New Planting Procedure - Summary of Assessments

RSPO Roundtable on Sustainable Palm Oil	Siat Group	SCSglobal SERVICES

NPP Reference Number:	SCS-RSPONPP-000205
Country of the NPP submission:	Nigeria
RSPO Membership Number:	1-0005-04-000-00

Section 1: General Information

1.1 Overview & Background

Presco Plc is one of the subsidiaries of Siat Group, a Belgian agro-industrial company with operations in Ivory Coast, Ghana, Gabon and two operations in Nigeria (Presco plc and Siat Nigeria). Presco was incorporated as a limited liability company in Nigeria on 24th September 1991, with its head office at Obaretin Estate in Edo State, Nigeria. Presco operates four oil palm estates at: Obaretin, Ologbo, and Sakponba in Edo State and Cowan in Delta State, Nigeria. As a subsidiary of an RSPO member, Presco is committed to ensuring that the development of the newly acquired concession meets requirements for the RSPO New Planting Procedure. Consequently, impact assessments including HCV and ESIAs have been completed for all estates including the existing Sakponba estate which has successfully submitted is NPP report to public consultation and RSPO in 2017. Parts of the concession have already been developed as oil palm plantation.

1.1.1 Description of location

The assessment area is in the northern extension of the existing Presco Sakponba concession. It is located ~ 51 km southeast of Benin City, in Edo State, Nigeria. The size of the assessment area is 2,500 ha and comprises highly modified habitat dominated by farmlands and bush fallows as well as patches of severely degraded secondary forests. Approximately 34% of the area is grassland dominated by beardgrass (Andropogon gayanus), elephant grass (Pennisetum purpureum), Bermuda grass (Cynodon dactylon), and thatch grass (Hyparrhenia dissolute). The area is an old reserve that has been de-reserved by the Nigerian Edo state government in 2016, due to the poor quantity of forest remaining and the anthropisation of the area.

1.1.2 Primary forests in the assessment area

There are no primary forests within the concession. The concessions consist of grassland and heavily degraded forestland largely as a result of uncontrolled timber logging over the past two decades and were eventually de-reserved for agricultural activities, mainly food crop farming by the local population. The current vegetation cover in the concession consists of pockets of bush fallows on abandoned farmlands; the area overlaps the southern portion of the heavily degraded and de-reserved Urhonigbe Forest Reserve. The wider landscape comprises (and is bordered to the south and the west by) the existing Presco Sakponba concession; the heavily farmed portions of the Urhonigbe Forest Reserve (to the north) and; local people's farmlands (to the east). The Ethiope River, which lies about 7km from the southwestern boundary of the Sakponba concession, is a feature in the landscape and forms the main boundary between Edo State and Delta State.

1.1.3 Areas of peat soils

There are no areas of peat soils in the assessment area.
The geology consists of sedimentary rocks of Coastal Plains Sands from the Pleistocene/Oligocene with more recent Alluvium nearer to the rivers. Soil are Nitisols, Lixisols and a few Gleysols around the pounds.

1.1.4 Local people's lands

There are no local people's lands within the boundaries of the concession. The area under consideration is state land. Although local communities have been allowed by the Edo State authorities to use parts of the concession for food crop farming, the local people do not lay any claim to the land. During the community consultations that formed part of the assessment, all the communities clearly admitted that the reserve land belonged to the State and they do not contest the State allocating it to Presco.

1.2 Assessment references

All related assessments were professionally carried out and therefore generally very comprehensive and detailed. The resulting management plans include the findings of the various impact assessments conducted by separate independent consultants including the environmental impact assessment, the high conservation value assessment and High Carbon Stock Assessment, Land Use Change Analysis Soil Survey conducted by consultant accredited and approved by the RSPO to lead HCV assessments. Presco has thus adhered strictly to the RSPO New Planting Procedures (NPP) and has documented the assessments and plans according to the RSPO NPP guidelines.

1.2.1 Scope of the Assessments

The assessment area overlaps the southern portion of the heavily degraded and de-reserved Urhonigbe Forest Reserve. The wider landscape comprises (and is bordered to the south and the west by) the existing Presco Sakponba concession; the heavily farmed portions of the Urhonigbe Forest Reserve (to the north) and, local people's farmlands (to the east). The Ethiope River, which lies about 3km from the southwestern boundary of the Sakponba Extension I concession, is a feature in the landscape and forms the main boundary between Edo State and Delta State.

The assessments conducted for the proposed Sakponba Extension 1 project area and authors are as follows:

Documents	Authors
Social impact assessment (SIA) of the Sakponba Oil Palm Plantation Development Project at Orhiomwon Local Government Area, Edo State, Nigeria, Foremost Environmental Services October 2018.	Foremost Env. Services
Presco Plc - Environmental and Social Impact Assessment (ESIA) Of the Proposed Sakponba Extension of Oil Palm Plantation Development Project at Orhionmwon Local Government Area, Edo State, Nigeria - Submitted To Federal Ministry of Environment, Abuja Foremost Environmental Services, January 2019	Foremost Env. Services
Soil survey Presco plc Sakponba estate, 2017	Dr. Umweni A. Sam. Reinout Impens
Participatory mapping Report: Sakponba Extensions, 2018	Presco
Summary of presco fpic process in the sakponba estate extension, 2020	Presco
Land-use change analyses for the proposed Sakponba extension I. New oil palm development, Orhionwon LGA, Edo State, Nigeria, by Arnaud Leidgens and Florent Robert Based on Proforest report, maps and satellite imagery proceed by Siat, January 2019.	Presco
High Conservation Value Assessment of Presco's Sakponba Extension I. Concession in Edo State, Nigeria Full Assessment Report, Final Version II Proforest, April 2019	Proforest
High Conservation Value Assessment of Presco's Sakponba Extension I. Concession in Edo State, Nigeria Public Summary Report Final Version, Proforest, July 2019	Proforest
Carbon Stock Assessment and GHG Emission Report for Presco's Sakponba Extension Concession in Edo State in Nigeria, Final Version, Proforest, February 2019	Proforest Presco
High Carbon Stock Assessment of Presco's Sakponba Extension I. Concession in Edo State, Nigeria, Final Version, Proforest, April 2021	Proforest

1.2.2 Assessment teams

The assessment teams for each assessment consisted of persons who are specialists with diverse academic and professional backgrounds and vast experiences appropriate to the task. The teams consisted of professionals from various fields including biology, ecology, botany, sociology, ornithology, forestry and GIS mapping. The specialist members of the team and their roles in the assessment are presented in Table1 below.

Table 1: Summary of assessment teams

S/N	Name	Organization/company	Ass.	Role in the assessment
1.	Mr Abraham Baffoe	Proforest	HCV & HCS	Assessment oversight and Ecology, social/land use planning Social team leader. Licensed ALS15006AB
2.	Dr Michael Abedi-Lartey			Assessment Coordination
3.	Dr Armand Yevide			Flora survey coordination plus GIS and mapping
4.	Mr Aristotle Boaitey			GIS and community consultation / Social Expert
5.	Mr Nana Darko Cobbina		HCV & HCSA	Lead Assessor (Licensed ALS15034NC)
6.	Ms. Laura Bachellerie		HCSA	HCSA Practitioner and review of patch analysis (ALS20003LB)
7.	Dr Augustus Asamoah		HCV	Conservation and wildlife management
8.	Mrs Helena Tettey		HCV	Participatory mapping, stakeholder consultations
9.	Mr S. Afolabi Kumoye	Independent consultant	HCV	Forest inventory, botanical survey
10.	Dr Adesoji A. Adeyemi	Federal University of Technology	HCV & HCS	Botanists/Flora survey Independent consultant
11.	Mr F.A. Afolabi	Foremost Development Services Limited	ESIA	M.Sc. Development Planning Overall job execution and delivery
12.	Mr A. A. Olanigan		EIA	M.Phil. Environmental Management & Protection Projection Coordinator
13.	Mrs Engr. Rofiat Badmos			B.Eng. Mechanical Engineering Operations
14.	Dr Oyebode T.A			Ph.D, Agric Economics Member, Social Impact Assessment (SIA)
15.	Pr Myke O. Omoigberale			Ph.D, Forestry and Wildlife Vegetation studies, Flora and Fauna
16.	Dr Nosakhare Erhunmwunse			Ph.D, Forestry and Wildlife Vegetation studies, Flora and Fauna
17.	Mr Hakeem Olajobi			M.Sc. Remote Sensing and Geographic information System GIS Expert
18.	Dr Femi Oyediran			Ph.D, Environmental Management & Protection Environmental Monitoring; Field work coordinator
19.	Pr Idris A. Ayinde		SIA	Ph.D, Agric Economics Team Leader, Social Impact Assessment (SIA)
20.	Sakiru Oladele Akinbode			Ph.D, Assessor (SIA)
21.	Tesleem Tunji-Bello			B.Sc, Field Assistant (SIA)
22.	Mr Florent Robert	Siat – Group	Coo.	Sustainability Specialist
23.	Mr Paul Hameed	Siat - Presco Plc	FPIC	Participatory mapping, stakeholder consultations
24.	Mr Arnaud Leidgens	Siat – Group	GIS	GIS Expert

1.2.3 Organisational information and contact persons

Table 2: Siat and Presco information and contact persons

Name of organisation:	Presco Plc.
Nature of business:	Oil palm plantation development; and extraction, refining and fractionation of crude palm oil into finished products
Address:	Obaretin Estate, Km 22, Benin - Sapele Road Ikpoba-Okha Local Government Area Benin City, Edo State, Nigeria
Existing estates:	Obaretin estate (in Edo State), Cowan estate (in Delta State), and the Ologbo Estate (in Edo State)
Contact person:	Felix O. NWABUKO, MD - Florent ROBERT, GSM
Email:	felix.nwabuko@siat-group.com - florent.robert@siat-group.com
Telephone:	+234(0)8131673977 - +233(0)243200233

1.2.4 Personnel involved in planning and implementation of assessment

Table 3: Personnel involved in Planning and Implementation of Assessment Recommendations

Names of Staff	Designation	Responsibility in HCV Planning and Implementation
Felix Nwabuko Gerald Ray	MD COO	Allocation financial resources and when required, authorized plan and manage the overall operation at each level
Anthony Uwajeh	CRO/ Relations Manager	Organise community consultations and other cooperates consultations
Emmanuel Wiafe	Estate Manager / Project Manager	Overall management of the estate, implement assessment recommendations and take correctives actions and drive the NPP process in collaboration with HSE team
Florent Robert	Siat – Group Sustainability Manager	Overall driver of the Assessment report implementation process in compliances with Statutory regulations and standards based on the recommendations.
Benedicta Elvis Ogbe Paul Hameed Matthew Ahuean	Presco HSE Team & Social Team	Field implementation of assessment recommendations, actions plans, verification and regular monitoring and reporting of progress, sensitization of contractors, workers and communities on the Conservation Areas with the concession and the need for their protections.
Eco -Guards	Field Team	Delineat HCV areas, monitor and gather conservation data regarding, protect and sensitize workers and communities members on HCVs
Arnaud Leidgens	Siat – group surveyor	GIS

1.2.5 List of Stakeholders Involved in the Process

Federal Ministry of Environment (FMEnv), Abuja

Ministry of Environment and Sustainability, Edo State;

Orhionmwon Local Government Area;

Table 4: List of directly and indirectly affected communities

Community	Representative name	Contact (+241)	Extension communities	Phase one communities	Situation
Ologbo-Nugu	Chief Gaius Eheneden	7037852119	X		Directly Affected
Evbonogbon	Chief Alfred	8134227396	X		
Orogho	Mr Kingsley Obakpolo	8034610058	X	X	
Owuo	Mr Earnest Erhahin	8056744899	X	X	
Obanakhoro	Mr Osazuwa Sunday	7089590168	X	X	
Iwevbo	Mr Omoefe	8143852875		X	Indirectly Affected
Ekigbe/Ugbigun	Mr John Palmer	8037594121		X	
Obagie-Nunuame	Mr Kingsley Obakpolo	8051856587		X	

1.2.6 List of legal documents, regulatory permits and property deeds related to area assessed

Table 5: List of legal documents, regulatory permits and property deeds related to area assessed

Legal document/ Permit/ property deed	Issue date	Issued by	Validity period
De-Reservation letter of 2,500ha of land in Urhonigbe forest reserve area.	28th April 2016	Edo State of Nigeria	NA
Certificate of Occupancy file no. EDL 40517 for plot no. 40517 covering area of 1790 ha.	29th November 2019	Edo State of Nigeria	25 years from 8 December 2017
Certificate of Occupancy file no. EDL 48131 for plot no. 48131 covering area of 650.5 ha.	29th November 2019	Edo State of Nigeria	25 years from 8 December 2017
Environmental and Social Impact Assessment (ESIA) Approval for proposed Sakponba Extension of Oil Palm and Rubber Development Project in Orhionwon LGA, Edo State, permit no. FMEnv/EA/EIA/4598/VOL.I/188 covering 3,150ha	13 November 2019	Federal Ministry of Environment	None

1.3 Land Clearing Plans

The development of the NPP area is planned to be carried out in 3 phases in year 2022, as indicated on the map below. The development of the three phases will also depend on the development capacities and could be delayed and occur in several years. The land preparation will only start when boundaries of the conservation areas are clearly demarcated and the remaining crops harvested. As for the first phase of Sakponba, soil preparation will be done by the sub-contractors established into the host communities.

