which is used by the community. They also collect shrimps and crabs from this water source known as Bonsamanka. ● They do not have any cultural site within the NPP AREA. ● The land belongs to the Adum Banso stool. ● Large portions of their farming areas are used for cocoa

			and rubber which they are aware will not be affected. ● About 200 oil palm trees have been enumerated but no compensation paid yet. ● The community expressed the need for portion of the NPP AREA to be allocated for food crop farming.
Adum Banso community leaders 28-06-2022	Queen mother and Elders (see attendance sheet in Annex 2 of Int. HCV-HCSA Assessment report)	Community consultation	● The Elders indicated that the NPP AREA is still under two different leases to Asubonteng family (1976 and 1981), hence anybody farming there is operating illegally. ● They stated that Asubonteng family has been engaged on the benefit sharing agreement. Memorandum of Understanding (MoU) has been drafted and yet to be signed by the Asubonteng family. After signing, copies will be provided to BOPP. ● When asked about concerns raised by the community members to allocate portion of the NPP AREA or provide alternate land for farming, they explained that this will be taken into consideration. ● They also explained that Dominase and the other communities will be considered in plot allocation under the project. ● The Elders advised the assessment team to speed up their work for the project to begin.
Department of Food and Agriculture (DFA), Mpohor District 28-06-2022	Patrick Bright Adaboe – District Crop & Extension Officer	Interview	● The main livelihood activity is farming. Food crops cultivated include cassava, rice (in swamp areas), maize and vegetables. Tree crops cultivated include oil palm, rubber and cocoa. ● BOPP should consult the DFA on the project as they work directly with the farmers. He further explained that the DFA has been providing extension and technical support for the ASHOPP. ● ASHOPP has been very successful with many benefits to the communities, especially through the additional livelihood options. These include piggery, beekeeping, etc. This project will also create jobs. ● The project area is currently underutilized and not a major food crop production site in the district, hence, the oil palm project will not have significant impact on food security. ● BOPP should collaborate with the DFA to provide extension services and support adoption of best management practices for the project. ● Indicated their support for the project.

Department of Social Welfare and Community Development 28-06-2022	Simon Sarfo – Department Head	Interview	• Social and developmental challenges in the district include high unemployment and influx of people from other areas resulting in high cost of living and high teenage pregnancy. • The high unemployment has contributed to illegal gold mining (Galamsey) in the district which has polluted many waterbodies. • There should be alternative lands for farmers losing land to sustain their farming as a livelihood. • Treboum model (ASHOPP) should be adopted for this project. Additional livelihoods options can include bead making, beekeeping, soap making, poultry, mushroom farming, etc. Communities should be involved in the selection of options. • Technical support on agronomic practices should be provided for the farmers under the project.
Asubonteng Family 29-06-2022	John Kwesi Asamoah – Family representative	Interview	• Stated that the Asubonteng family consents to the project and are eager for the project to commence. • They are willing to send a written consent if required. • Indicated that he has met with the Chief of Adum Banso to discuss the benefit sharing agreement. It was agreed that the Chief drafts the agreement for consideration and finalisation. This meeting was held a week prior to the consultation. • Thanked the assessment team for their continuous engagement on the project.

Pictures of some of these consultations are provided below:

Plate 4: Engagement with Dominase community members and farmers

Plate 5: Engagement with farmers of Go Slow community

Status of FPIC

In all the affected communities, the community members were aware of the proposed smallholder oil palm plantation project by BOPP and the leadership of Adum Banso, and gave their consent to the project and for the full HCV-HCSA assessment. They had been engaged in series of meetings by BOPP where the project had been explained to them. The consultations revealed that the communities were aware of some of the project impacts, both positive and negative, including allocation of plots to affected farmers and community members, benefits from the additional livelihood options and the effects of the project on their food crop farming areas. The communities were also aware of the compensation process, including crops that will be compensated for and those that they will be allowed to harvest, as well as areas such as cocoa and rubber farms which will not be included in the project. Crop enumeration had been completed at the time of assessment, but compensation was yet to be paid.

Consultations also revealed that Asubonteng family were aware of the proposed smallholder project and gave their consent to the project. The Asubonteng family and the Adum Banso Royal Stool have signed a memorandum of understanding (MoU) on the use of the NPP AREA for the project and a benefit sharing agreement between both parties. The assessment team was given a copy of the MOU and verified the contents. The team therefore concluded that FPIC was ongoing and all the affected communities and Asubonteng family had given consent to the project and the assessment.

Social fieldwork

- Participatory Mapping

During the community consultations, discussions were held on the presence of waterbodies, community use areas and cultural values within the NPP AREA with the aim of identifying and mapping these values. For the waterbodies, members of the communities sketched the relative positions of the Fia, Mrehua, Atedja, Anwianwia, Abibre, Afiafi and Bonsamanka streams on the large map displayed by the assessment team during the community engagement.

Lom nava community indicated that they obtain water for drinking and domestic purposes from the Bonsamanka stream. The Atedja stream is used by a section of Go Slow, and Mrehua and Afiafi streams are used by farmers from Dominase and Adum Banso when they visit their farms. At the end of the community consultations, each community appointed representatives to lead the assessment team to map the identified streams. Due to heavy rains and time

constraints, the full extent of all the streams could not be mapped during the full assessment. Participatory mapping (PM) for the remaining streams (except Fia stream) was conducted in October 2022 prior to the final stakeholder consultation.

Participatory mapping of cocoa and rubber farms was conducted by BOPP during the land tenure study (see report attached in Annex 9 of Integrated HCV-HCSA report) and the data was used in the land cover classification and subsequent maps. Also, following the final stakeholder consultation, BOPP engaged community members who currently have food crop farms within the NPP AREA to identify and map their food crop farms. Subsequently, a delegation comprising of BOPP officials and representatives from the affected communities visited the NPP AREA to identify and map a total area of 11.25 ha to be reserved within the NPP AREA for food crop farming. Figure 11 shows the outcome of the participatory mapping exercise.

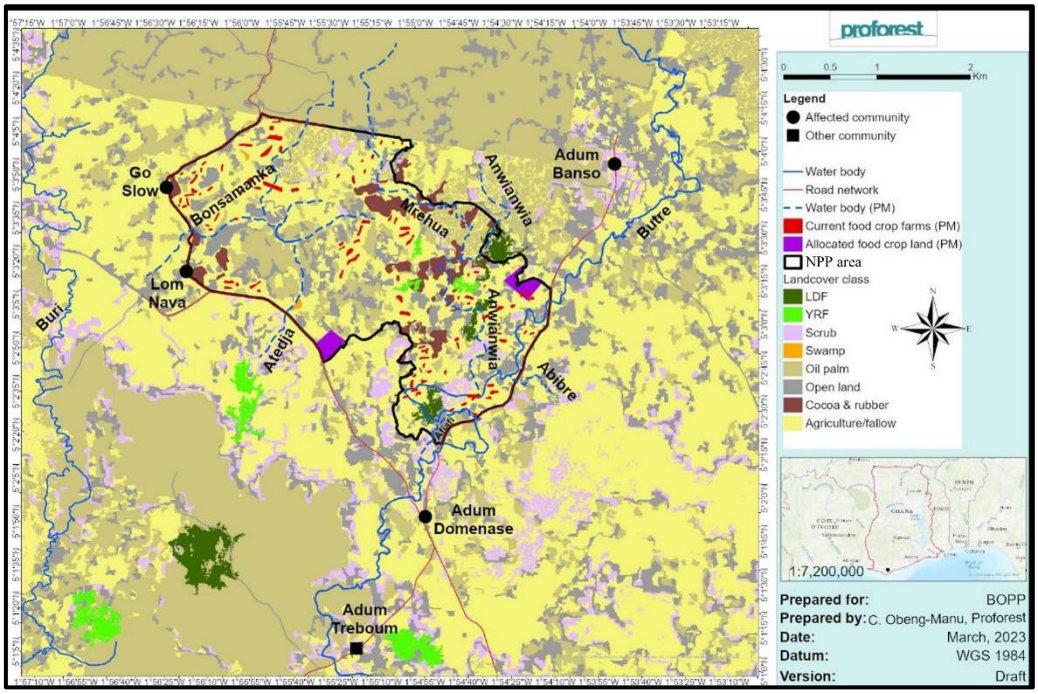


Figure 11: Map showing participatory mapping (PM) exercise

*Data sources: Base map: ESRI; Road network obtained from **www.openstreetmap.org**; Water body obtained from Ghana rivers dataset; Water body (participatory mapping) obtained through participatory mapping; Concession boundary provided by BOPP; Communities mapped during the fieldwork; Land cover classification obtained by processing Sentinel 2 satellite imagery; Map composed using ArcGIS Pro.*

The pictures below show some of the participatory exercises conducted.

Plate 6: Participatory mapping with Adum Banso farmers and community members

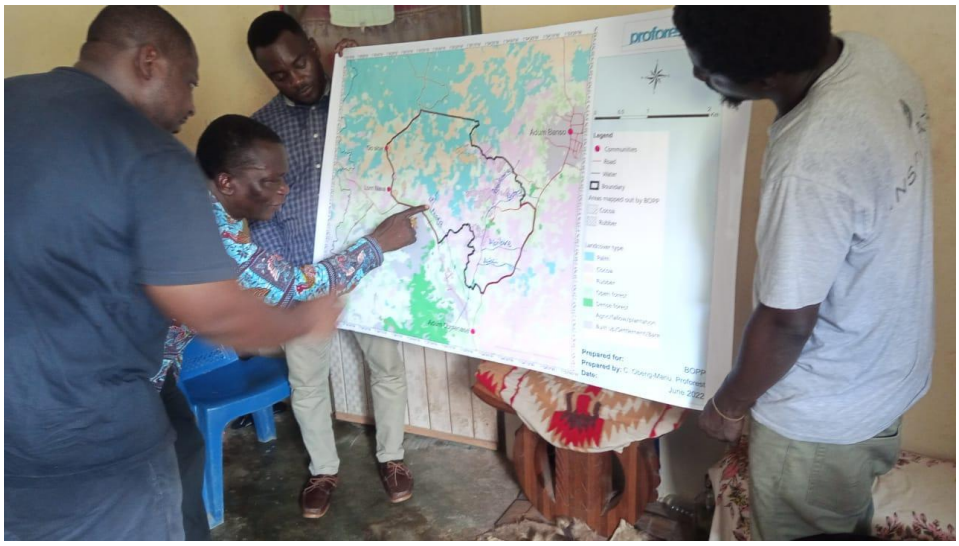


Plate 7: Participatory mapping with Chief of Dominase

- Household survey

Household survey was conducted within all the affected communities (Adum Banso, Dominase, Lom Nava and Go Slow) as part of a social impact assessment (SIA) that was conducted for the project. The household survey and SIA in general provided useful community level primary data including household sizes, sources of income, livelihoods, land ownership, community members perception of the project, among others. Some of the findings were incorporated into the assessment report. The interview guides and survey questionnaires for the SIA included questions to verify FPIC for the proposed project. The household survey was carried out concurrently with the HCV-HCSA assessment. Figure 10 shows all the affected communities where the household surveys were conducted.

Social HCVs and Livelihoods

A summary of the outcomes of the identification of social HCVs are presented in table 18. This is followed by discussion and justification of these outcomes.

Table 18: Summary findings of social HCVs

HCV	Definition	Finding
4	Basic ecosystem services in critical situations, including protection of water catchments and control of erosion of vulnerable soils and slopes.	**Present**
5	Sites and resources fundamental for satisfying the necessities of local communities or indigenous peoples (for livelihoods, health, nutrition, water, etc...), identified through engagement with these communities or indigenous peoples.	**Present**
6	Sites, resources, habitats and landscapes of global or national cultural, archaeological or historical significance, and/or of critical cultural, ecological, economic or religious/sacred importance for the traditional cultures of local communities or indigenous peoples, identified through engagement with these local communities or indigenous peoples.	**Absent**

- HCV 4: Ecosystem services in critical situations

HCV 4 refers to areas that provide basic ecosystem services in critical situations. These include protection of water catchments, and control of erosion of vulnerable soils and slopes. According to the Ghana HCV Toolkit, HCV 4 covers but not limited to:

- HCV 4.1: Forest areas critical to water catchment
- HCV 4.2: Forest critical to erosion control
- HCV 4.3: Forest areas providing barriers to destructive fires, and
- HCV 4.4: Forest that play critical role in local climate regulation.

HCV 4.1: Forest areas critical to water catchment

Indicators for the presence of HCV 4.1 are:

- Communities adjacent to forest reserves that do not have access to boreholes for drinking water and depend exclusively on the river in the catchment area.
- Communities that are adjacent to forest reserves and that are in low lying areas known to be susceptible to flooding and
- Communities adjacent to forest reserves that are dependent on river fish as a major source of protein.

The community consultations revealed that all the affected communities depend on streams flowing within the NPP AREA as their source of water for drinking and domestic purposes within their homes and when they visit their farms. These include Bonsamanka stream used by Lom Nava community, Atedja stream used by a section of Go Slow and Mrehua and Afiafi streams used by farmers from Dominase and Adum Banso when they visit their farms. In addition to these streams which serve as water sources for the communities, there are other seasonal and perennial streams within the NPP AREA including the Anwianwia, Abibre and Fia streams which are tributaries of the Butre River. The Butre River is a perennial river and the main waterbody which traverses the NPP AREA. The Buri River also flows within the AoI but outside the NPP AREA. With the exception of the afore mentioned streams used for drinking and domestic purpose by the communities, the remaining streams and the Butre and Buri Rivers have been polluted by illegal small-scale mining activities, popularly known as “Galamsey”.

The riparian vegetation along the Bonsamanka, Atedja, Mrehua, Afiafi, Anwianwia, Abibre and Fia streams, as well as the Butre and Buri Rivers, provide water catchment protection and thus concluded to constitute HCV 4. The Ghana Riparian Buffer Zone Policy recommends a buffer width of 10-20 metres for minor perennial streams and 10-15 metres for important seasonal streams. The widths of the Butre and Buri Rivers were determined to be 30 metres which per RSPO guidelines require a buffer area of 40 metres. The average width of the mapped streams, thus Bonsamanka, Atedja, Mrehua, Afiafi, Abibre and Anwianwia was determined to be between 2-3 metres and per RSPO guidelines require a buffer of 5 metres. Therefore, taking into consideration the Ghana Riparian Buffer Zone Policy and RSPO guidelines on riparian management, the assessment team recommended that BOPP establishes a buffer of 40 metres on both sides of the Butre River within the NPP AREA and a buffer of 15 metres on both sides of all the streams within the NPP AREA. **The riparian buffer for the Butre River and the Bonsamanka, Atedja, Mrehua, Afiafi, Abibre and Anwianwia streams within the NPP AREA/management unit (MU) cover an area of 61.772 ha** as shown in Table 19**.** Figure 12 below shows the location of the riparian buffers within the NPP AREA.

The Fia stream wasn't mapped due to heavy rains during the fieldwork and time constraints. Thus, the assessment team recommended BOPP to collaborate with the local communities to map the Fia stream and any other stream/ tributary they encounter during land preparation which has not been mapped within the NPP AREA and reserve the recommended buffer area of 15 metres on both sides.

Table 19: River/stream within the NPP AREA and the size of their buffer area in the NPP AREA

River/stream	Size of buffer within MU (ha)
Butre River	30.375
Bonsamanka stream	6.464
Atedja stream	8.973
Mrehua stream	7.130
Afiafi stream	2.133
Abibre stream	0.387
Anwianwia	8.023
Total (minus overlaps)	***61.772***

NB: Kindly note that the total buffer area as shown in the table is not a summation of the individual buffer areas as there are overlaps between some of the buffers.

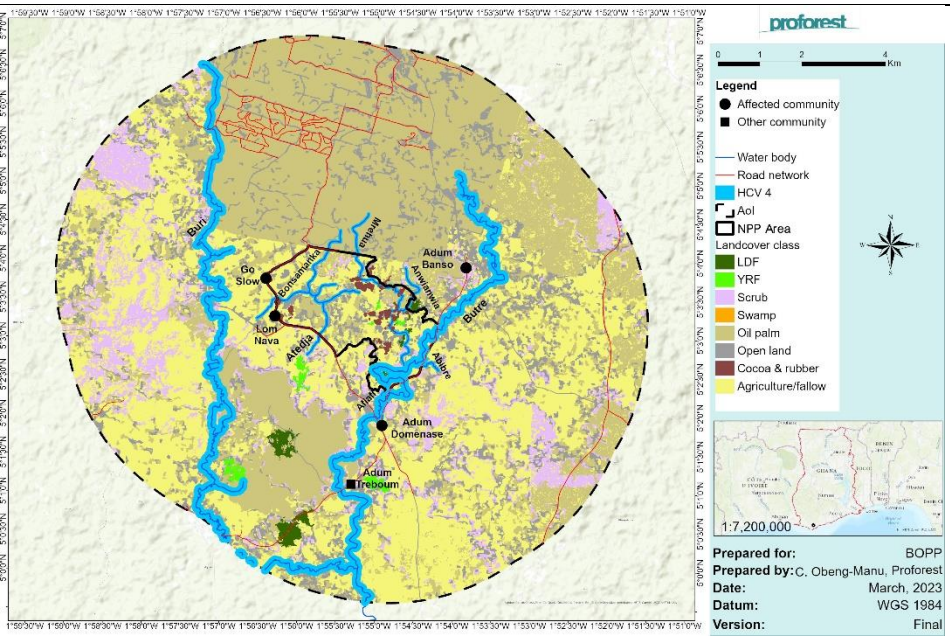


Figure 12: Map of HCV 4 within the NPP AREA

*Data sources: Map: ESRI; Concession boundary from boundary; Land cover from classification of remote sensing data Data sources: Base map: ESRI; Road network obtained from **www.openstreetmap.org**; Water body obtained from Ghana rivers dataset; Water body mapped through participatory mapping; Concession boundary provided by BOPP; Communities mapped during the fieldwork; Land cover classification obtained by processing Sentinel 2 satellite imagery; Map composed using ArcGIS Pro.*

HCV 4.2: Forest critical to erosion control

This includes catchment forests that prevent or shelterbelt forests that prevent serious wind erosion where this would drastically affect local agriculture. It was established from the assessment through mapping (figure 13) with global scale data that the highest slopes within the concession are between 9-19 degrees, and thus, there is no steep slope of gradient greater than 25 degrees. **It is concluded that HCV 4.2 is absent**. Soil conservation measures including terracing, platforms, cover cropping, etc. should be applied on the terrain of slope 9-19 degrees as per RSPO and best practice requirements.

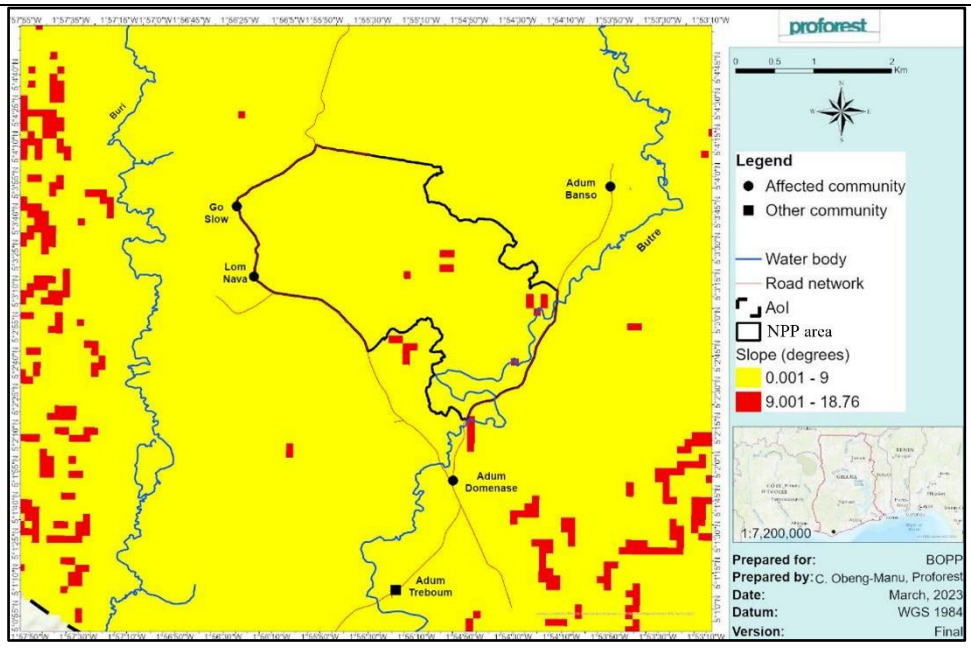


Figure 13: Map showing slope gradient within the NPP AREA

Data source: Concession boundaries from company; Topographic layer based on DEM extracted from http://viewfinderpanoramas.org/dem3.html; Sources of the base map: Esri.

HCV 4.3: Forests providing barriers to destructive fire

The Ghana HCV Toolkit states that parts of forest reserves along road margins may be considered HCV where there is:

- Evidence of a fire risk from the activities of man, and
- The likelihood that they will act as natural barriers to fire spreading into the reserve towards an existing protected area, or another area designated as HCV.

The Toolkit further states that, in areas that have been subjected to increasing levels of anthropogenic fires in recent years, any forest areas that may prevent fire spreading into protected areas will be considered as HCV. Fire risk in the NPP AREA is very low due to the rainfall regime and vegetation in the landscape. The NPP AREA falls within the moist evergreen vegetation zone of Ghana with very little deciduousness and experiences very high rainfall. Severe dry conditions are rare. Secondly, due to BOPP's commitment to no burning and as per RSPO requirements, fire will not be used for land preparation for the out-grower project. The cocoa and rubber farms within the boundary of the NPP AREA also pose very low risk to fire as farmers typically do not use fire for their development or maintenance. Again, there are no significant forest patches within the NPP AREA that could be considered as natural barriers to destructive fires. Thus, the assessment concluded that HCV 4.3 is absent.

HCV 4.4: Forests that play a critical role in local climate regulation

The Ghana HCV Toolkit classifies these forests as those that play a critical role in local climatic conditions such as reduction of fire risks or preventing exposure to dry winds that would compromise productive agriculture. These include designated shelterbelt forest reserves and forest areas in the transition zone between the high forest zone and the dry savannah, that provide protection against the North-East trade winds and/or 'Harmattan' dry winds. As per the definition of the Ghana HCV Toolkit, the NPP AREA and the larger AoI do not fall within the forest categories

described in the interpretation above as HCV 4. The landscape is not a designated shelterbelt and is not located in the transition zone (rather in the High Forest Zone). **HCV 4.4 is thus concluded to be absent**.

- HCV 5: Local people's basic needs

According to the Ghana HCV Toolkit, an area will be considered as HCV 5 when it is the source of a basic need in a situation where majority of the local people or the poorest population among the local people have no realistic alternative. The basic needs most likely to occur, according to the HCV Toolkit include food (where this is a fundamental protein component of diet), NTFPs and medicinal and building materials.

Food (e.g. bushmeat): All the communities – Adum Banso, Dominase, Go Slow and Lom Nava – revealed during the consultations that the NPP AREA is not a main source of protein, including bushmeat and fish. Due to the extensive farming in the landscape, bushmeat is scarce and diffused in the wider landscape. Some fishing is done by community members from Adum Banso in the Butre River and Anwiawia and Mrehua streams using local fish traps, however this does not constitute the main source of fish for the community. Meat and fish are mainly purchased from the market and many households also keep poultry and other livestock as sources of animal protein.

Water for drinking and domestic purposes: All the affected communities depend on streams flowing within the NPP AREA as their source of water for drinking and domestic purposes within their homes and when they visit their farms. For Lom Nava community, the Bonsamanka stream is the main source of water for drinking and domestic purposes in their homes. A section of the Go Slow community, referred to as Kyenkyenase, depend on the Atedja stream within the NPP AREA as their main and nearest source of water for drinking and domestic purposes. The rest of the Go Slow community depend on a borehole for water and a stream located outside the NPP AREA as their alternative source when the borehole is not functioning. **The Bonsamanka, Atedja, Mrehua and Afiafi streams are therefore considered as HCV 5 because they are important sources of water for drinking and domestic purposes.** These streams were mapped with a buffer area of 15 metres recommended to be reserved on both sides based on Ghana Riparian Buffer Zone Policy and RSPO guidelines on riparian management. The size of the Bonsamanka, Atedja, Mrehua and Afiafi streams within the NPP AREA is 2.683 ha and their buffer areas within the NPP AREA is 26.510 ha. **The total HCV 5 management area is therefore 29.193 ha as shown in** Table 20. Figure 14 below is a map of the HCV 5 identified.