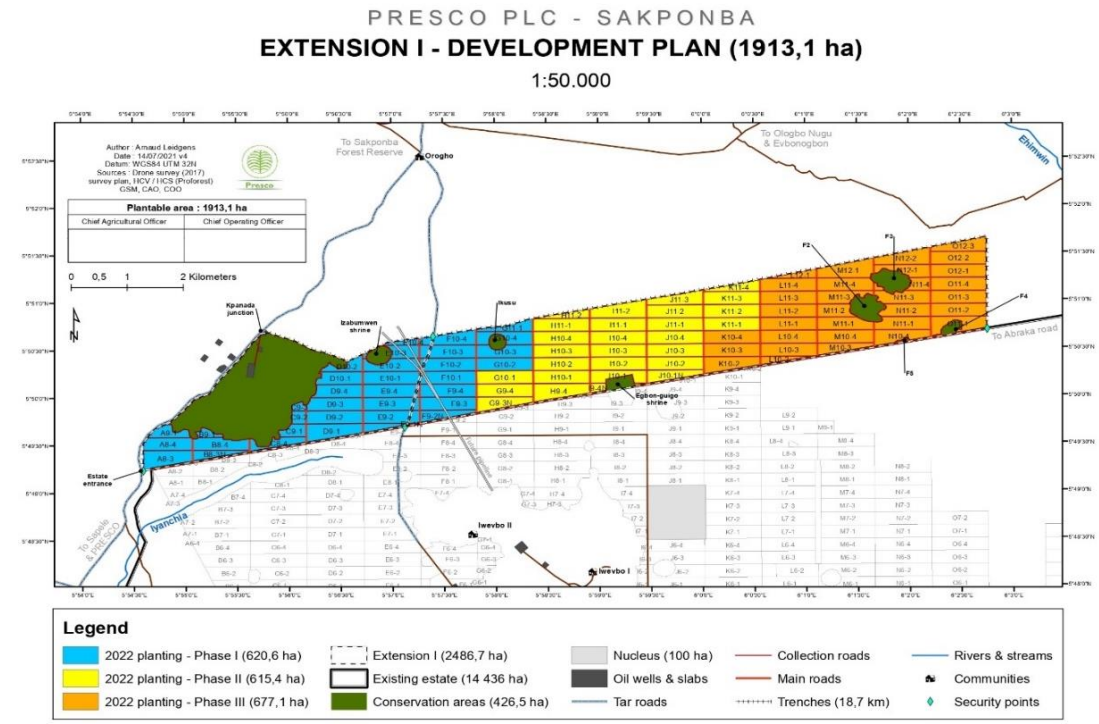


Figure 1: Sakponba Extension I Development Plan for 1913ha

Section 2: Maps

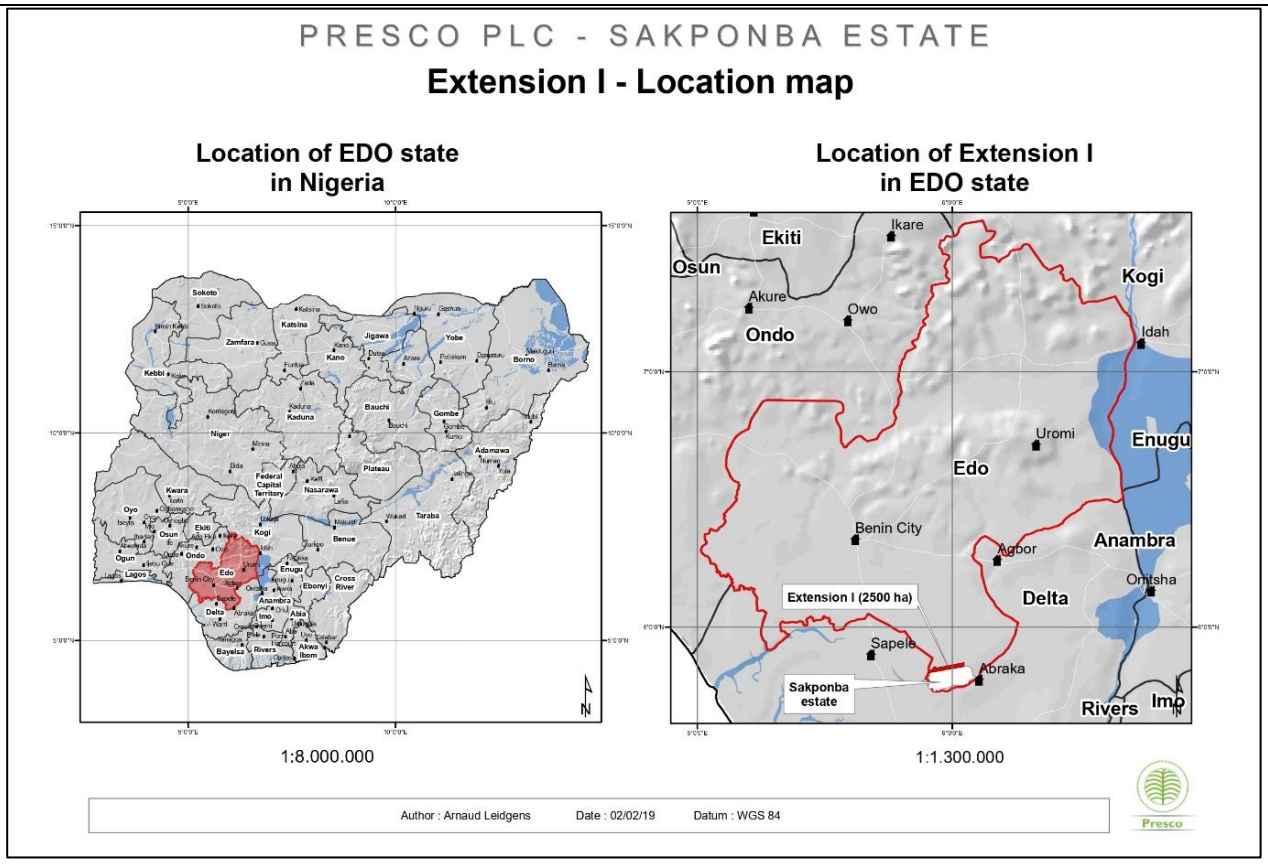


Figure 2: Sakponba Extension I Location Map

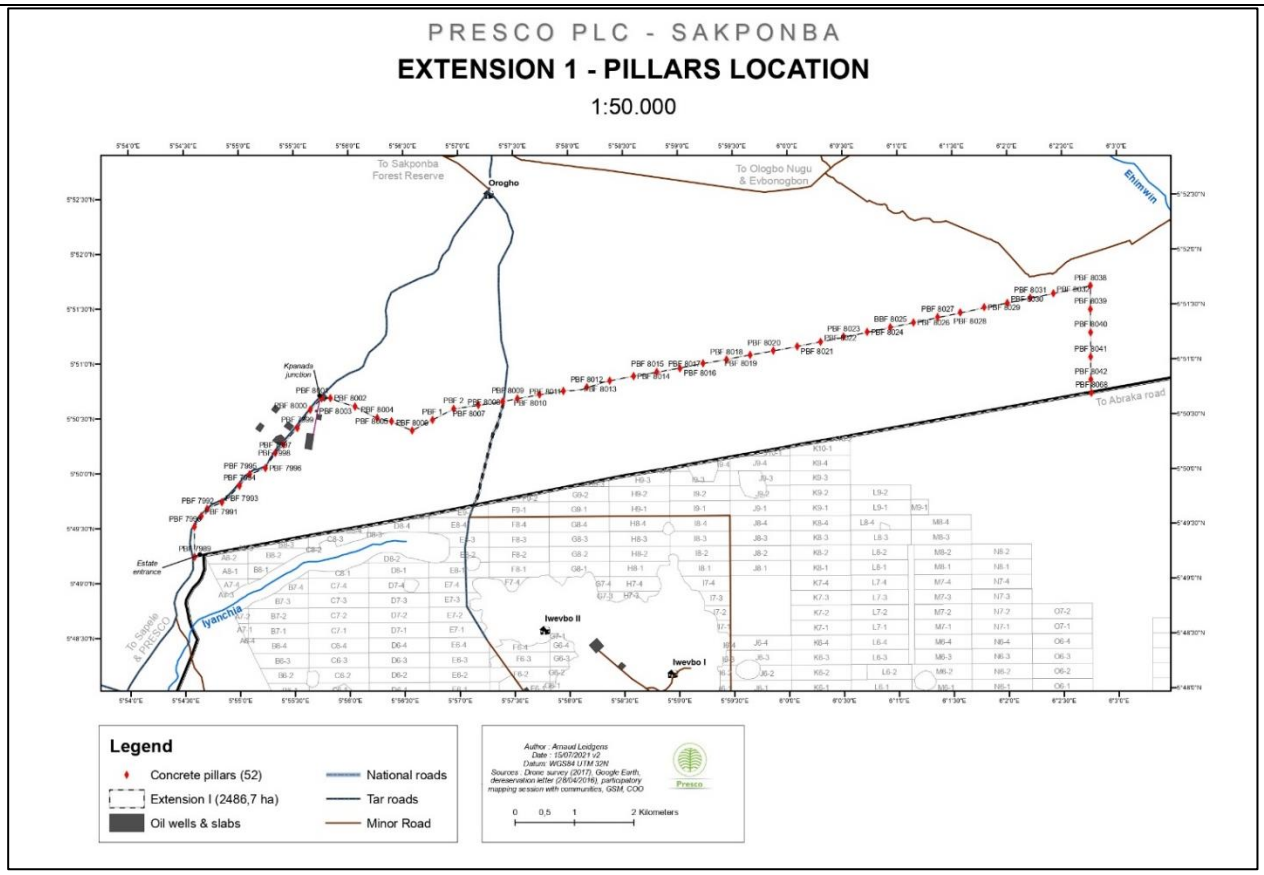


Figure 3: Sakponba Extension I Pillars Location

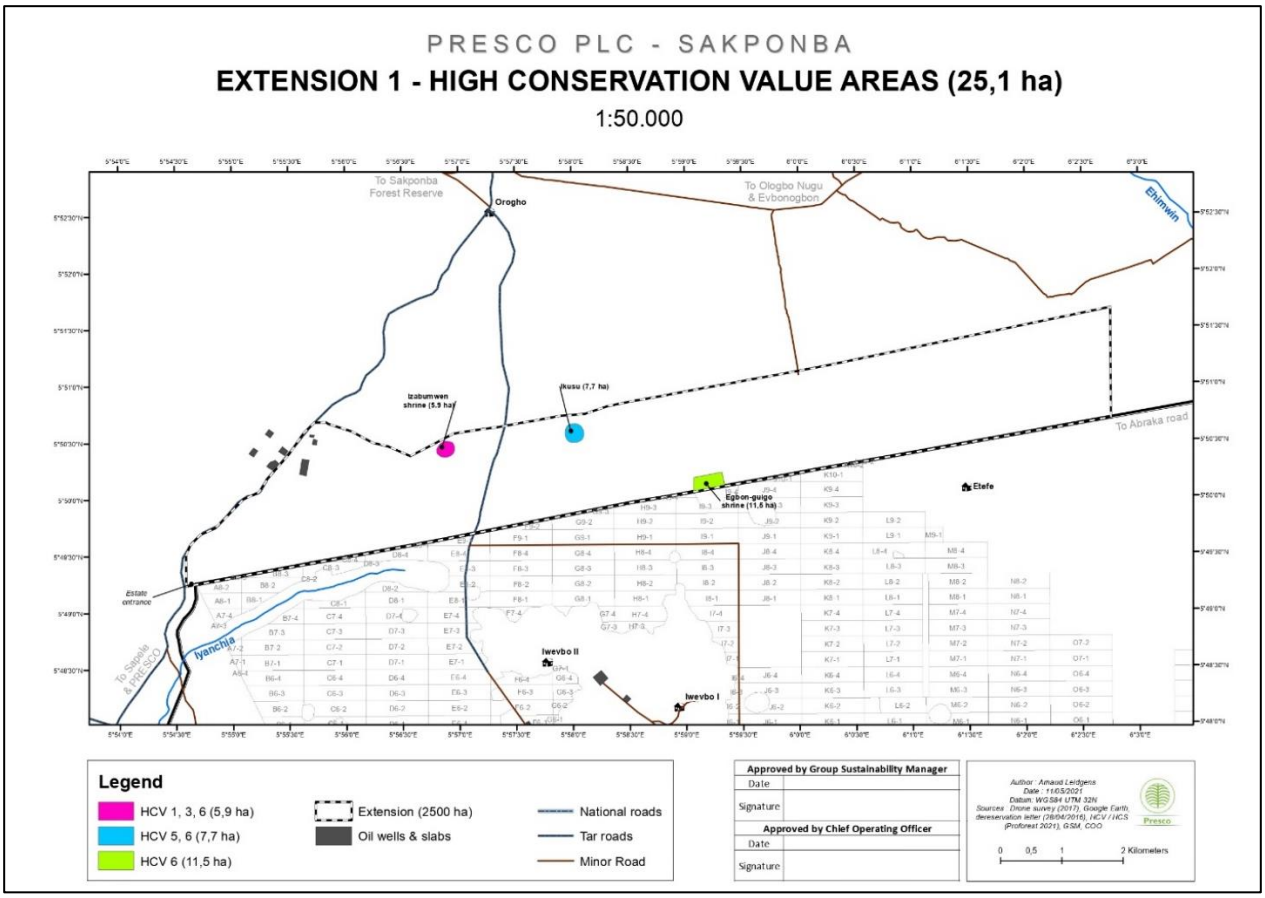


Figure 4: Sakponba Extension I High Conservation Value Areas

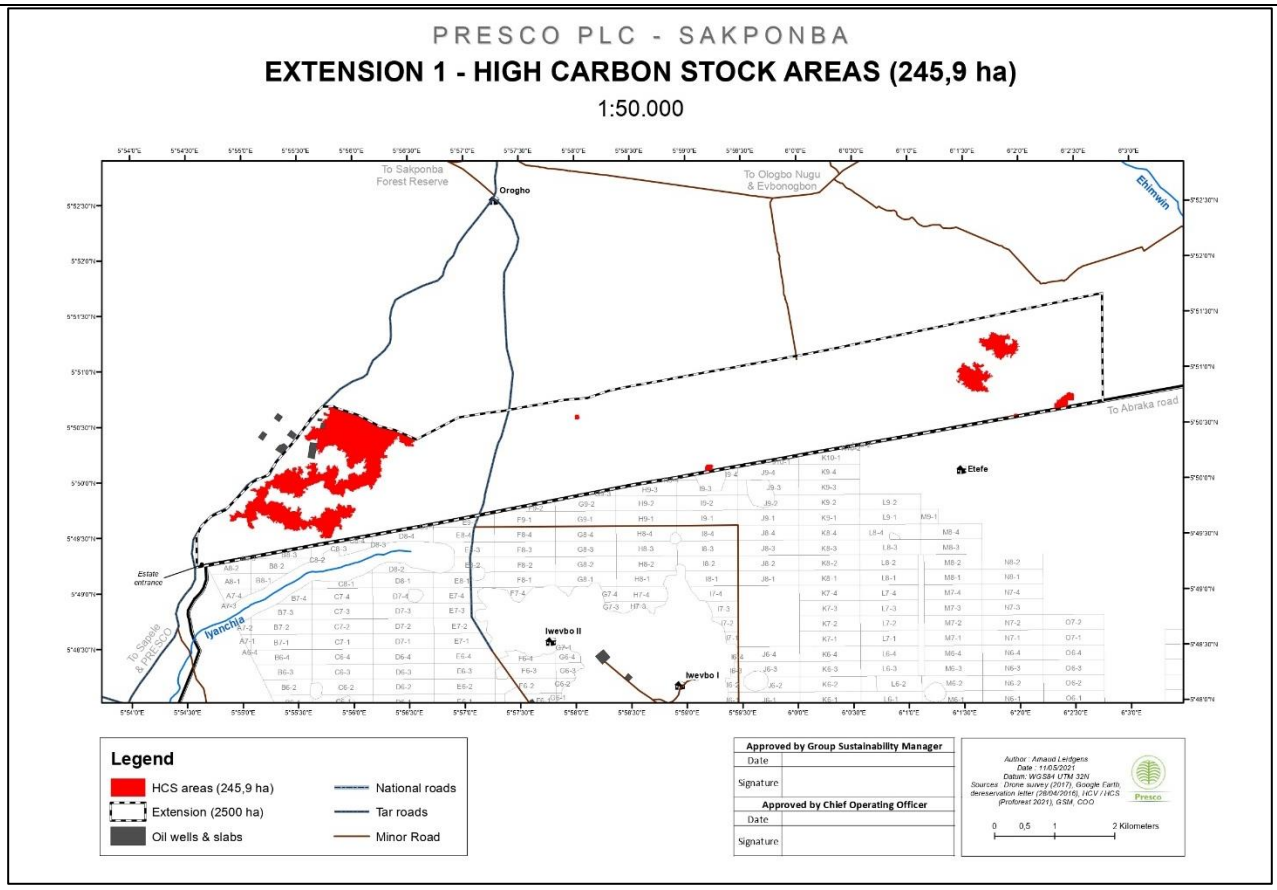


Figure 5: Sakponba Extension I High Carbon Stock Areas

Section 3: SEIA

3.1 Summary of SEIA

The Environmental and Social Impact Assessment (ESIA) of the Proposed Sakponba Extension of Oil Palm Plantation Development Project at Orhionmwon Local Government Area, Edo State, Nigeria was conducted by Foremost Development Services Limited and submitted for approval to the Federal Ministry of Environment, Abuja.

Date of EIA assessment report: August 2019

Date of SIA assessment report: November 2019

Dates of field data gathering for ESIA: 18th to 20th July 2018, 20-21 August 2018, 14th and 19th September and October 1st 2018

Stakeholder Consultations: 3 – 5 July 2018 and 1st October 2018

Assessor Designation and Company: Foremost Development Services Limited (Consultant)

3.2 ESIA Assessment Team

Table 6: Name of ESIA assessors

S/N	Name	Organization/company	Ass.	Role in the assessment
1	Mr F.A. Afolabi	Foremost Development Services Limited	ESIA	M.Sc. Development Planning Overall job execution and delivery
2	Mr A. A. Olanigan	Foremost Development Services Limited	EIA	M.Phil. Environmental Management & Protection Projection Coordinator

3	Mrs Engr. Rofiat Badmos	Foremost Development Services Limited	EIA	B.Eng. Mechanical Engineering Operations
4	Dr Oyebode T.A	Foremost Development Services Limited	EIA	Ph.D, Agric Economics Member, Social Impact Assessment (SIA)
5	Pr Myke O. Omoigberale	Foremost Development Services Limited	EIA	Ph.D, Forestry and Wildlife Vegetation studies, Flora and Fauna
6	Dr Nosakhare Erhunmwunse	Foremost Development Services Limited	EIA	Ph.D, Forestry and Wildlife Vegetation studies, Flora and Fauna
7	Mr Hakeem Olajobi	Foremost Development Services Limited	EIA	M.Sc. Remote Sensing and Geographic information System GIS Expert
8	Dr Femi Oyediran	Foremost Development Services Limited	EIA	Ph.D, Environmental Management & Protection Environmental Monitoring; Field work coordinator
9	Pr Idris A. Ayinde	Foremost Development Services Limited	SIA	Ph.D, Agric Economics Team Leader, Social Impact Assessment (SIA)
	Sakiru Oladele Akinbode	Foremost Development Services Limited	SIA	Ph.D, Assessor (SIA)
10	TesleemTunji-Bello	Foremost Development Services Limited	SIA	B.Sc, Field Assistant (SIA)

3.3 ESIA Methodology and procedure

The EIA study was carried out after due consultation with the Federal Ministry of Environment (FMEnv), and in accordance with the Ministry's Procedural Guidelines, and Terms of Reference (ToR) and scope of work, approved by the Ministry.

The biophysical socio-economic and health environments that might be impacted by the proposed project were ascertained from field data gathering, previous natural resources and environmental studies and in-house environmental records of the company spanning only wet season. Rainfall, temperature and sunshine hours (1995-2018), Relative Humidity, Wind speed and direction were obtained from meteorological record of Presco Plc at both Obaretin and Ologbo estates. The spatial boundary for the proposed plantation extension project is about 5km – 10km for affected communities from the project boundary.

3.3.1 Overall methodology

The overall methodology comprises of five steps as follows:

Step 1

- Identification and description of project phase.
- Associated activities and their possible interactions with environmental, social and health components.

Step 2

- Preliminary identification of potential impacts on environmental, social and health components

Step 3

- Screening for impact significance
- Elimination of activity of environmental interactions producing no effect;
- Selection of focus impacts for further assessments

Step 4

- Detailed assessment of selected focus impacts in terms of:
- Nature- positive or negative, direct or indirect
- Magnitude-qualitative and quantitative
- Areal extent-qualitative and quantitative
- Frequency
- Receptor sensitivity
- Duration including reversibility
- Cumulative effects

Step 5

- Final assessment and assignment of overall impact significance levels based on step 4 results and application of objective impact severity criteria and likelihood;
- Identification of impacts requiring mitigation.

3.3.2 Field Data Gathering

The field data gathering started with the wet season field data gathering including environmental parameters such as water quality, air quality, noise level, air temperature on 18th to 20th July 2018 as witnessed by FMENv official from Abuja, both days inclusive (see Annexure II), vegetation type, plant form/species was carried out on 20-21 August 2018 while Social Impact Assessment (SIA), data on socio-economic characteristics and land use were obtained between 14th and 19th September and October 1st 2018. The secondary data was obtained from approved ESIA study around the proposed project area. The Federal Ministry of Environment had granted the consultant's request for one season data. About 28 samples were obtained for environmental parameters which include 3 samples for groundwater, 2 samples for surface river, 23 sampling points for soil, air quality and noise measurements. Automatic reading equipment was employed to determine air quality, north and south of the project site.