Table 20: Size of HCV 5 waterbodies and size of their buffer within the NPP AREA

Feature	Size of river/stream within MU (ha)	Size of buffer within MU (ha)	Management area (MU)
Bonsamanka stream	0.642	7.058	7.700
Atedja stream	0.904	8.961	9.865
Mrehua stream	0.725	7.095	7.820
Afiafi stream	0.217	2.122	2.339
Total	**2.683**	**26.447**	**29.131**

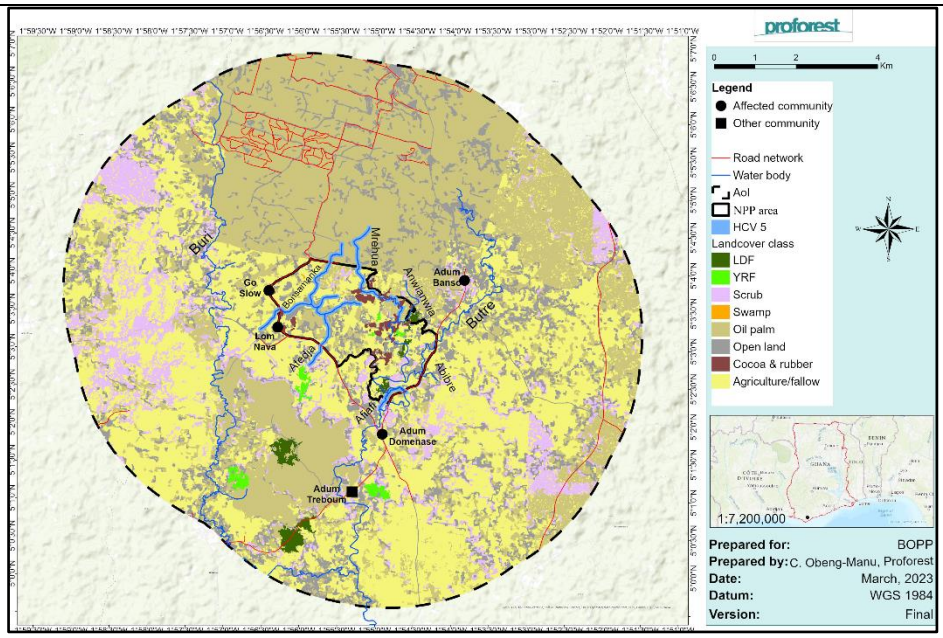


Figure 14: Map showing the HCV 5 areas identified

*Data sources: Base map: ESRI; Road network obtained from **www.openstreetmap.org**; Water body obtained from Ghana rivers dataset; HCV 5 mapped through participatory mapping; Concession boundary provided by BOPP; Communities mapped during the fieldwork; Land cover classification obtained by processing Sentinel 2 satellite imagery; Map composed using ArcGIS Pro.*

All the communities revealed that they source NTFPs (e.g. mushrooms and snails) and medicinal materials from the NPP AREA and the wider landscape. The NTFPs are common within the wider landscape including around their homesteads and in their farms and are not localised. Also, the medicinal resources are not the main source of healthcare as the communities depend on clinics and health posts in their communities or the nearest town for healthcare. In the case of building materials, the communities do not depend on the NPP AREA for their building materials as the site does not contain any good forest or matured timber trees. They use timber from nearby wood markets for parts of their constructions, such as roofing.

- HCV 6: Cultural values

HCV 6 areas are sites, resources, habitats and landscapes of global or national cultural, archaeological or historical significance, and/or of critical cultural or religious/sacred importance for the traditional cultures of local communities or indigenous people. The Ghana HCV National Interpretation identifies the following as HCV 6:

- Traditional burial grounds for chiefs located in forest areas
- Ritual grounds for traditional religious worship of shrines and fetish gods
- Taboo days when entry to a forest area is forbidden
- No-go areas of forest, possibly overseen by a traditional/religious leader
- Forest animals hunted for festival occasions
- Forest provides only habitat for cultural totems
- Significance for stool or skin identity.

In line with the recommendations of the Ghana HCV Toolkit, the identification of HCV 6 was done through consultation with the affected communities. All the affected communities revealed that none of them have burial grounds for Chiefs, or any other burial grounds within the NPP AREA. They also indicated that they are Christians and do not have ritual grounds or designated sites for traditional religious worship, shrines or fetish gods within the NPP AREA. None

of the affected communities has taboo days where entry to any part of the NPP AREA is forbidden or designated areas no-go areas within the NPP AREA. Furthermore, the NPP AREA is highly converted for agriculture and there is no forest within the area where animals are hunted for festivals. There are also no areas providing habitats for totems or significant stool or skin identity. Based on the outcome of the community consultations, the assessment team concluded that **HCV 6 is absent in the NPP AREA**.

- Local people's lands and future livelihood security

Most parts of the NPP AREA are used for food crop and cash crop farming by members of the affected communities. The cash crops cultivated are rubber, cocoa and oil palm while the main food crops include cassava, maize and plantain. BOPP and the Adum Banso Chief have indicated that cocoa and rubber farms will not be converted to oil palm, hence although these farms fall within the boundary of the NPP AREA (see Figure 2), they will be left as cocoa and rubber farms and will be under the management of their owners. The oil palm and food crop areas will however be used for the oil palm project. The oil palm farms have been enumerated for compensation and food crop farmers will be allowed to harvest their food crops before the project commences. The communities had also been informed by the leadership of Adum Banso of the proposed project since January 2020 and advised not to plant any permanent or long-term crops on the land. Farmers from all the affected communities confirmed that they are aware of these arrangements through a series of meetings with BOPP management and the leadership of Adum Banso. Although some of the farmers had moved to farm in other communal/stool land areas around the NPP AREA, some also continued farming within the NPP AREA.

From the consultations, the affected farmers indicated that their livelihoods will be enhanced through being part of the project as plots will be allocated to them for oil palm cultivation. In addition, they would benefit from the additional livelihood options which will be incorporated into the project. They however expressed concerns about the loss/reduction of their food crop farming areas due to the oil palm project and requested that part of the NPP AREA should be reserved or alternative land provided for food crop farming.

It was discussed and agreed during the final stakeholder consultation that the current food crop farming areas within the NPP AREA will be mapped through a participatory method and a commensurate area allocated within the NPP AREA for food crop farming. In addition, project beneficiaries will be allowed to intercrop the oil palm at the immature stage under supervision by BOPP as is done for ASHOPP and additional livelihood component will be implemented.

Following the final stakeholder consultation, the current food crop farms within the NPP AREA have been identified and mapped through a participatory approach. A delegation comprising of BOPP officials and representatives from the affected communities then visited the sites to identify and map a commensurate area within the NPP AREA for food crop farming as agreed during the final consultation. A total area of 11.25 ha was identified within the NPP AREA by the delegation to be reserved and used by the affected farmers for food crop farming. This 11.25 ha area is divided into two and reserved closer to the main communities (Adum Banso and Dominase) to minimize the distance to the farms. Thus, an area of 5.68 ha has been reserved close to Adum Banso to be used by farmers from Adum Banso and 5.57 ha reserved close to Dominase to be used by farmers from Dominase, Lom Nava and Go Slow. Figure 15 shows the current food crop farms and the allocated portions of the NPP AREA to be reserved for food crop farming by community members. The use of the NPP AREA for the proposed project is therefore not expected to have any significant negative impact on food security and livelihoods as the affected farmers will not lose their main farming areas. Moreover, there are available communal/stool lands around the NPP AREA for farming by community members to cater for future population growth.

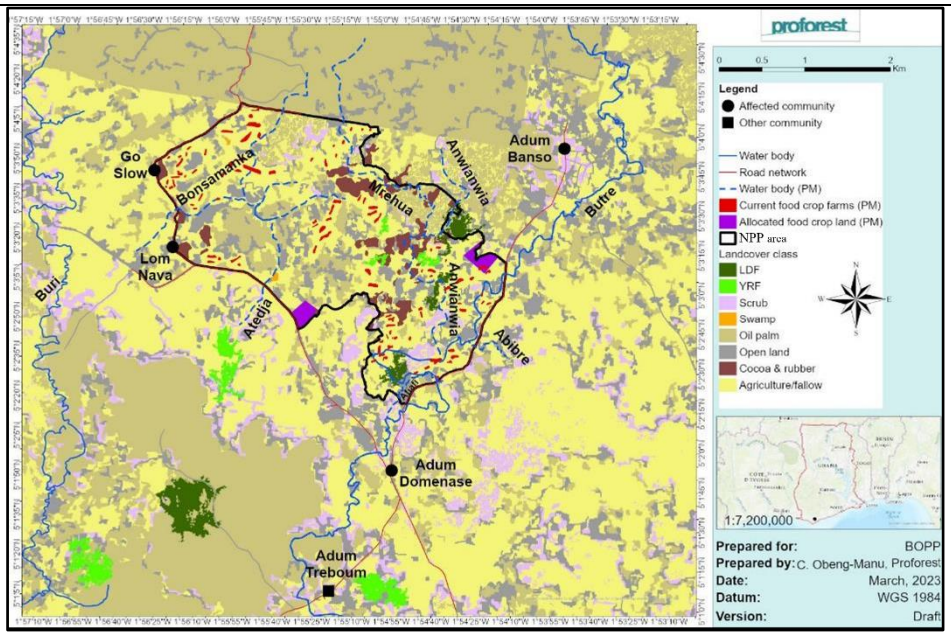


Figure 15: Allocated portions of the NPP AREA to be used for food crop farming by community members
*Data sources: Base map: ESRI; Road network obtained from **www.openstreetmap.org**; Water body obtained from Ghana rivers dataset; Allocated farmland mapped through participatory mapping; Concession boundary provided by BOPP; Communities mapped during the fieldwork; Land cover classification obtained by processing Sentinel 2 satellite imagery; Map composed using ArcGIS Pro.*

Environmental Methods

Literature review and use of secondary data

A literature review was conducted prior to the scoping visit and during planning for the full assessment. This entailed systematic literature review based on previous studies or work done in the project area. The secondary data listed below were used:

- Literature and reports including but not limited to academic papers, and grey literature on the ecological, biophysical and social context.
- Information on relevant legislation and international conventions such as national legislation, CITES and the IUCN Red List.
- Spatial information and relevant local demographic statistics.
- HCV and HCSA implementation guidance including the HCV-HCSA Assessment Manual, the Common Guidance for HCV Identification, the HCSA toolkit (version 2), and the HCSA Social Requirements Implementation Guide.

Environmental fieldwork

Primary information on fauna and flora community and other ecological attributes of the NPP AREA were collected directly from field studies as there did not exist much documented information on fauna and flora community of the site. Seven linear sampling transects measuring about 1.5 kilometers were preselected across the NPP AREA. The transect lines were laid to cut across the various vegetation cover and terrain conditions on the site and survey of three vertebrate fauna taxa; large mammals, birds and herpetofauna was carried out along the linear transects. Forty-five 12.61-metre radius circular plots spread across the entire concession and spread over the different vegetation cover, were used to carry out the vascular plant survey.

- Fauna study methods:

The vertebrate fauna study was carried out to identify and document the fauna community of the NPP AREA. Three fauna taxa; mammals, birds, and herpetofauna were the focus of the fauna assessment. In relation to herpetofauna, refuge examination within 25 metres along the linear transects and also in puddles and marsh/wet areas was undertaken, and this involved turning over rocks and fallen logs, peeling tree barks, digging through leaf litter, and searching through decayed tree stumps, tree buttresses, termite mounds and burrows for reptiles. Refuge examination provides a quick but efficient way of sampling herpetofauna community in terrestrial habitats, particularly when the essence of the study is to assess the herpetofauna community of an area. This procedure was intensified whenever a marsh area (inundated riverine, ponds and puddles) was encountered. Identification of herpetofauna species was mainly through sight and sound as well as through the recording and playback of calls. Recorded calls of amphibians were played back later for confirmation using the Amphibiaweb.

Large mammal component of the fauna studies was carried out by transect survey. This involved attentive walks and ground observations within 25 metres along transects (trails, foot paths and other access routes) particularly in the forest patches and the fallow vegetation during which direct and indirect observation of a large mammal species were recorded. Direct observation entailed the sighting of large mammal species whereas indirect sightings involved the identification of signs of the presence and activity of living animal (such as feeding sites, tracks, footprints, faecal pellets, nests, etc.). Local indigenous knowledge of the large mammal fauna of the NPP AREA was also sought through informal interaction with a local hunter who was assigned to the field study team. Pictures of large mammal species obtained from desktop studies were also used as a guide to solicit local knowledge on the occurrence of some large mammals in the study area.

Transect count procedure involved slow attentive walk along transect during which any bird encountered by sight or sound, within 100 metres along each transect, was identified, and recorded. This survey method is quite effective in habitats where the chance of hearing and seeing birds are high and where the surveyor's knowledge of the avifauna of the area is quite good. Distant observations were aided by a pair of binoculars (x10 magnification). Desktop studies helped to confirm the identity of unfamiliar species seen.

- Flora survey:

The flora survey was conducted using a sampling approach based on the final land cover classification. The sampling points were distributed within the NPP AREA such that adequate information is obtained per vegetation type although the interest was mainly on the forest classes as non-forest classes are less relevant in the HCSA assessment. Due to the unavailability of data to be used in the formula to estimate the sample size and no literature that proposes the minimum number of sample plots to be used per land cover type in Ghana, a sampling rate of 10% of the size of the NPP AREA was used to determine the sample size in hectares. This was then converted to the number of sample plots by dividing the sample size in hectares by the size of the survey plots. Considering the kind of statistical analysis to be carried out (especially ANOVA), a minimum of 2 samples was required per land cover type.

With the other land cover classes in the HCSA being less significant and HCS classes covering just 2.3% of the NPP AREA, a purposive random sampling approach was used to allocate the plots such that the enough data can be obtained for the statistical analysis. To ensure the independence of the sampled plots, a minimum distance of 50 m was maintained between each plot despite their random distribution. With all these conditions, a total of 45 sampling points were used for the flora survey.

The coordinates of the center of the plots were obtained and uploaded into a Garmin GPS for navigation to each plot. The circular plots were established on the field using a radius of 12.61 m and 5.64 m for the main plots and sub plots respectively. During the forest inventory, trees with diameter at breast height (DBH) above 10 cm that were in the

main plots were measured and recorded while trees above 3 cm DBH in the sub plot were recorded. Figure 16 below shows a pictorial view of the plots established.

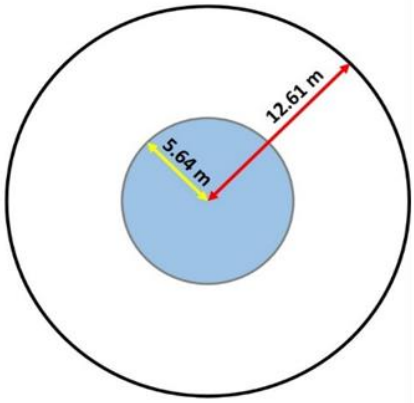


Figure 16 Flora survey distribution plots and characteristics

The DBH was measured with tape measure and the height measured with Vertex which determines the height using a Pythagorean approach. Each tree in the plot was identified and recorded and georeferenced and assigned a unique number.

Estimation of Biomass and Carbon

The non-destructive approach was used to estimate above ground biomass and carbon of tree species to avoid destruction of forest cover. The non-destructive approach to above ground biomass estimation involved using the measured field data (DBH, height, and tree species) with an allometric equation developed by Chave et al. (2014) who used a conversion factor of 0.475 to convert from above ground biomass to above ground carbon:

$AGB = 0.067 * (\rho D^2 H)^{0.970}$ ..... (eqn. 1)

Where:

AGB = Above Ground Biomass, measured in kg; ρ = wood density, measured in g/cm^3; D = diameter at breast height, measured in cm; H = height, measured in m.

The below ground biomass was estimated based on the assumption that below ground biomass (BGB) is about 20.5% of the above ground biomass (Mokany et al., 2006). The total biomass was estimated by summing the below and above ground biomass values. While the dbh, height and tree species were measured on the field, the wood density information were gathered from African Wood Density Database (Carsan et al., 2012) and Global Wood Density Database (Chave et al., 2009; Zanne et al., 2009).

Statistical analysis of estimated carbon

Statistical analysis was required to determine any statistically significant difference between the estimated carbon stock values estimated for the land cover types. The normality of the data was first checked after which the analysis of variance (ANOVA) and Scheffe pairwise test was carried out using the programming software R version 4.2.1. The test was carried out at 95% confidence intervals.

Data Analysis

Bio-qualitative assessment using species diversity and richness of the fauna community was done using the Shannon-Wiener Diversity Index (H') and Margalef's Index (d) respectively. This was done where the method of data collection

and the data obtained allowed for such analysis to be carried out. Where appropriate, diversity indices of fauna species for a taxon was calculated using the Shannon-Wiener Index (Krebs 1989). General descriptive statistical analysis was done using Microsoft Office Excel®.

Conservation Status

The conservation status of the fauna in the Area of Interest (AoI) was assessed using the global (International Union for the Conservation of Nature (IUCN) and national (Ghana Wildlife Laws) criteria. For the flora, the IUCN and national star rating system (Hawthorne and Abu-Juan (1995) were used to assess the conservation status.

Limitations to environmental methods

- The main limitation to the environmental methods is the relatively short time (June-July) used for the fieldwork. This however did not affect the quality of the data collection. The sampling methods and intensity deployed for the biological survey was deemed appropriate and adequate to provide sufficient data and information on the biological entities at the NPP AREA, considering the condition and size of the NPP AREA. The method deployed for each of the taxons are based on well tested field sampling techniques that are well adapted to the vegetation cover and habitat characteristics of the NPP AREA. Also, the NPP AREA and the surrounding areas are not located within an area that is subjected to significant seasonal variations in fauna community. The NPP AREA is not located along migratory or movement corridor, being located within degraded and fragmented landscape within the moist-evergreen vegetation zone. Hence, seasonality did not affect the data collection.
- Some methodology (Leache et al., 2006; Rodel, 2009; Kingdon, 1997; Borrow and Demey, 2010) referenced for the herpetofauna, large mammal and bird survey are older than 3 years. These methods however are still relevant for fauna surveys and are widely used for primary data collection. Considering the limited secondary data available for the project area, primary data was mainly used, and these methods were considered appropriate in gathering the primary data.

Results

Summary of interviews and discussions

Table 21 below presents the summary of consultations with relevant stakeholder institutions.

Table 21: Summary of interviews and discussions

Expert/Organisation/ social group & date	Name/title/ role	Type of interaction	Concerns and/or recommendations
Conservation Foundation 21-07-2022	Mr. Owusu Sekyere - Executive Director	Interview	● The organisation is involved in campaigns against illegal artisanal mining (Galamsey) in the area. Illegal mining in riparian buffers has led to pollution of water bodies such as the Butre river, reducing the depth and quality of these waterbodies due to siltation and chemical pollution. This increases the cost of water treatment at the Birimso Water Station. ● Establishment of oil palm on the NPP AREA will reduce local people's access to NTFP's e.g., fuel wood. BOPP can look at establishing woodlots in the affected communities, setting aside areas within the NPP AREA that are rich in biodiversity and properly managing these areas.

Forestry Services Division (FSD), Dompim Range, Tarkwa District 29-06-2022	Joseph Aggrey – Range Manager	Interview	● Dominant tree species found on farms include Odum, Ofram and Emire. ● For economic trees outside reserves, farmers can apply, and they will be allowed to harvest them. ● RTE tree species outside the reserves are to be protected. For protected trees even if farmers apply, they are not allowed to fell. Some of these trees are used for seed collection. ● There are sacred groves located in Dompim but not Adum Banso area. ● Recommended that conservation areas including buffers should be demarcated. These areas should be enhanced through enrichment planting. Other management measures should include monitoring patrols and education/sensitization of communities. ● Forest guards within the range can be deployed to support monitoring patrols around the NPP AREA. They would however require logistical support such as means of transport and accommodation. ● Threats to conservation in the landscape include illegal mining and chainsaw lumbering. ● The NPP AREA falls under Takoradi District.
Forest Services Division, Tarkwa District Office 29-06-2022	Vincent Appiah – District Manager	Interview	● Confirmed that off reserve areas within the landscape of the project are under Takoradi District. Hence, the NPP AREA falls under the jurisdiction of the Takoradi FSD. However, the Tarkwa District can still help in managing the conservation areas as they have presence in the area. The two district offices can therefore collaborate for the sustainable management of the conservation areas. ● The office does not have much control over off reserve areas, hence for any species of conservation concern within the NPP AREA, farmers should be sensitized to conserve those trees and they should be compensated for it. ● Green belt should be created around the conservation areas to prevent fires during the dry season. Also, communities should be sensitized on fire prevention. ● Species like Kokrodua, Edinam, Odum, Mahogany, Utile, Kusia, Sapele and Hyedua which are declining in population and occurrence, can be planted to enhance the conservation areas. These are called restricted species and require special permit to be felled. ● The office can recommend fast growing indigenous tree species to be used for enrichment planting.

			● Signposts and pillars can be used to demarcate conservation areas. ● The Manager provided a list of the restricted tree species.
Forest Services Division, Takoradi 29-06-2022	Charles Nketiah – District Manager	Interview	● The FSD's operations are focused on the forest reserve areas. ● Off reserve areas are under the management of the Department of Agriculture. However, FSD manages the trees within off reserves especially areas under timber concession. There is no timber concession within the project area. ● Farmers usually connive with chainsaw operators to harvest trees on their farms. ● The forest reserves include endemic and protected trees. Hence, some of the reserves have areas designated as Globally Significant Biodiversity Areas (GSBAs). ● Restricted tree species require special permits to be felled. Some are seed trees. ● Permits are granted to individuals and communities who want to harvest economic trees for community use under supervision. ● Threats to conservation include construction activities, chainsaw, farming and illegal mining. ● Community sensitization and education should be carried out as part of the management measures. ● BOPP should collaborate with FSD on the project. FSD can provide seedlings for enrichment planting.

Environmental fieldwork

- Fauna observations

The fauna survey carried out using transect count recorded a total of 117 species comprising 91 bird species, 17 herpetofauna species and 9 large mammal species. The 17 herpetofauna species recorded in the study comprised 7 amphibians and 10 reptiles. The 10 reptiles comprised 6 snakes and 4 lizards.

Fauna community recorded in the NPP AREA comprised mainly common and widespread habitat generalists that are commonly associated with open and cultivated areas within the high forest zone. The fauna community appeared to be the remnant of a climax community that previously persisted in the area, but which have probably been decimated by habitat loss resulting from persistent habitat degrading human activities.

None of the 117 fauna species recorded in the study is of global conservation concern. All the recorded fauna species are listed as Least Concern on the IUCN Red List of Threatened Species (see Annex 5a – Annex 5c of the Integrated HCV-HCSA assessment report). However, 29 out of the 117 fauna species are listed on the different Schedules of the Wildlife Conservation Regulation 1971, LI 685 with varying degree of protection as shown in Table 22. This comprises 19 birds, 2 herpetofauna and 8 mammals.

Table 22: Fauna species of national conservation concern

Species	Total encounter along transects	Wildlife Conservation Regulation Schedule
Avifauna		
Guttera pucherani	2	III
Pternistis ahantensis	2	II
Treron calvus	7	II
Turtur afer	7	II
Streptopelia semitorquata	6	II
Turtur tympanistria	5	II
Tauraco macrorhynchus	2	II
Ploceus nigricollis	6	II
Malimbus nitens	6	II
Malimbus malimbicus	6	II
Ploceus aurantius	12	II
Malimbus scutatus	5	II
Ploceus nigerrimus	37	II
Ploceus cucullatus	24	II
Pyrenestes ostrinus	4	II
Nigrita bicolor	4	II
Nigrita canicapillus	6	II
Estrilda melpoda	11	II
Spermophaga haematina	3	III
Herpetofauna		
Varanus niloticus	1	I
Python regius	1	II
Mammals		
Cercopithecus nictitans	2	II
Atherurus africanus	x	II
Euxerus erythropus	2	III
Epixerus ebii	3	I
Galerella sanguinea	4	II
Civettictis civetta	x	II
Tragelaphus scriptus	x	II
Cephalophus maxwelli	x	II

X= not a direct observation, but sign of presence, such as footprints, faecal pellets, etc.

- Flora observations

Habitat degradation arising from intense food crop and cash crop cultivation, logging and charcoal burning and artisanal gold mining appear to have affected the flora community in the NPP AREA in terms of conservation significance. The flora study recorded 59 tree species from the 45 sampling plots of which only four are of global conservation concern and listed on the IUCN Red List of Threatened Species. These comprise an Endangered species (*Omphalocarpum ahia) and three Vulnerable species (Guarea cedrata, Afzelia africana and Entandrophragma cylindricum).* Two other plant species are listed as Near Threatened and these are *Hallea ledermannii* and Milicia excelsa. *At the national level, Afzelia africana* and *Milicia excelsa* are listed as Red and Scarlet Star species in view of their increasing rarity and declining stock, although the two species are quite widespread throughout the forest zone and outlying areas. *Anthostema aubryanum, Erythrina vogelii and Pentadesma butyracea* are also listed as blue species at the national level as they may be widespread internationally but not very widespread in Ghana. Table 23

shows the flora species of conservation concern found within the NPP AREA. The full list of flora species from the flora survey is provided in Annex 5d of the Integrated HCV-HCSA assessment report.