3.3.3 Verification by the FMEnv:

The FMEnv visited the proposed plantation extension development project site in order to verify the proposals and statements in the Presco Plc's application for an environmental impact assessment permit

Table 7 : EIA Sampling Points and Controls

Sample Locations	North	East	Parameters Monitored
SKPEXT1 (Iyancha stream)	0644410	0825182	Surface Water
SKPEXT2 (Izabuewmen Lake)	0646451	0826561	Surface Water
SKPGW1 (Groundwater 1)	0643330	0832257	Borehole Water
SKPGW2 (Groundwater 2)	0643167	0831739	Borehole Water
SKPGW3_CTRL (Groundwater 3)	0650374	0827398	Borehole Water
Point 1	5°49'19.7"	5°54'56.7"	Air Quality, Noise Measurements and Soil
Point 2	5°49'49.5"	5°55'08.8"	Air Quality, Noise Measurements and Soil
Point 3	5°50'12.2"	5°55'47.3"	Air Quality and Noise Measurements and Soil
Point 4	5°50'12.7"	5°56'17.5"	Air Quality and Noise Measurements and Soil
Point 5	5°49'50.3"	5°56'14.5"	Air Quality and Noise Measurements and Soil
Point 6	5°50'19.7"	5°56'46.5"	Air Quality and Noise Measurements and Soil
Point 7	5°50'02.0"	5°57'19.5"	Air Quality and Noise Measurements and Soil
Point 8	5°50'09.8"	5°57'54.7"	Air Quality and Noise Measurements and Soil
Point 9	5°50'10.5"	5°58'28.8"	Air Quality and Noise Measurements and Soil
Point 10	5°15'48.0"	5°58'38.8"	Air Quality and Noise
Point 11	5°50'13.8"	5°59'05.1"	Air Quality and Noise Measurements and Soil
Point 12	5°50'19.6"	5°59'34.1"	Air Quality and Noise Measurements and Soil
Point 13	5°50'47.6"	5°59'31.2"	Air Quality and Noise Measurements and Soil
Point 14	5°50'26.8"	6°00'02.4"	Air Quality and Noise Measurements and Soil
Point 15	5°50'55.1"	6°00'06.2"	Air Quality and Noise Measurements and Soil
Point 16	5°50'27.2"	6°00'06.2"	Air Quality and Noise Measurements and Soil
Point 17	5° 51'0 .5"	6°00'47.5"	Air Quality and Noise Measurements and Soil
Point 18	5°55'02.8"	6°01'24.1"	Air Quality and Noise Measurements and Soil
Point 19	6°01'43.2"	5°50'46.9"	Air Quality and Noise Measurements and Soil
Point 20	5°51'12.2"	6°01'41.6"	Air Quality and Noise Measurements and Soil
Point 21	5°50'46.1"	6°02'23.9"	Air Quality and Noise Measurements and Soil
Point 22	5°51'10.5"	6°02'19.9"	Air Quality and Noise Measurements and Soil
Orogho Community (Control)	5°52'33.5"	5°57'22.6"	Air Quality, Noise Measurements and Soil
STN 1 (Security Outpost)	5°49'14.88"	5°54'38.16"	Biodiversity: Flora and Fauna
STN 2 (Seplat Field)	5°50'22.56"	5°55'32.88"	Biodiversity: Flora and Fauna
STN3 (Palm tree)	5°49'24.6"	5°55'28.56"	Biodiversity: Flora and Fauna
STN4	5°49'36.84"	5°56'26.88"	Biodiversity: Flora and Fauna
STN5 Water body (wetland)	5°50'26.45"	5°56'53.30"	Biodiversity: Flora and Fauna
STN6-I101	5°50'3.84"	5°59'09.24"	Biodiversity: Flora and Fauna
STN7 (Igbinehi)	5°50'10.32"	5°59'43.08"	Biodiversity: Flora and Fauna

STN8 (Existing Village with Cassava Mill)	5°50'14.28"	6°00'05.04"	Biodiversity: Flora and Fauna
STN9	5°50'18.96"	6°00'33.12"	Biodiversity: Flora and Fauna
STN10 (M-Cassava Farm)	5°50'25.44"	6°01'13.44"	Biodiversity: Flora and Fauna
STN11	5°50'31.92"	6°01'50.16"	Biodiversity: Flora and Fauna
STN12 (Etefe)	5°50'37.32"	6°02'19.32"	Biodiversity: Flora and Fauna
STN13	5°51'34.21"	6°02'40.16"	Biodiversity: Flora and Fauna

3.3.4 Consultations with and Participation by Stakeholders:

The Stakeholders identified were: (i) Federal Ministry of Environment (FMEnv), Abuja (ii) Ministry of Environment and Sustainability, Edo State; (iii) Orhionmwon Local Government Area; (iv) Project affected communities.

The objective of the consultation was to inform and educate stakeholders on details of the project, its justification, discuss the scope of study and the project's potential and associated environmental impacts, and obtain their views and comments.

Table 8: List of directly and indirectly affected communities

Community	Representative name	Contact (+241)	Extension communities	Phase one communities	Situation
Ologbo-Nugu	Chief Gaius Eheneden	7037852119	X		Directly Affected
Evbonogbon	Chief Alfred	8134227396	X		
Orogho	Mr Kingsley Obakpolo	8034610058	X	X	
Owuo	Mr Earnest Erhahin	8056744899	X	X	
Obanakhoro	Mr Osazuwa Sunday	7089590168	X	X	
Iwevbo	Mr Omoefe	8143852875		X	Indirectly Affected
Ekigbe/Ugbigun	Mr John Palmer	8037594121		X	
Obagie-Nunuame	Mr Kingsley Obakpolo	8051856587		X	

Table 9: Schedule of SIA Study

S/N	Communities	Date	Attendance			Contact Person	Contact Telephone
			Male	Female	Total		
1.	Ologbo-Nugu	July 3, 2018	14	02	16	Chief Gaius Eheneden	(07037852119)
2.	Owuo	July 3, 2018	17	02	19	Mr. Ernest I. Erhahon	(08056744899)
3.	Obanakhoro	July 4, 2018	15	04	19	Mr. Osazuwa Sunday	(07089590168)
4.	Iwevbo	July 4, 2018	20	07	27	Mr. Edevbie Emmanuel	(0703235855)
5.	Ekigbe/Ugbigun	July 5, 2018	39	10	49	Mr. John Palmer	(07055293986)
6.	Obagie-Nunuame	July 5, 2018	14	02	16	Mr. Kingsley Obakpolo	(08051856587)
7.	Evbonogbon	October1, 2018	40	0	45	Chief Alfred-Odionwere	(08134227396)
8.	Orogho	October 1, 208	35	0	35	Comrade Charlse Eghrauyi	(08034610058)

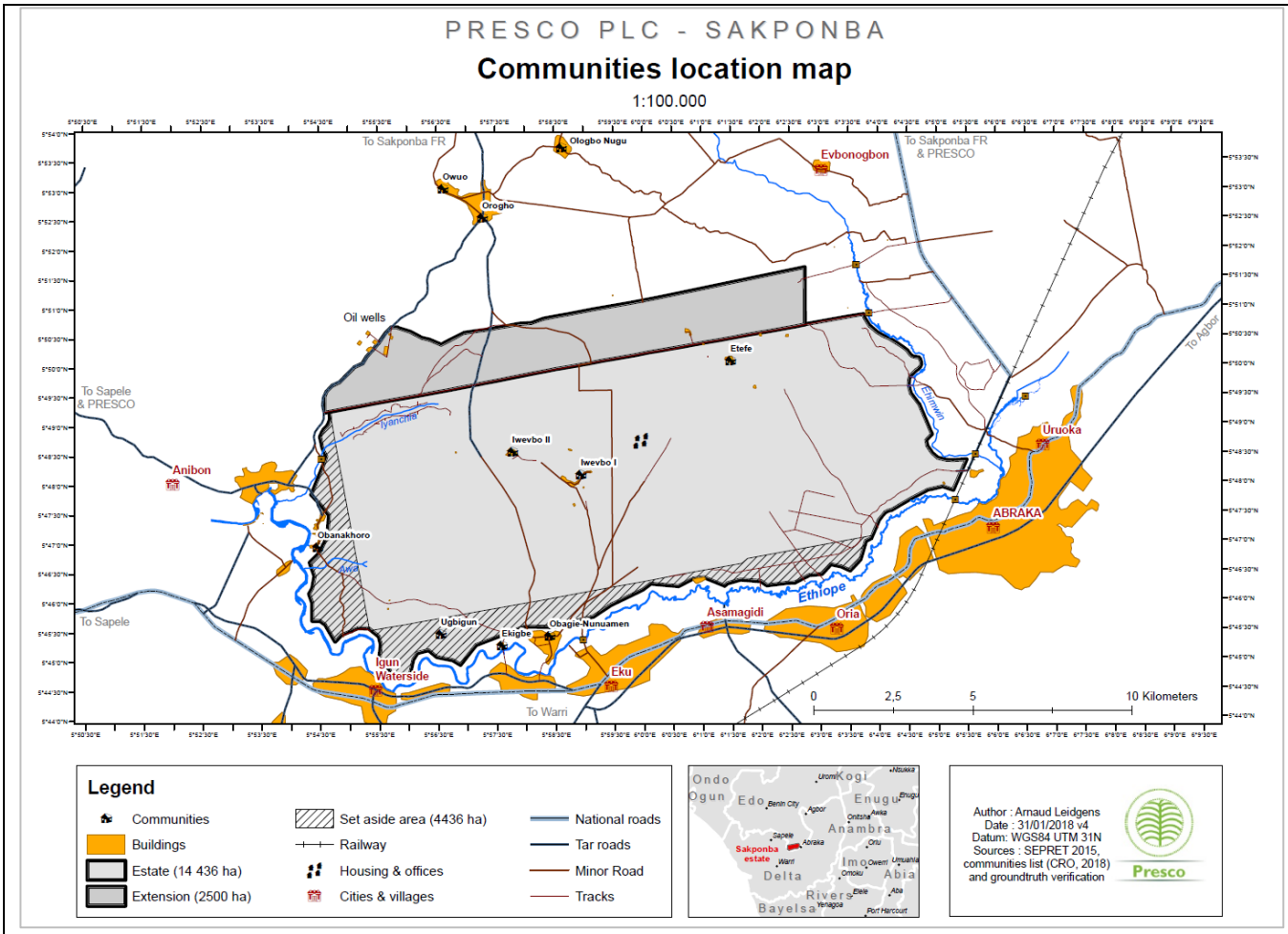


Figure 6: Sakponba Estate and Sakponba Extension I Communities Location Map

3.4 EIA Results

3.4.1 Impact Severity and Significance Evaluation

The overall methodology for assessing impacts of activities associated with the proposed project involves establishing impact indicators, and evaluating the potential effects of project activities on each project specific impact indicator. Impacts may be positive (beneficial) or adverse (detrimental). Impact indicators are easily identifiable environmental or socio-economic components that would readily indicate changes in environmental or socio-economic conditions. For the purpose of this project, the impact indicators selected are shown in Table 10.

In order to facilitate the process of impact assessment, a tabular checklist was developed from information provided by the client, to highlight the major activities and the key concerns in the project location.

Table 10: Matrix for Identification of Significant Activity Impacts of the Proposed Sakponba Extension Plantation Project on the Environment

ENVIRONMENTAL COMPONENTS	PROJECT ACTIVITY PHASES																			
	Site Preparation						Transplanting/ Planting				Upkeep & Harvesting								Decommission and Abandonment		
	Boundary Demarcation	Opening of Roads and Tracks	Land Clearing/Preparation	Stumping and Stacking	Vegetation & Soil Disposal	Heavy Machinery Use/Traffic	Tracing/Pegging/Lining	Cover Crop Establishment	Hole Digging	Seedling Planting	Weed Control	Fertilizer Application	Gaseous Emission	Pest Control	Phytosanitary Inspection	Pruning	Harvesting & Fruit Collection	Mulching	Laying off Staff	Lack of care of plantation	Equipment/Chemicals
Air Quality	-2	-2	-2	-1		-2	-2	-2	-2			-3	-3								
Noise level	-1	-2	-2			-3	-2	-2	-2			-3									
Vegetation	-2	-2	-2	-1		-2						-2									
Terrestrial Inverts.	-2	-3	-3	-1	-2	-2	-2		-1			-2				-1					
Wildlife	-2	-2	-2	-1		-3						-2									
Surface River Quality	-1	-1	-2											-3							
Groundwater														-3							
Soil/Land Pollution		-1	-1			-2		+2	-2	-2	-2			-4	-2						
Landuse/Landscape	-3	-2	-2		-2			+2		-1				-3	-1						
Demography									-1												
Employment/Income	+3	+3	+1		+2				+3												
Culture/Religion																					
Health/Accidents		-1	-2				-2		-2		-2	-3		-3	-2						
Community Relations	+3	+2	+2	+2			+2	+2	+2	+2	+2								-3	-2	
Economic loss																			-3	-2	

KEY: + Positive impact
- Negative impact
No impact = Blank Square
Minor effect, (very low) = 1 point in square
Moderate short term effect (Low) = 2 points
Moderate long term effect (Moderate) = 3 points
Major short term effect (High) = 4 points
Major long term effect (Very high) = 5 points

3.4.2 Significant Impacts

The proposed Sakponba extension of Oil Palm Plantation Development Project by Presco Plc offers a number of potential beneficial impacts to the affected communities of the project site and area beyond. These effects shall be enhanced throughout the duration of the project. Improved and more secured plantation development would benefit a broad range of individuals, communities and businesses throughout Nigeria. The project will substantially improve agricultural development by improving palm oil and specialty fats and oils production n that will continuously provide job opportunities for teeming youths in Nigeria.

In addition, the project will contribute to achieving some of the objectives of the Federal Ministries of Agriculture & Rural Development and Trade & Investment which include securing the social and economic benefits of an efficient Agricultural and Investment sector; considerably increasing Palm oil production to meeting its annual requirement in the country.

Moreover, the project will provide employment opportunities for qualified Nigerians (skilled, semi –skilled and unskilled) from the immediate project area and beyond. The employment opportunity will lead to acquisition of new skills and introduction of all manners of income generating spillover effects.

Other potential benefits of the project include:

- Add value to the existing production of the company
- Create additional jobs

- Contribute to the socio-economic development of neighbouring communities

3.4.3 Evaluation of Potential Impacts of Project Activities

Plantation boundary demarcation, Opening of roads and tracks, Site forest clearing and Maintenance of tracks and roads:

Existing farms and unharvested agricultural and economic crops and trees will be destroyed. Economic trees such as timber, raffia palms, cane plant, many trees that produce edible fruits and seeds, alligator pepper, large wide leaves for wrapping kolanuts and food items and some medicinal plants present in the area will be destroyed. Some areas of the fresh water swamps may be lost. Some siltation of rivers may occur if planting activities extend to river banks. These changes in the ecosystem may adversely affect some shellfish and finfish. However, Presco Plc will retain and maintain at least 50 meters of buffer vegetation on both sides of the river.

Wildlife such as the giant African land snail and amphibians in the sites may be killed. Snakes and mammals will relocate/emigrate to unfamiliar territories and some may get killed in the process. Birds will relocate or emigrate. Bush/forest clearing and exposure of land to wind and storm water will increase the potential for soil erosion and very high rate of evaporative groundwater loss in the area. The erosion control, cooling, shading and watershed-protection effect which trees provide will therefore be lost. However, the planting of cover crop immediately after land clearing will minimize the erosion to a great extent. However, these activities will give employment for unskilled labour in the communities around the project area.

Vegetation and Spoil Disposal:

Soil accumulated during harrowing and stumping and felled vegetation will have to be removed and deposited somewhere. Accumulation of soil spoils, if not removed, may alter water drainage pattern and reduce landscape beauty. Disposal of the vegetation and soil spoils will give opportunity for employment in the communities.

Ploughing, Grading and Levelling of Tracks and Roads:

There is the possibility of initiation of erosion because the topsoil in the affected areas is loose and coarse-grained.

Increased Transportation and use of Heavy Machinery during Land Preparation:

Wildlife presence in the affected area may be reduced due to unusual and frequent high level noise from tractor-drawn ploughs and harrows and chain saws. During the raining season, the access earth roads/tracks may be rendered inaccessible due to activity of these vehicles.

Weeding:

In mature oil palm plantation, unwanted weeds are removed from the ground cover by manual clearing with cutlass. There is then the problem of disposal of removed weeds which are therefore allowed to gradually decay or rot. Many invertebrate fauna may be killed during or after weeding. Weeding removes the cover for wildlife such as amphibians, snakes and small mammals. Predator birds such as the black kites and owls increase in numbers in recently weeded plantations to locate exposed and moving prey.

Herbicides, Fungicides and Insecticides Application:

Presco Plc uses Decis Organophosphate insecticide in the nursery only. The possibility of carriage of residue from the nursery to any surface river is extremely remote.

Fertilizer Application:

In order to increase productivity of oil palm fruit bunches per unit area, fertilizers are applied at various stages. At the nursery, in each bag of soils, fertilizers are applied such as NPK, borax, potash, sulphate of ammonia. Ashes of burnt kernel shells from boiler furnace are also applied as fertilizers. Not all nutrients added to the soil as fertilizers are taken up by the growing palm. Residues (NO3, PO4) may remain in the soil and end up in surface waters through storm water runoffs or be leached out of the soil and enter groundwater. High nitrate level in drinking water sources cause health risks particularly in children. It reacts with haemoglobin causing

methehaemoglobinema which impairs respiratory gases transport. Nitrites and nitrates can form nitrosamines, which are carcinogenic, mutagenic and tetratogenic (Odiete, 1999). At Presco Plc, the ashes from the boiler furnace and palm kernel cake make excellent fertilizers and are applied widely throughout the entire plantation. Nursery seedlings are transferred with the soil in the bags during planting and transplanting. Therefore, the possibility of high levels of nitrite and nitrates in groundwater is very remote.

Decommissioning and Abandonment

- Permanent and casual workers will be laid off resulting in loss of employment and income, although severance payment will also be made to permanent workers. But this can itself give rise to strained relations between workers/community and the company.
- The plantation will no longer be regularly and properly maintained including no weeding, no pest control, no maintenance of roads and tracks, no pruning of palm fronts. There will be great economic loss to the company and shareholders and the nation. The plantation will become densely populated by weeds, pests and many invertebrates' fauna and small to medium size wildlife.
- The land area might need to be restored back to its original state and this includes felling the palm trees as well as planting trees. This will portend a great economic loss to the company in addition to the already incurred losses.
- Removal of equipment and ancillary facilities such as chemicals, ploughs, tractors, harrows, trucks and other farm machinery will generate excessive noise and also a potential for accident.
- Return of land area to State Government which can generate conflicts between the affected communities and the local authority.

3.4.4 Significant Impact Producing Activities

Based on a score of -4 point to -2 (i.e. -4, -3 and -2) as shown in Table 10, the significant impact producing activities (IPAS) are as follow:

- Plantation boundary demarcation which may be a source of conflict with the migrant/settler communities.
- Opening of roads and tracks in swampy areas will initially adversely impact water quality of freshwater swamps; it will provide access roads to farms of communities and provide opportunity for employment during construction and maintenance phases of the project.
- Site clearing will produce many beneficial and adverse impacts.
- Stacking, Stumping and restacking; this may create huge cavities in the soil and become a source of soil erosion.
- Peg Preparation; this will impact negatively on both wildlife fauna and flora.
- Holing and transplanting seedlings; it can impact negatively in terms of safety of workers if not handled carefully.
- Weeding in young plantation and manual removal of unwanted weeds with cutlass in mature planting.
- Fertilizer Application; In Presco Plc, mainly ash from boiler is applied. Also, other chemical fertilizer application may affect groundwater as a result of runoffs and leaching.
- Pruning, harvesting and collection of fruit bunches
- Use of diesel machinery and powered generators for electricity generation
- Transportation of Fresh Fruit Bunches (FFB) to the palm oil mill at Obaretin estate for processing pending the time new palm oil mill will be constructed at Sakponba.
- Laying off workers/Severance Payment
- Lack of care of plantation
- Decommissioning and abandonment have three main activities which will produce adverse impacts

3.4.5 Project Specific Cumulative Effects' Assessment

Cumulative impacts are changes to the environment that are caused by an activity in combination with other past, present and future human activities. This section evaluates the cumulative effects of the individual impacts evaluated in the preceding sections.

Public Services:

There would be no impact to public services under the proposed project action. The project will not introduce any additional long-term population or employment into the area that would necessitate any additional demand for police or fire services or the need for new or altered facilities. No damage to roadways is expected beyond that which would be considered normal wear and tear and it is basically within the company's land concession. Therefore, the proposed project would result in negligible impact on public utilities.

Employment Opportunities:

There will be some beneficial impacts that are cumulative that are in the employment sector. During the operational phase of the project, the plantation will employ workers – majorly Nigerians. Positive cumulative social benefits include gainful employment and tax being paid to government coffer.