Table 23: Summary of flora species of global and national conservation importance encountered in the NPP AREA

Scientific Name	Frequency	Conservation Status (IUCN)	Ghana Genetic Heat Index Star Rating
Omphalocarpum ahia	1	Endangered	Blue
Guarea cedrata	1	Vulnerable	Pink
Afzelia africana	3	Vulnerable	Red
Entandrophragma cylindricum	1	Vulnerable	Scarlet
Hallea ledermannii	12	Near Threatened	Red
Milicia excelsa	7	Near Threatened	Scarlet
Anthostema aubryanum	2	Least Concern	Blue
Erythrina vogelii	1	Least Concern	Blue
Pentadesma butyracea	1	Least Concern	Blue

HCS forest classification and carbon assessment

From the land cover classification, two of the four HCS forest classes (namely low-density forest and young regenerative forest) were identified in the NPP AREA. A description and some statistics of the HCS forest classes are presented below. Also, a description of the general land cover is presented below.

- Description of stratum (technical description and photographs)

The land cover analysis identified eight different classes as shown in table 24. Two of the land cover class can be classified under the HCS forest class while six are considered non-HCS class. The low-density and young regenerating forest within the NPP AREA is about 3% of the area of the NPP AREA with LDF and YRF covering about 2.4% and 0.6%, respectively. Below are pictorial views of each landcover type.

Figure 17 Images of Oil palm taken from the field.
NB: Top = North; Down = South; Right = East; Left = West; Centre = Canopy

Figure 18: Images of water body (Butre)
NB: Top = North; Down = South; Right = East; Left = West; Centre = Canopy

Figure 19: Images of built up/bare land

NB: Top = North; Down = South; Right = East; Left = West; Centre = Canopy

Figure 20: Images of Swamps

NB: Top = North; Down = South; Right = East; Left = West; Centre = Canopy

Figure 21: Images of Agriculture/fallow taken from the field

NB: Top = North; Down = South; Right = East; Left = West; Centre = Canopy

Figure 22 Images of cocoa and rubber taken from the field

NB: Top = North; Down = South; Right = East; Left = West; Centre = Canopy

Figure 23 Images of Young Regenerative Forest taken during the fieldwork
NB: Top = North; Down = South; Right = East; Left = West; Centre = Canopy

Figure 24 Images of Low Density Forest taken on the field
NB: Top = North; Down = South; Right = East; Left = West; Centre = Canopy

Figure 25: Images of Scrub taken on the field
NB: Top = North; Down = South; Right = East; Left = West; Centre = Canopy

- Area estimates for vegetation stratification

Below (Table 24) is the statistics (size in hectares and area coverage) of the land cover types identified from the final classification in the NPP AREA.

Table 24: Details of the land cover classes

Land cover class	Size in Hectares	% of total management unit
Potential HCS classes		
Low Density Forest	12.406	1.66
Young regenerating forest	4.516	0.60
Sub-total	16.922	2.26
Non-HCS classes		
Scrub	15.605	2.08
Swamp	0.840	0.11
Oil palm	419.664	16.59
Agriculture/fallow land	124.010	56.02
Cocoa & rubber	47.325	6.32
Open land	124.074	16.59

Sub-total	731.518	97.74
Total	748.44	100

- Vegetation stratification map

The vegetation within the assessment area gives an indication that the NPP AREA is largely an agricultural area. The agriculture/fallow covers about 56% of the total size of the NPP AREA while the forest area covers about 2.26% of the NPP AREA size. Considering the landcover classes in terms of the HCS classes, about 2.26% of the NPP AREA was identified as HCS forest while 97.74% of the NPP AREA was identified as non-HCS class. The vegetation stratification map of the assessment area is presented in Figure 26 below.

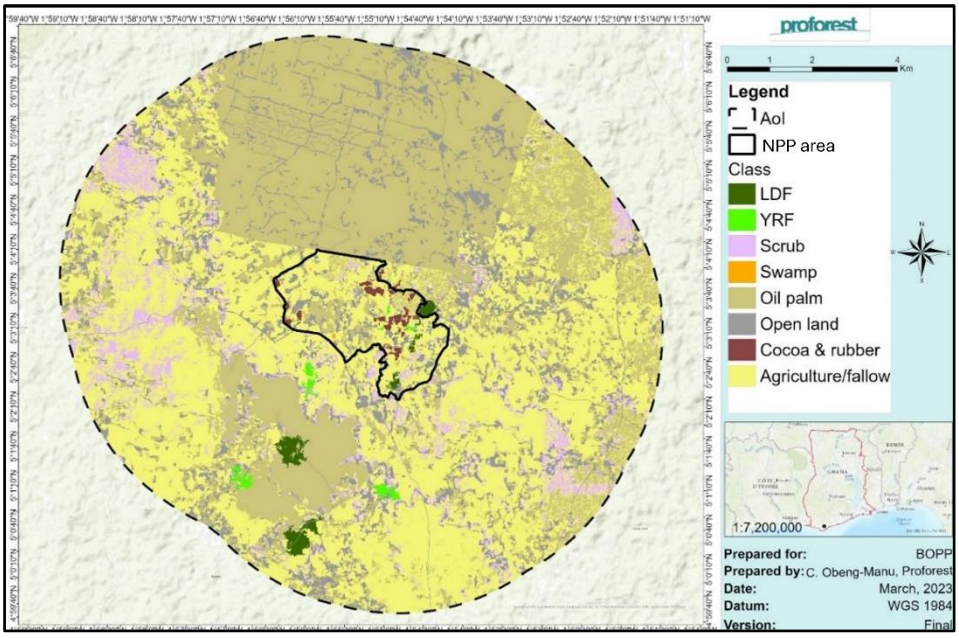


Figure 26: Map showing the vegetation stratification of the AoI

Data source: Concession boundaries obtained from the company; AoI generated y creating a 5 Km buffer around NPP AREA; Base map from ESRI; Land cover classification obtained by processing Sentinel 2 satellite imagery; Map composed using ArcGIS Pro.

- Carbon stock estimates for vegetation stratification

The carbon stock varied from non-forest HCS class to forest HCS class. The estimated average carbon stock was 3.596 Mg and 7.870 Mg in agriculture/fallow and scrub, respectively. The estimated average carbon stock was 31.966 Mg and 27.202 Mg for low-density and young regenerating forest, respectively. The total carbon stock for all the plots was 655.685 Mg.

Table 25: Total hectares per vegetation class

Land cover class	**Area**	**Number of Plots**	**Average Carbon Stocks**	**Standard error of the mean**	**Confidence limits (95%)**		**Total Carbon Stocks**
					Lower	Upper	
	(ha)		**Mg/ha**				**Mg**
Potential HCS classes							

Low Density Forest	12.406	9	4.088	3.609	1.760	11.794	228.151
Young Regenerating Forest	4.516	6	1.540	0.139	1.287	1.671	133.215
Non-HCS classes							
Scrub	15.605	4	1.081	0.110	0.956	1.215	118.379
Swamp	0.840	3	0.896	0.049	0.845	0.942	59.722
Agriculture/fallow land	419.664	9	0.554	0.218	0.281	0.842	107.863
Oil palm	124.010	2	0.273	0.273	0.269	0.277	1.362
Cocoa & rubber	47.325	10	0.058	0.058	0.00	0.135	6.993
Open land	124.074	2	0	0	0	0	0

- Statistical analysis of carbon stock inventory

Some statistical tests were carried out to determine if there is any statistically significant difference between the carbon stock estimated per land cover type. ANOVA and Scheffe pairwise tests were the statistical tests applied. Table 26 below shows the result of the ANOVA test. The result indicates that there is a statistically significant difference in the carbon estimated per land cover type. The pairwise Scheffe test was also carried out and the result is shown in Table 27 below.

Table 26: Results of ANOVA test

	Sum of Squares	df	Mean Square	F	P-value
Land cover class	96.9	7	13.843	4.889	5.9e-4
Residual	104.8	37	2.832		
Total	201.7	44			

Table 27: Results of pairwise Scheffe test

Land cover class	Average Carbon Stocks (Mg)	Total Carbon Stocks
Low Density Forest	4.088	A
Young Regenerating Forest	1.540	AB
Scrub	1.081	AB
Swamp	0.896	AB
Agriculture/fallow	0.554	B
Oil palm	0.273	B
Cocoa-rubber farms	0.058	B
Open land	0	B

From Table 27 above, all the land cover types with the same alphabet represent land cover types with differences in mean carbon values not statistically significant and vice versa. This implies that the difference in carbon stock in the LDF is statistically significant from the other land cover types. However, the difference in mean carbon stock recorded for scrub, swamp, and YRF is not statistically significant. Also, agriculture/fallow, Oil palm, Cocoa-rubber farms, and open land have carbon values which are not statistically significant.

Environmental HCVs

A summary of the outcomes of the identification of social HCVs are presented in Table 28. This is followed by discussion and justification of these outcomes.

Table 28: Summary findings of environmental HCVs

HCV	Definition	Finding
1	Concentrations of biological diversity including endemic species and rare, threatened or endangered species that are significant at global, regional or national levels	**Absent**
2	Large landscape-level ecosystems, ecosystem mosaics and Intact Forest Landscapes that are significant at global, regional or national levels	**Absent**
3	Rare, threatened, or endangered ecosystems, habitats or refugia.	**Present**

- HCV 1: Concentrations of biodiversity

HCV 1 refers to areas that contain significant concentrations of species of conservation significance, including rare, threatened, endangered or endemic species, unusual assemblages of ecological or taxonomic groups and extraordinary seasonal concentrations of species. According to the Ghana HCV Toolkit, HCV 1 constitutes:

- HCV 1.1: Protected areas
- HCV 1.2: Forest that contain outstanding concentrations of threatened or endangered species.

HCV 1.1: Protected areas

The Ghana HCV Toolkit considers all protected areas as HCV 1. Therefore, in Ghana, the following protected areas are recognised as HCV 1:

- National Parks
- Resource Reserves
- Global Protection Reserves
- Globally Significant Biodiversity Areas
- Hill Sanctuaries
- Provenance Protection Areas
- Wildlife Sanctuaries

The NPP AREA neither falls within nor adjoins any of the designated protected areas. The area falls within an off-reserve area and has been under oil palm plantation in the past. Most parts of the NPP AREA are currently under food and cash crop farming. The NPP AREA therefore neither contains nor is contained within HCV 1.1 area.

HCV 1.2: Forest that contain outstanding concentrations of threatened or endangered species

The Ghana Toolkit also considers forest areas to be HCV 1 if they contain concentrations of species that are threatened globally (according to IUCN), or nationally listed as protected areas and when there is evidence to suggest one or more of the following:

- Presence of populations of at least 25% of the forest dependent, red-listed species that are naturally resident in Ghana, and
- Presence of a population of at least one nationally protected species, whose survival in Ghana is critically dependent on the sustainable management of the population in question as integrity of the forest is not the only factor influencing the survival.

The NPP AREA does not contain any natural forest cover. The area has been highly converted for crop production, including food crops, oil palm, rubber and cocoa.

Fauna and Flora

The outcome of the fauna and flora study showed low diversity of flora and fauna community as well as paucity in species of global conservation concern and all together does not meet the definition of HCV 1. No fauna species of global conservation concern was identified within the NPP AREA, as well as no forest dependent and forest edged species. Only 4 flora species of global conservation concern were encountered, albeit at low concentrations. The flora species identified to be of national significance are quite widespread within the forest zone and were also not in significant concentrations to be considered as HCV 1. The 4 flora species of global conservation concern were not recorded at the same area, but sparsely distributed and no specific area within the NPP AREA can be designated as HCV 1. **It is therefore concluded that HCV 1 is not present in the NPP AREA**. Although HCV 1 was determined to be absent, management of BOPP informed the assessment team that they will identify these few tree species of global and national conservation concern during land preparation and protect them.

- HCV 2: Large landscapes

HCV 2 refers to Intact Forest Landscapes (IFLs) and globally, regionally or nationally significant large landscape forests contained within or containing the management unit where viable populations of most, if not all, naturally occurring species occur in natural patterns of distribution and abundance. The Ghana National HCV Toolkit concluded that no HCV 2 areas are present in Ghana. The reasons given are that:

- Forest reserves in Ghana have had a long history of management and intervention. Many of the reserves are also extensively degraded.
- Most Forest Reserves in Ghana are smaller than 50,000 ha.
- Most reserves cannot be considered as uniform blocks of intact forest, due to fragmentation within reserves. On a landscape level, this pattern is matched by fragmentation between reserves, most of which are separated by intensively managed agricultural land and cocoa plantations.

The NPP AREA does not fall within, share boundary or link with any forest reserve. Also, it is fragmented and degraded with farm fallows and existing food crop, oil palm, cocoa and rubber farms. For these reasons, the assessment team concluded that HCV 2 is absent.

- HCV 3: Rare ecosystems

HCV 3 refers to areas with ecosystems that are naturally rare due to geographical or climatic factors limiting their distribution and development or ecosystems whose extent and/or distribution has been reduced by anthropogenic activities.

The Ghana HCV Toolkit defined 'ecosystems' at two levels; the broad 'Forest types' as defined by Hall and Swaine (1981), and smaller 'Habitat types' that can occur within a forest type. The forest and habitat types that qualify as HCV 3 fall in one or more of the following categories:

- Naturally rare habitats;
- Habitats which are dramatically reduced from their original extent due to the activities of man; and
- Habitats so threatened by existing and planned activities that they should be considered threatened/endangered.

Naturally rare forests and habitats:

The Ghana Toolkit identifies the wet evergreen, southern marginal and mangrove forests as naturally rare forest types while upland marshes and wetlands, savannah gallery forest and lowland swamps and coastal savannah are classified as naturally rare habitats. These are considered HCV 3. The NPP AREA does not fall within or contain any of these naturally rare forest types.

The NPP AREA, however, contains two swamp areas which are permanently waterlogged, have waterways and are dominated with fern and wild palm species. A third swamp, which is dominated by bamboo and has waterways is located close to the eastern boundary outside the NPP AREA. In the NPP AREA, some river basins and swamp areas were observed to have been degraded through past illegal mining activities and therefore important that these remaining intact swamps are protected. **The assessment therefore concluded that the three swamp areas are HCV 3.** In accordance with the Ghana Riparian Buffer Zone Policy requirements for wetlands, a buffer of at least 30 m is recommended around the perimeter of the swamps from the high-water level to protect the swamps. **The total HCV 3 management area within the NPP AREA/management unit (MU) is 3.211 ha** as shown in Table 29**.** Figure 27 also shows the HCV 3 management area.

Table 29: Size of swamps and buffer area

Feature	Size of swamp within MU (ha)	Size of buffer within MU (ha)	Management area within MU (ha)
Swamp 1 (SW1)	0.255	1.017	1.272
Swamp 2 (SW2)	0.585	1.179	1.763
Swamp 3 (SW3)	0	0.177	0.176
Total	***0.840***	***2.371***	***3.211***

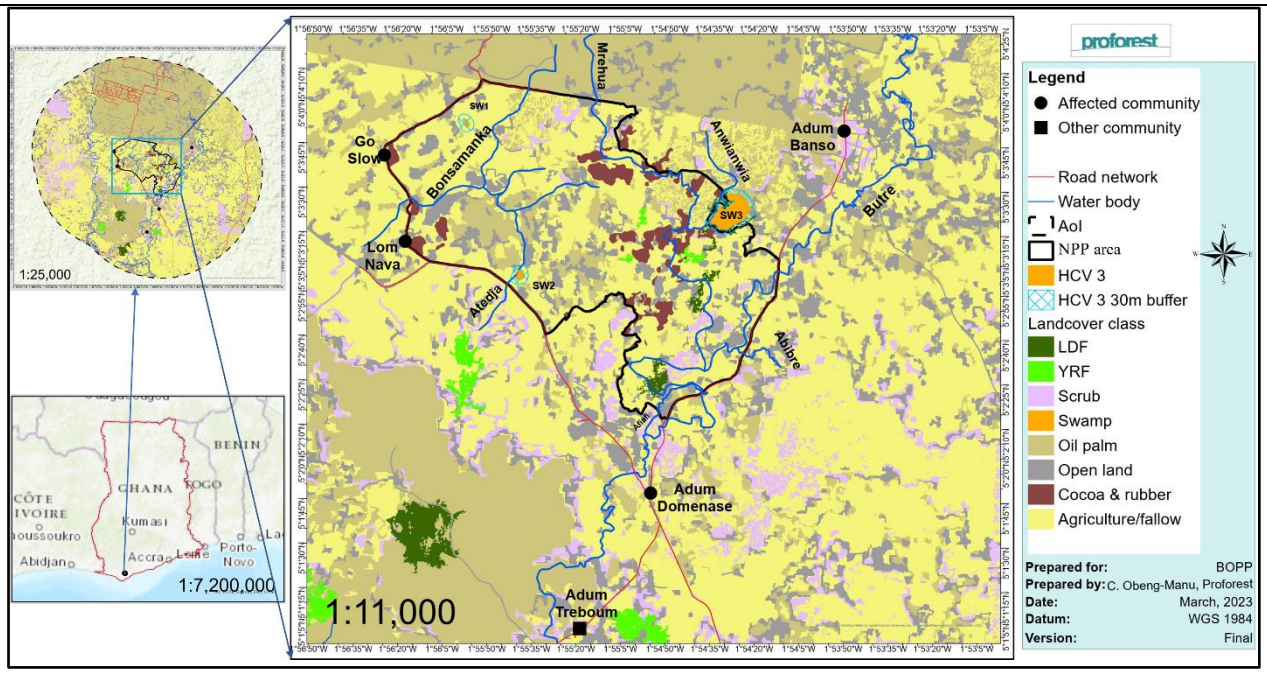


Figure 27: HCV 3 map

*Data source: NPP AREA boundaries from company; Swamp area mapped during field work; Communities mapped during fieldwork; Road network obtained from **www.openstreetmap.org**; Water body obtained from Ghana rivers dataset; Land cover classification obtained by processing Sentinel 2 satellite imagery; Map composed using ArcGIS Pro*

Forest and habitats dramatically reduced in extent of quality: According to the Ghana HCV Toolkit, this category of HCV 3 includes the southern marginal, mangroves, and dry and moist semi-deciduous forest types. The NPP AREA does not fall or link with any of these forest and habitat types.

Habitats so threatened by existing and planned activities that should be considered threatened/endangered: This includes dry and moist semi-deciduous forest types as well as savannah gallery forest, upland marshes and upland wetlands. The NPP AREA is not within or does not contain any of these habitat types except the three swamps described above which are considered as HCV 3.

Peat

To identify the presence of peat within the NPP AREA, the map of peatland areas developed by CIFOR in 2016 was used as a base map. It was mapped in 231 meters spatial resolution by combining a hydrological model and annual time series of satellite-derived estimates of soil moisture to represent water flow and surface wetness that are then combined with geomorphological data. The developers warn that a validation of the depth map against ground measured peat depths (i.e. soil profiles) suggests that the deepest values (>10m) overestimate depth. For this reason, all depths >10m have been thresholded to 10m. Also, there is the need for further ground validation to conclusively determine the presence of peatland in the areas mapped as such using this remote approach. Analysis and review of peatland map for the area indicated that there is no overlap of peatland with the NPP AREA. Figure 28 shows the map of the location of the NPP AREA and peat distribution within the catchment area.

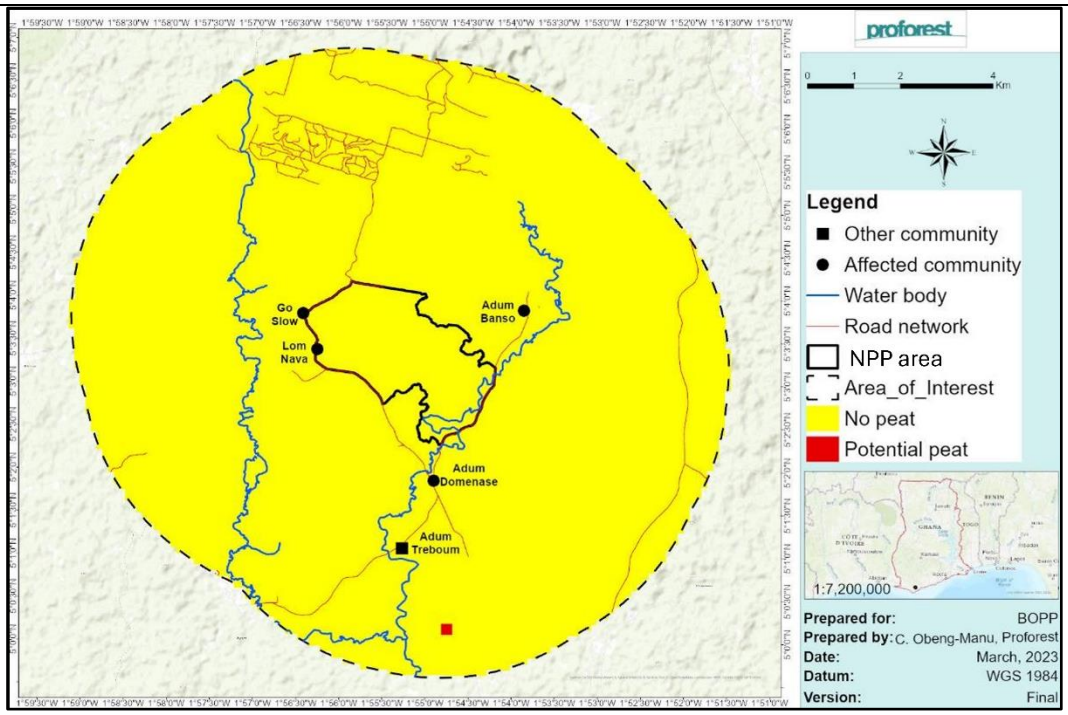


Figure 28: Map showing distribution of potential peat around the NPP AREA and AoI

Data source: Concession boundaries from company; AoI generated by creating a 5 Km buffer around the NPP AREA; Base map from ESRI; Road network obtained from **www.openstreetmap.org**; Water body obtained from Ghana rivers dataset; Peat data from Tropical and Sub-tropical peat data from CIFOR (**https://www.cifor.org/knowledge/dataset/0058/**); Map composed using ArcGIS Pro.

Patch analysis

The input for the patch analysis was the final land cover classification, the allocated food crop area and identified HCVs. From the final land cover classification, all the identified forest classes (YRF and LDF) were reclassified to HCS forest patch while the other landcover types were classified as Non HCS forest. However, the allocated food crop area as well as cocoa and rubber areas identified as non-HCS areas were excluded from the patch analysis such that they are not included for any give and take as these areas need to be protected as it is an area of economic value to members of the communities. The HCS forest patches were extracted, and the boundary dissolve tool was used to merge them. The non-HCS forest classes were also merged but not used in the patch analysis. The HCV area was also merged.

A negative 100-meter buffer was then applied to the merged forest classes to determine the core. The area of the core was then calculated and classified based on the core area. Patch with core area greater than 100 ha represents the High Priority Patch (HPP), patch with core area less than 100 ha but greater than 10 ha was classified as Medium Priority Patch (MPP), and patch with core area greater than 0 ha but less than 10 ha was identified as Low Priority Patch (LPP). A forest patch without core was also classified as Low Priority Patch without core (LPPWC).

The negative buffer of 100 m resulted in the creation of 3 core areas with area less than 10 ha (LPP), although they were all not within the NPP AREA, and 8 core patches without core (LPPWC). Due to the absence of a patch with core area greater than 100 ha (i.e., HPP), no connectivity and connected analysis was carried out (steps 4 and 5). The forest patches were then classified based on the core area.

Also, risk assessment was not carried out due to the absence of MPPs. To determine which of the LPP is to be selected for conservation, the percentage of forest cover within the assessment area was estimated by finding the ratio of total

forest cover and total area of the assessment area. From the calculation, it was estimated that there is 2.26% forest cover within the assessment area. Since the assessment area had 2.26% forest cover, the assessment area was classified as low forest cover landscape.

The Pre-Rapid Biodiversity Assessment check was carried out using identified HCVs (water/streams) and information gathered during the biodiversity survey to determine the presence of significant biodiversity. The inventory of the forest inventory plots placed in some of these patches served as the basis for the flora's biodiversity evaluation, whilst the fauna was based on direct and indirect observations of animal occurrence.

Analysing the biodiversity data revealed that the LPPs that were obtained from the YRF did not house any significant species of conservation concerns. Hence, the LPPs from the LDF were marked for conservation while the LPPs from the YRF was taken for indicative give and take process in step 11. Step 10 of the workflow was skipped because field datasets were used for the Pre RBA step.

Although the LPPs derived from YRF were taken for indicative give and take, not all of them were used for this. The YRF that shares boundary with the cocoa and rubber aids the cocoa trees especially when the cocoa is very young by providing shade. Hence, the LPPs derived from YRF that share boundary with the cocoa and rubber were also marked for indicative conservation and the remaining used for the indicative give and take.