3.4.6 Health Impact Assessment (HIA) of the Proposed Sakponba Extension Project

The health impact assessment of the proposed project is a rapid appraisal of the likely health impacts the project might have on the totality of the environment. The assessment will consist simply of a summary table and a conclusion. The summary table shall list the intermediate factors and their likely impacts with minimal qualification.

Table 11: Summary of Health Impacts of the Proposed Sakponba Extension Project.

Intermediate Factor	Affected Group	Health Impact	Mitigation measures
Air quality Dust and gaseous emissions from land preparation and vehicular emission leading to high suspended particulates in the atmosphere.	All*	- Allergy - Eye irritation - Nose irritation Respiratory Tract Infections	The Company shall ensure the following: - Low-emission/high efficiency engines shall be used. - Regular maintenance of vehicles to ensure optimal performance - Movement of men and materials shall be properly coordinated to optimize vehicle use and resultant emissions. - Dust and particulate barriers shall be used during operation. - Avoid burning on site (i.e. zero burning).
Noise and vibration Noise emissions generated by heavy duty vehicles and workers activities and resultant	All	- Hearing impairment, hypertension, annoyance, sleep disturbance of site workers. - Hand-Arm Vibration Syndrome (HAVS)	The Company shall ensure the following: - Noise attenuation measures such as installation of acoustic mufflers onlarge engines and equipment; - Hearing protection shall be providedand usage enforced for workers on site. - Plantation operations will be duringdaytime only. - Cold exhaust air are kept away from pneumatic tools and away from the hands. - Workers take breaks from working with tools. - Workers should rest for at least 10 minutes per hour. - Workers use gloves that cover the fingers

Water Quality and Hydrology Water body turbidity and euthrophication from runoff and from the plantation. Improper storage and handling of, hydrocarbons, fuel and other chemicals would inevitably result in spillage during construction activities.	All	- Illnesses including Typhoid, Cholera, Dysentery, Polio, Hepatitis	The Company shall ensure the following: - Controlled usage of fertilizer and provision of buffer zone between planting area and water bodies. - Put in place adequate contingency measures to curtail accidental spills and ensure spill containment equipment shall be available at the construction site - In order to reduce ground contamination, an impervious sump or container shall be placed under the spigots of fuel drums to collect drippings. - Re-fuelling and maintenance of heavy construction vehicles at the site, shall be done at specified areas or makeshift "depots" where measures are in place to deal with spillages and temporary storage of oily waste. Preferably these depots shall be located in an area that would ultimately be permanently paved (e.g parking lots) thereby covering any contaminated soil. - A thick layer of sawdust or absorbent would be used to absorb any spillages. Subsequently, this layer shall be removed for proper disposal. In the event of a large spill, the latter will be cleaned up immediately by excavating the contaminated soil and removing it in a secure vehicle to an approved disposal site. - Nutrients (such as fertilizer and soil conditioner) application shall not be done during heavy rainfall (Peak of rainy season).
Solid Waste Solid waste constituting aesthetic nuisance Sewage nuisance	All	- Improper solid waste handling can lead to thefollowing: - Creating conditions favourable to the survivaland growth of microbial pathogens - Causing infectious and chronic diseases especiallythe waste workers.	The Company shall ensure the following: Waste is contained and removedregularly through its own waste management system already in place.
Hostility - Land acquisition and take- over Conflicts between the communities and the company. - Industrial disputes	Workers and communities	- Youth restiveness - Persistence conflicts between community andcompany - Hostages	The Company shall ensure the following: - Grievance and conflict resolution mechanism is instituted. - Employ as much local labour as possible. - Adequate stakeholders forum and information shall be given to stakeholders. - Adequate compensation shall be paid to permanent workers in case of any eventualities.
Health and Safety - Accidents, Vehicular, slips, falls, trips etc - Carcinogenic/Toxic/Chemical hazards: corrosive substances - Poor chemical handling - Asphyxiating atmosphere - Road Traffic Accident	All	- Health hazards that can arisefrom poor health and safety include: - Occupational health problems such as terminal diseases and/orprolonged ill health - Permanent Loss Injury	The Company shall ensure the following: - Wearing of ear protection. - Safe storage areas shall be identified and retaining structures constructed prior to thearrival of material. - Hazardous materials (e.g. agrochemicals, fuels) shall be properly stored in appropriatecontainers and shall be safely locked away. - Conspicuous warning signs (e.g. 'No Smoking') shall be posted around hazardouswaste storage and handling facilities.

- Wrong use of PPE - Inadequate PPE - Inadequate equipment/surface guardon equipment - Low awareness		- Temporary Loss Injury	The Company shall ensure the following: - Guideline on safe handling of chemicals(SHOC) and appropriate PPE are provided. - Guideline on traffic control to ensure besttraffic safety practices on the road. The Company shall ensure: - Awareness training - Sufficient PPE are provided The Company shall ensure: - Equipment specifications are made available. - Provision of adequate training to workers. - Provision of warning signs to workers and commuters.
Waste Management - Wastes constitute aesthetic and pollution issues for the project area Accumulated waste could lead to contamination of soil/groundwater and breeding grounds for vectors and rodents	All	- Health hazards associated with poor waste management include: - Skin and blood infections resulting from direct contact with waste. - Different diseases such asintestinal infections that result from poor waste management. - Genetic mutilation - Reduction in aquatic food supply - Disruption of food chain	The Company shall ensure the following: - A site waste management plans althoughalready in place shall be prepared prior to project commencement. This shall include designation of appropriate waste storage areas, collection and removal schedule, identification of approved disposal sites, andsystem for supervision and monitoring. - Preparation and implementation of theplan shall be the responsibility of Presco Plc with the system being monitored independently. - Waste generation shall be properlycontained to avoid contamination of groundwater.
Sewage Feacal aesthetic issues for the projectarea. Spillage of septic quor	Workers	- Cholera - Dysentry - Infectious and chronic diseases	The Company shall ensure the following: - Onsite toilets shall be made available foruse
Socio-economic Promiscuity Sexual harassment Youth Militancy Unemployment Grievances	All	- Sexually transmitted diseases (STDs) - HIV/AIDS - Population explosion	The Company shall ensure the following: - Public enlightenment about potentialhealth risks (STDs). - Facilitate education/enlightenment aboutthe project and its nature. - Appropriate policies
Workers' Welfare Especially when worker leaves the organization and/or layoff.	Workers	- Depression - Hypertension - Workers' restiveness	The Company shall ensure that: - Workers receive their full benefits when leaving the organization.
Corporate Image The negative corporate image arising from day-to-day activities of the organization,	Company	- Annoyance - Depression	The Company shall always: Ensure that its day-to-day activities and operations do not portend bad image about the organization to the general public and therefore operate according to the best industry standards and practice.

* *Totality of the Environment including Flora and Fauna and Humans.*

Table 12: Checklist for Health Impact Assessment of the Proposed Project

	Effect on Health		
	Good	**None**	**Bad**
Employment	✓		
Income	✓		
Workplace	✓		
Housing	✓		
Transport	✓		
Built Environment		✓	
Air Pollutants			✓
Water pollutants			✓
Noise			✓
Amenity		✓	
Lifestyle	✓		
Social Cohesion		✓	
Parenting		✓	
Education	✓		
Use of health services	✓		
Other cause of public concern		✓	

3.5 SIA Results

3.5.1 Potential Positive Social Impacts

The following are some of the potential positive social impacts of the proposed Sakponba extension of oil palm plantation development project:

Creation of Employment:

The proposed project if implemented can create thousands of new jobs. The various activities including palm and rubber nursery development and maintenance, plantation land preparation, planting, harvesting and tapping are all labour intensive activities and can also give employment to the eight affected communities; a potential tool for reducing rural unemployment and rural poverty. From the findings of socio-economic survey, the estimated population of the eight affected communities is about 24,360 (community sources).

Improved Planting Material:

Introduction of high yielding types of oil palm and sustainable management of palm plantation practices.

Capacity Building:

Training and capacity building for employees and smallholders if any, including knowledge and technology transfer in the application of best practices and delivery of World class products and services in the oil palm and rubber industry.

Corporate Social Responsibility:

Development of the local communities through Corporate Social Responsibility of Presco Plc.

Taxes:

Tax revenue for the Edo State Government.

Smallholder Development:
Potential for smallholder schemes.

SME Development:

Commercial opportunities for small and medium scale enterprises including petty trading.

Infrastructure Development:

It is anticipated that the corporate social responsibility of Presco Plc will include different infrastructure development projects for the communities. It was obvious from socio-economic survey that the communities of proposed Sakponba extension of Oil Palm Plantation Development Project lack the desirable infrastructure out of prolonged government neglect. The eight communities are therefore of the opinion that the proposed Sakponba extension project will come with considerable infrastructure development in the respective communities.

Table 13: Analysis of the Positive Impacts of the Proposed Sakponba Extension Project

S/N	Impact	Certainty of impact	Extension of the impact	Durationof impact	Frequency of impacts	Period of Manifestation
1.	Employment opportunities	Certain	Within and outside the community	Project duration	Frequent	At inception and throughout project life
2.	Increased economic activities	Certain	Within and outside the community	Persistent	Frequent	At inception and throughout project life
3.	Reduction of youth restiveness	Certain	Within the community	Project duration	Infrequent	At inception
4.	Increased income	Certain	Within and outside the communities	Project duration		At inception and throughout project life
5.	community development	Certain	Within the communities	Project duration	Frequent	At inception and throughout project life
6.	Technology Transfer	Not certain	Within and outside communities	Project duration	Infrequent	At inception and throughout project life
7.	Increased local remittances	Certain	Within and outside the communities	Project duration	Frequent	Throughout the project life
8.	Infrastructural development	Not certain	Within the communities	Project	Infrequent	Throughout the project life

3.5.2 Potential Negative Social Impacts

The potential negative social impacts of the proposed Sakponba extension of oil palm development project includes:

i) Loss of farmlands, community conservation and forest products collection areas.

ii) Impacts on food insecurity and prices of food products.

iii) Influx of plantation workers and potential impacts on family structures and social networks.

iv) Water pollution due to agro-chemicals, sewage from worker's camps

v) Potential conversion of traditional conservation areas including riparian vegetation.

vi) Pollution from hazardous substances.

vii) Impacts of increased traffic including heavy vehicles and construction activities.

viii) Noise pollution from plantations machineries.

ix) Exposure to health hazards including HIV.

x) Adulteration/destruction of indigenous cultural values.

xi) Impacts on public facilities (e.g. public structures)

xii) Impacts on already deplorable infrastructure (roads, water)

xiii) Potential for conflicts with farmers whose farmlands have been taken over and no proper resettlement plan designed for them.

xiv) Potential for communal conflicts: the entry and operation of Presco Plc may give rise to intra and inter communal conflicts through the promotion and entrenchment of vested interests within and among the communities. The allocation of resources and support (employment, contracts, CSR projects etc.) by the company may raise equity question and thus become a source of conflict, chaos and anarchy within and between the communities

xv) Cultural mix of values: this is another source of social conflicts. Since people from different backgrounds and all walks of life will come to the proposed project to work, they will definitely mix with other members of the communities. The process of blending and integration will result to certain influences which if not properly managed will affect the overall cultural values of the various communities.

Table 14: Analysis of the Negative Impacts of the Proposed Sakponba Extension Project

S/N	Impact	Impact Significance	Extensionof the impact	Durationof impact	Frequencyof impacts	Period of Manifestation
1.	Loss of farm lands	Certain	Within the community	Persistent	Infrequent	At inception
2.	Destruction of economic trees	Certain	Within the community	Persistent	Infrequent	At inception
3.	Under-payment of compensation	Not certain	Within and outside the community	Project duration	Infrequent	At inception
4.	Destruction of Community physical assets	Certain	Localised within contiguous communities	Project duration	Infrequent	At inception
5.	Blockage or narrowing of access road	Not certain	Within the community	Project duration	Frequent	At inception
6.	Risk of contracting STDs	Not certain	Within and outside the community	Project duration	infrequent	Throughout the project life
7.	Noise pollution	Certain	Within the community	Project duration	Frequent	Throughout the project life
8.	Cultural erosion	Certain	Within and outside the community	Project duration	Frequent	Throughout the project life
9.	Potential conflicts	Not certain	Within and outside the community	Project duration	infrequent	Throughout the project life

Section 4: ALS HCV and Standalone HCSA assessment

4.1 Overview of ALS HCV Assessment and Standalone HCSA assessment

The ALS HCV and Standalone HCSA assessment of the NPP area were both conducted by Proforest as per the following documents:

1) High Conservation Value Assessment of Presco's Sakponba Extension I Concession in Edo State, Nigeria, Full Assessment Report (Version II) dated April 2019 and Public Summary Report dated July 2019

   ALS Satisfactory Date Obtained (ALS HCV assessment): 30 July 2019

   HCV Network site link: https://hcvnetwork.org/reports/hcv-prescoaes-sakponba-extension-i-concession-nigeria/

   Name of Lead Assessor: Nana Darko Cobbina

   ALS Number: ALS14034NC (Full license)

   Dates of assessment: January to June 2018

   Size of assessment area: 2,500 hectares

   HCV areas: 25.07 ha

   HCV management areas: 25.07 ha

2) High Carbon Stock Assessment of Presco's Sakponba Extension 1 Concession in Edo State, Nigeria dated 20 April 2021

   HCSA peer review completion date and link to HCSA summary report (HCSA website): 11 November 2021

   https://highcarbonstock.org/registered-hcsa-and-hcv-hcsa-assessments/

   Name of Lead Assessor: Nana Darko Cobbina

   ALS Number: ALS14034NC (Full license)

   Dates of assessment: 12 – 21 September 2020

   Size of assessment area: 2,500 hectares

4.2 HCV Assessment Team

Table 15: HCV Assessment Team roles and expertise

Name	ALS License	Institution	Role	Expertise
Nana Darko Cobbina	ALS15034NC (Fully licensed)	Proforest	Lead Assessor	Social and participatory mapping
Abraham Baffoe	ALS15006AB (Fully licensed)	Proforest	Social team leader	Forest Ecology, and social expert
Dr Armand Yevide	N/A	Proforest	GIS expert	GIS/Mapping/ Hydrology
Dr Michael Abedi-Lartey	N/A	Proforest	Fauna assessment team leader	Conservation and wildlife management
Dr Augustus Asamoah	N/A	Proforest	Fauna assessment team member	Conservation and wildlife management
Aristotle Boaitey	N/A	Proforest	Social assessment team member	Social expert, GIS, Natural resources management
Helena Tettey	N/A	Proforest	Social assessment team member	Participatory mapping, stakeholder consultations

Dr. Adesoji A. Adeyemi	N/A	Independent Consultant	Flora survey team leader	Botany and ecology expert
S. Afolabi Kumoye	N/A	Independent Consultant	Flora survey team member	Forest inventory, botanical survey

4.3 HCV Assessment Methodology

4.3.1 Assessment Timelines

The field assessment was conducted from 26th February to 9th March 2018 as per the timelines below.

Table 16: HCV assessment timelines for Sakponba Extension I concession

Process steps	Main activities	Dates						
		Aug 2017	Jan 2018	Feb 2018	Mar 2018	Apr 2018	May 2018	Jun 2018
Pre-assessment	Review of data and information from Presco and other sources							
Field assessment	Preparation of Full HCV assessment proposal andcontracting							
	Botanical and fauna survey including ecosystem typing							
	Participatory mapping and identification of social HCVs							
Communities and stakeholder consultations	Communities consultations							
	Consultations with state and local government agencies, experts and NGOs							
Analysis drafting of report	Analysis of field data and drafting of report							
Quality Review of report	Quality Panel reviews							
Finalization of report	Report will be finalised and submitted to the client following approval by the HCVRN.							

4.3.2 Assessment methods

The assessment was carried out in a pre-assessment phase (desk-based), and a full HCV assessment (on-site) phase. The pre-assessment included desk and web- based research, and review of documents of the assessment area and adjoining landscape. This included previous assessment reports, surveys and studies, maps, and satellite imagery, which served to identify key landscape concerns related to the concession.

Scoping

Proforest has previously carried out several HCV assessments in the landscape including at Cowan, Obaretin, Ologbo and the adjacent Sakponba concession (Figure 6). The Public Summary Reports for Ologbo and Sakponba concessions are available at https://www.hcvnetwork.org/als/public-summaries) The Lead Assessor and some of the assessment team members are also thoroughly familiar with the area due to their engagement in previous HCV assessments in the landscape and have sufficient knowledge about the bio-physical and socio-cultural context. During these previous engagements, several stakeholders including NGOs and government agencies were consulted – there results of which consultations remain relevant.

4.3.3 Desk-based study and literature review

A desk study was conducted, which entailed gathering and reviewing existing relevant reports and studies. Relevant documents reviewed included those provided by Presco, such as maps, shapefiles and results of independent studies conducted in the area. These provided the assessment team with a better understanding of the geo-physical landscape setting, biological, and the socio- economic setting of the assessment area to support the identification of potential HCV values.

The team further reviewed shapefiles and maps of the area to identify road and river networks and settlements; as well as a land cover analysis and classification to guide fieldwork. Additionally, the team compiled the list of IUCN Rare, Threatened and Endangered (RTE) species potentially present in the Lower Guinean Forest. This list was combined with the species list from the CBD 4th National Report of Nigeria (2010) which provides conservation status of flora and fauna species of Nigeria. These two lists were combined to assist the team to identify potential presence of RTEs and vulnerable species potentially present in the area of interest. These information sources and the outcome of the land cover analysis formed the basis for the development of tools and methodologies for the field surveys.

4.3.4 Stakeholder Consultation

Consultative meetings were held with stakeholders to inform them about the proposed project and the planned assessments prior to and during the field data collection. The consultation was also aimed at soliciting stakeholder concerns on critical social and environmental issues that required further probing during the field work, and which should be addressed during the project implementation. The stakeholder consultation included engagement with:

i. Local communities around the concession area including the cassava farmers who may be actively farming on the land;

ii. Relevant government institutions responsible for land administration, agriculture, forestry and natural resources.

iii. Social and environmental Non-Governmental Organizations (NGOs);

NB: Results of previous consultations with the Environmental Rights Action in respect of the adjoining Sakponba concession was deemed to be relevant for this assessment.

Efforts were made to engage Fulani herdsmen, but none were available during the assessment. The team were informed that they are nomads and had since moved on to Delta State and beyond for greener pastures for their cattle.

Likewise, cassava farmers were engaged during the public consultation meetings in each of the communities.

Typically, the demographic structure of a village in southern Nigeria will comprise the groups identified. The existence of these groups in the communities were validated during the public meetings which were convened by the chief and elders upon the request of the company on behalf of the assessment team.

State level institutions consulted included the Ministry of Environment and Forestry, the Ministry of Agriculture, the Lands Department and the Orhionmwon Local Government Area.

Socio-economic survey and community consultations:

Prior to this HCV assessment, Presco commissioned an environmental and social impact assessment in respect of the planned development. Socio-economic survey results from this assessment have been reviewed and incorporated into the HCV assessment. Additional socio-economic information has been collected during this HCV assessment during community consultations using participatory methods to complement the results from the ESIA study. Consultative meetings were held with local communities to collect socio-economic and cultural information, with the aim of identifying their perceptions of the potential impacts of the Presco's Sakponba Extension I operations on them and their communities. A variety of approaches were employed including:

- Engagement to share information with the local population, confirm the traditional structure, beliefs and norms as well as the origin of migrants, if any
- Investigating the land ownership and tenure relations
- Investigating livelihood sources, resource use patterns and income generating activities
- Identifying the types, prevalence and significance of socio-cultural and religious sites
- Finding out the past and potential sources of local social conflicts

The consultative public meetings were held in all five communities with existing rights in the proposed development area. Participants involved a cross-section of stakeholder groups, including traditional leaders, elders, women, youth groups, farmers, hunters and other identifiable groups8 using a range of participatory methods including public meetings, focus group discussions9 and participatory mapping to collect and analyse information in affected communities. Public meetings, FGDs and participatory mapping was carried out sequentially in each of the five communities. Public meetings involved a broad array of the entire community while FGDs targeted women, youth and traditional leaders.

Communities were selected for consultation using the criteria of location inside or within 5 km of the proposed concession. Public meetings were carefully planned to ensure broad representation of the range of stakeholders. A total of over 216 individuals participated in consultations in the 5 communities.

Focus-group discussions and participatory mapping:

Focus group discussions and participatory mapping were usually carried out after the general public meetings. Usually after each public meeting, short meetings were had with smaller groups of women, traditional leaders and cassava farmers. Outcomes from the focus group discussions are included in the summary in Annex 2.

Participatory mapping

The participatory mapping conducted for this assessment focused on:

- Providing information about the oil palm development and the studies carried out to understand the customary land rights of the communities and concerns in relation to the project.
- Gaining information on livelihood activities and land use.
- Mapping information on communities' land and resource use.
- Identifying routes that communities use to access forest resources, resource use areas and the importance of resource collection activities.

Participatory mapping proceeded in the following stages:

1) Group mapping process was carried out in affected communities. This was partially combined with the focus group discussions and involved a basic interactive map of landmarks (e.g. rivers, etc.) around the villages and in the proposed concession drawn on a sheet of paper. Community members were asked to locate key resource use areas and religious/cultural points on the map. The sites were classified according to the type of use (e.g. hunting (which animal), fishing (which species), collecting (what product), religious or cultural site).
2) Subsequently, GPS mapping of identified resource use and cultural locations was done. This involved the social survey team and a subset of community members that are well-versed with the locations. The community representatives guided the team to key sites in the surrounding landscape.

The full range of participatory methods were conducted in all 5 communities below.

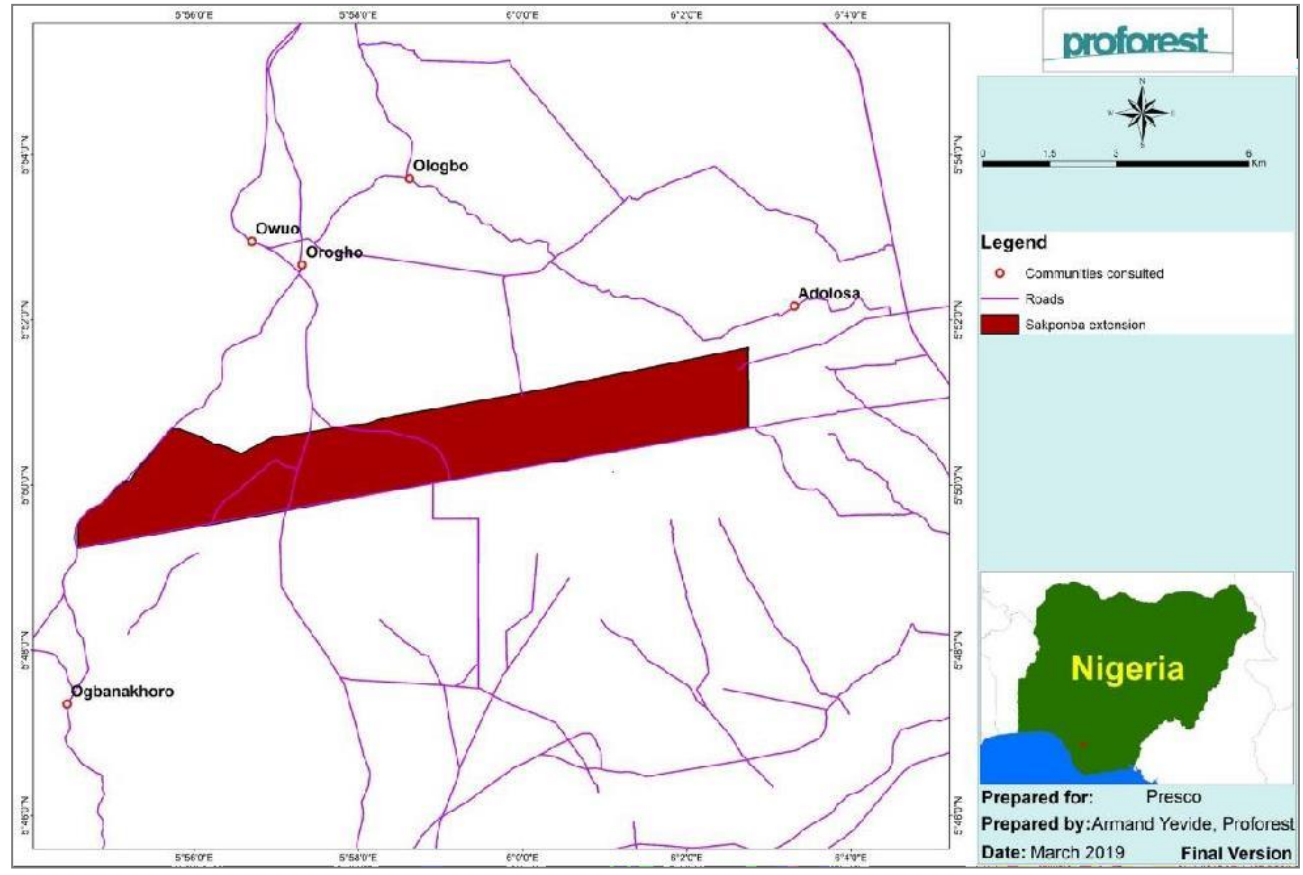


Figure 7: Consulted communities

4.3.5 Biological Assessment (fauna and flora surveys)

An essential part of the HCV assessment process is the need to obtain primary information on the vegetation and ecology of the proposed area and to some extent the wider landscape. This is crucial to help map out the land cover, identify rare, threatened and endangered species, and to be able to map out critical ecosystems in the assessment area. The field assessments of flora and fauna in the concession were undertaken to:

- Obtain a better understanding of vegetation cover of the concession
- Assess the presence of fauna species in the concessions, their distribution and their conservation importance
- Identify rare, threatened and endangered ecosystems
- Assess floristic composition of the vegetation of the area with focus on presence and abundance of species of conservation concern
- Identify areas with reasonable forest cover, with high carbon stock or special habitat of interest that should be set aside and excluded from conversion to oil palm plantation and,
- Make appropriate recommendations for their protection and management.

The vegetation maps developed during the planning process were used as a basis for carrying out the field verification of flora and fauna. Pre-designed field data collection tools and methods were used to collect primary data on flora and fauna as well as ecosystem types and mapping in the concession. A total of 25 sample plots (transects), of length between 500m and 1,000 m, were established and surveyed for fauna and flora in the major vegetation types in the 2,500-ha concession. The field data obtained from the survey were analysed to identify the different biological HCVs as well as rare, threatened and endangered ecosystems present in the concession.

The pre-assessment review indicated that the landcover in the concession area could be broadly divided into three major blocks or areas:

- a western portion lying to the left of the grassland, which we designated the Area West (approximately 520 ha; 20.8%). This was composed primarily of farmlands, and bush fallows of various ages from recently harvested areas to young secondary forest;
- the grassland (approximately 852 ha; 34.08%), lying directly south of the Orogho community. This was grassland, following harvesting of a recent industrial cassava plantation and;
- an eastern portion lying to the east of the grassland, which we designated the Area East (approximately 1,128 ha; 45.12%). This was also composed primarily of farmlands, and bush fallows of various ages from recently harvested areas to young secondary forest.

In order to distribute the biological survey transects across the habitat types, a 500m x 500 m grid was overlaid on a landcover map of the assessment area using GIS software (QGIS® Ver 2.18.4).

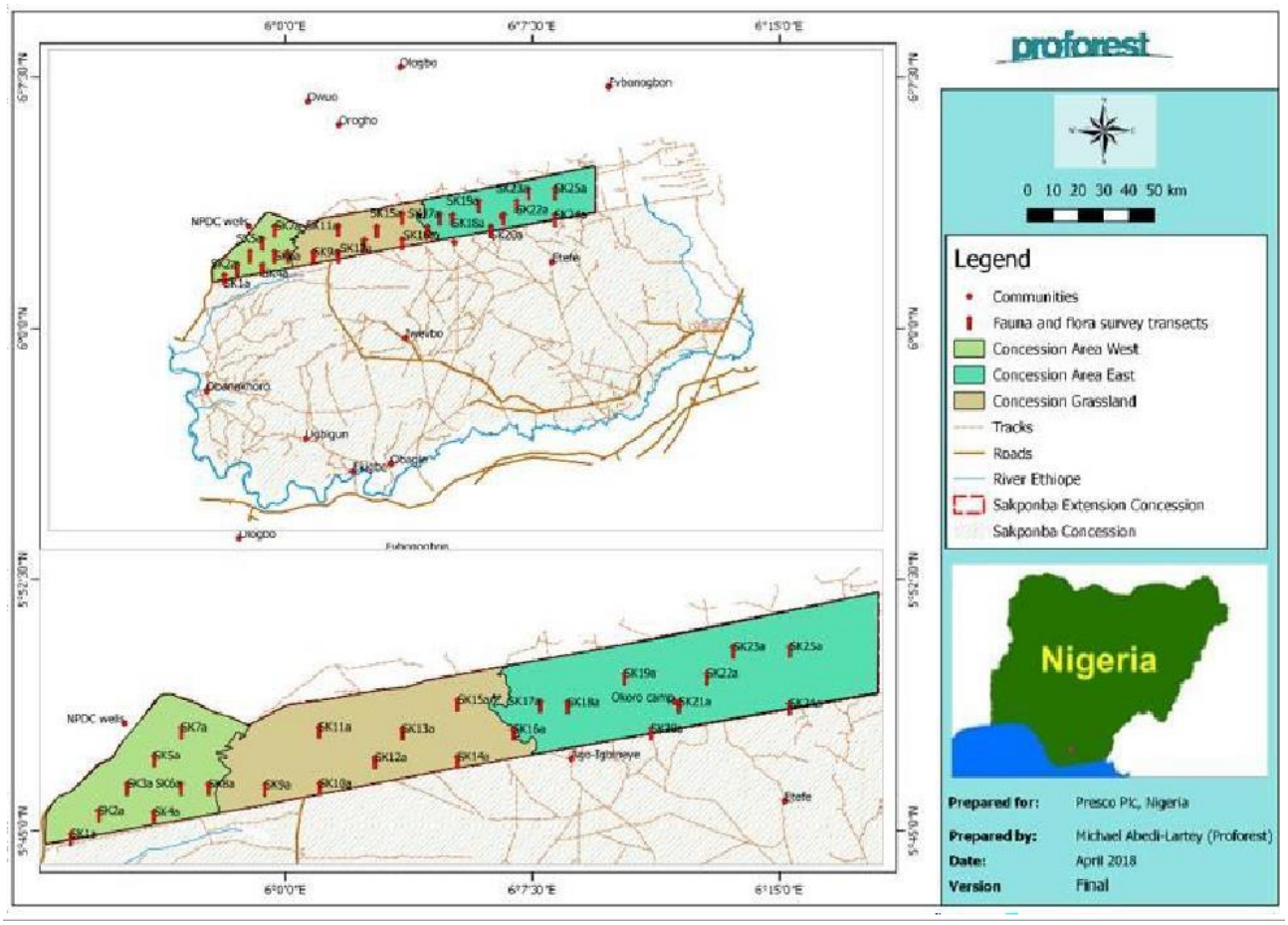


Figure 8: Distribution of habitat types and biological survey transects within the Sakponba Extension I concession.

4.4 HCV Assessment Findings

The findings of the HCV assessment are summarised in the table below:

Table 17: Summary of HCV assessment findings for Sakponba Extension I concession.

HCV	Definition	Present	Potentially present	Absent
1	**Species diversity.** Concentrations of biological diversity including endemic species, and rare, threatened or endangered (RTE) species that are significant at global, regional or national levels.			
2	**Landscape-level ecosystems and mosaics.** Intact Forest Landscapes (IFLs) and large landscape ecosystems and ecosystem mosaics that are			
	significant at global, regional and national levels, and that contain viable populations of the great majority of the naturally occurring species in natural patterns of distribution and abundance.			
3	**Ecosystems and habitats.** Rare, threatened, or endangered ecosystems,habitats or refugia.			
4	**Ecosystem services.** Basic ecosystem services in critical situations, including protection of water catchments and control of erosion of vulnerable soils and slopes.			
5	**Community needs.** Sites and resources fundamental for satisfying the basic necessities of local communities or indigenous peoples (for livelihoods, health, nutrition, water, etc.), identified through engagementwith these communities or indigenous peoples.			
6	**Cultural values**. Sites, resources, habitats and landscapes of global or national cultural, archaeological or historical significance, and/or of criticalcultural, 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.			

HCV management areas:

The assessment identified HCV management areas, totaling approximately 25.07 ha, which have been recommended as set-aside areas for the Sakponba Extension I concession. These are summarized as follows:

HCV 1 (potentially present): Izabumwen is the only remnant of lowland swamp in the assessment area, and so may well harbour species of aquatic animals, reptiles, etc. not found in other parts of the concession … Given the types of species concerned (fish, turtles, snakes, crocodiles, herons, kingfishers), if they are present in the assessment area, presumably the most likely place would be the pond/swamp area. Keeping with the precautionary principle, the pond is designated as a potential HCV area until it is established otherwise (see HCV 3: Izabumwen pond).

HCV 3: The Izabumwen pond, together with a recommended buffer of approximately 100 m, which total approximately 5.86 ha. This water body and associated wetland vegetation, which also serve as a shrine, is recommended to be set-aside as HCV 3 to provide ecosystem services and to support the continued services it provides for the local people.

HCV 4 (outside the concession): The Nyanchia River lies about 300m to the south, and the Ehinmwin River (or Ethiope as it is also called) River is about 2km to the east of the concession. Both rivers and their headwaters are located outside the concession and while they are in the landscape, there are no tributaries on the concession. Plantation development and management activities are therefore not expected to negatively affect

the integrity of these water bodies. However, considering its occurrence within the wider landscape and the relative proximity to the concession, the Nyanchia River and any surrounding riparian vegetation is designated as HCV 4 (the river being included into the Sakponba estate, first development phase, its already included into its conservation and management plan).

HCV 5: The Ikukusu bush serves as a source of critically scarce local herbal medicine for the local communities. Upon recommendation of the local communities, the currently 1.56 ha has been buffered by approximately 100 m to extend it to an HCV management area of 7.71 ha. The area has been recommended as a set aside to ensure that communities have continued access to them.

HCV 6: The three cultural and religious areas in the concession are considered as HCV 6 areas, with a total management area agreed with the local population to be approximately 25.07 ha. It should be noted that the HCV 6 area overlaps with HCV 3 and HCV 5. This area is being recommended for set-aside to enable the local people continue to perform their spiritual and religious rites.

The table below provides a description and summary of HCV (management) areas.

Table 18: Summary HCV areas and corresponding management areas

HCV	Value	Location	Area (ha)	HCVMA (ha)
1	Potential HCV 1 species including RTE fish, turtles, snakes, crocodiles, herons)	Izabumwen pond	2.55	5.86
3	Swamp	Izabumwen pond	2.55	5.86
5	Herbal medicines	Ikukusu bush	1.56	7.71
6	Shrines	Izabumwen pond	2.55	5.86
		Ikukusu bush	1.56	7.71
		Egbon-ogiougo	1.96	25.8

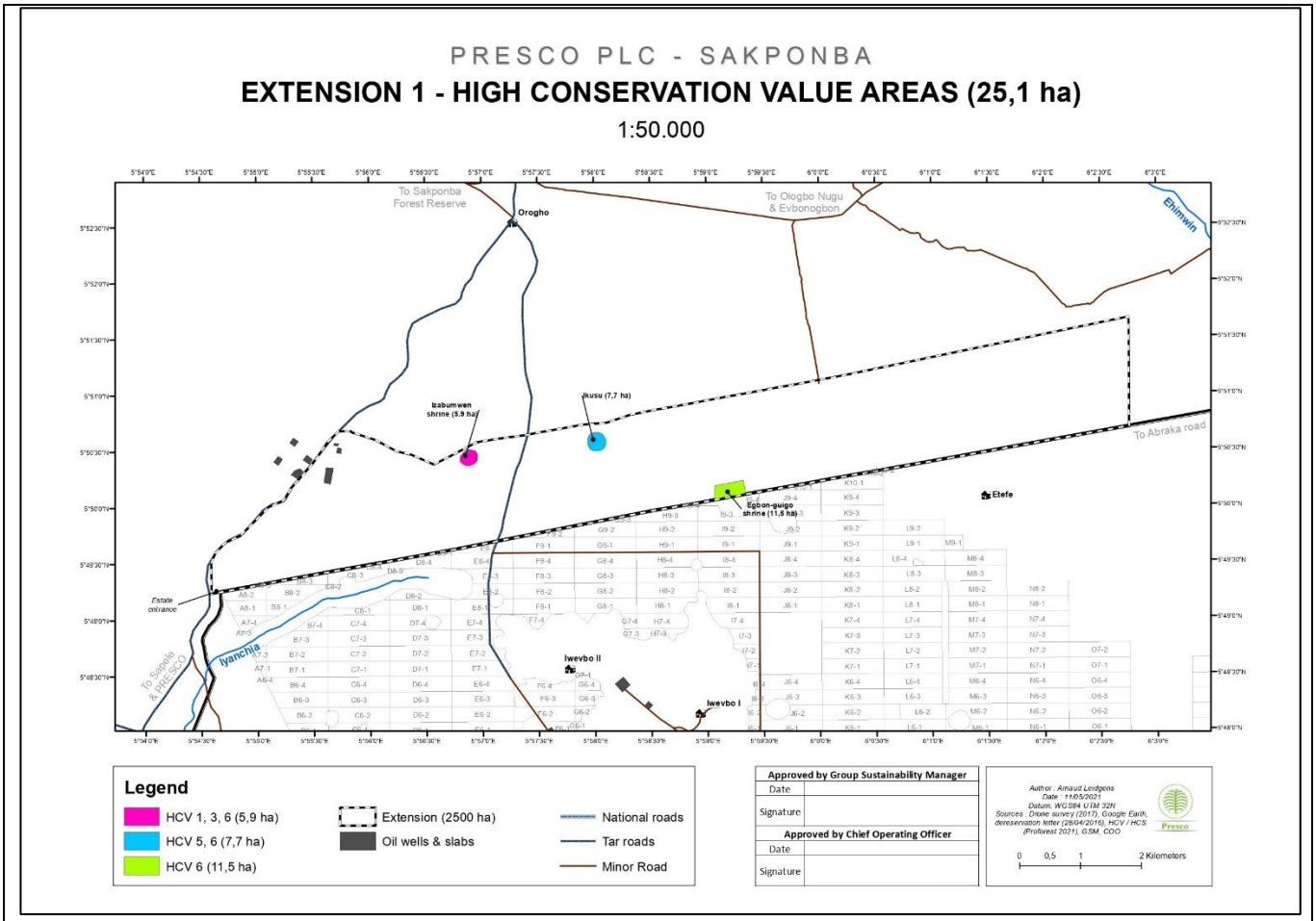


Figure 9: Sakponba Extension I High Conservation Value Areas

4.5 HSCA Assessment Team

The table below presents details of the HCS assessment team members which comprises experts from Proforest and local consultants.