During the indicative give and take process, more effort was put into making sure that the non-HCS acreage allocated for conservation exceeded the HCS area taken for development. The HCS forest patch that was taken during the indicative give and take process was not contiguous and was also isolated. Hence, this forest patch was taken to smoothen the boundary of the other HCS forest patches to be conserved and make them contiguous. The cocoa and rubber farms were not used for the indicative give and take process because the cocoa and rubber farms will be under the control of those farmers and not under the project. Also, BOPP and the chief of Adum Banso have indicated that those farms will not be included in the project. The HCS forest patch that was used for the give and take was 1.03 ha while the non-HCS area given for conservation was 2.44 ha. This was necessary because the give and take process made the HCS patches more contiguous and less isolated.

After the patch analysis, the HCS forest patches that were identified for conservation within the assessment area was 20.764 ha. While the HCS forest and HCV areas were identified for conservation, the allocated food crop land and cocoa & rubber land were identified for protection for community use. The remaining area of land can be used for development. The map below shows the identified HCS forest overlaid on the land cover.

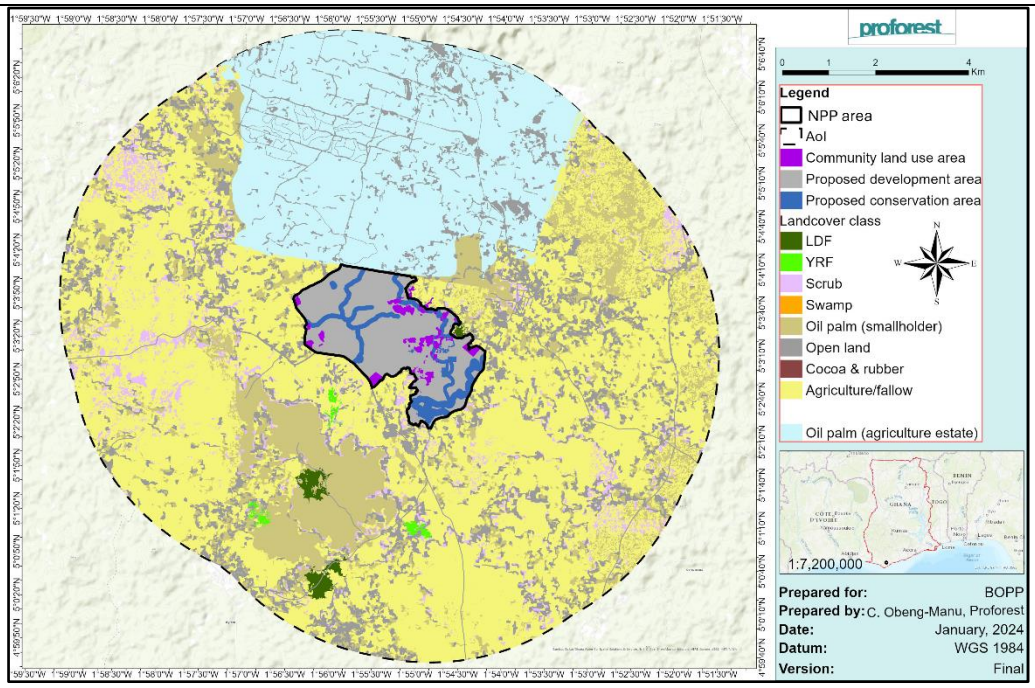


Figure 29: Final HCS map

Data source: Community land, NPP AREA and AoI boundaries from company; Base map from ESRI; HCS and non HCS layers from reclassification of final Land cover; swamp mapped during fieldwork.

The patch analysis carried out was based on the final forest classes and the identified HCVs based on the HCSA Approach Toolkit version 2.0. The rivers were mapped and used as input in the patch analysis to help make improved decisions. However, Butre river path was obtained from Ghana river dataset.

Summary HCVs and forest patches

Table 30 and Figure 30 below shows all identified and mapped HCV areas and HCS forest patches to be set-aside and conserved under the smallholder oil palm plantation development project.

Table 30 Summary of identified HCVs and HCS forest patches and allocated land for food crop farming

Environmental and social values to be conserved	Area (ha) where the value is found (inside MU only)	Management areas (ha) (inside MU only)
HCS forest	20.664	20.664
HCV 3	0.840	3.211
HCV 4	61.772	61.772
HCV 5	2.683	29.131
Local peoples lands (if any additional to HCV 5&6)**	11.25	11.25
Net Total (after subtracting overlaps):	**90.130**	**94.479**

***Land allocated within the NPP AREA to be used by communities for food crop farming*

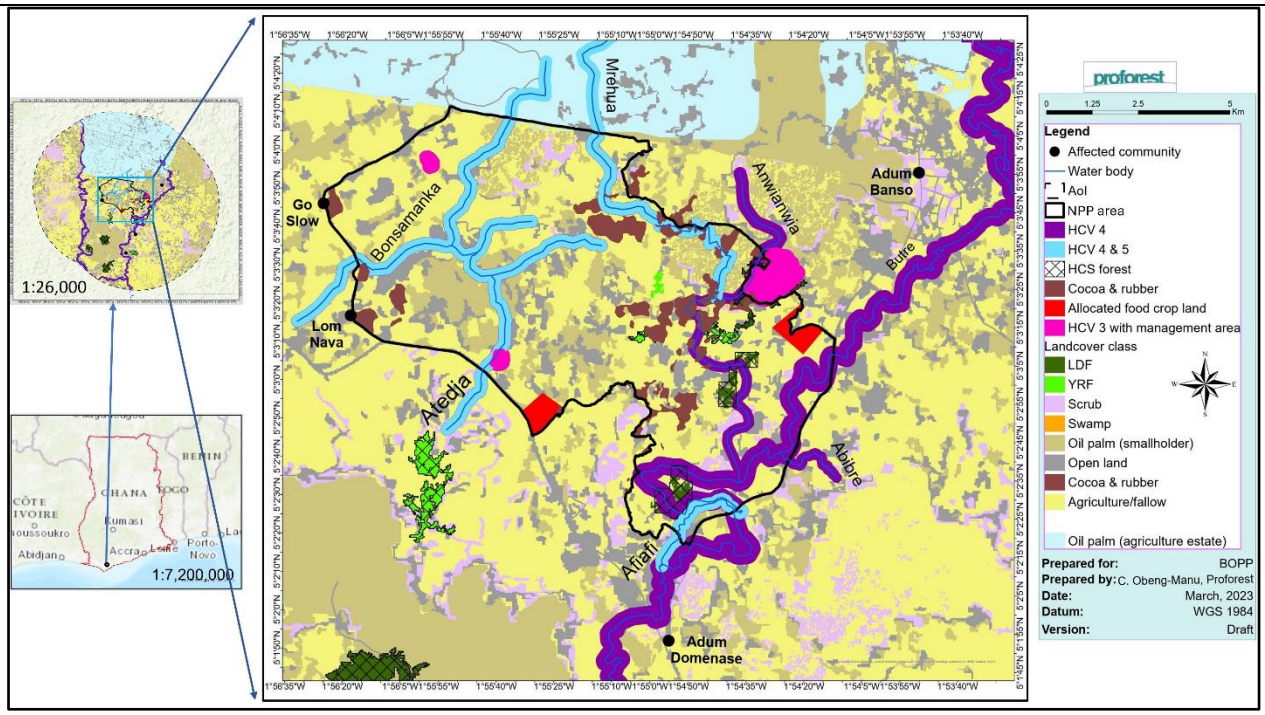


Figure 30: Summary map showing all the areas for conservation

Data source: Community land, NPP AREA and AoI boundaries from company; Base map from ESRI; HCS and non HCS layers from reclassification of final Land cover; HCVs areas mapped during fieldwork. NB: The map is labelled as draft because some streams are yet to be mapped.

Final consultation

A final stakeholder consultation workshop for the integrated HCV-HCSA assessment was held on 5th October 2022 at the Mpohor District Assembly Hall. All the stakeholders engaged for the assessment including government and non-governmental organisations, affected communities, affected farmers, Chiefs and Elders, and the Asubonteng family were invited for the workshop. The assessment team presented the draft findings to the participants using PowerPoint presentation and large printout map of the HCV and HCS areas. This was followed by discussions where participants were given the opportunity to ask questions, make inputs and provide comments on the findings.

Following the final stakeholder consultation, the assessor advised BOPP that the agreed actions on mapping of current food crop farming areas and allocation of part of the NPP AREA for food crop farming should be implemented and the information and evidence provided to the assessor for incorporation into the final report. This exercise was completed in June 2023 and the shapefiles and report of the allocation exercise were presented to the assessor. Also, as agreed during the final stakeholder consultation, a project steering committee comprising of representatives from community leaders, members and farmers was elected and inaugurated in March 2023 to determine project beneficiaries and oversee allocation of plots. The steering committee will also serve as the affected communities' representatives on the project and facilitate communication and implementation of the project with BOPP. Number of participants present were 116. Details of the final consultation meeting are provided below in table 31.

Table 31: Summary details of Final consultation meeting

Name	Title/role	Organisation/social group	Place and date
See attendance sheet in Annex 2	See attendance sheet in Annex 2 of	Traditional authorities, Local Government Authority, Departments of Agriculture and	5th October 2022 at the Mpohor District

of Int. HCV-HCSA report	Int. HCV-HCSA report	Social Welfare, all affected communities (Adum Banso, Dominase, Go Slow and Lom Nava), affected farmers, Asubonteng family, Conservation Foundation and BOPP	Assembly Hall

Key concerns & recommendations

- Some participants asked for clarity on the NPP AREA boundary and if it was limited to the "Asubonteng land" because their lands shared boundary with the "Asubonteng land". BOPP explained using the printed map and physical features like roads to help participants understand the boundaries. The Chief of Adum Banso assured the participants that any activity or land outside the "Asubonteng land" as shown will not be affected by the project.
- Discussions were held on the options proposed to address the issue of land availability for food crop farming. BOPP explained that project beneficiaries will be allowed to intercrop the palm at the immature stage under supervision by BOPP as is done for ASHOPP. Also, part of the NPP AREA, commensurate with their current food crop farms, will be reserved for food crop farming. This was reiterated by the Chief of Adum Banso and was agreed by the participants.
- Others inquired if community members who do not farm within the NPP AREA will benefit from the project. BOPP explained that a committee will be formed to determine project beneficiaries and oversee allocation of plots as was done for ASHOPP. The Chief of Adum Banso indicated that all the affected communities were going to benefit from the project. It was recommended by some community members that the committee should have representation from all the affected communities to ensure fairness.
- Some rubber farmers asked that their rubber farms within the NPP AREA be voluntarily converted to oil palm under the project. BOPP explained that this will be considered on a case-by-case basis.
- BOPP indicated that any accidental damage to crops during land preparation will be fairly compensated for.
- Representatives from the environmental NGO advised the participants to be each other's keeper and support in the management and conservation of the identified HCV and HCS areas. They pleaded that agrochemical use should be minimized especially around buffer areas and recommended enrichment planting to enhance the buffer areas and HCS forest patches. BOPP, in supporting the call of the environmental NGO, explained how they had carried out tree planting activities within their concession and in forest reserves within the landscape.
- The representative from Asubonteng family indicated that the family has granted their full consent and support for the proposed project.
- BOPP announced that Partnerships for Forests (P4F) has committed to supporting the project and hence the additional livelihoods component may commence even before the oil palm development starts.

Assessment team response

The assessment team advised BOPP, the affected communities, and the traditional leaders to comply with the recommendations provided for the HCV and HCS. These include measures to be taken by BOPP and those to be taken by the communities, and they must all play their role in the collaborative management of the resources and ensure the success of the project.

Plate 8: Final consultation meeting

Section 5: FPIC

Guidance Note: This section is where the information on stakeholder mapping is put and all required information that the building blocks for FPIC have been conducted. References and pictorial evidence are recommended. What are the methodology(ies), people involved in the process, date of assessment and findings?

Methodology

Social methods including document reviews, stakeholder consultations, focus group discussions and participatory mapping were employed in verifying FPIC.

Results

Pre-assessment phase

The review of a land tenure assessment report of the proposed project area and other relevant documents submitted by BOPP confirmed that the NPP AREA is Adum Banso stool land which forms part of a 1,213.9 ha land leased to Asubonteng Brothers Limited (ABL) under two lease documents in 1976 and 1981 for 50 years each. Although the two leases have not expired, both the Asubonteng family and the Chief of Adum Banso had resolved to seek new investors for the land under joint negotiation and benefits agreement. This followed a court action on the 1,213.9 ha land leased to ABL and an out-of-court settlement in November 2012 in which both parties agreed that the land reverts to the Chief of Adum Banso and the Chief can lease it out to a new tenant under joint assessment, negotiation, and mutual agreement on a proportionate share with Asubonteng family. The land tenure assessment report also showed participatory mapping with some affected farmers. The land tenure report is provided in Annex 9 of the Integrated HCV-HCSA assessment report. Also, copies of the indenture and the out-of-court settlement between the Chief of Adum Banso and the Asubonteng family are provided in Annex 7 of the same report.

Following the success of a smallholder oil palm out-grower project (Adum Smallholder Oil Palm Project (ASHOPP) implemented by BOPP for the Treboum, Dominase and Mpeasem communities in the Mpohor District of the Western Region of Ghana, the Adum Banso community expressed interest in developing the NPP AREA for such purpose. Subsequently, on behalf of the community, the Chief of Adum Banso wrote a letter to BOPP requesting the latter to develop the land for a smallholder oil palm out-grower project for the Adum Banso Royal Stool and community

following the ASHOPP model. BOPP indicated in writing to the Adum Banso Stool its acceptance of the request and subsequently held meetings with all relevant stakeholders such as the Chiefs, elders and members of the Adum Banso community as well as the affected farmers including those from Dominase and Abroso. Minutes of such meetings is provided in Annex 2 of the assessment report and the letter of intent from the Chief of Adum Banso and the response of BOPP is shown in Figures 31 to 33 below (can also be accessed in Annex 7 of the assessment report)

In addition to the letter of intent from the Chief of Adum Banso and the response of BOPP, pictures of stakeholder meetings, participatory mapping with affected farmers are shown below:

Plate 9: Meeting between BOPP and the Adum Banso Community including Chiefs, Elders, representatives of the local district assembly, women representatives and heads of religious organizations.

Plate 10: Meeting between BOPP and farmers at Adum Banso

Plate 11: BOPP staff and farmer conducting participatory mapping

NANA KWANDOH BREMPONG III

ADUM BANSO HENE & BENKUMHNENE OF WASSA FIASE TRADITIONAL AREA

Tel: 0208307027
Mobile: 0276087267
My Ref: .....
Your Ref: .....

P.O.BOX AX 255
TAKORADI

29-01-2020

The Group Manager
BOPP
Adum Banso Estate

cc MCM
29/01/2020

Dear Sir,

RELEASING A PORTION OF THE ASUBONTENG CONCESSION TO BE USED FOR A SMALL HOLDER SCHEME FOR THE ROYAL STOOL AND THE COMMUNITY.

The Chief and Elders of the Adum Banso community have agreed that part of the above named concession be used for a small holder scheme for the Royal Stool and the community.

If this project materialize, a certain percentage amount would be deducted from the proceeds of the would be beneficiaries into a community development account. This amount would be used for developmental project.

The Stool would also be on her feet financially to support the community in some developmental project.

I hope if this our request is granted the Chief and His Elders with the opinion Leaders in the community would meet the management of your company to discuss on the modalities for the implementation of the project.

Looking forward to hear from you.

BENSO OIL PALM PLANTATION LTD. RECEIVED 29 JAN 2020 GROUP MANAGER

Yours faithfully

NANA KWANDO BEMPONG III

ATTACHED ARE THE SIGNATORIES:

ABU... ...HENE

Figure 31: Letter of intent from Chief of Adum Banso to BOPP

NANA KWANDOH BREMPONG III

ADUM BANSO HENE & BENKUMHNENE OF WASSA FIASE TRADITIONAL AREA

Tel: 0208307027
Mobile: 0276087267
My Ref: ....
Your Ref: ....

P.O.BOX AX 255
TAKORADI

................20........

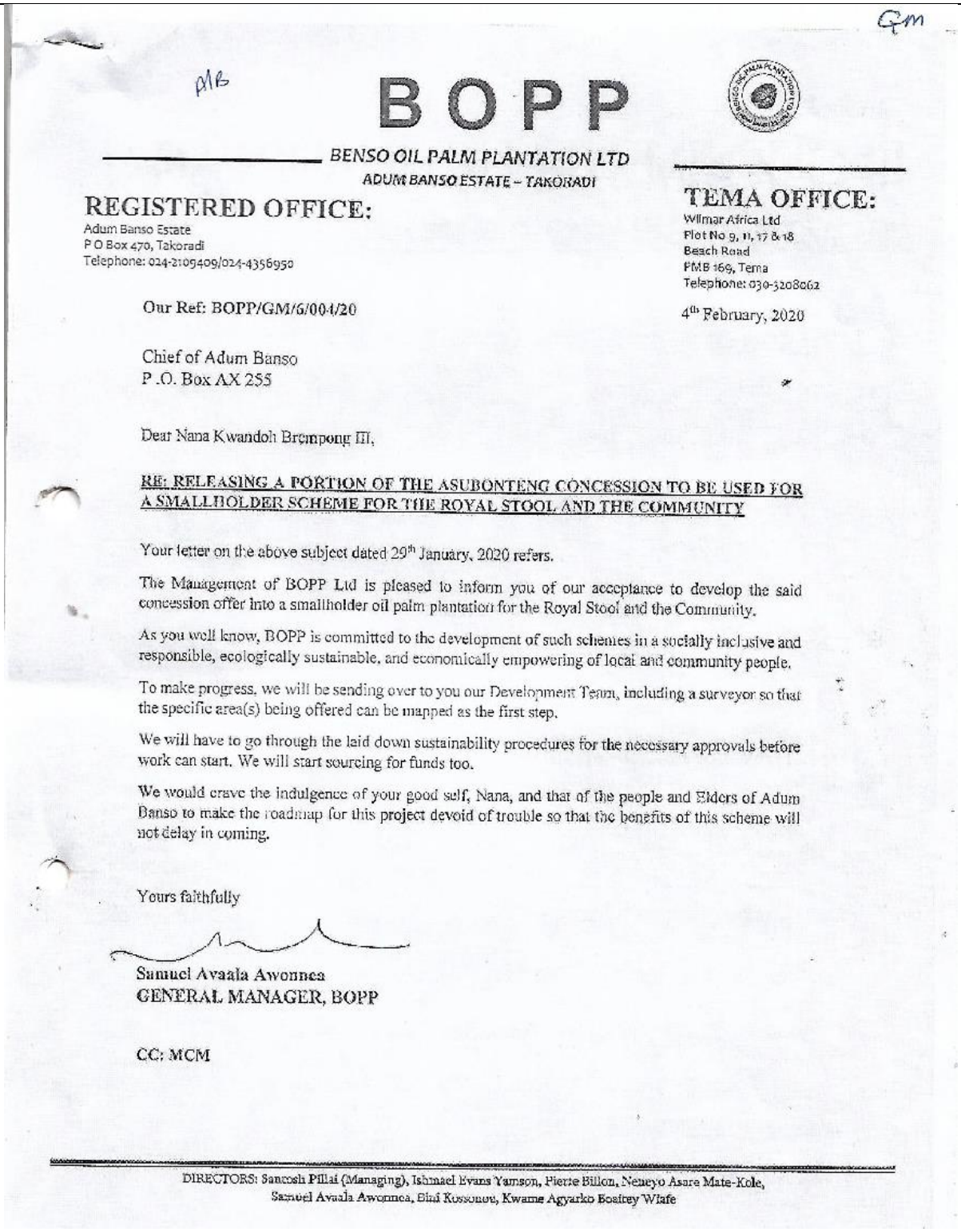
Name	Designation	Signature
Kobina Atta	Abusuapanyin	
Nana Yaa Manu I	Queen Mother	
Nana Kweku Agyabeng II	Tufuhene	
Nana Boakra II	Gyaasehene	
Nana Manso II	Krontihene	
Nana Afi Barima Duku II	Adontenhene	
Nana Asare Kofi III	Kyidomhene	
Opiah Mensah	Safohene	

OPINION LEADERS

Gilbert Quaysen	Family member	
Vr Safohene	Opirah	
Abdul S. Issah	SNR Family Member	
James Yaw Agyei	Oyoko Abusuapanyin	
Isaac Minyimsah	Ex Assembly member	

BENSO OIL PALM PLANTATION LTD. RECEIVED 29 JAN 20 GROUP MANAGER

Figure 32: Signatories to the letter of Intent from Chief of Adum Banso to BOPP and response by BOPP



BOPP

BENSO OIL PALM PLANTATION LTD
ADUM BANSO ESTATE – TAKORADI

REGISTERED OFFICE:
Adum Banso Estate
P O Box 470, Takoradi
Telephone: 024-2109409/024-4356950

TEMA OFFICE:
Wilmar Africa Ltd
Plot No 9, 11, 17 & 18
Beach Road
PMB 169, Tema
Telephone: 030-3208062

Our Ref: BOPP/GM/6/004/20

4th February, 2020

Chief of Adum Banso
P .O. Box AX 255

Dear Nana Kwandoh Brempong III,

RE: RELEASING A PORTION OF THE ASUBONTENG CONCESSION TO BE USED FOR A SMALLHOLDER SCHEME FOR THE ROYAL STOOL AND THE COMMUNITY

Your letter on the above subject dated 29th January, 2020 refers.

The Management of BOPP Ltd is pleased to inform you of our acceptance to develop the said concession offer into a smallholder oil palm plantation for the Royal Stool and the Community.

As you well know, BOPP is committed to the development of such schemes in a socially inclusive and responsible, ecologically sustainable, and economically empowering of local and community people.

To make progress, we will be sending over to you our Development Team, including a surveyor so that the specific area(s) being offered can be mapped as the first step.

We will have to go through the laid down sustainability procedures for the necessary approvals before work can start. We will start sourcing for funds too.

We would crave the indulgence of your good self, Nana, and that of the people and Elders of Adum Banso to make the roadmap for this project devoid of trouble so that the benefits of this scheme will not delay in coming.

Yours faithfully

Samuel Avaala Awonnea
GENERAL MANAGER, BOPP

CC: MCM

DIRECTORS: Santosh Pillai (Managing), Ishmael Evans Yamson, Pierre Billon, Nenoyo Asare Mate-Kole, Samuel Avaala Awonnea, Bini Kossonou, Kwame Agyarko Boafrey Wiafe

Figure 33: Response by BOPP to Letter of Intent from Chief of Adum Banso

Scoping

During this phase, the assessment team confirmed through consultations whether BOPP had initiated FPIC with relevant stakeholders including affected communities, farmers and the Asubonteng family. The consultations revealed that all the affected parties and the Asubonteng family were aware of the proposed smallholder oil palm plantation project, including its benefits and negative impacts and had given their consent. However, concerns were raised on impacts on land availability for food crop farming which had to be addressed. Details of consultations during the scoping phase can be found in Table 16.

Some pictures of the scoping study activities are as follows:

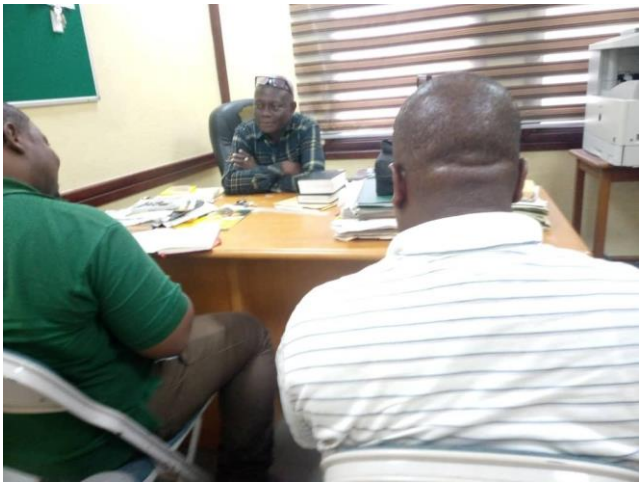


Plate 12: Meeting with a member of the Asubonteng family

Plate 13: Engagement with farmers and members of the Dominase and Go Slow communities

Plate 14: Participatory mapping with Chief of Adum Banso

Full Assessment

As part of the full assessment, the team conducted a Social Impact Assessment (SIA) of the proposed project. Consultations made in all affected communities revealed that the community members were aware of the proposed smallholder oil palm plantation project by BOPP and the leadership of Adum Banso and gave their consent to the project. They were informed of allocation of plots to affected farmers and community members, benefits from the additional livelihood options and the effects of the project on their food crop farming areas. The communities were also aware of the compensation process, including crops that will be compensated for and those that they will be allowed to harvest, as well as areas such as cocoa and rubber farms which will not be included in the project. Crop enumeration had been completed at the time of assessment, but compensation was yet to be paid.

Consultations also revealed that a Memorandum of Understanding (MoU) between the Asubonteng family and the Chief of Adum Banso on the use of the NPP AREA and a benefit sharing agreement had been drafted and yet to be finalized. Details of the consultations done as part of the SIA is found in table 6. Picture of a consultation in Lomnava community is provided below:

Plate 15: Community consultation at Lomnava

Final consultation

All the stakeholders engaged for the assessment including government and non-governmental organisations, affected communities, affected farmers, Chiefs and Elders, and the Asubonteng family were present at the final stakeholder consultation meeting. The meeting occurred on 5th October 2022. Key stakeholders granted their full consent and support for the proposed project. Key next steps that were agreed upon are:

- mapping of current food crop farming areas and allocation of part of the NPP AREA for food crop farming and
- formation of a project steering committee comprising of representatives from community leaders, members and farmers to determine project beneficiaries and oversee allocation of plots. The steering committee will also serve as the affected communities' representatives on the project and facilitate communication and implementation of the project with BOPP.

At the time of final consultation, the MoU between the Adum Banso Stool and the Asubonteng family had been agreed and signed. This is attached in Annex 7 of the HCV-HCSA assessment report. Further details of the final consultation can be found in table 31. A picture of the final consultation meeting can be seen in Plate 8.

Post-assessment activities

The actions agreed during the final consultation have been implemented as follows:

- After election of members, the project steering committee was inaugurated in March 2023
- A delegation comprising of BOPP officials and representatives from the affected communities have visited the NPP AREA to identify and map a total area of 11.25 ha to be reserved within the NPP AREA for food crop farming. This exercise was completed in June 2023.

Copies of the reports on the food crop land allocation exercise and election and inauguration of the project steering committee presented by BOPP to the assessor are provided in Annex 2 of the HCV-HCSA assessment report.

Section 6: Soil and topography

RSPO Note: This section should indicate the type of soil identified and the area of it. Sampling points should be indicated. Topographic maps will be included here as well. Any potential areas identified as steep terrain according to the P&C 2018 definition should be mentioned accordingly. What are the methodology(ies), people involved in the process, date of assessment and findings? Note: Should an assessment carried out by internal staff, just fill the name of the staff and his/her designation.

Date of Assessment: August 2023

Name of Assessors: F.M. Tetteh, A. Owusu Ansah, A. Appiah, J.K. Gyamfi, G. Nsiah-Boateng, E. Danquah and E. Pankah

Assessor Designation and Company: Consultants/Council for Scientific and Industrial Research – Soil Research Institute (CSIR-SRI)

Methodology

Soil Sampling

On a mapping scale of 1:100,000, soil observations were made at a density of 1/20ha, and approximately 40 locations within the site were studied by the assessment team for physical properties including colour, texture, consistency, depth, coarse fragments and gleyic properties.

A conventional grid sampling method was then employed to sample soils from these locations. Using ArcGIS 10.7.1 and R v. 4.3.2, a fishnet was created, dividing the study area into ten (10) squares. The centroid of these squares was then appended geographic coordinates, and subsequently converted to spatial point features, from which a total of ten (10) sampling locations were generated. These points were subsequently uploaded onto a Garmin Etrex GPS Device, which enabled sampling from the locations within the site.

A soil auger and/or earth chisel were used to take out samples from a Y-shaped cluster generated on each particular sampling unit, with a radius of 2.5m. Samples were taken at two depths (0 – 20 cm and 20 – 50 cm) respectively. Each of these samples from the cluster were mixed thoroughly and bagged into Ziplocs, correctly labelled and sent to the CSIR-Soil Analytical Laboratory for testing. Also, bulk density samples at the surface (0 – 20 cm) were collected with a core sampler with a volume of 100cm3. In all, a total of thirty samples constituting surface and subsurface as well as bulk density samples were collected from the field for analysis. Soils were also observed and sampled along topo sequences and routes through the site.

Below are some pictures of the soil assessment and sampling activities.

Plate 16: Soil assessment and sampling activities

Soil Processing and Laboratory analyses

Soil samples taken to the laboratory were air dried (25º C) for 15 fifteen (15) days. It was ground and sieved (2 mm) before laboratory analysis for soil pH, organic carbon (%OC), total nitrogen (%TN), cation exchange capacity (CEC), base saturation, electrical conductivity, available (P) phosphorus and potassium (K). Soil particle size analysis (sand, silt and clay) were determined with the standard Bouyoucos hydrometer method after removing organic matter with H2O2 treatment by dispersion with 5% Nahexametaphosphate. Soil reaction (pH) was determined in a distilled water at a soil: 0.01M CaCl2 ratio of 1:5 with glass electrode and pH meter (Thomas 1996).

Total nitrogen (N) was determined by the Kjeldahl method as described in Soil Laboratory Staff (1984), soil bulk density (BD gcm-3) was determined with the core method (Blake & Hartage, 1986), available phosphorus (P) determined colorimetrically after extraction with Olson solution (Bray, 1945), and cation exchange capacity (CEC) was determined by ion extraction with ammonium acetate solution and subsequent determination of the extracted cations (Thomas, 1982). Soil organic carbon (SOC) was determined with Walkley and Black's wet combustion method as described by Jackson (1973). Base saturation (% BS) was determined as the ratio of basic cations in CEC. Micronutrients (Iron, copper, zinc and manganese) were determined by DTPA method using Atomic Absorption Spectrophotometer (AAS).

The micronutrient values were compared with the widely used normal and critical limits as postulated by Kebata-Pendias and Pendias (1984).

Suitability evaluation and classification

The assessment classified the soil units generally into two orders – SUITABLE (S) and NON - SUITABLE (N). The orders have classes within them as follows: Highly Suitable (S1), Moderately Suitable (S2), Marginally Suitable (S3), Currently Not Suitable (N1) and Permanently Not Suitable (N2) (FAO, 1976, 1983). Highly suitable (S1) soils have no limitations. Limitations increase in severity from S2 to N2. The final assessment of the soil unit is made by the limitations it possesses relative to the kind of use intended. They are indicated by lower case letters which reflect the kind of limitation(s) and therefore the main improvement measures required to upgrade the productivity of the land. The observed limitations of the land units affecting the production of the selected crops are topography or slope, drainage, texture and coarse fragments (ironstone concretions and gravel) which are defined by lower case letters as follows:

w: Wetness (drainage class and flooding hazard indicative of oxygen availability)

t: topography/slope

c: coarse fragment (gravel and concretions)

s: soil conditions – texture, structure

So a unit evaluated as S3w means that the unit is marginally suitable for the intended use due to limitation posed by poor drainage.

Findings

Soil Physical Suitability Status of the Site

- Highly Suitable Soils (S1)

This constitutes the *Kokofu series* on the Birrimian Phyllite geology. These soils are moderately well-drained, loams that are fairly deep (>1m). The soil unit exists on gentle, nearly level slopes (1-2%) within the south-western portions of the study area, en route to Adum Banso. Owing to their gravel-free nature, these soils are easily worked with mechanically and retain sufficient moisture within their profiles for uptake by the oil palm. There also exists little to no susceptibility to sheet and rill erosion, as this poses limitations on commercial production. This series which is most suitable for oil palm cultivation represents 33.81 ha of the study area.

- Moderately Suitable Soils (S2t, S2tc)

Moderately suitable soil units for oil palm production within the study area consist of the *Omappe* (S2tc), *Agona* (S2t), *Akroso* (S2t) and *Nkwanta* (S2t). Both *Omappe* and *Akroso* represent the most extensive soils of the area, covering over 82% of the total acreage. The former is encountered on the moderately steep rising hills of the middle portions of the site towards Kyenkyenase and Maame Bolga, whilst the latter, being middle sloped extends from Adum Banso towards Wassa Dominase. *Omappe* soils are fairly deep, however, their gravelly nature and position on the toposequence inhibits optimum oil palm production. Ironstone concretions and gravels make mechanical cultivation difficult. Slope-potential erosion is a major limiting factor of these soils, which inadvertently affects fertilizer application as run-off may leach the essential nutrients downslope. Terracing is advised along contours regarding the steep nature of the relief of the area on which these soils are encountered.

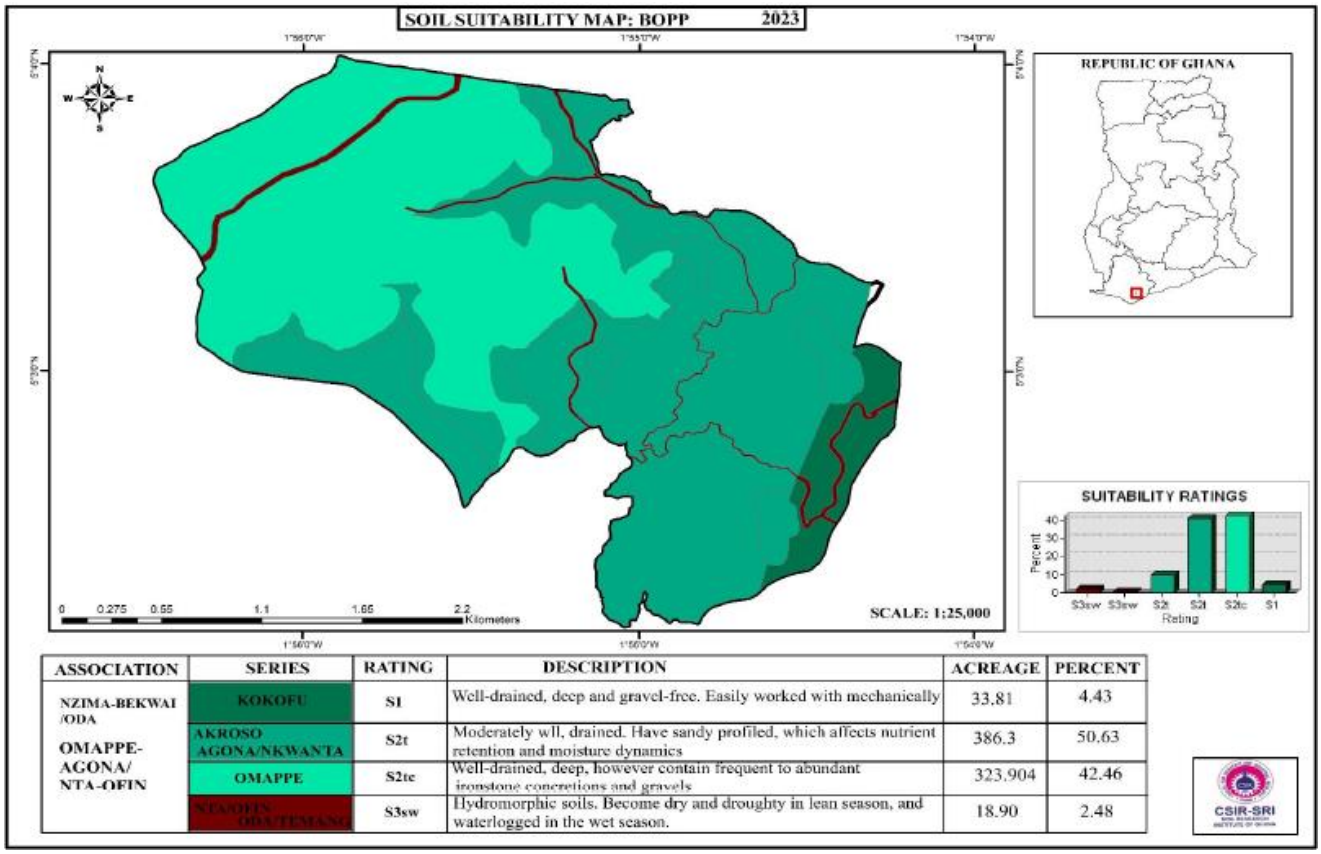
Akroso soils have sandy profiles, although of sufficient depth and moisture retention capacity, and are therefore rated moderately suitable for production. Mediation with organic matter would therefore be recommended, as would

improve fertilizer assimilation and ultimately, yield potential. Agona soils are gravelly, however not as frequent as Omappe, and both exist in relation to each other on the same topography, which is moderately steep.

- Marginally Suitable Soils (S3sw)

These also constitutes *Nta/Ofin* soil units on the Granite and *Kakum/Oda/Temang* units on the Phyllite. These soils are shallow, hydromorphic, and imperfectly to poorly drained, exhibiting gleyic properties as a result of poor air and moisture dynamics. These occur along streams and streamlets within the site and narrow valley bottoms. They are sandy, which corresponds to leaching of essential nutrients. Usually, water table is within 50cm of their profiles, and is considered marginally suitable owing to oil palm's intolerability to excessive waterlogging. Cultivation on these soils would also require actions to improve drainage, organic matter and soil tilth.

The distribution of the various soil classes and corresponding hectarage is shown In Figure 34 below:



ASSOCIATION	SERIES	RATING	DESCRIPTION	ACREAGE	PERCENT
NZIMA-BEKWAI /ODA	KOKOFU	S1	Well-drained, deep and gravel-free. Easily worked with mechanically	33.81	4.43
OMAPPE-AGONA/ NTA-OFIN	AKROSO AGONA/NKWANTA	S2t	Moderately wll, drained. Have sandy profiled, which affects nutrient retention and moisture dynamics	386.3	50.63
	OMAPPE	S2tc	Well-drained, deep, however contain frequent to abundant ironstone concretions and gravels	323.904	42.46
	NTA/OFIN ODA/TEMANG	S3sw	Hydromorphic soils. Become dry and droughty in lean season, and waterlogged in the wet season.	18.90	2.48

Figure 34: Soil Suitability for Adum Banso Smallholder Oil Palm Plantation Project

Fertility Status

- Soil pH

Oil palm is tolerant of a wide range of soil pH but prefers a soil with a pH between 5.0 and 7.5. The soil pH levels of all samples collected from the Adum Banso Smallholder Oil Palm Plantation are shown in Figure 35 below. Surface soil pH values ranged from 4.9 (described as very strongly acidic) in Area A, to 5.38 (strongly acidic) with a mean pH value of 5.14. Most of the pH values could be described as strongly acidic. Sub-soil pH values were slightly higher than the topsoil values in some of the areas and ranged from 4.72 to 5.65 at Area B. This is most probably due to movement of bases from top-soil into the sub-soils. The low exchangeable calcium content and low base status of the soil (low exchangeable base content) with continuous leaching of bases due to the sandy nature of the soil might be the reason

for the high acidity. Application rate of 1.0 ton/ha of lime is recommended to improve the pH by at least one unit. The use of rock phosphate is also recommended to improve both soil pH and recapitalizing soil phosphorus.

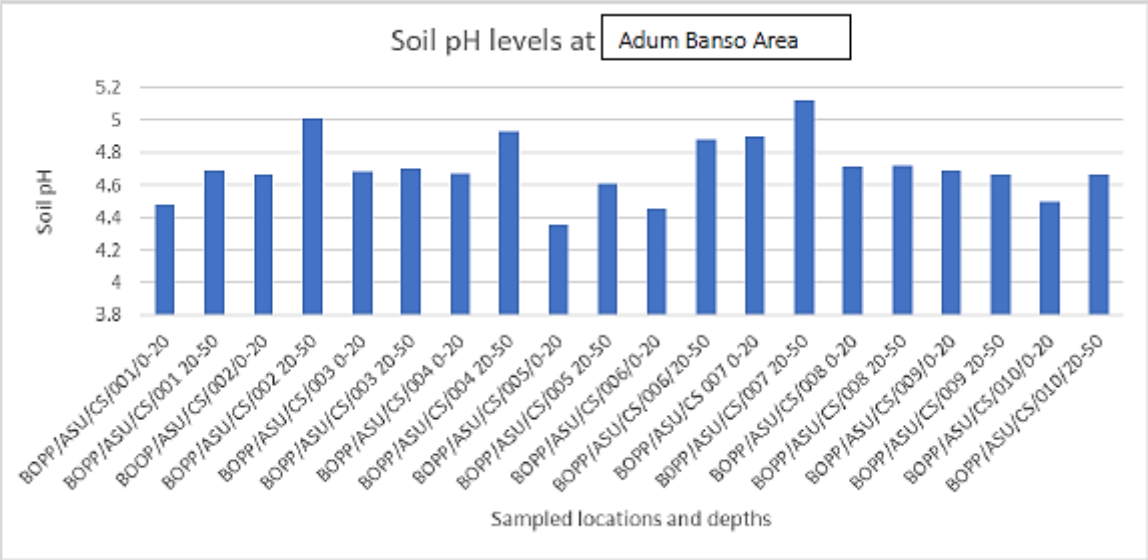


Figure 35: Soil pH levels of the various sampled points within the study area.

- Soil available Phosphorus

Available phosphorus levels in surface soil horizons were found to be low with most of the sample having very low levels (Figure 36). Surface soil available phosphorus levels ranged from 1.89 mg/kg (very low) to 6.18 mg/kg (low). Generally available phosphorus levels declined with soil depth. Available phosphorus levels less than 10 mg/kg are described as low, between 10 and 20 mg/kg as moderate/medium and above 20 mg/kg as high. For such soils which are low in available P, application of rock phosphate, super phosphates or compound fertilizers containing phosphates are recommended.

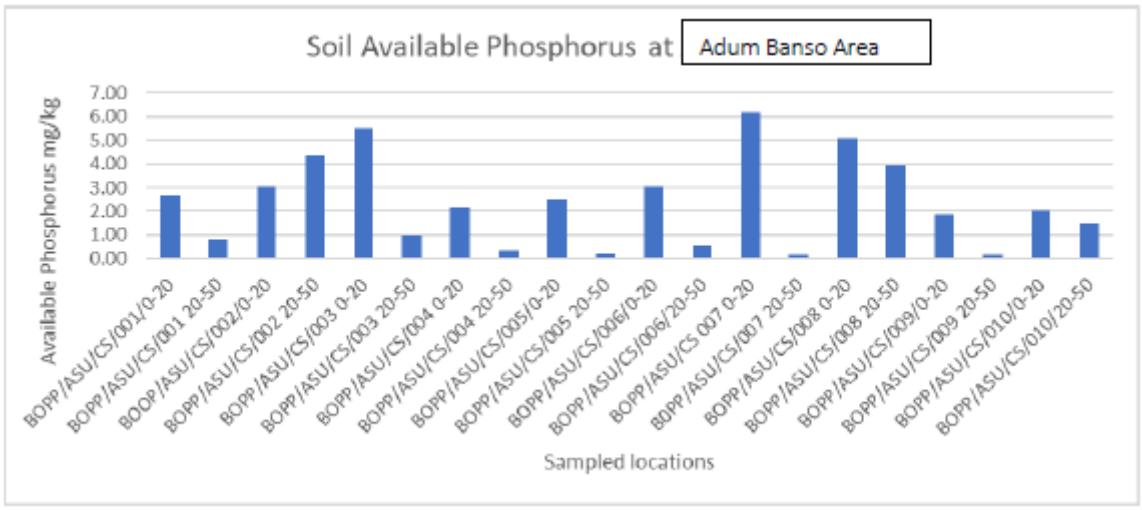


Figure 36: Soil available Phosphorus levels at the Adum Banso Smallholder Oil Palm Plantation project area

- Soil Organic Matter (SOM)

Considering the broad impact SOM has on soil physico-chemical properties and crop productivity, improved organic matter management may be the most significant thing to do to improve soil productivity and crop yields. Generally, samples with organic matter content less than 1.5% are described as low and between 1.5 to 3.0% as moderate. Figure 37 shows the levels of SOM across the sampled locations at the study area. Top-soil organic matter levels were generally from moderate (i.e. between 1.5% and 3.0%) to high (greater than 3.0%). Soil organic matter levels declined with soil depth.

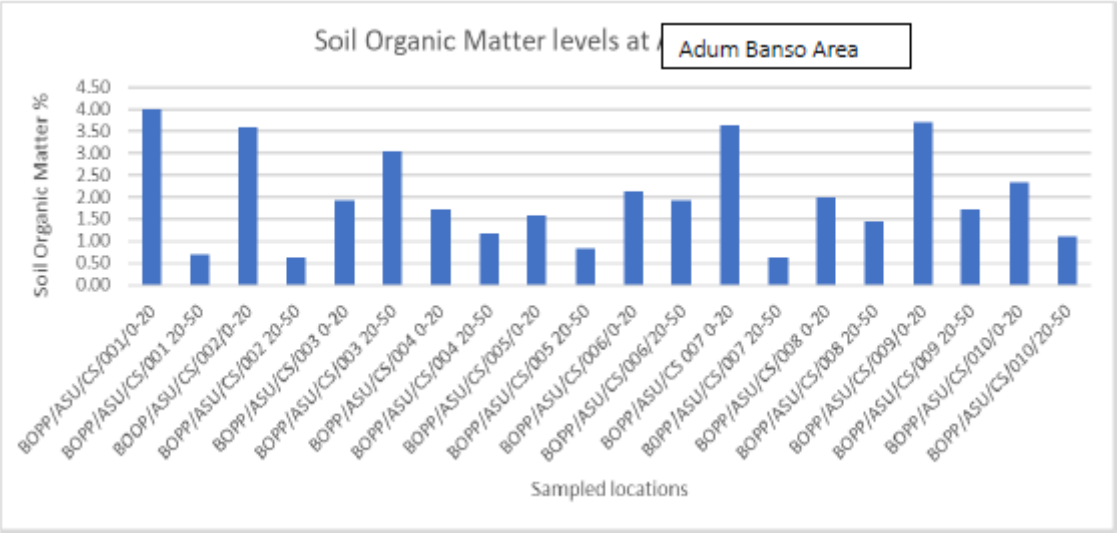


Figure 37: Soil Organic Matter levels at sampled locations of the Study Area

- Soil Total Nitrogen

Surface soil total nitrogen values ranged from very low (i.e., less than 0.10%) to moderate (less than 0.20%) with a greater proportion of the samples with moderate levels of total nitrogen i.e., between 0.10% and 0.20% (Figure 38). Total nitrogen levels generally declined with soil depth. Growing of cover crops e.g., *Pueraria sp* can lead to increased soil total nitrogen accumulation. Application of nitrogen fertilizers especially urea and use of organic fertilizers- cow dung, poultry manure or compost (depending on their availability) could improve and sustain soil total nitrogen levels.

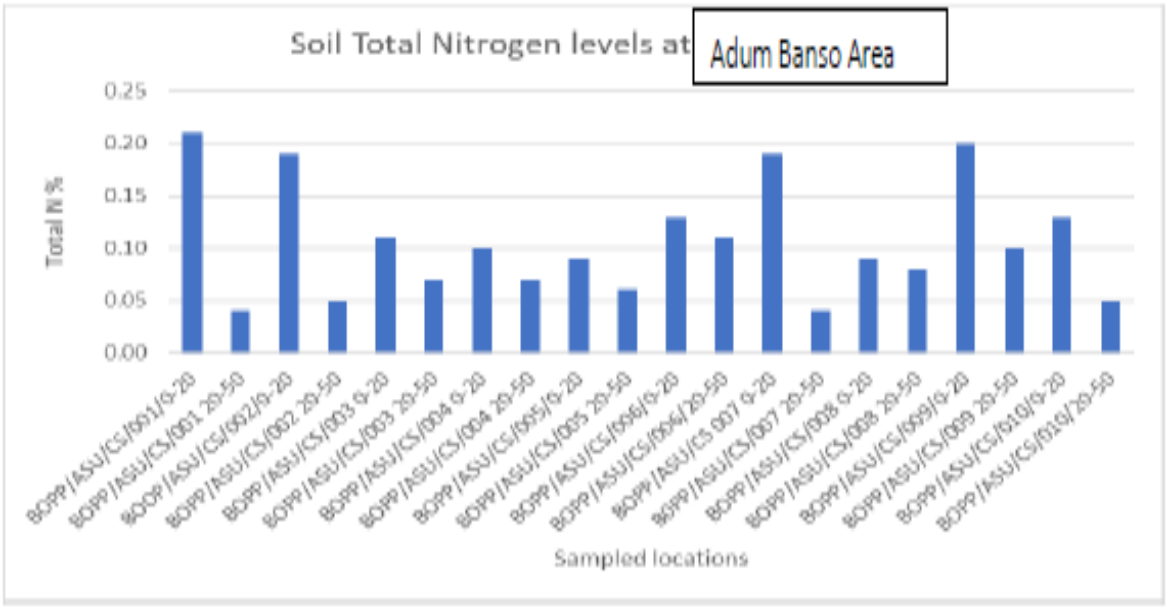


Figure 38: Soil Total Nitrogen levels at the Adum Banso Smallholder Oil Palm Plantation project area.

- Soil Exchangeable Magnesium

Most of the soils had low magnesium levels (less than 1.0 me/100g) in the top-soils (Figure 39). Application of dolomite could improve soil magnesium content.