Table 19: Lead assessor and GIS/remote sensing expert

Name	ALS License	Organisation	Role	Expertise
Nana Darko Cobbina	Provisional (ALS1503 4NC)	Proforest	HCSA Practitioner	Biodiversity, conservation and social expert. Community consultations andparticipatory mapping
Laura Bachellerie	Provisional (ALS20003LB)	Proforest	HCSA Practitioner and review of patch analysis	GIS, conservation biology.
Dr. S. I. Armand Yevide	NA	Proforest	Team member	Forest ecology, GIS, conservation, PhD inNatural Resources Management.
Aristotle Boaitey	NA	Proforest	Team member	Geo-Information Science and EarthObservation for Natural Resources Management
Dr. Augustus Asamoah	NA	Proforest	Team member	Ecology, environmental management,PhD in Zoology (Biodiversity Studies)
Dr. Adesoji Akinwumi Adeyemi	NA	University of Ilorin	Local consultant/ flora expert	Forest Inventory and Biometrics/RemoteSensing

4.6 HSCA Assessment Methodology

4.6.1 Assessment Timelines

The assessment process commenced in late 2019 with proposal request and submission to Presco as well as initial engagement. After acceptance of the proposal, engagement with local consultant and preparation of the assessment started but could only proceed towards the last quarter of the year 2020 due to the Covid-19 pandemic. The field study for the HCS assessment was done from 12nd to 21st October 2020. Data screening commenced immediately after data reception and the analysis and drafting of the report followed. Below is the detailed timeline for the HCS assessment.

Table 20: HCSA Assessment Timeline

Process Steps	Main activities	Timeline							
		2020				2021			
		SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR
Pre-assessment	Desk study: Information exchange, Gathering andreview of data.								
	Engagement with localconsultant								
	Remote sensing data acquisition and initial landcover classification								
Field assessme	Forest inventory and ground truthing data collection								

nt	Supplementary community consultations and FPIC verification								
Data processing andreport drafting	Analysis of field data anddrafting of report								
Finalisation of report	Finalisation and submission of report								

4.6.2 Land Cover Analysis

Delineation of the Area of Interest (AoI) :

Since the PDA which represents the core of the Area of Interest (AoI) is inland without any natural boundaries such as water bodies, or cliff lines, the AoI used for the land cover analysis and for the HCS study was obtained by creating a 5 kmbuffer zone around the 2,500 ha of the PDA, that encompassed all affected communities.

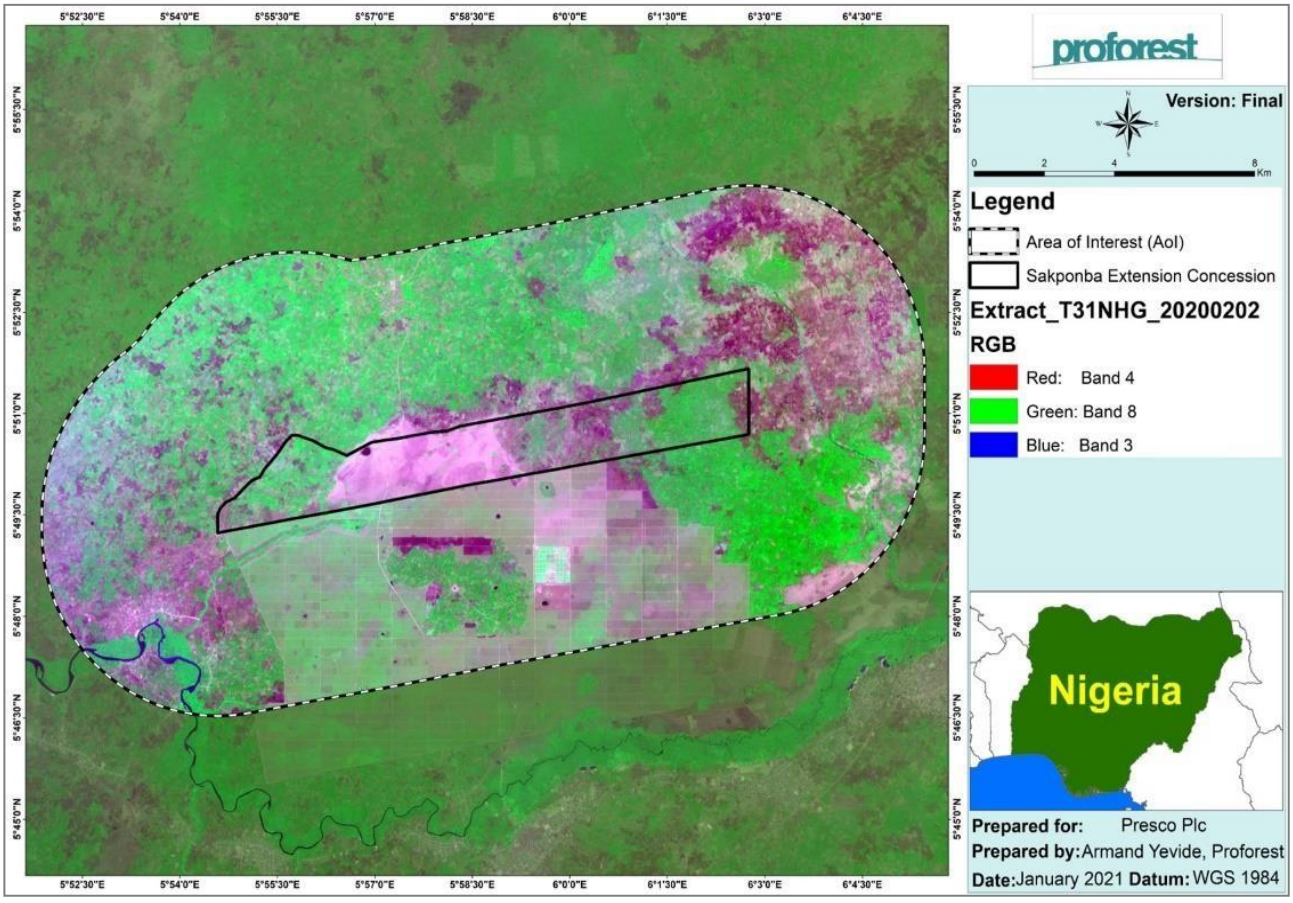


Figure 10: Map showing the Sakponba extension 1 concession and the delineated AoI.

NB: The Sentinel-2A image is a 10 metres resolution satellite image acquired from the EarthExplorer webpage of the United States Geological Survey (USGS) (http://earthexplorer.usgs.gov/) for the year2020 (Entity ID: L1C_T31NHG_A024100_20200202T100431 acquired on the 02nd February 2020).

Remote sensing image acquisition and characteristics:

To carry out the initial land use and land cover classification, a 0.32% Sentinel-2A remote sensing product which was less than a year was downloaded from the United States Geological Survey (USGS) which provides

through its Earth Explorer website (http://earthexplorer.usgs.gov/) several remote sensing that exist in various types and for various dates. Though various products are available on that platform, Sentinel 2 was chosen because it provides a multispectral data with 13 bands in the visible, near infrared, and short-wave infrared part of the spectrum with spatial resolution of 10 m, 20 m and 60 m. Various band combination based on the 10 m spatial resolution bands 2, 3, 4, and 8 were used and the false colour image based on the combination of the bands 483 was finally used to perform the vegetation classification.

Table 21: Detailed characteristics of the remote sensing products used.

ID	**L1C_T31NHG_A024100_20200202T100431**
Acquisition date	02-FEB-2020
Tile Number	T31NHG
Cloud Cover	0.31660%
Platform	SENTINEL-2A
Processing Level	LEVEL-1C
Datum/Projection	WGS84/UTM 31N

Land cover classification methodology:

To perform the land cover classification of the AoI, a segmentation of the satellite image was done using the segment mean shift function in AcrGIS version 10.3 with 19.5, 15, and 20 as spectral detail, spatial detail, and minimum segment size in pixel respectively. The default value of the spatial detail was maintained while the spectral detail and minimum segment size in pixel were set to ensure a more precise segmentation of the land cover features on the Sentinel-2A image. The expected minimum size of patches is 2000 m2 (0.2 ha) though 2.5 times smaller than the standard size of forest according to the FAO forest definition which is 0.5 ha. The output raster of the segmentation was subjected to an unsupervised classification into 32 classes. Each of the 32 classes were assigned one of the HCS and non-HCS land cover classes in the table below that presents the description of the land cover classes used and their correspondence to the HCS classes.

Table 22: Description of the land cover classes used.

Land cover classesused	Description	HCS and non-HCS classes
Low Density Forest(LDF)	Remnant forest-like highly disturbedand recovering.	Low Density Forest
Young Regenerating Forest (YRF)	Mostly young re-growth forest, but with occasional patches of olderforest within the stratum.	Young Regenerating Forest
Scrubland (SCR)	Vegetated land with some woodyregrowth and shrub. This might include some relatively old fallow.	Scrub
Agricultural land(AGRI)	Farmland and or young fallow land.	Scrub
Oil Palm Plantation(OPP)	Cultivated oil palm regardless of theage.	Scrub
Open Land (OL)	Cleared or grassland as well as buildup or urban area. This also includes newly planted oil palm.	Cleared / Open Land
Water bodies (WB)	Waterlogged area such as ponds as well as rivers	NA

Land cover outputs :

The land cover classification of the AoI revealed that the Project Development Area is in a low-density forest landscape as the total forest cover represent about18.90% of the AoI. The land cover is dominated by agricultural land (24.45%) and scrubland (23.68%) representing together about 48.13% of the AoI. The PDA has about 0,04% of low-density forest cover and 9,11% of Young Regenerating Forest. The scrubland in the area could qualify as fallow as they are mainly areas abandoned after harvesting or after years of farming to restore soil fertility.

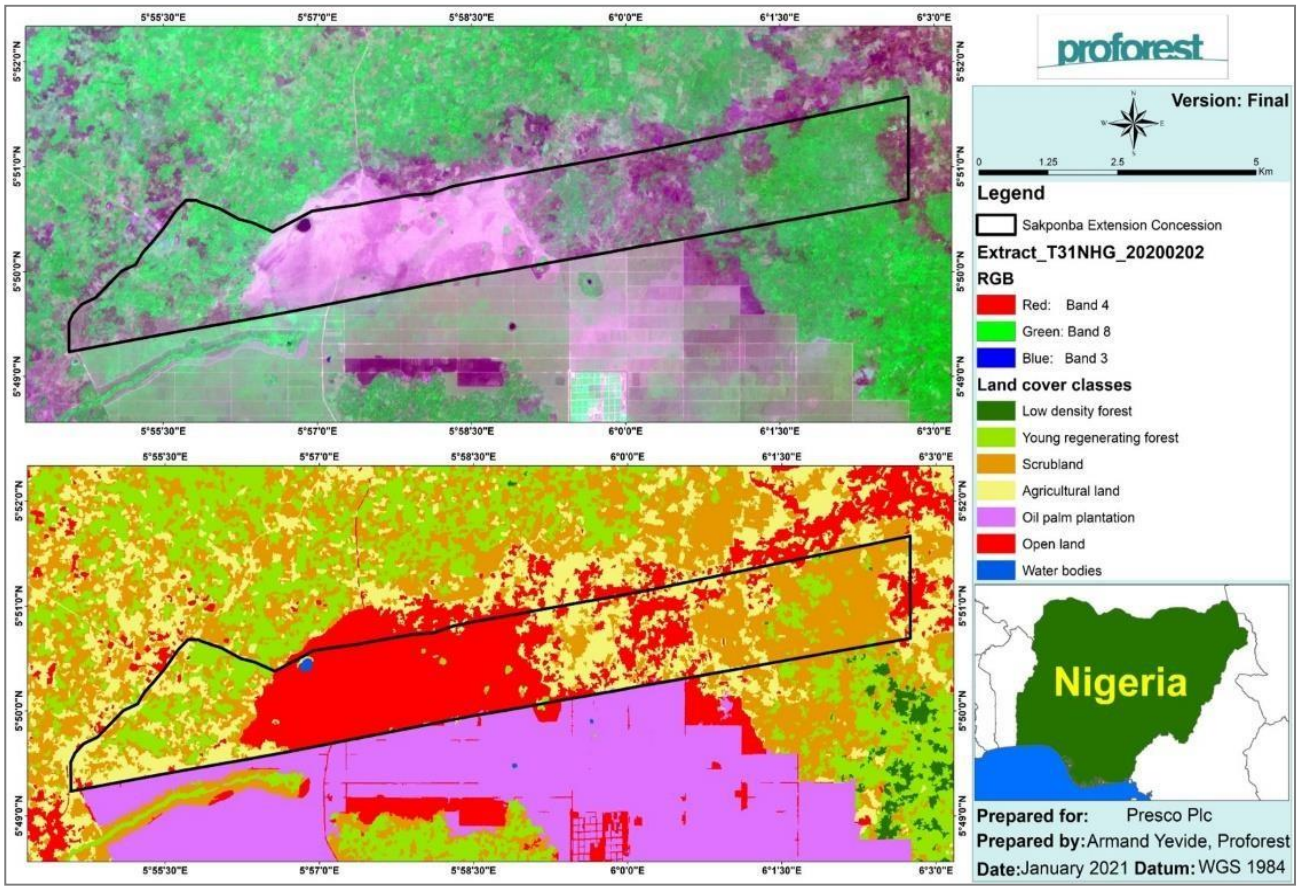


Figure 11: Map showing the result of the initial land cover classification

NB: The Sentinel-2A image is a 10 metres resolution satellite image acquired from the EarthExplorer webpage of the United States Geological Survey (USGS) (http://earthexplorer.usgs.gov/) for the year2020 (Entity ID: L1C_T31NHG_A024100_20200202T100431 acquired on the 02nd February 2020).

Table 23: Size and proportion of HCS and non-HCS classes within the PDA.

Land cover classes	Number of Hectares		Total	% of total concession
	Mineral	Peat		
HCS classes:				
High Density Forest				
Medium Density Forest				
Low Density Forest	0.9	0	0.9	0.04
Young Regenerating Forest	227.8	0	227.8	9.11
Sub-total	228.7	0	228.7	9.15
Non-HCS classes:				
Scrubland	657.6	0	657.6	26.30
Oil Palm Plantation	3.8	0	3.8	0.15

Agricultura land	585.4	0	585.4	23.42
Open Land	1020.5	0	1020.5	40.82
Water bodies	4.0	0	4.0	0.16
Sub-total	2271.3	0	2271.3	90.85
TOTAL	2500.0	0	2500.0	100.00

Land cover classification accuracy assessment:

Independent samples of 350 pixels and 300 pixels were randomly selected including a minimum of 50 for each land use and land cover classes for the initial and final classification respectively to assess the classification accuracy. Google Earth imagery and ground truthing data collected during field visit were used to create the independent sample for the accuracy assessment. Error matrices as cross-tabulations of the mapped class vs. the reference class were used to assessthe accuracy. Overall accuracy, user's and producer's accuracies, and the Kappa coefficient were then derived from the error matrices. The Kappa coefficient incorporates the off-diagonal elements of the error matrices (i.e., classification errors) and represents agreement obtained after removing the proportion of agreement that could be expected to occur by chance. The overall accuracy was 89.4% with a kappa coefficient of 87.7% for the initial classification while for the final classification the overall accuracy was 88.7% with a kappa coefficient of 86.4%.

Table 24: Accuracy assessment results.

A- Initial classification

Land cover class	AGRI	LDF	OL	OPP	SCR	WB	YRF	Total	User accuracy
AGRI	37		3		10			50	74.0%
LDF		47					3	50	94.0%
OL	7		42			1		50	84.0%
OPP				50				50	100.0%
SCR	1				46		3	50	92.0%
WB						50		50	100.0%
YRF	2	1			6		41	50	82.0%
Total	47	48	45	50	62	51	47	350	
Producer accuracy	78.7%	97.9%	93.3%	100.0%	74.2%	98.0%	87.2%		89.4%

B- Final classification

Land cover class	LDF	OL	OPP	SCR	WB	YRF	Total	User accuracy
LDF	47					3	50	94.0%
OL		42		7	1		50	84.0%
OPP			50				50	100.0%
SCR		6		36		8	50	72.0%
WB		2	1		47		50	94.0%
YRF	1			5		44	50	88.0%
Total	48	50	51	48	48	55	300	
Producer accuracy	97.9%	84.0%	98.0%	75.0%	97.9%	80.0%		

4.6.3 Forest Inventory

Sampling and data collection methodology:

The inventory was carried out from 12nd to 21st October 2020. The sampling methodology was developed based on the preliminary or initial land cover classification conducted to ensure adequate sampling effort in each of the main vegetation types within the AoI. In absence of recent data to use in the sample size estimation formula, an approximately 0.22% sampling rate was used to determine the sample size in hectare (5.5 ha) and later converted into number of plots (109 plots). Plots were randomly distributed within the land cover classes with the aim of more intensive sampling of the forest and scrub classes as the other land cover classes are less important in the HCSA. Though plots were distributed randomly, it was kept a minimum distance of 100 m between plots to ensure independence of sample plots (Figure 12).