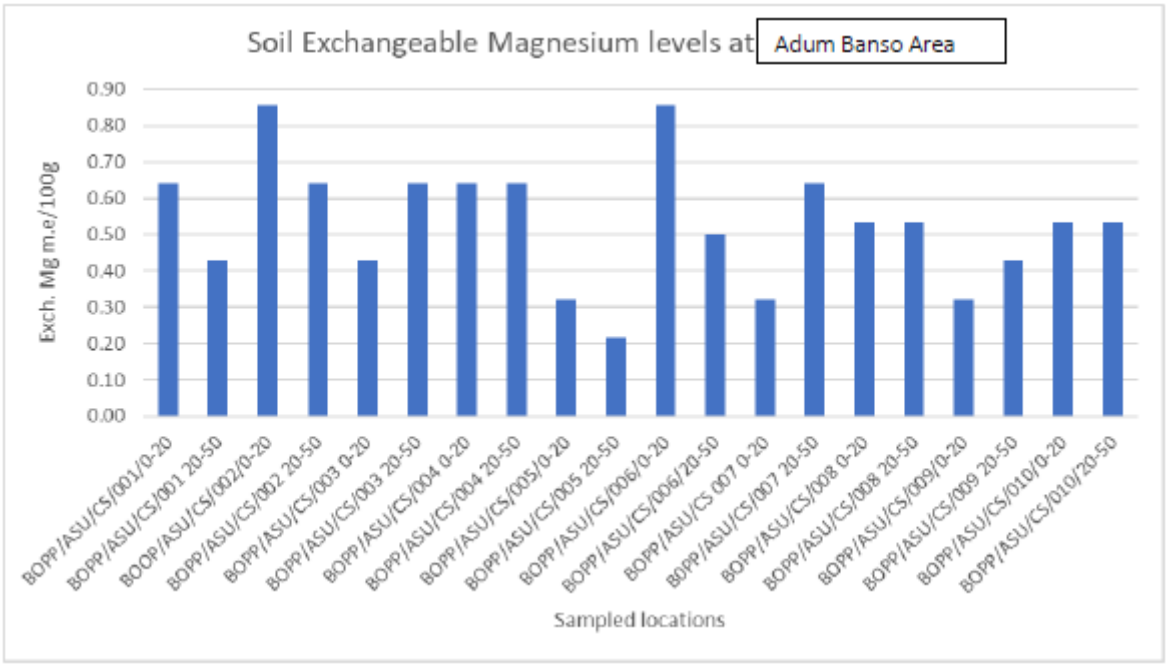


Figure 39: Soil Exchangeable Magnesium levels of Adum Banso Smallholder Oil Palm Plantation project area

- Soil Exchangeable Calcium

Exchangeable calcium levels were low and ranged from 0.85 to 2.57 m.e./100g across the NPP AREA (Figure 40) samples). Application of rock phosphate or triple super phosphate or soluble calcium sources like dolomite and calciprill will improve soil calcium content.

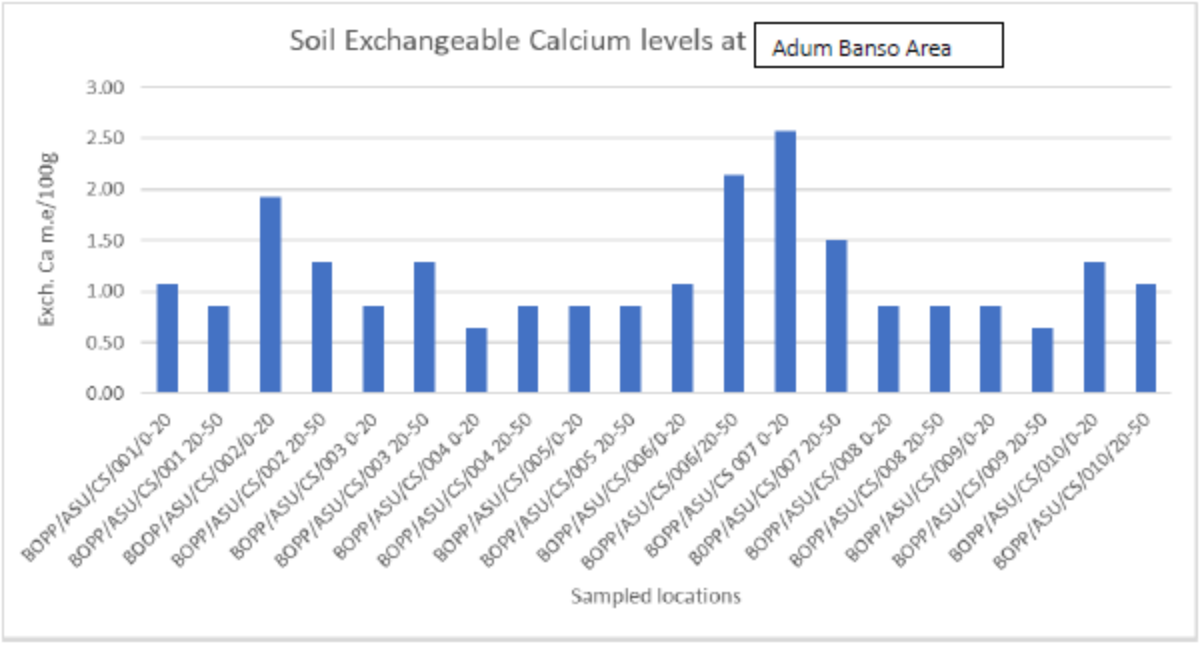


Figure 40: Soil Exchangeable Calcium levels of Adum Banso Smallholder Oil Palm Plantation project area

- Soil Exchangeable Potassium

Most of the soil samples collected from the Adum Banso Area had exchangeable K levels below the critical level of 0.20 cmol/kg soil. Samples had low exchangeable potassium levels (Figure 41). Exchangeable potassium levels also declined with soil depth at all sites. Application of potassium fertilizer is required to improve yield and quality of crops.

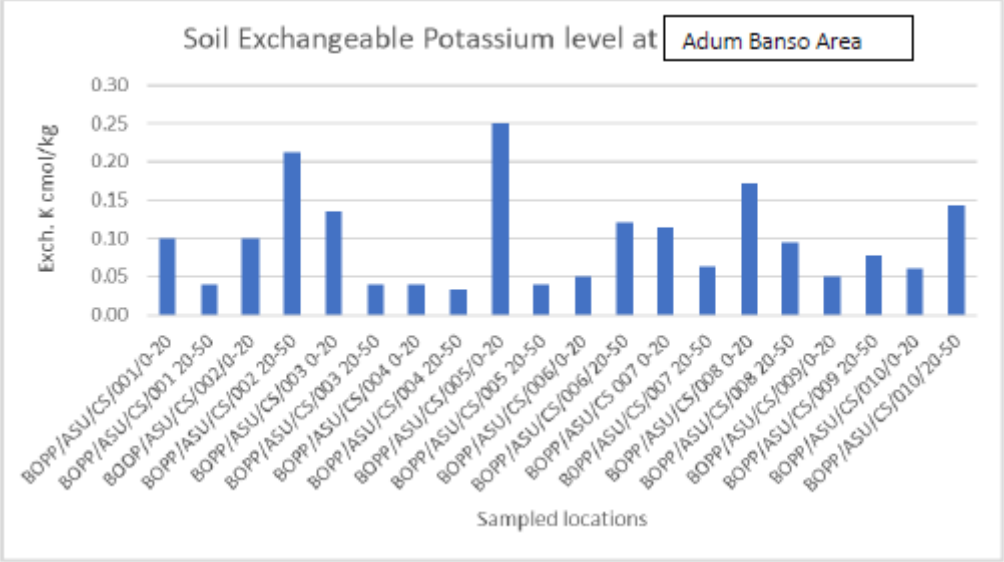


Figure 41: Soil Exchangeable Potassium levels at Adum Banso Smallholder Oil palm Plantation project area

- Soil Effective Cation Exchange Capacity (ECEC)

Figure 42 below shows the ECEC values of soils within the study area. ECEC values were low across all locations i.e, <10.00 cmolc/kg. The proposed project area is characterized by soil erosion, kaolinitic clay mineral, gravelly and concretionary soils and moderate soil organic matter content. All these contribute to low ECEC of the soils. ECEC values of the topsoil samples ranged from as low as 2.3 to 4.0 cmolc/kg soil which are less than the critical value of 10.0 cmolc/kg soil. The soils have high content of iron concretions and therefore will have low ECEC. Management practices that can improve ECEC (cover cropping, application of organic manure, compost, and soil conservation practices) are recommended.

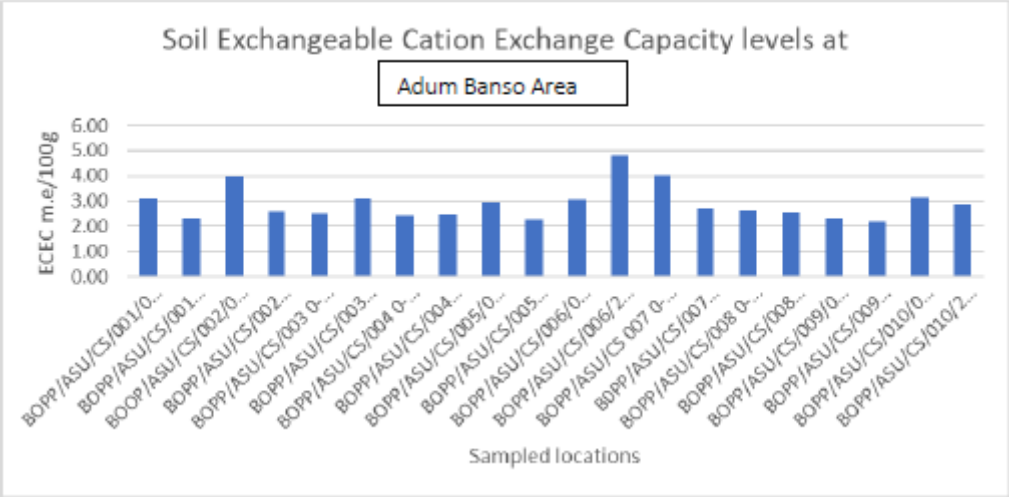


Figure 42: Soil Effective Cation Exchange Capacity levels of locations at Study Area

- Gravel content

Most the areas have soils which are gravelly and concretionary, developed over phyllite and biotite granite containing quartz gravels, stones and ironstone concretions. Gravel content of the soils ranged from 20% to 60% with an average of 40%. Gravelly soils are often droughty due to their low moisture holding capacities. The high amount ironstone concretions will also promote adsorption of phosphorus on to the surfaces of the concretions. The soils are often low in fertility because of their poor nutrient holding ability. Intermittent irrigation and split application of fertilizer should be practiced to ensure improved and sustained yields of oil palm.

- Bulk density

Average soil bulk density for a loamy soil is 1.33 g/cm3. Figure 43 shows that some of the soils at some sites had soil bulk density values above the critical value of 1.33 g/cm. Bulk density values increased with soil depth. This means there is subsoil compaction at most of the sites. Water infiltration, moisture holding capacity, root penetration, as well as nutrient movement in the soil will be reduced. The use of inter-row rippers or subsoilers could be used to break up the compaction.

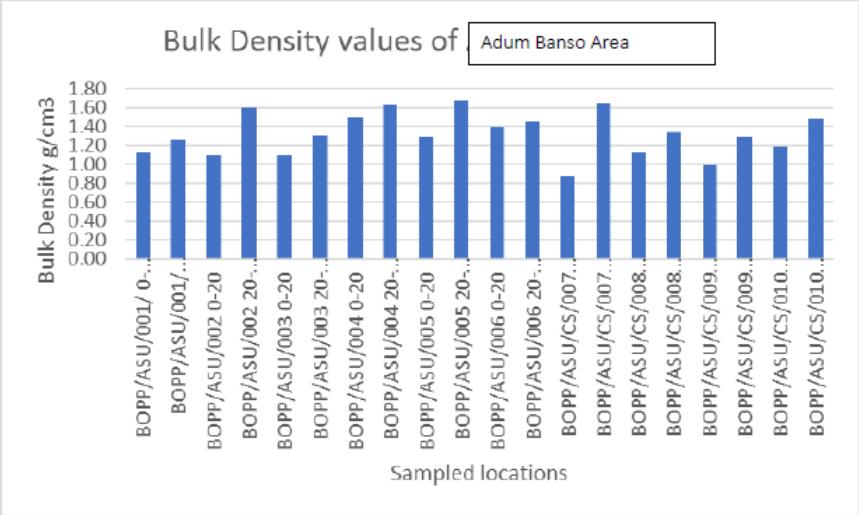


Figure 43: Bulk density levels of soil within the Adum Banso Smallholder Oil Palm Plantation project area.

Topography

The topography of the area is generally undulating with narrow valleys interspersing straight and convex hill slopes in the northern to middle portions, around Maame Bolga and Kyenkyenase Village en route to BOPP Main Plantations. The valleys widen to about 100m on the south-eastern portions from Adum Banso township, and within them, streams and streamlets alongside drainage grooves exist, which sometimes may become dry during the minor season. The hills rise to a height of 110 metres above sea level, assuming a moderately steep topography (15-20%), which allows for upland mechanical cultivation with not so much difficulty. The soil catenae exist primarily due to the topographic influences on weathering, deposition, erosion and moisture content within the geological formations. Streams visibly assume a dendritic pattern, with a southward direction, usually through the narrow and wide valley bottoms, usually affecting moisture retention and hydraulic conductivity of the lower slope soils of the area.

Figure 44 below depicts the general topography of the study area.

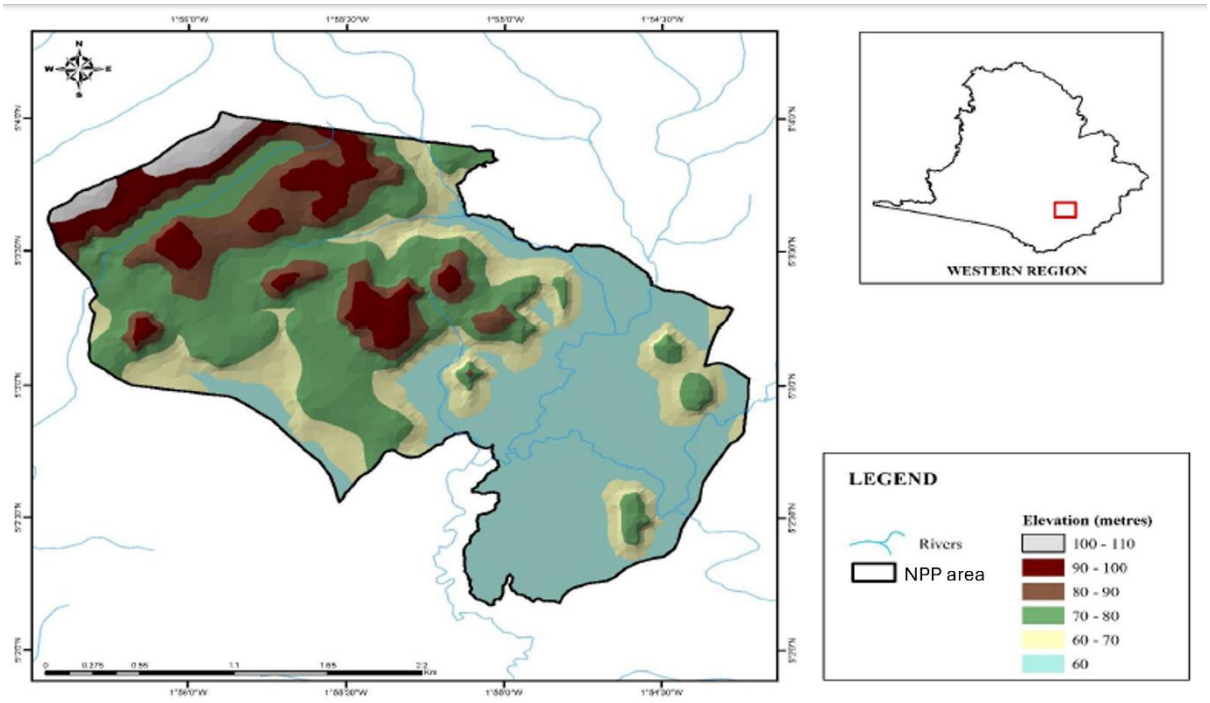


Figure 44: Topography of NPP AREA

Section 7: Greenhouse Gas (GHG)

RSPO Note: this section should be used to explain the findings that come out from the usage of the New Development GHG calculator. Please include what are the significant sources and type of emissions expected from this area. What are the methodology(ies), people involved in the process, date of assessment and findings? Note: Should an assessment carried out by internal staff, just fill the name of the staff and his/her designation.

Date of Assessment: 1st March, 2024

Name of Assessor: Foo Siew Theng

Assessor Designation and Company: Certification Manager: Wilmar International

Methodology

The methodology comprised of a desktop review of documents as well as the use of the 2016 New Development GHG Calculator developed by RSPO to generate the GHG emission estimates. Four scenarios were used in the analysis:

- Scenario 1 (S1) implies the full development of the concession i.e. all of the identified land area is opened up for oil palm.
- Scenario 2 (S2) implies none of the identified land area is opened up for oil palm, except for existing oil palm land.
- Scenario 3 (S3) implies only selected identified land area is opened up for oil palm, preserving conservation and community-use areas
- Scenario 4 (S4) implies selected identified land area is opened up for oil palm along with community area and preserving conservation area

The information relative to each scenario was filled in the spreadsheet of the 2016 New Development GHG Calculator to generate the GHG emission estimates.

Findings

The NPP AREA will entail only oil palm development. There will be no new mill established in the NPP AREA because the FFB produced will be transported to the BOPP mill at Benso which is located at least 6km north of the NPP AREA. In this regard, there will be no emissions associated with Palm Oil Mill Effluent (POME), fossil fuel and electricity. However, emissions from the project will likely emanate from:

- Land use change
- Fertilizer use and
- FFB transport

Results of Scenario Analysis and GHG Estimation

The table below presents the characteristics of the four scenarios considered for the analysis. The company is intending to set aside 94.479 ha for conservation purposes.

Table 32: Characteristics of the scenarios used for the GHG emission estimations (Land sizes in hectares).

	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Concession lease	748.44	748.44	748.44	748.44
Low density forest	12.406			
Young regenerating forest	4.516			
Open land	124.074		62.35	62.35
Scrub	15.605		15.605	15.605
Swamp				

Agriculture/ fallow land	419.664		404.67	404.67
Oil palm	124.010	124.010	124.010	124.010
Cocoa & rubber	47.325			47.325
Set aside area for conservation	0	0	94.479	94.479
Percentage of conservation area (%)	0	0	12.62	12.62
Land in hectare cleared for other use (%)	0			
Proposed development (ha)	748.44	124.00	653.961	653.961
Percentage of proposed development area (%)	100	16.57	87.38	87.38
Total planted area (ha)	748.44	124.00	606.636	653.961
Percentage of planted area (%)	100.00	16.57	81.05	87.38

Table 33 below presents the results of the GHG analysis.

Table 33: Carbon emissions/sequestration under the four different scenarios.

	Scenario 1	Scenario 2	Scenario 3	Scenario 4
	t CO2e	t CO2e	t CO2e	t CO2e
Land clearing	50.51	4.97	40.32	40.72
Crop sequestration	(6,507.79)	(1,078.28)	(5,274.78)	(5,686.28)
Fertilisers	274.52	45.49	222.51	239.86
N2O	241.00	39.93	195.33	210.57
Field fuel	379.03	62.80	307.22	331.19
Peat	0.00	0.00	0.00	0.00
Conservation credit	0.00	(1,504.88)	(341.75)	(227.69)
POME	0.00	0.00	0.00	0.00
Mill fuel	0.00	0.00	0.00	0.00
Purchased electricity	0.00	0.00	0.00	0.00
Credit (excess electricity exported)	0.00	0	0.00	0

Credit (sale of biomass for power)	0.00	0	0.00	0
Field emissions & sinks	**(5,562.73)**	**(2,429.98)**	**(4,851.15)**	**(5,092)**
Mill emissions & credit	**0**	**0**	**0**	**0**
Total emissions (field and mill)	**(5,562.73)**	**(2,430)**	**(4,851.15)**	**(5,092)**

Data derived from the 2016 New Development GHG Calculator.

The outputs of the scenario analysis show that, there would be a net field sequestration of more than 2,430 tCO2e for all the scenarios tested. They assume that the planted area will be able to sequester from 1,708 to 6,508 tCO2e, whilst the land clearance would emit 5 to 51 tCO2e depending on the scenarios. Based on the outcome of the scenarios, there is a net sequestration of carbon for all the scenarios with the highest sequestration recorded for Scenario 1. However, given that scenario 1 does not come with a set aside area for conservation purposes, it is not in line with best management practices that require HCV/HCS conservation and enhancement. Therefore, the scenario (scenario 1) cannot be recommended. Scenarios 3 and 4 have the advantage of incorporating set asides for conservation, and therefore can be recommended. Scenario 4 has higher sequestration compared to scenario 3 and 2 but not recommended, because it does not take into consideration the local communities' wish to continue with their food crop, cocoa & rubber cultivation. Thus, scenario 3 is recommended, because it is a balance of conservation and cultivation, providing sufficient sequestration value.

The figures below summarize the expected emissions from land clearance and other field activities.

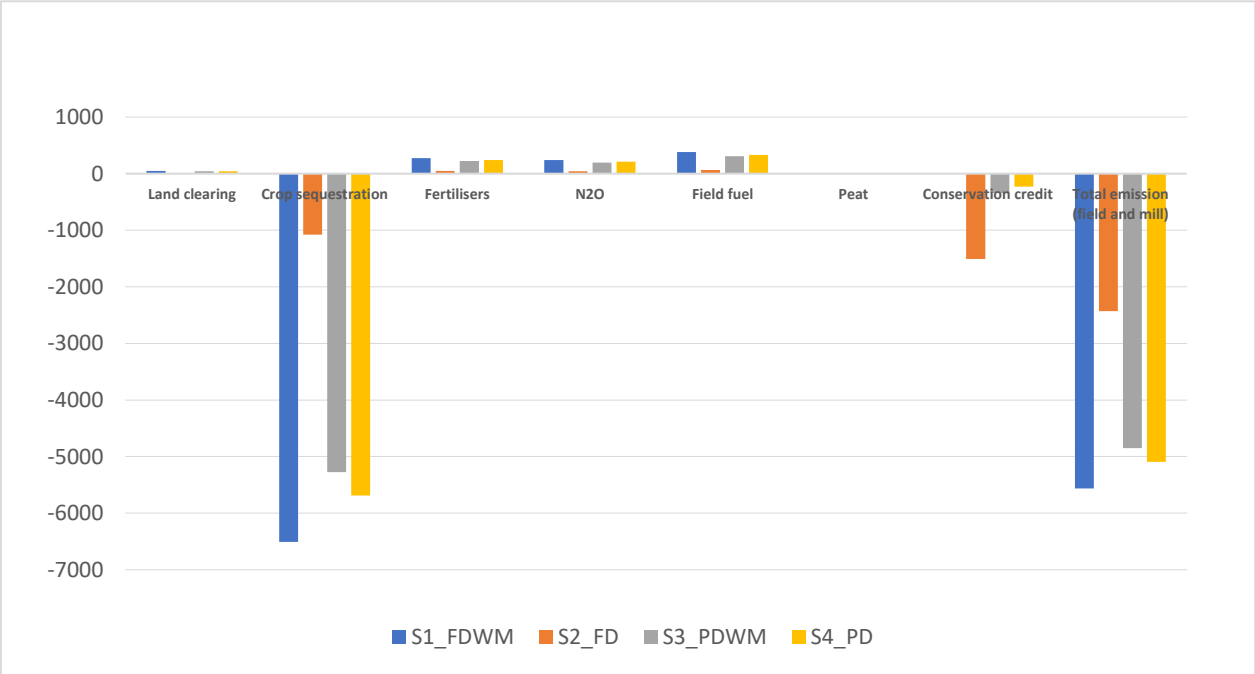


Figure 45: Expected emissions from proposed development for all scenarios.

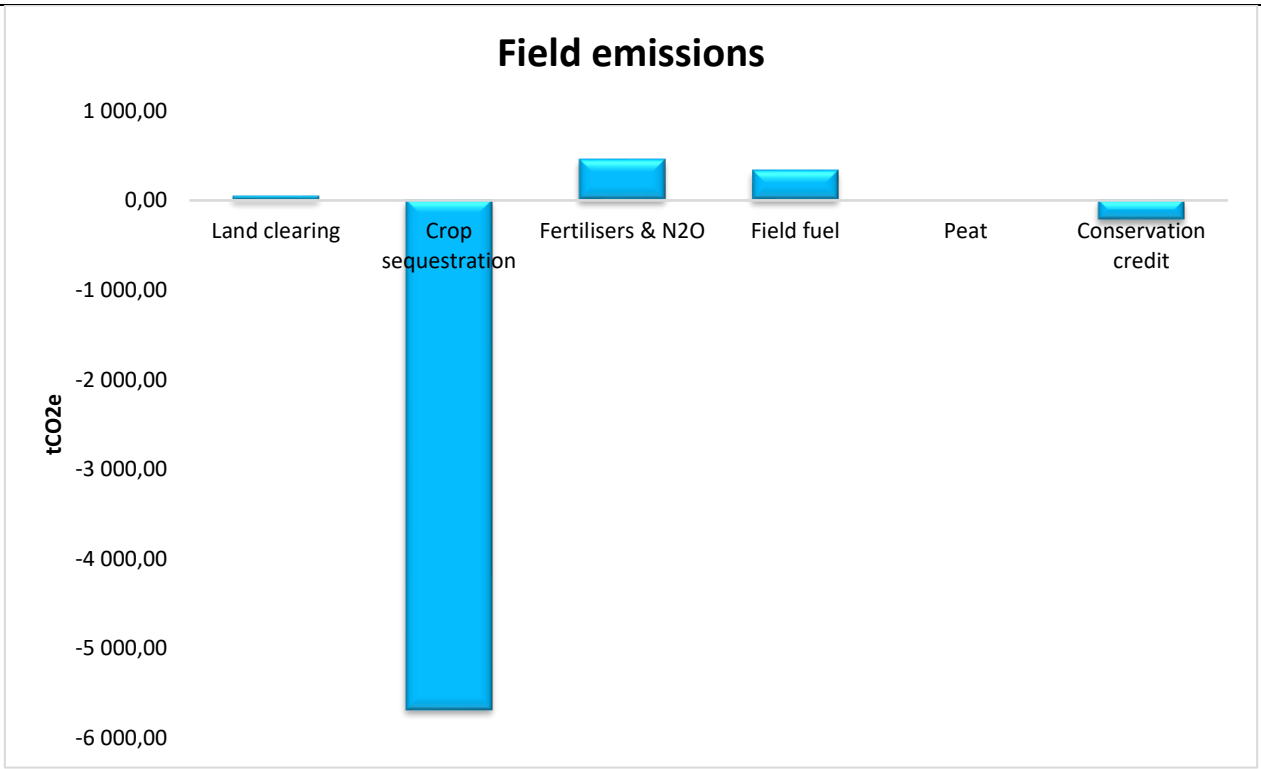


Figure 46: Expected field emission from proposed development in scenario 3.

Because the landscape of the NPP AREA is dominated by agriculture and fallow land, the sequestration potential of the vegetation is high. It appears that, the oil palm development will contribute to sequester more carbon than the current vegetation. Studies in Ghana have also showed that there is considerable carbon sequestration potential in plantations if the plantations are established on land with modest carbon content such as degraded forest or agricultural land, and not on land with old-growth forest.

Section 8: Land Use Change Analysis (LUCA)

RSPO Note: This section will be used to analyses that there has been no land clearing in the area before the NPP is submitted. Arrangement should be following the proxy dates indicated in section 2.2.7 of the current NPP Document. Please ensure that the minimum resolution is 300 dpi. What are the methodology(ies), people involved in the process, date of assessment and findings? Note: Should an assessment carried out by internal staff, just fill the name of the staff and his/her designation.

Date of Assessment: 10 June 2024

Name of Assessor: Clement Obeng-Manu

Assessor Designation and Company: Consultant, Proforest

Methodology

The methods used to carry out the LUCA considered the RSPO required timeframe of November 2005, November 2007, and November 2018 (or as close to these dates as possible considering the quality of remote sensing data available) as well as satellite imagery in 2014 and 2024 with the 2024 satellite imagery to be used to determine the

current land cover. The timeframe is in accordance with the RSPO Guidance for Land Use Change Analysis. The boundary of the NPP AREA was used to carry out this analysis.

To complete the LUCA, several steps were followed including desk-study, acquisition of satellite imageries, image processing, land cover classification, change detection, etc. A combination of ASTER, SPOT 5, Landsat 8, and Sentinel 2 satellite imageries was obtained by considering factors such as data availability, cloud cover and spatial resolution. ArcGIS Pro 3.2 was used for all the analysis and creating maps. A flowchart of the approach used is presented in figure 47.

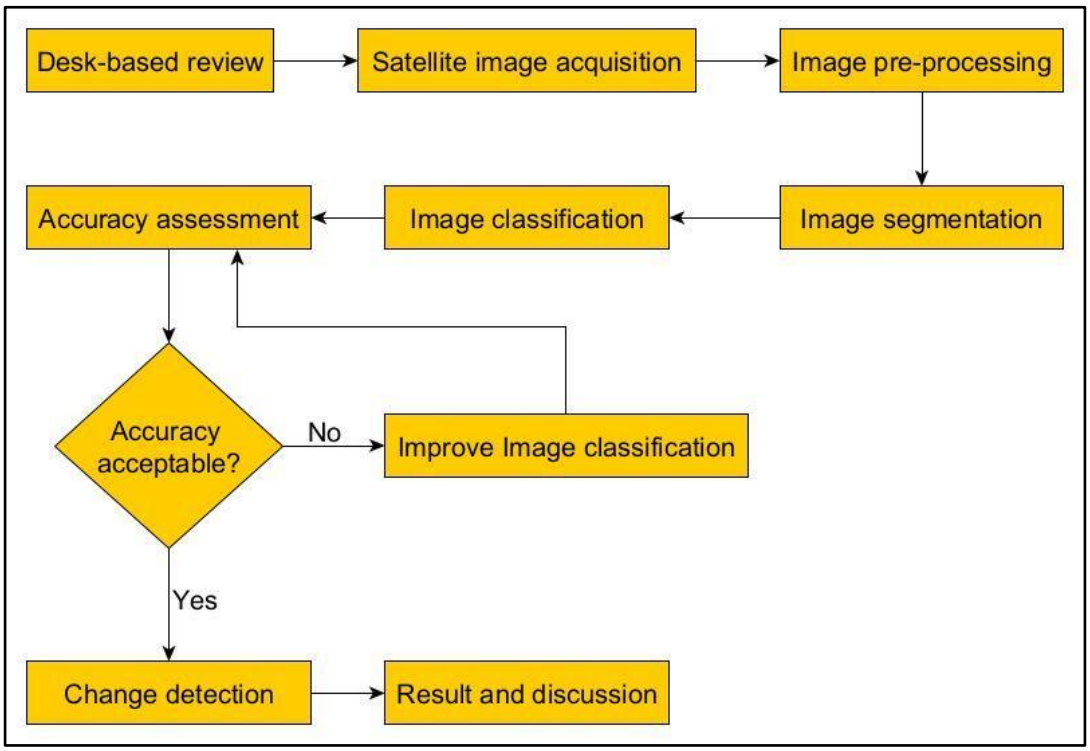


Figure 47: LUCA workflow

Desk-based review

Several documents were obtained and reviewed including land tenure reports, land lease documents and satellite imageries.

Image acquisition and pre-processing

Satellite imagery that is corrected for errors caused by topography, geometry, and atmosphere/radiometrics was obtained from PLANET Labs and used as input for the analysis. As these corrections are applied to the satellite imagery, the only pre-processing step carried out was masking the assessment area to reduce the processing time. Table 34 below shows the imagery used and the acquisition date.

Table 34: Imagery and acquisition date

Date	2005-11-07	2008-02-01	2009-12-14	2014-05-27	2018-12-28	2024-01-31
Image type	ASTER	Landsat 7	SPOT 5	Landsat 8	Sentinel 2A	Sentinel 2A

Spatial resolution	15 m	30 m	10 m	30 m	10 m	10 m

A map of the satellite imagery used for the 2005, 2008, and 2009 image classification is presented in Figure 48 below.

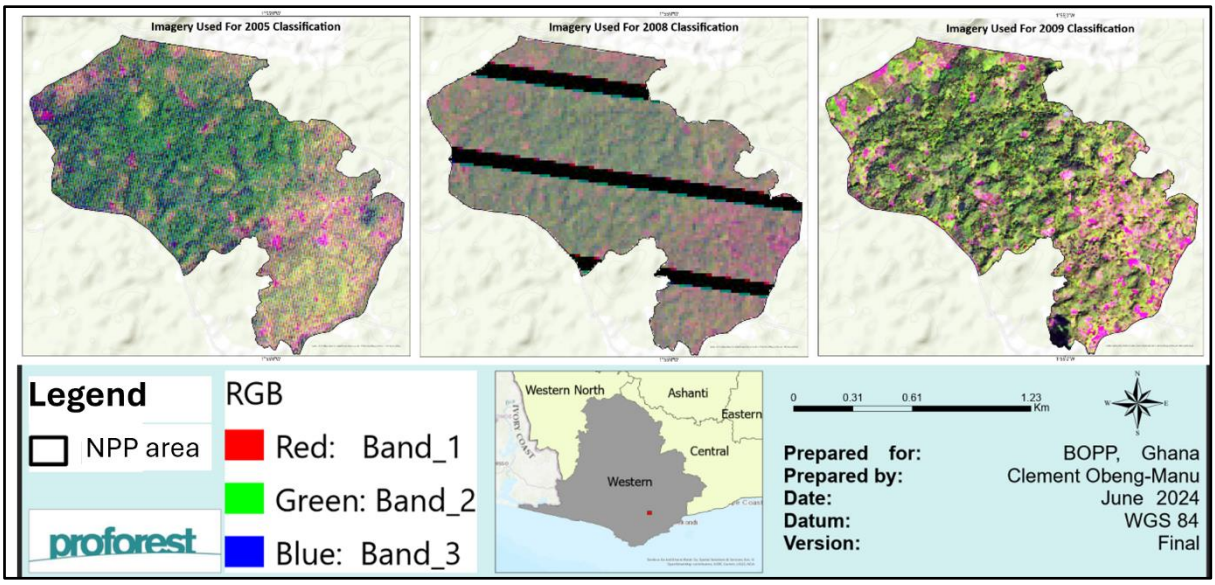


Figure 48: Input used for the 2005, 2007, and 2009 satellite image classification

Data sources for X: Concession boundary (NPP AREA) obtained from BOPP; Administrative data obtained from https://gadm.org/; Satellite imagery obtained from Planet Labs; Base map: ESRI; Map composed using ArcGIS Pro.

The November 2007 satellite imagery had very high cloud cover, hence a Landsat 7 satellite imagery close to the date (February 2008) was obtained and used for the analysis. As normal for all Landsat 7 imagery, line stripping was identified in the data, hence the gap-fill de-stripping algorithm was used in ArcGIS to remove the line strips. This was necessary as information was required of the area blacked out by the strips. All the satellite imageries were masked to the NPP AREA.

The map of the input used for 2014, 2018, and 2024 is shown in figure 49 below.

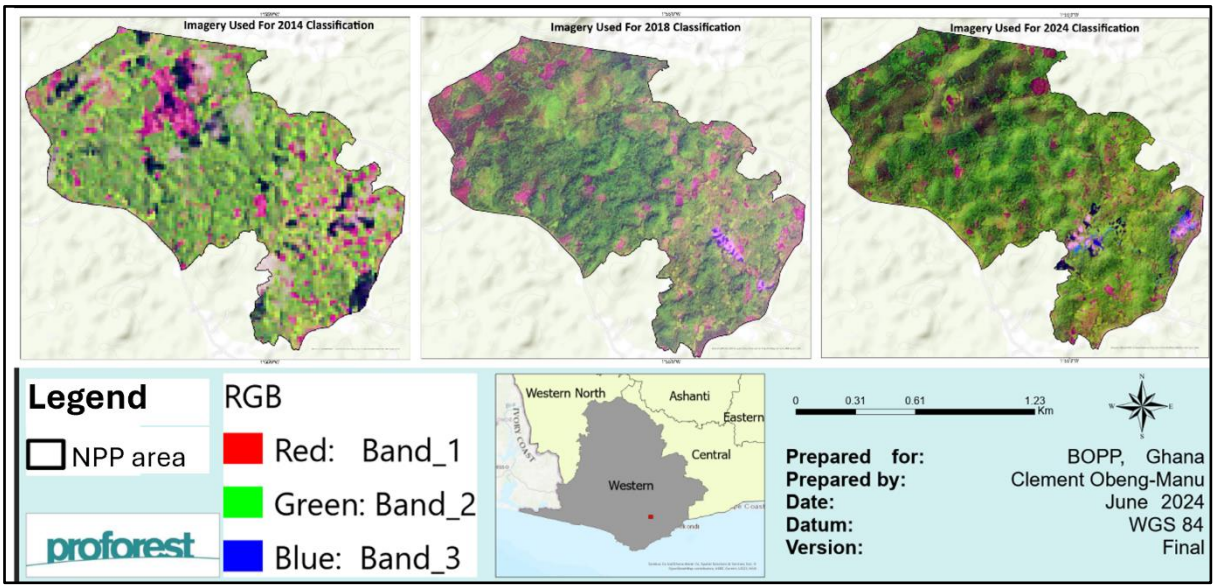


Figure 49: Input used for the 2014, 2018, and 2024 satellite image classification
Data sources for X: Concession boundary (NPP AREA) obtained from BOPP; Administrative data obtained from https://gadm.org/; Satellite imagery obtained from Planet Labs; Base map: ESRI; Map composed using ArcGIS Pro.

The 2014 satellite imagery shown in figure 49 above shows some clouds and shadows within the assessment area. Hence, cloud masking was carried out by masking the cloud and shadow from the satellite imagery. The boundary of the cloud and shadow was used to mask cloud-free satellite imagery dated 23rd December 2014. The mask satellite imagery was used to replace the mask and shadow identified.

Image Segmentation

The next phase of the image analysis involved deriving the image object representative of the input satellite imagery. The mean shift segmentation algorithm was used to create image objects in ArcGIS Pro software. The algorithm requires three bands for analysis, hence the NIR, Red, and Green bands were selected for the segmentation. Through a trial-and-error approach, the spectral and spatial parameters to be used for the segmentation were identified. After each set of parameters, the image objects were visually inspected to determine the output which represents the features. After iterating through the parameters, the spatial, spectral, and minimum size of a segment of each satellite imagery was chosen. The value of the spatial and spectral parameters determines their relevance, hence a higher value for a parameter implies that the parameter has more weight or relevance. Below is the table showing the parameters used for the image segmentation.

Table 35: Parameters used for the image segmentation

Segmentation parameters	2005-11-07	2008-02-01	2009-12-14	2014-04-27	2018-12-28	2024-01-31
Spatial detail	20	17	20	18	20	20
Spectral detail	20	20	20	20	20	20
Minimum segment size in Pixels	10	15	15	10	10	20

From table 35, a spectral detail of 20 was used for the different satellite imagery but the spatial detail and minimum segment size in pixels varied. This may be attributed to the different spatial resolution of the satellite imagery used. Landsat with a spatial resolution of 30 m implies features smaller than the minimum mapping unit of Landsat cannot be identified. This implies some features may be identified with the Landsat satellite imagery.

Land Cover Classification

The Unsupervised classification approach was used to classify all the satellite imagery. Unsupervised classification works by identifying the groups or features of similar information within the input data. These features of similar properties are then grouped by the algorithms to create spectral profiles of similar information. The land cover classes are then assigned each spectral profile created by using information obtained from the community members as well as features observed during HCV-HCS scoping and full assessment. The Iso Cluster Unsupervised Classification algorithm was used for the image classification. Below are the maps of the various land cover classes.

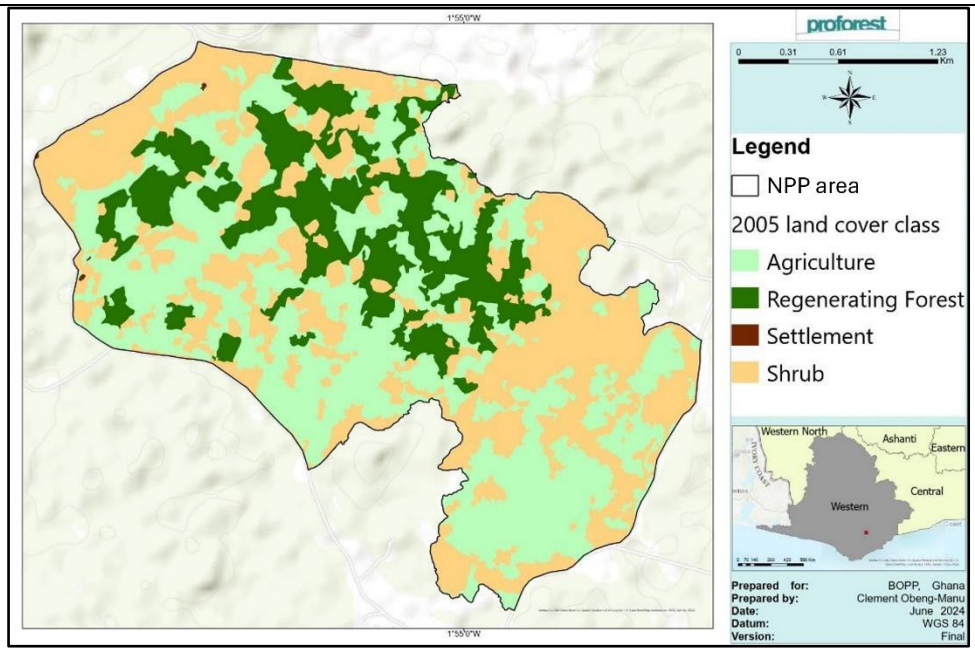


Figure 50: 2005 land cover classification

Data sources: Concession boundary (NPP AREA) from BOPP; Landcover obtained by processing input satellite imagery; Base map: ESRI; Map composed using ArcGIS Pro.

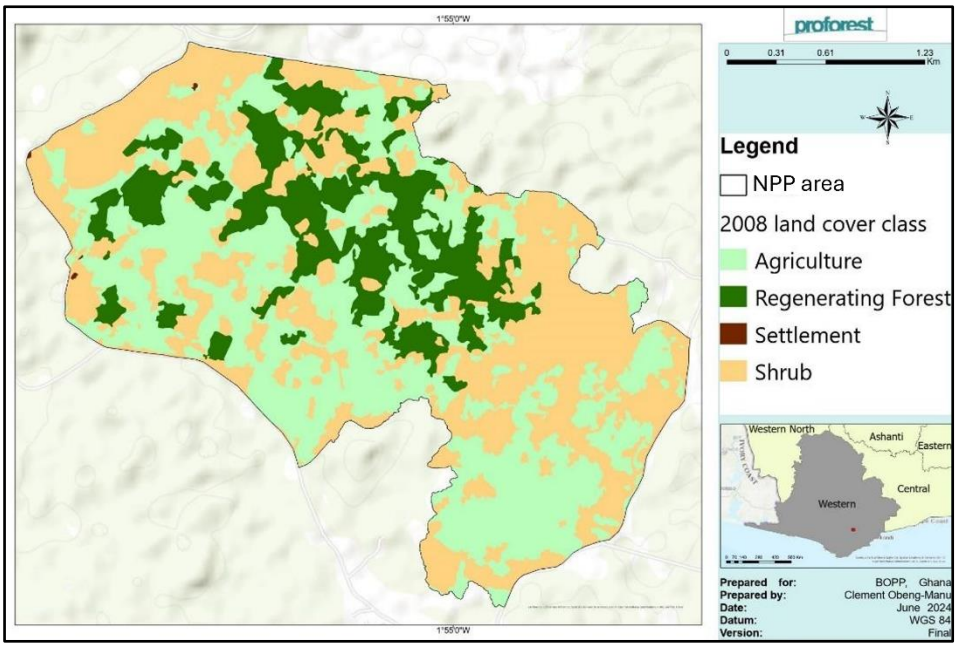


Figure 51: 2008 land cover classification

Data sources: Concession boundary (NPP AREA) from BOPP; Landcover obtained by processing input satellite imagery; Base map: ESRI; Map composed using ArcGIS Pro.

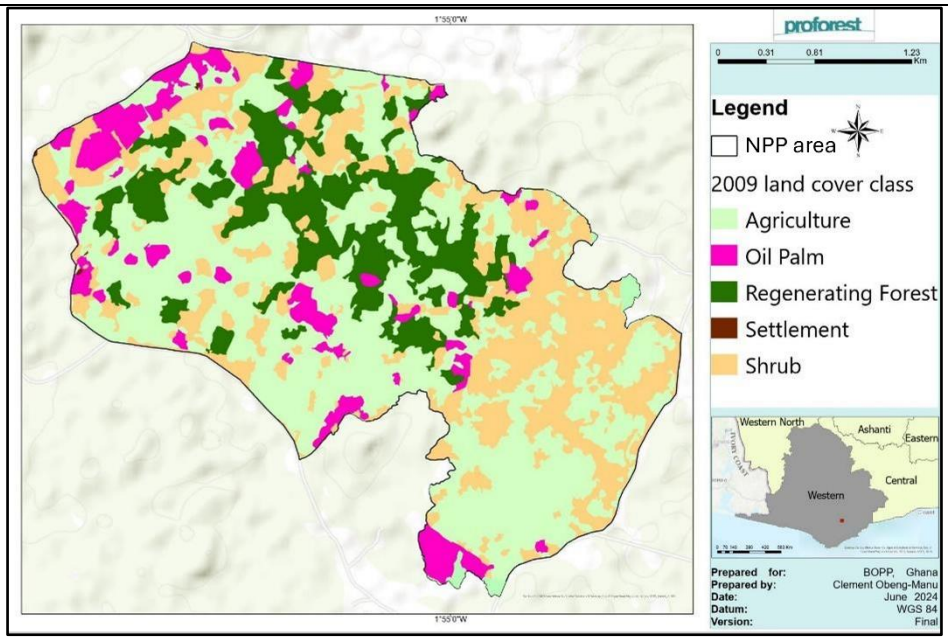


Figure 52: 2009 land cover classification

Data sources: Concession boundary (NPP AREA) from BOPP; Landcover obtained by processing input satellite imagery; Base map: ESRI; Map composed using ArcGIS Pro.

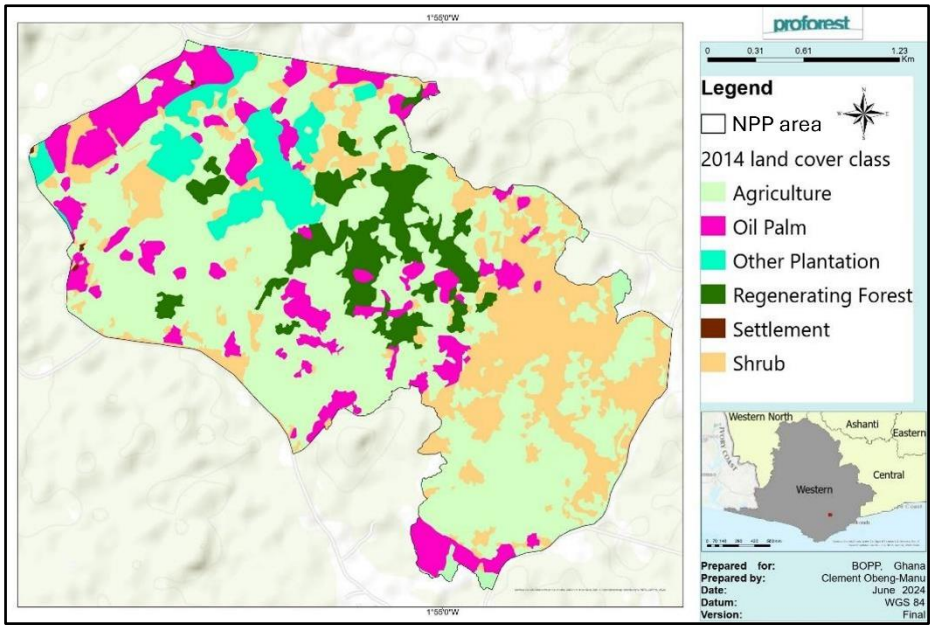


Figure 53: 2014 land cover classification

Data sources: Concession boundary (NPP AREA) from BOPP; Landcover obtained by processing input satellite imagery; Base map: ESRI; Map composed using ArcGIS Pro.

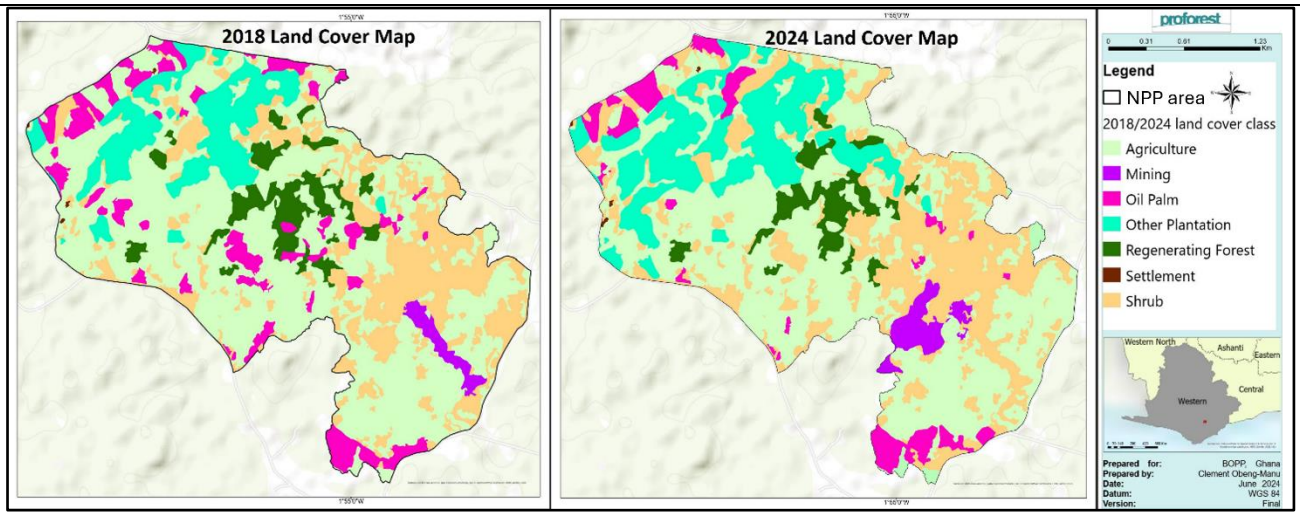


Figure 54: 2018/2024 land cover classification

Data sources: Concession boundary (NPP AREA) from BOPP; Landcover obtained by processing input satellite imagery; Base map: ESRI; Map composed using ArcGIS Pro.