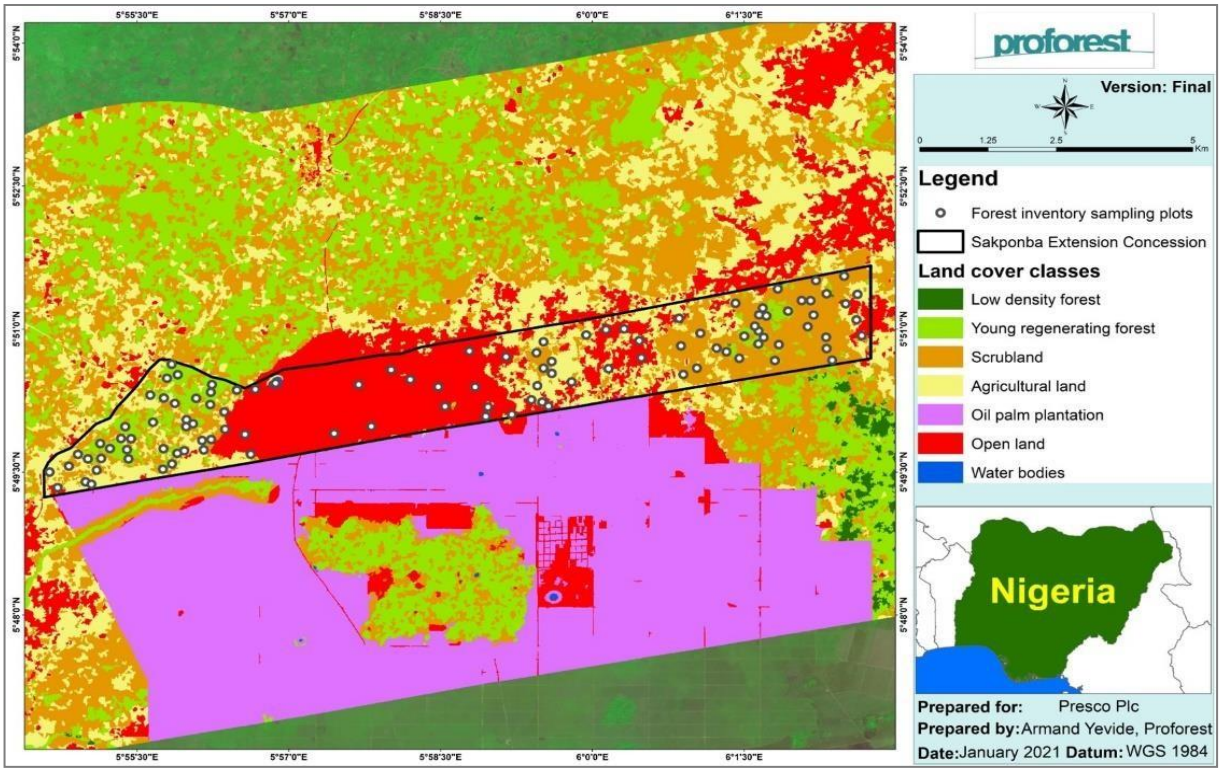


Figure 12: Distribution of the forest inventory plots overlaid with the initial land cover.

The geographical coordinates of the plots (centre of the plots) were extracted andloaded into a GPS Garmin used to navigate to each of the plots. Circular plots of 12.61 m radius (main plots) and 5.64 m radius (sub plots) were laid for the surveyof trees beyond 10 cm diameter at breast height (dbh) and for trees above 5 cm dbh respectively (Figure 13).

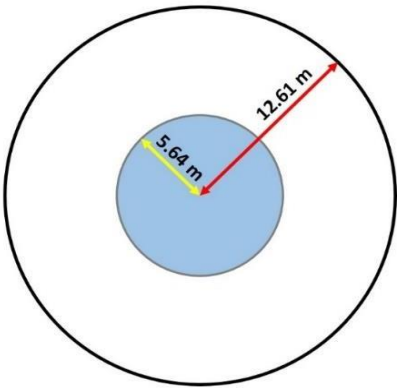


Figure 13: Botanical survey distribution plots and characteristics.

Data collected from the plots included the name of the species, diameter at breast height, and the height as well as any useful observation on the individual tree (whether it was diseased, fruiting, etc.). The diameter was measured with a diameter tape and the height of each individual tree was estimated visually. Each main plot was assigned to one of the land cover classes. Additional information onthe land cover types were also collected. When applicable, the pictures of the land cover were taken towards the North, East, South, and West as well as the canopy cover.
Almost all the sampling plots were accessible and were accessed. Only one wasreplaced due to accessibility challenges.

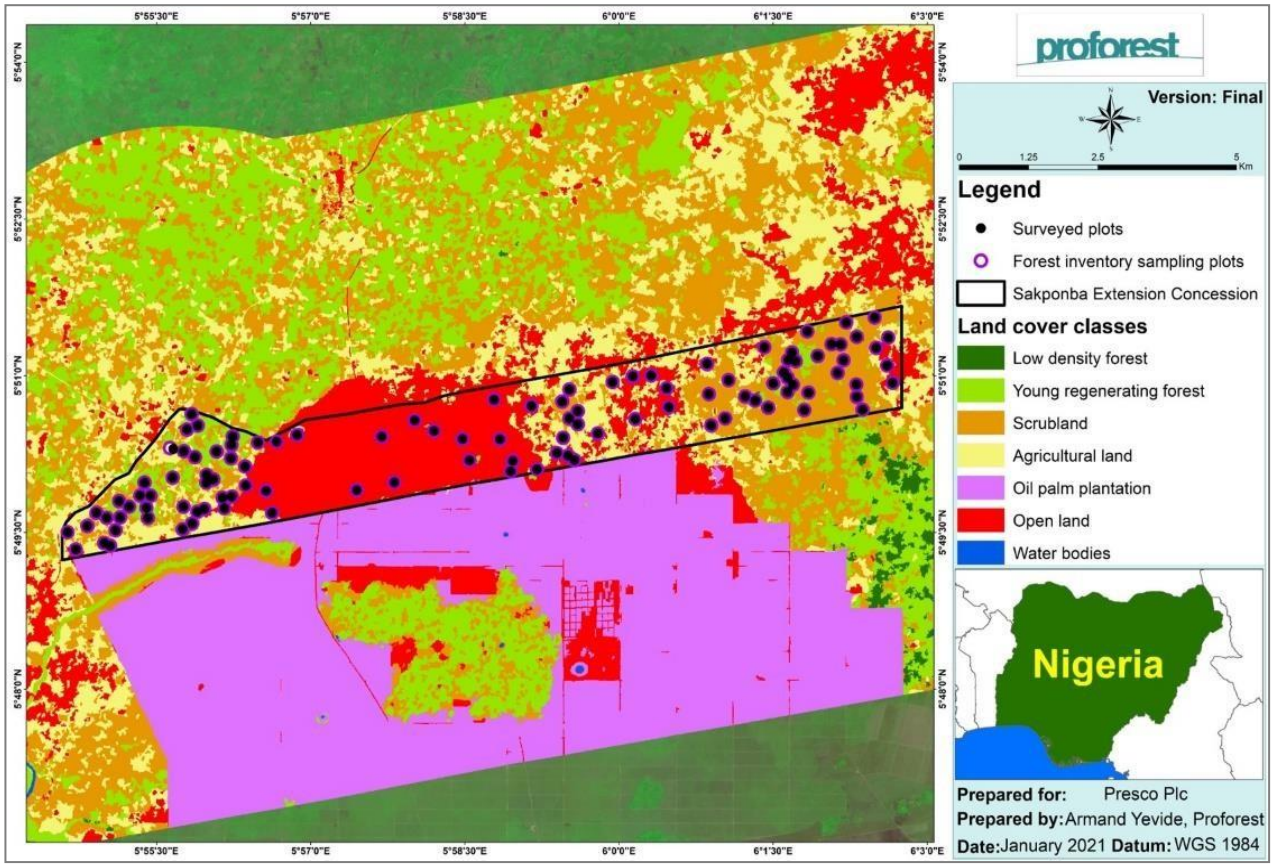


Figure 14: Distribution of the sampling plot and surveyed plots overlaid with the initial land cover.

Biomass and carbon estimation methodology:

There are several approaches developed and used to estimate the total above ground biomass of individual trees or of a given ecosystem. The non-destructive approach (used in this assessment) based on field data collected on living trees and models already built to estimate the biomass they contain is an advancement on the destructive approach which consists in felling trees.

Numerous models have been developed over the course of the years. Some of them are solely diameter-based allometric models while others are diameter and height-based models.

For the current carbon stock estimation, the above ground biomass was estimated using the latest improved allometric model of Chave et al. (2014) which uses tree height, stem diameter and wood density as covariates. To deduce carbon content from the biomass, we used the assumption that carbon concentration is about half (47.5%) of the biomass (Whittaker & Likens, 1973; Brown, 1997; Losi et al., 2003; Nasi et al., 2009). The biomass was estimated for each individual tree (including all stems for multi-stemmed trees) using the equation below:

$$AGB = 0.0673x\left(\rho D^2 H\right)^{0.976}$$

Where AGB is aboveground dry biomass (in kg); ρ is wood density (in g/cm3) D is diameter at breast height (in cm) and H is the height (in m).

The underground or belowground biomass (BGB) was deduced using the assumption that, for each individual tree, the belowground biomass represents 20.5% of the aboveground biomass (Mokany et al., 2006). Therefore, the total biomass was equal to 1.205 * AGB.

Wood density was compiled from the Global Wood Density Database (Chave et al., 2009; Zanne et al., 2009), and from the African Wood Density Database (Carsan et al., 2012). Of the 46-species recorded during the inventory; wood density was available for 32 species (69.6%). For the remaining species not reported in these databases, we used the mean wood density of the matching genus (1 species) or an average wood density for timber species (13 species).

Statistical analysis methodology:

Statistical analyses were conducted to test for statistical differences in carbon stock between HCS land cover classes. After checking the normality and the homoscedasticity of the data, the ANOVA and pairwise tests were conducted using R.

Final land cover class description:

After the field work conducted, vegetation ground truthing data collected by the assessment team were used to improve the initial land cover classification conducted prior to the assessment. The figure and table below present the final land cover classes distribution and description.

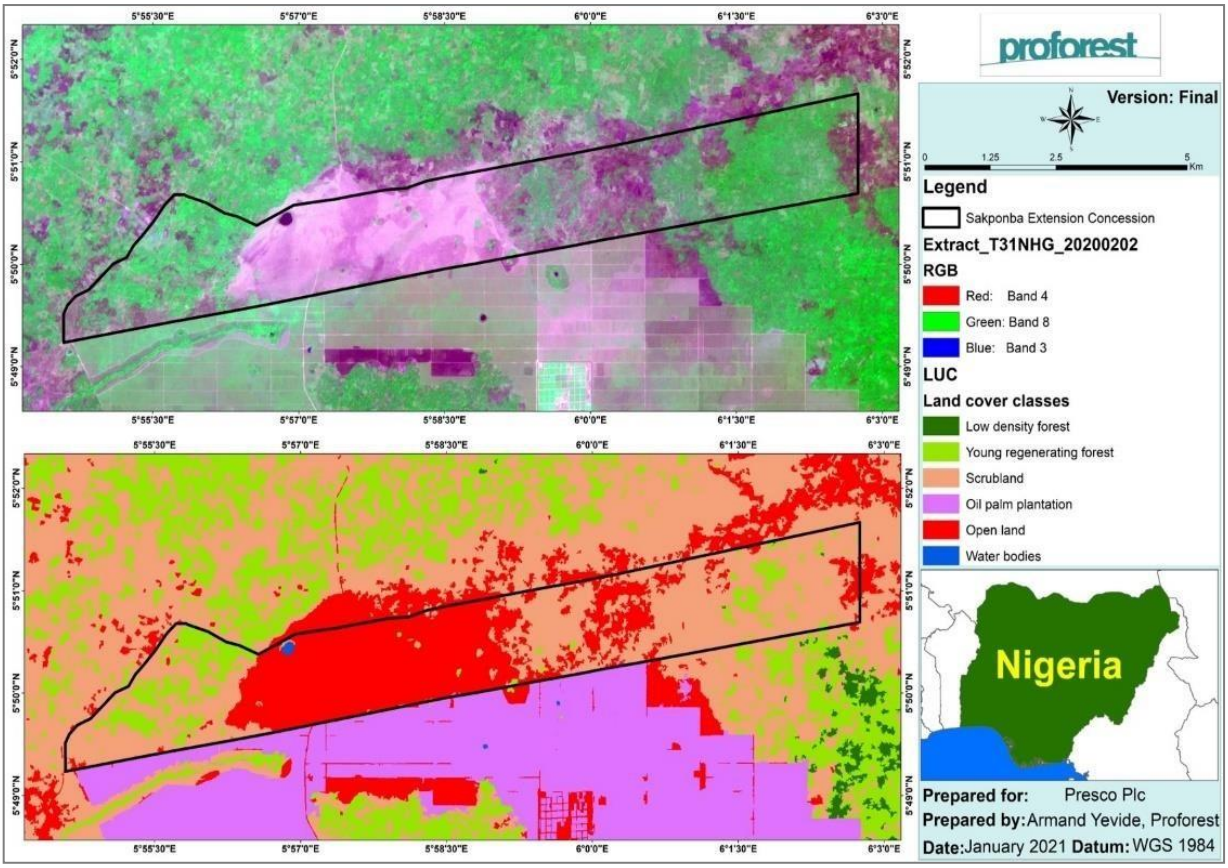


Figure 15: Map showing the result of the final land cover classification.

NB: The Sentinel-2A image is a 10 metres resolution satellite image acquired from the EarthExplorer webpage of the United States Geological Survey (USGS) (http://earthexplorer.usgs.gov/) for the year 2020 (Entity ID: L1C_T31NHG_A024100_20200202T100431 acquired on the 02nd February 2020).

Table 25: Description of the land cover classes used.

Land cover classes used	Description	HCS and non-HCS classes
Low Density Forest (LDF)	Remnant forest-like highly disturb and recovering. This vegetation type was not surveyed within the PDAdue to its non-significant size.	Low Density Forest
Young Regenerating Forest (YRF)	Mostly young re-growth forest dominated by *Margaritaria discoidea* and *Albizia zygia*. The density of tree species is 318 trees/ha.	Young Regenerating Forest
Scrubland (SCR)	Vegetated land with somewoody regrowth and shrub. This includes fallow land and agricultural land. This vegetation type within the PDA is dominated by *Margaritaria discoidea* and *Albizia zygia*. The density of tree species is 265 trees/ha.	Scrub
Oil Palm Plantation (OPP)	Cultivated oil palm relatively.	Scrub
Open Land (OL)	Cleared or grassland as well as buildup or urbanarea. This also includes newly planted oil palm.	Cleared / Open Land

The outputs of the final land cover classification have revealed that the agricultural land and the scrubland can be merged as scrubland. There was lessthan one hectare of the low density forest within the PDA (Table 11).

Table 26: Size and proportion of HCS and non-HCS classes within the PDA.

Land cover classes	Number ofHectares		% of total concession	
	Initial	Final	Initial	Final
HCS classes:				
High Density Forest				
Medium Density Forest				
Low Density Forest	0.9	0.9	0.04	0.04
Young RegeneratingForest	227.8	228.7	9.11	9.15
Sub-total	228.7	229.6	9.15	9.18
Non-HCS classes:				
Scrubland	657.6	1242.1	26.30	49.68
Oil Palm Plantation	3.8	3.8	0.15	0.15
Agricultura land	585.4		23.42	
Open Land	1020.5	1020.5	40.82	40.82
Water bodies	4.0	4.0	0.16	0.16
Sub-total	2271.3	2270.4	90.85	90.81
TOTAL	2500.0	2500.0	100.00	100.00

4.6.4 Forest Patch Analysis

Description of the patch analysis:

The current patch analysis was conducted on the outputs of the final classification and was mainly based on the HCS forest patches formed by the low density forest and the young regenerating forest. A negative buffer of 100 m was used to group the HCS forest patches into High Priority Patch (core area > 100 ha); Medium Priority Patch (core area from 10 to 100 ha) and Low Priority Patch (core area < 10 ha). In the AoI, 27 patches with core areas were identified (1 HPP, 7 MPP, and 19 LPP). The only HPP intersects partially with the Sakponba extension 1

concession but its major area lies outside the PDA boundaries. One of the 7 MPP overlaps with the concession and 3 LPP with core area are completely embedded in the PDA. Apart from these patches, there are 97 LPP without core areas that overlap with the PDA and having 0.01 to 17.71 ha as size. In order to assess connectivity between HPP patches, a 100 m buffer was established around patches. Within the PDA, 2 LPP without core area were connected to the HPP. Since the PDA is located in a low forest cover landscape (AoI forest cover about 19%) the LPP were marked as indicative to developed and biodiversity assessment of the landscape was considered to conclude on their conservation status or whether their will undergo give and take process. The road network within the landscape was used to assess the MPP patches exposure to risk by establishing 1 km buffer around the roads. It was found that the MPP inside the PDA were high risk patch in addition to be a patch made of young regenerating forest. Since in 2018 and early 2019 a carbon stock assessment was carried out for the same PDA, the patches identified in 2018 were overlaid with the current patches and it appears that they are all located within the 1 km buffer around the road network making them high risk patches. A biodiversity assessment was conducted within the patches back to 2018 and based on the data collected these patches do not have any biological diversity that would worth conservation. The report of the HCV assessment conducted for the same PDA in 2018 indicates an absence of HCV 1 in the forested areas but potential presence of HCV 1 aquatic species in the Izabumwen pond. The MPP and LPP that are not connected to the HPP undergo the give and take process. During this process it was ensured that area given for conservation exceeded HCS patches taken for development. The identified HCV during the 2018 HCV assessment were combined to the HCS patches marked for conservation to map out the HCV-HCS areas to be set aside for conservation purposes.

The HCS patches marked for conservation include part of the only HPP that overlaps with the PDA over 2.83 ha and HCS patches that are connected to this HPP as well as MPP and LPP within the PDA. The total area marked for conservation as HCS area was 245.9 ha which represent 9.84% of the PDA and includes 2.19% of non-HCS area. The total HCV-HCS area set aside is 262.87 ha including 1.92 ha of intersected HCV and the HCS area.

4.7 HCSA Assessment Findings

4.7.1 Carbon stock estimation results

The estimated carbon stock varies from 0.98 tC/ha for the Open Land to 18.97 tC/ha for the Young Regenerating Forest. The total carbon stock estimated for theentire proposed concession was 12,393.6 tC.

Table 27: Area, carbon stock mean and confidence intervals for each land cover class.