The area coverage for the various land cover types is presented in table 36 below:

Table 36: Area coverage per land cover type

Land cover class	2005 land cover		2008 land cover		2009 land cover		2014 land cover		2018 land cover		2024 land cover	
	Area (ha)	% coverage	Area (ha)	% coverage	Area (ha)	% coverage	Area (ha)	% coverage	Area (ha)	% coverage	Area (ha)	% coverage
Agriculture	310.73	41.52%	311.47	41.62%	354.5	47.37%	381.99	51.04%	384.36	51.35%	328.32	43.87%
Mining	0	0.00%	0	0.00%	0	0.00%	0	0.00%	9.94	1.33%	17.25	2.31%
Oil palm	0	0.00%	0	0.00%	66.75	8.92%	94.67	12.65%	63.44	8.48%	39.59	5.29%
Other plantation	0	0.00%	0	0.00%	0	0.00%	47.72	6.38%	81.01	10.82%	125.59	16.78%
Regenerating forest	143.66	19.19%	132.56	17.71%	119.91	16.02%	60.87	8.13%	43.65	5.83%	34.76	4.64%
Settlement	0.32	0.04%	0.32	0.04%	0.32	0.04%	0.41	0.05%	0.41	0.05%	0.5	0.07%
Shrub	293.44	39.25%	304.09	40.63%	206.95	27.65%	162.78	21.75%	165.62	22.13%	202.44	27.05%
Total	748.44	100.00%	748.44	100.00%	748.44	100.00%	748.44	100.00%	748.44	100.00%	748.44	100.00%

From table 36, the total area under cultivation increased from 310.73 hectares in 2005 to 384.36 hectares in 2018, when it peaked, and then decreased to 328.32 hectares in 2024. This variation points to intervals of increased agricultural production that might be followed by fallowing or other changes.

According to land cover data from 2018, mining activities increased from 9.94 hectares to 17.25 hectares by 2024. A move toward resource extraction is indicated by the emergence and expansion of mining operations, which may have serious negative effects on the environment. Oil palm plantations emerged in 2009 with 66.75 hectares and peaked at 94.67 hectares in 2014, before declining to 39.59 hectares in 2024. The initial rapid growth followed by a decline suggests a change in policy. The reduction in the oil palm area in 2024 can be attributed to the migration of farmers who were relocated to areas outside the NPP AREA. Other plantations also emerged in 2014 with 47.72 hectares but significantly expanded to 125.59 hectares by 2024. This growth indicates diversification in plantation crops beyond oil palm, potentially due to economic or agronomic factors.

The area coverage of regenerating forests steadily declined from 143.66 hectares in 2005 to 34.76 hectares in 2024. The continuous reduction in regenerating forests suggests either conversion to other land uses or poor forest regeneration. The NPP AREA being part of the land leased to the Asubonteng Brothers did not have any primary or

secondary forest within the landscape. The regenerating forests are a result of old farms being allowed to fallow for longer periods resulting in the emergence of some tree species. The decline in regenerating forests can be attributed to the fact that the landowners and community members used the land for various agriculture activities resulting in land clearing. It should however be noted that no primary or secondary forest was identified within the assessment area during the assessment timelines (starting from 2005 to 2024).

The acreage of settlement areas has remained relatively constant, growing from 0.32 hectares in 2005 to 0.50 hectares in 2024. The controlled urban expansion within the region is indicated by the minimal increase in settlement areas. From 304.09 hectares in 2008 to 162.78 hectares in 2014, shrubs show a decline before rising once more to 202.44 hectares in 2024. Natural succession, land management practices, or agricultural practices may be the reasons for the dynamic changes in shrubs. The definition of each land cover type is presented in table 37 below.

Table 37: Description of land cover classes

Land cover class	Description
Agriculture	An area for subsistence farmers. Does not include cash crops. It may include fallow land.
Regenerating Forest	A degraded forest land with some young regrowth of forest patches. This land cover may include some cocoa or rubber farms.
Shrub	Vegetated land with the presence of some trees and shrubs. It may include farmlands that have been abandoned for some years.
Oil palm	Smallholder oil palm farms.
Settlement	An urban area which includes houses.
Other plantation	Cocoa and rubber farms.
Mining	An area used for small-scale mining.

Change Detection

The post-classification change detection used the land cover classification dated 2005, 2008, 2009, 2014, 2018, and 2024 as the input to identify how the changes in the land cover over time. The land cover change detection was carried out between 2005 and 2008, 2008 and 2009, 2009 and 2014, 2014 and 2018, 2018 and 2024.

Results

2005 to 2008 change detection

Four land cover types were identified in the 2005 and 2008 land cover classifications. The changes in the land cover classes and the resulting area coverage are shown in figure 55 and table 38 below.

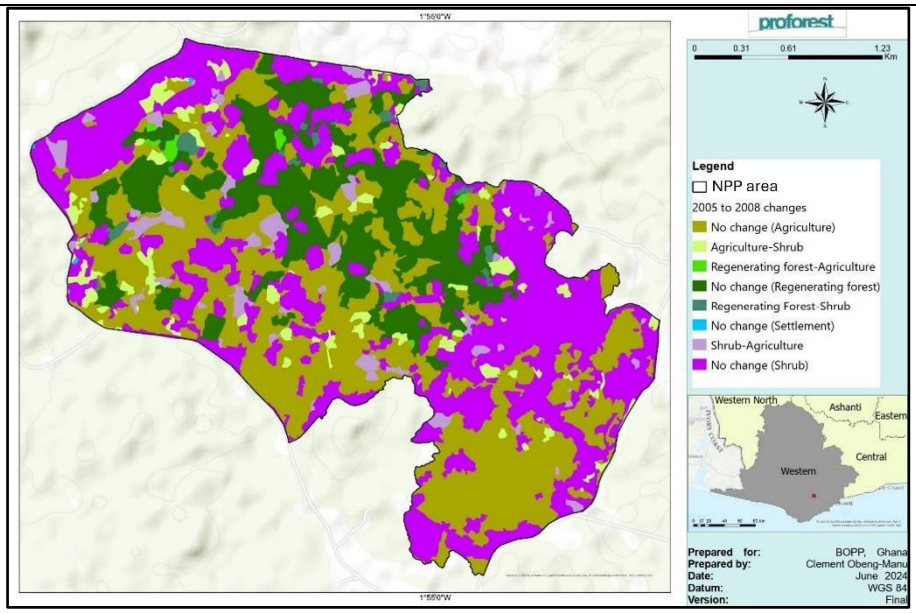


Figure 55: 2005 to 2008 land cover change map.

Data sources: Concession boundary (NPP AREA) from BOPP; Change detection map obtained using post-classification approach; ESRI; Map composed using ArcGIS Pro.

Table 38: 2005 to 2008 change matrix

Land cover class	Agriculture		Shrub		Regenerating Forest		Settlement	
	Area (ha)	% coverage	Area (ha)	% coverage	Area (ha)	% coverage	Area (ha)	% coverage
Agriculture	280.05	37.42%	30.87	4.13%	0.00	0.00%	0.00	0.00%
Shrub	28.62	3.82%	264.99	35.41%	0.00	0.00%	0.00	0.00%
Regenerating Forest	2.80	0.37%	8.23	1.10%	132.56	17.71%	0.00	0.00%
Settlement	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.32	0.04%

2008 to 2009 change detection

From the change detection map presented in figure 56 below, most of the agriculture, young regenerating forest, and shrubland areas were maintained between 2008 and 2009. One of the dominant changes that can easily be observed from visual inspection is the shrub to oil palm change. The change matrix between 2008 and 2009 is presented below the map.

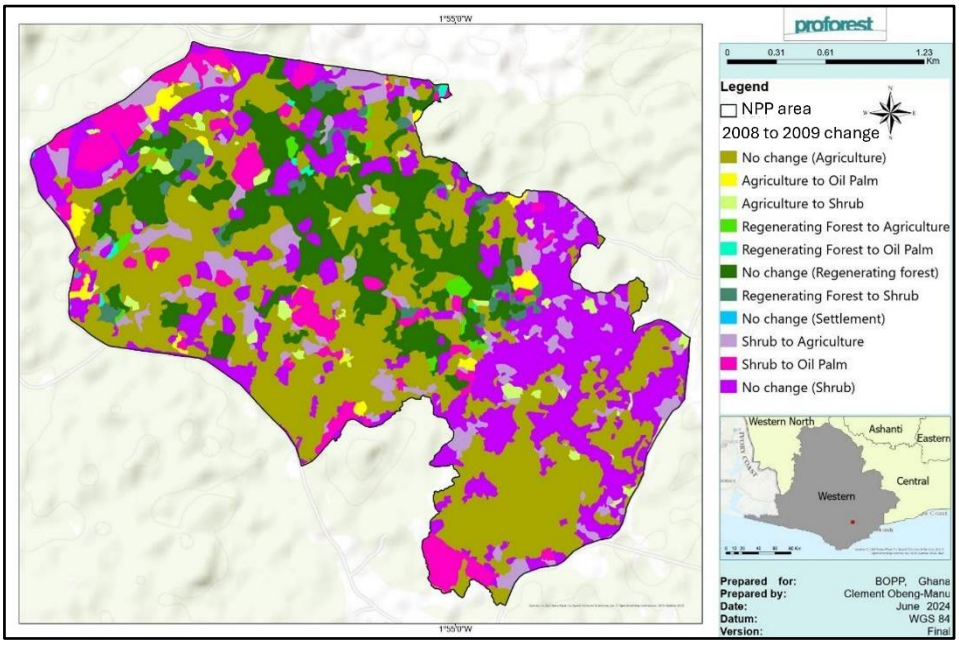


Figure 56: 2008 to 2009 change map

Data sources: Concession boundary (NPP AREA) from BOPP; Change detection map obtained using post-classification approach; ESRI; Map composed using ArcGIS Pro.

Table 39: 2008 to 2009 change matrix

Land cover class	Agriculture		Oil palm		Shrub		Regenerating Forest		Settlement	
	Area (ha)	% coverage	Area (ha)	% coverage	Area (ha)	% coverage	Area (ha)	% coverage	Area (ha)	% coverage
Agriculture	302.53	40.42%	1.92	0.26%	7.02	0.94%	0.00	0.00%	0.00	0.00%
Oil palm	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%
Shrub	48.23	6.44%	64.46	8.61%	191.40	25.57%	0.00	0.00%	0.00	0.00%
Regenerating Forest	3.74	0.50%	0.38	0.05%	8.53	1.14%	119.91	16.02%	0.00	0.00%
Settlement	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.32	0.04%

2009 to 2014 change detection

The changes in land cover between 2009 and 2014 is shown in figure 57 below.

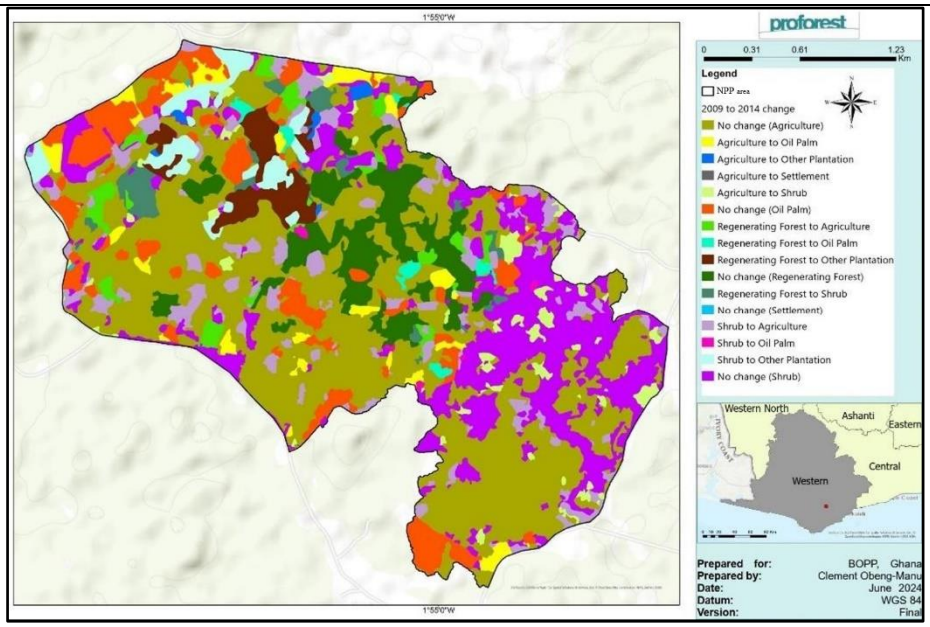


Figure 57: 2009 to 2014 change map

Data sources: Concession boundary (NPP AREA) from BOPP; Change detection map obtained using post-classification approach; ESRI; Map composed using ArcGIS Pro.

A quick overview of the 2009 to 2014 change map shown in figure 57 above reveals that most of the agriculture areas were still not converted to other land cover types. Detailed information is shown in the change matrix table (table 40) below.

Table 40: 2009 to 2014 change matrix

Land cover class	Agriculture		Oil palm		Other plantation		Regenerating Forest		Settlement		Shrub	
	Area (ha)	% coverage	Area (ha)	% coverage	Area (ha)	% coverage	Area (ha)	% coverage	Area (ha)	% coverage	Area (ha)	% coverage
Agriculture	307.66	41.11%	20.69	2.76%	2.87	0.38%	0.00	0.00	0.09	0.01%	17.61	2.35%
Oil palm	0.00	0.00%	66.75	8.92%	0.00	0.00%	0.00	0.00	0.00	0.00%	0.00	0.00%
Other plantation	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00	0.00	0.00%	0.00	0.00%
Regenerating Forest	16.45	2.20%	5.50	0.74%	22.32	2.98%	60.87	0.08	0.00	0.00%	14.77	1.97%
Settlement	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00	0.32	0.04%	0.00	0.00%
Shrub	52.29	6.99%	1.73	0.23%	22.54	3.01%	0.00	0.00	0.00	0.00%	130.40	17.42%

2014 to 2018 change detection

The change map and the corresponding change matrix are presented in figure 58 and Table 41 below.

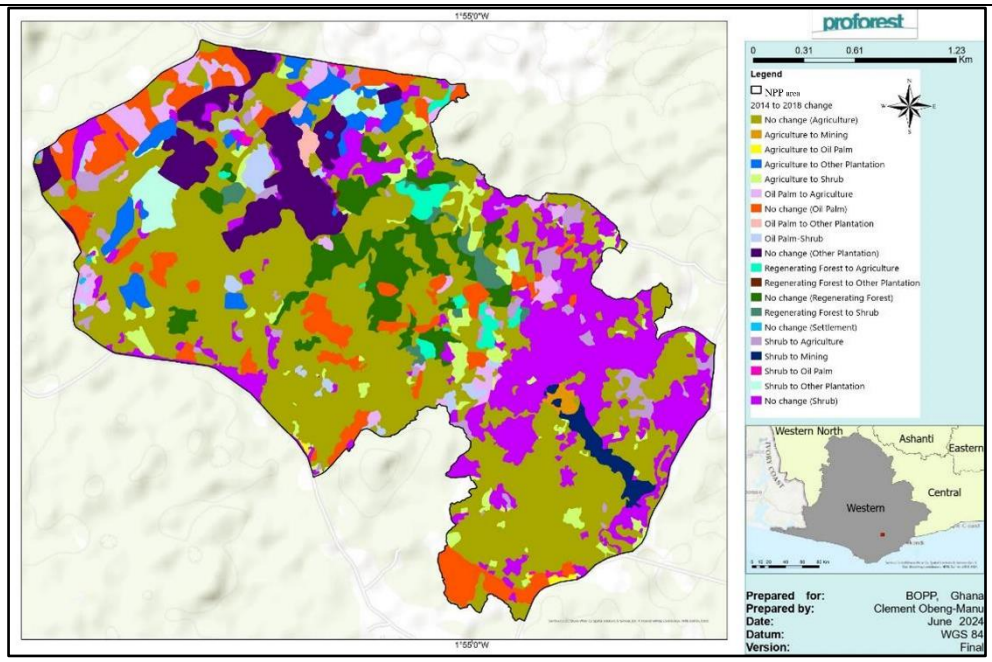


Figure 58: 2014 to 2018 change detection map

Data sources: Concession boundary (NPP AREA) from BOPP; Change detection map obtained using post classification approach; ESRI; Map composed using ArcGIS Pro.

Table 41: 2014 to 2018 change matrix

Land cover class	Agriculture		Mining		Oil palm		Other plantation		Regenerating Forest		Settlement		Shrub	
	Area (ha)	% coverage	Area (ha)	% coverage	Area (ha)	% coverage	Area (ha)	% coverage	Area (ha)	% coverage	Area (ha)	% coverage	Area (ha)	% coverage
Agriculture	335.46	44.82%	2.02	0.27%	0.91	0.12%	18.91	2.53%	24.70	3.30%	0.00	0.00%	0.00	0.00%
Mining	20.54	2.74%	0.00	0.00%	61.55	8.22%	2.71	0.36%	9.86	1.32%	0.00	0.00%	0.00	0.00%
Oil palm	0.00	0.00%	0.00	0.00%	0.00	0.00%	47.72	6.38%	0.00	0.00%	0.00	0.00%	0.00	0.00%
Other plantation	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%
Shrub	19.35	2.59%	7.92	1.06%	0.99	0.13%	11.57	1.55%	122.95	16.43%	0.00	0.00%	0.00	0.00%
Regenerating Forest	9.01	1.20%	0.00	0.00%	0.00	0.00%	0.10	0.01%	8.11	1.08%	43.65	5.83%	0.00	0.00%
Settlement	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.41	0.05%

2018 to 2024 change detection

The 2018 to 2024 change map and matrix are also shown below

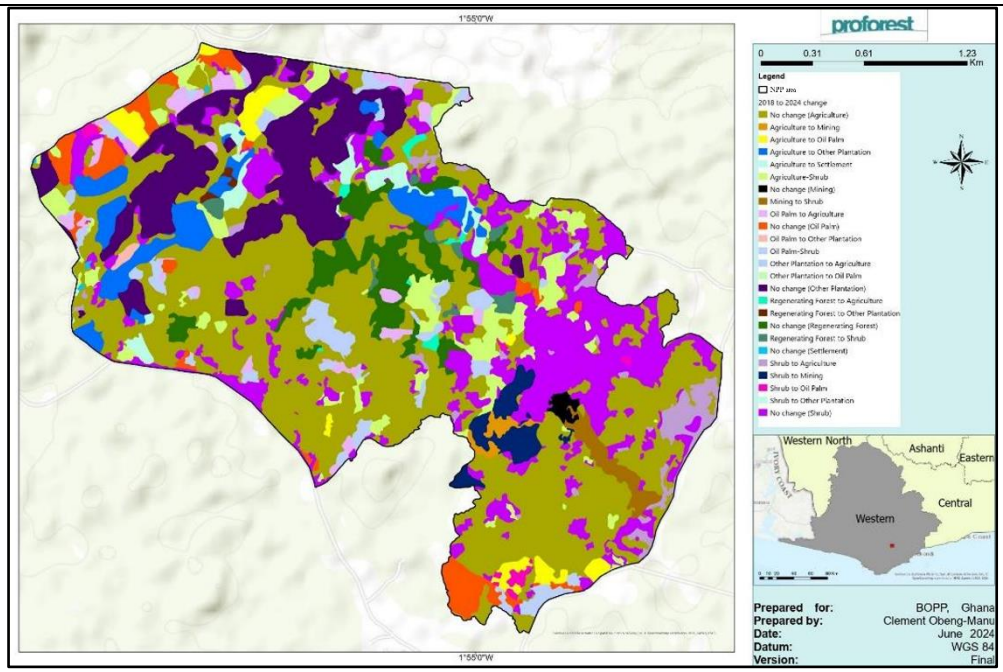


Figure 59: Change map for 2018 to 2024

Data sources: Concession boundary (NPP AREA) from BOPP; Change detection map obtained using post-classification approach; ESRI; Map composed using ArcGIS Pro.

Table 42: 2018 to 2024 change matrix

Land cover class	Agriculture		Mining		Oil palm		Other plantation		Settlement		Shrub		Regenerating forest	
	Area (ha)	% coverage	Area (ha)	% coverage	Area (ha)	% coverage	Area (ha)	% coverage	Area (ha)	% coverage	Area (ha)	% coverage	Area (ha)	% coverage
Agriculture	296.69	39.64%	3.17	0.42%	13.86	1.85%	30.87	4.12%	0.09	0.01%	39.69	5.30%	0.00	0.00%
Mining	0.00	0.00%	2.24	0.30%	0.00	0.00%	0.00	0.00%	0.00	0.00%	7.70	1.03%	0.00	0.00%
Oil palm	13.34	1.78%	0.00	0.00%	22.86	3.05%	1.00	0.13%	0.00	0.00%	26.24	3.51%	0.00	0.00%
Other plantation	0.49	0.07%	0.00	0.00%	0.10	0.01%	80.43	10.75%	0.00	0.00%	0.00	0.00%	0.00	0.00%
Settlement	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.41	0.05%	0.00	0.00%	0.00	0.00%
Shrub	15.45	2.06%	11.84	1.58%	2.77	0.37%	12.40	1.66%	0.00	0.00%	123.15	16.45%	0.00	0.00%
Regenerating forest	2.34	0.31%	0.00	0.00%	0.00	0.00%	0.90	0.12%	0.00	0.00%	5.65	0.75%	34.76	4.64%

The result of the land cover analysis between 2005 and 2024 shows that the NPP AREA is predominantly an agricultural area. Agriculture also increased between 2005 and 2018 but reduced in 2024. The increase in agriculture area between 2005 and 2018 can be attributed to the type of agriculture practice carried out as well as the intensification of agriculture practices while the reduction in the size of agriculture area in 2024 can be attributed to the fact that farmers who grow food crops are encouraged to farm outside the NPP AREA as the project timeline draws close.

There was a general reduction in the area of regenerating forest between 2005 and 2024. The regenerating forest changed to other land cover types such as agriculture and shrub. Within the assessment area, no primary or secondary forest was identified within the timeframe of the analysis. The regenerating forest are as a result of agricultural areas left to fallow for a long period of time resulting in some tree species developing. The conversion of regenerating forest to fallow may be attributed to farmers returning to clear those areas for agriculture as this is common with the type of farming practices carried out. It can be concluded that no deforestation of primary forest has taken place between 2005 and 2024 as no primary forest was identified.

Section 9: Conclusions

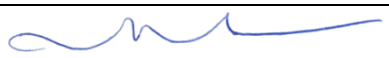
RSPO Note: Please conclude all the findings of the assessment and how this will be translated into a management plan. If there is any known significant issue, the RSPO member needs to acknowledge its existence and ensure it is a priority for the management to address those issues.

- As a subsidiary of Wilmar Africa Limited (which is a subsidiary of Wilmar International, a member of RSPO), BOPP conducts its operations in line with national and international best practices as well as social and environmental sustainability requirements, including that of the RSPO.
- BOPP has followed due diligence procedures in respect of wanting to develop the NPP AREA under the RSPO NPP including demonstrating FPIC (from key stakeholders) to develop the land.
- As expected of agricultural land development projects, the proposed project will generate social and environmental impacts. These have been summarized in this report with key management and monitoring recommendations detailed in the integrated management plan for implementation by BOPP.
- Significant issues (also included in the integrated management plan) which the management of BOPP need to follow up with to ensure the successful implementation of the project include:
    - ensuring that any outstanding crop enumeration is completed, and fair compensation is paid to the concerned farmers in accordance with relevant local and national laws;
    - completing mapping of all cocoa and rubber farms within the NPP AREA which will be excluded from the oil palm development areas. This is important to know the boundaries of the cocoa and rubber farms and their sizes, and to prevent encroachment of the project into the farms; and
    - engaging the broader affected communities and relevant stakeholders during the ICLUP development and throughout the project lifespan on the measures proposed to address concerns on food crop farming areas to gain broader consensus and incorporate any future concerns or inputs.

Section 10: Confirmation of Report

RSPO Note: This section is used to confirm that all findings are accepted by the grower company and will be responsible for its ownership and development process for as long as it is within their control.

Management of BOPP accepts and approves of the findings in this report which is a summary of various assessments including HCV-HCSA, SEIA, Soil and Topography Study, GHG and FPIC. The report will serve as an invaluable resource in guiding the Management of BOPP to implement the project.

Date of Completion	04/09/2024
Signature	
Name	Samuel Avaala Awonnea
Position	General Manager