Land coverclass	Area(ha)	%	Number of plots	Average carbon stock (tC/ha)	Standard Deviation	Confidence limits (90%)		Total carbon stock (tC)
						Lower	Upper	
LDF	0.9	0.04	NA	NA	NA	NA	NA	NA
YRF	228.7	9.15	31	18.97	11.27	15.00	22.94	4338.4
SCR	1242.1	49.68	50	5.68	6.72	3.82	7.55	7055.1
OL	1020.5	40.82	28	0.98	2.22	0.15	1.80	1000.1
OPP	3.8	0.15	NA	NA	NA	NA	NA	NA
WB	4.0	0.16	NA	NA	NA	NA	NA	NA

In order to appraise the existence of statistically significant difference between the carbon stock of the land cover classes, an ANOVA followed by the pairwise tukey Honestly Significant Difference (tukey HSD) test was conducted. The table 28 present the results of the ANOVA and show the existence of statistically significant difference between the carbon stock of the various land cover classes as the probability associated to the analysis was below 0.05. The pairwise test hasrevealed that the YRF has the highest carbon stock which is significantly different from the carbon stock of the other land cover types and the carbon stock of the scrubland is significantly different from the open land. The land cover could be classified into three groups as presented in the Table 29.

Table 28: Results of the ANOVA assessing for differences in carbon stock between the land cover classes.

	Sum of Squares	df	Mean Square	F	P-value
Land coverclass	5373	2	2686.5	46.24	3.66e-15***
Residual	6159	106	58.1		

Significant codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Table 29: Results of tukey HSD test for differences in carbon stock between land cover classes.

Pair Conversion	Mean diff	Lower	Upper	P-adj
SCR - OL	4.708419	0.4314773	8.985361	0.0272496
YRF - OL	17.993908	13.2698396	22.717977	0.0000000
YRF - SCR	13.285489	9.1433306	17.427648	0.0000000

Table 30: Grouping of the land cover classes based on the pairwise comparison.

Land cover classes used	Average carbon stock (tC/ha)	Group
Low Density Forest (LDF)	NA	
Young Regenerating Forest (YRF)	18.97	A
Scrubland (SCR)	5.68	B
Open Land (OL)	0.98	C
Oil Palm Plantation (OPP)	NA	

NB: The average carbon stock of the land cover classes with the same letters are not statistically different.

4.7.2 Forest inventory results :

The table below presents some dendrometric characteristics of the land cover.

Table 31: Average densities, diameter and height of the land cover classes.

LUL	Density		Diameter(cm)		Height (m)	
	Tree/ha	Stems/ha	Average	SD	Average	SD
OL	125.45	345.45	10.48	6.53	6.18	2.63
SCR	264.78	716.12	10.12	7.42	6.16	2.52
YRF	317.67	684.67	11.49	6.79	6.95	2.52

NB: SD stands for Standard Deviation.

4.7.3 Maps corresponding to the different steps of the decision tree

Step 1

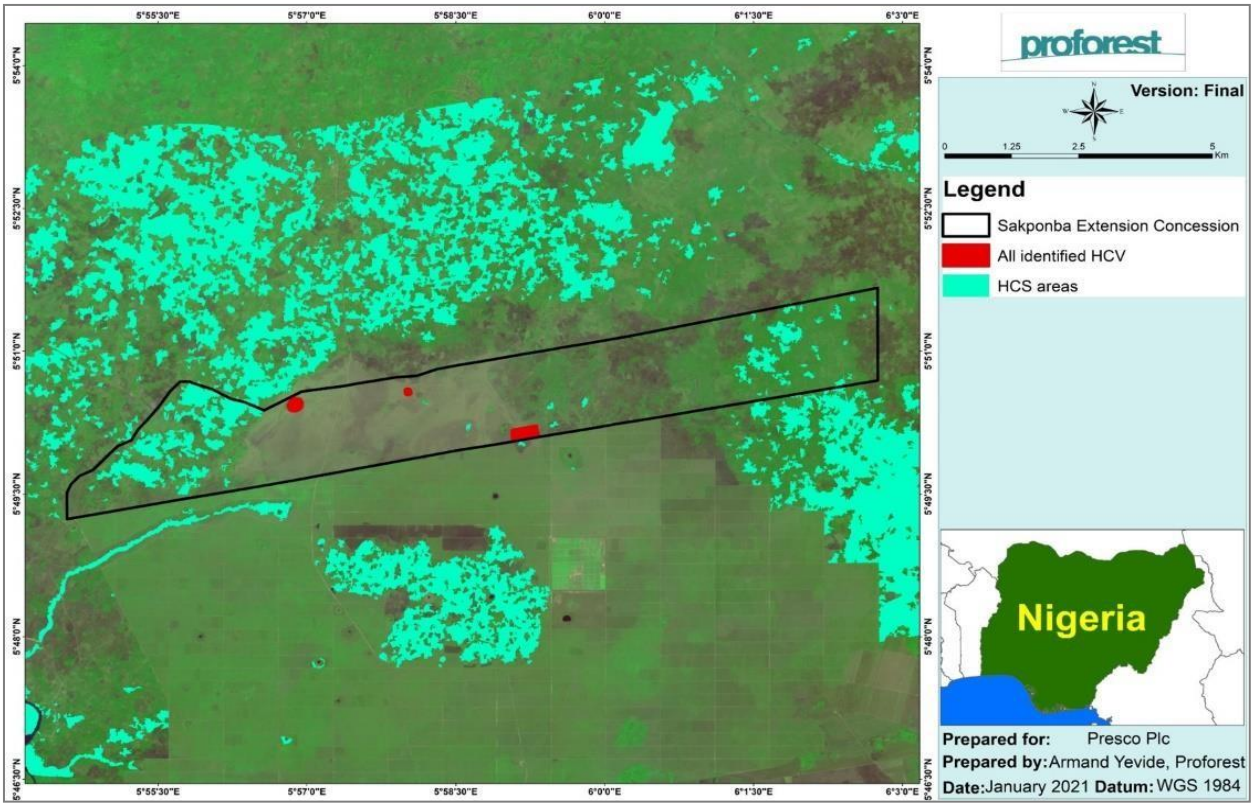


Figure 16: Map showing HCS areas overlaid with HCVs areas.

Step 2

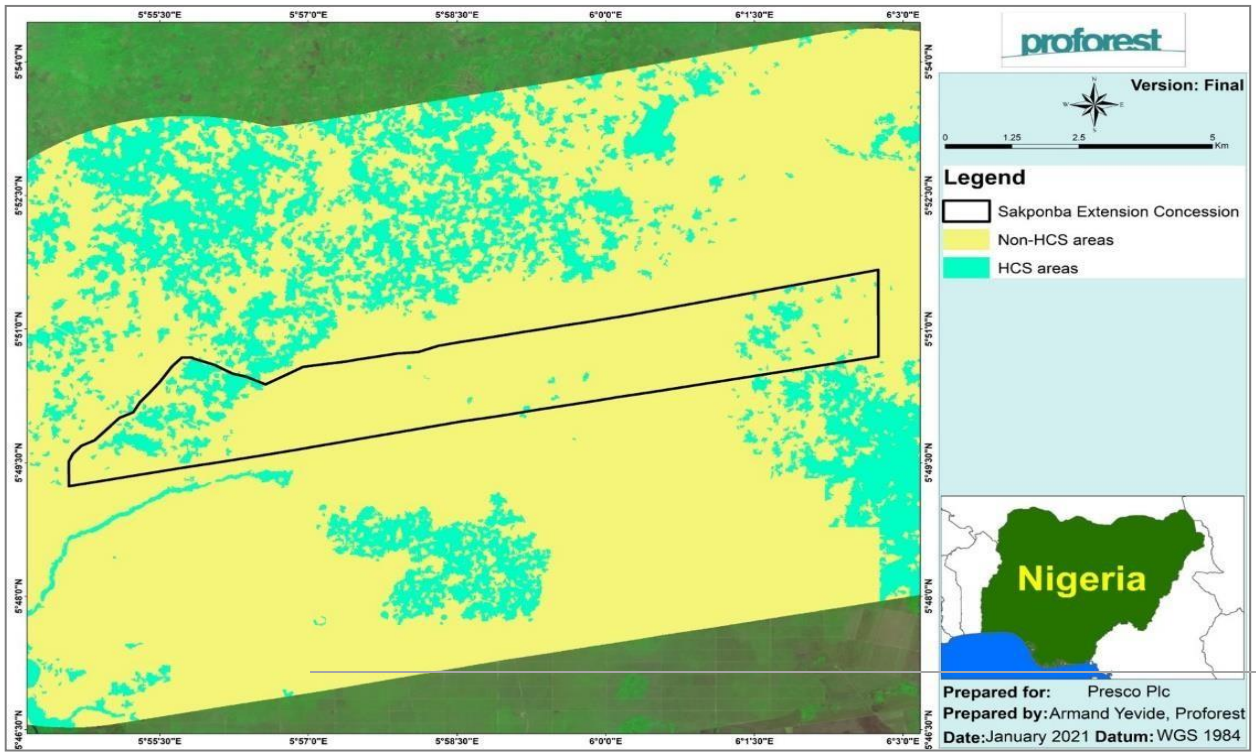


Figure 17: Map showing HCS classes merged.

Step 3

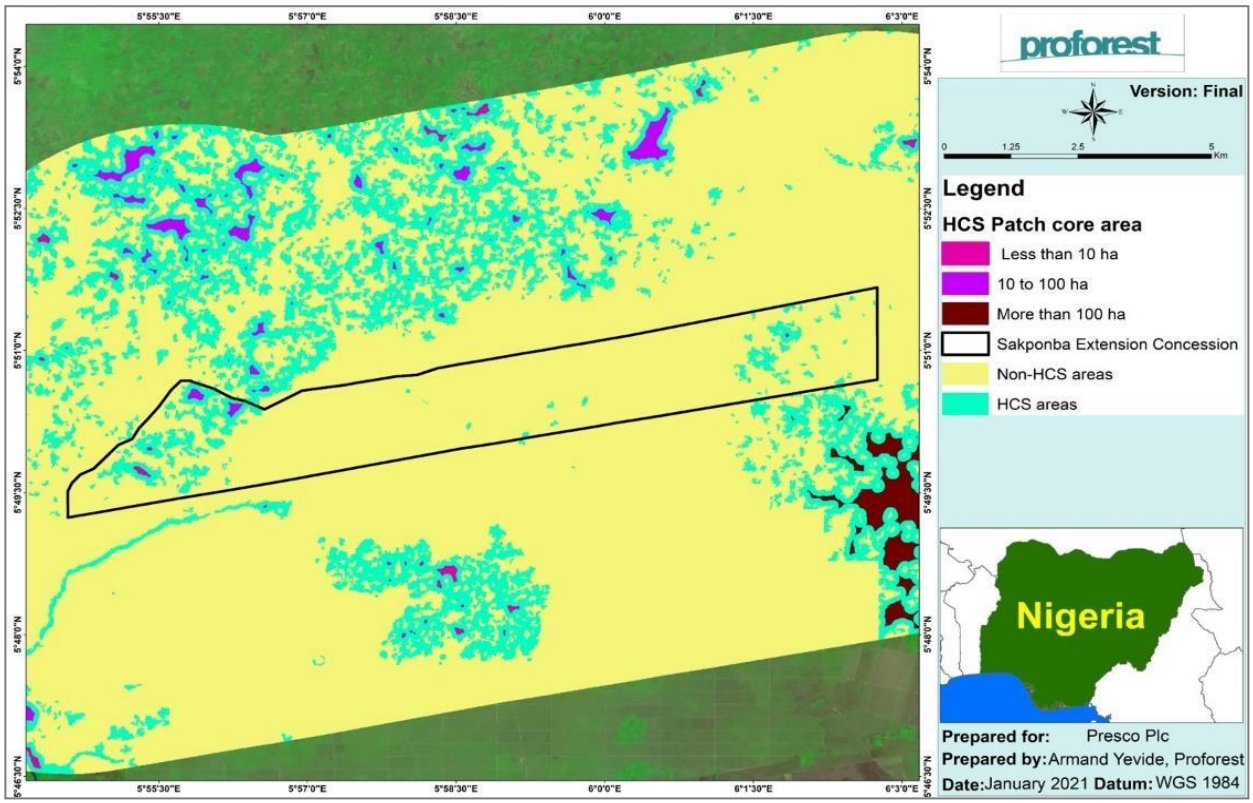


Figure 18: Map showing HCS classes and their core area.

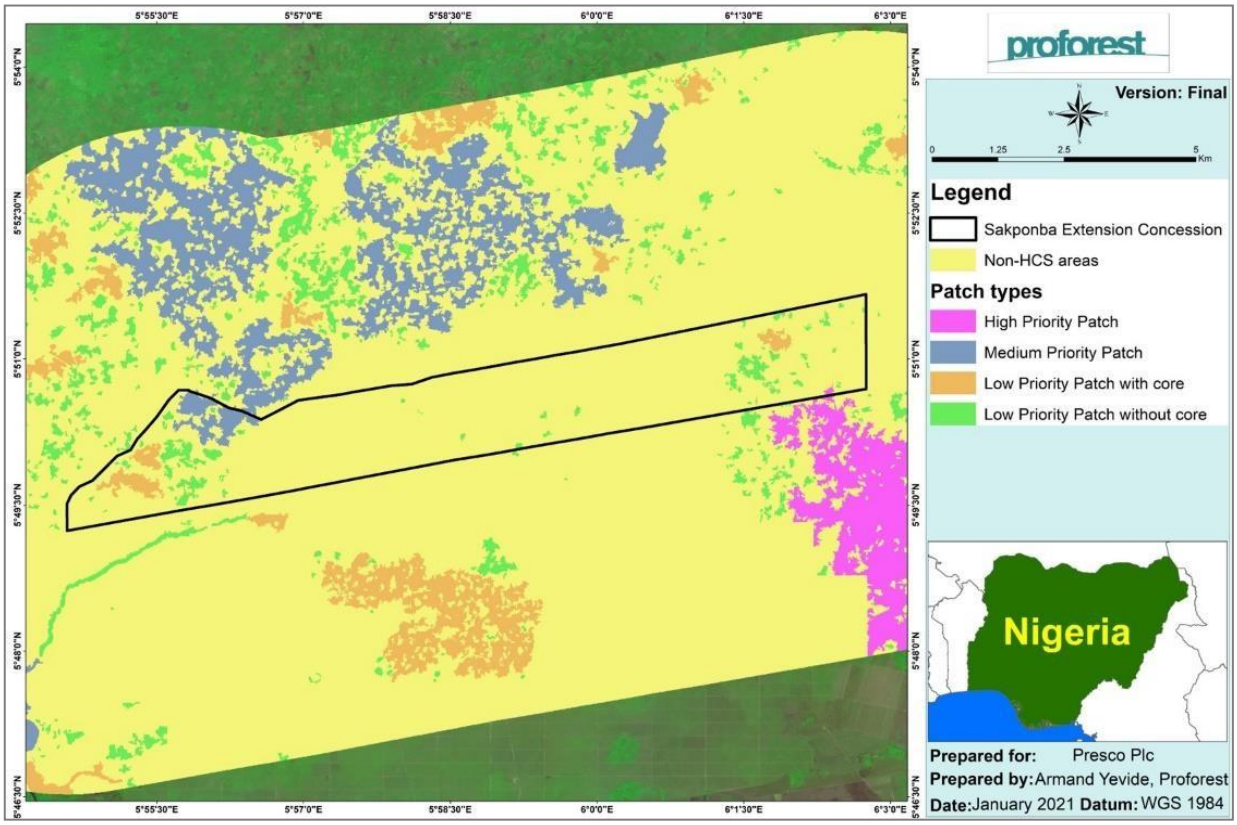


Figure 19: Map showing HCS patches categories based on their core area.

Step 4 and 5

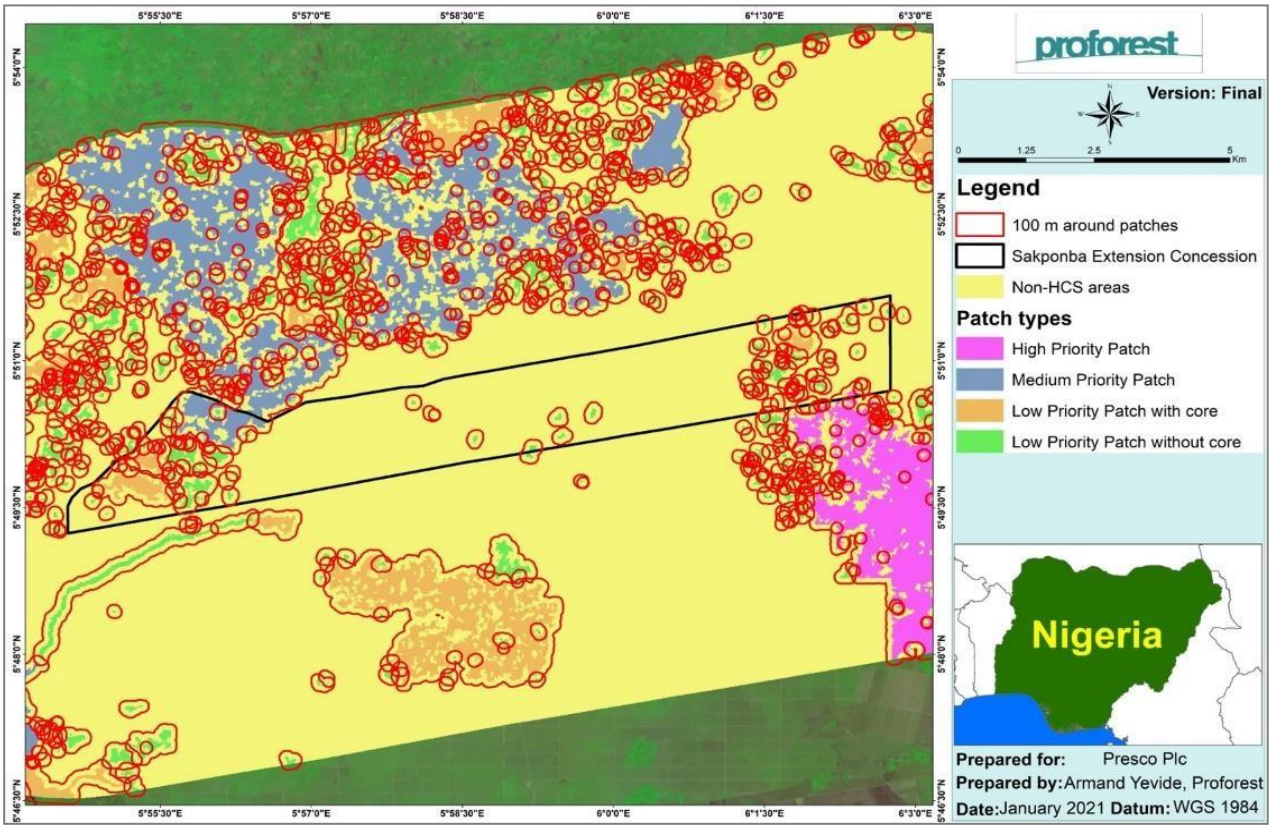


Figure 20: Map showing HCS patches and the 100m buffer around patches.

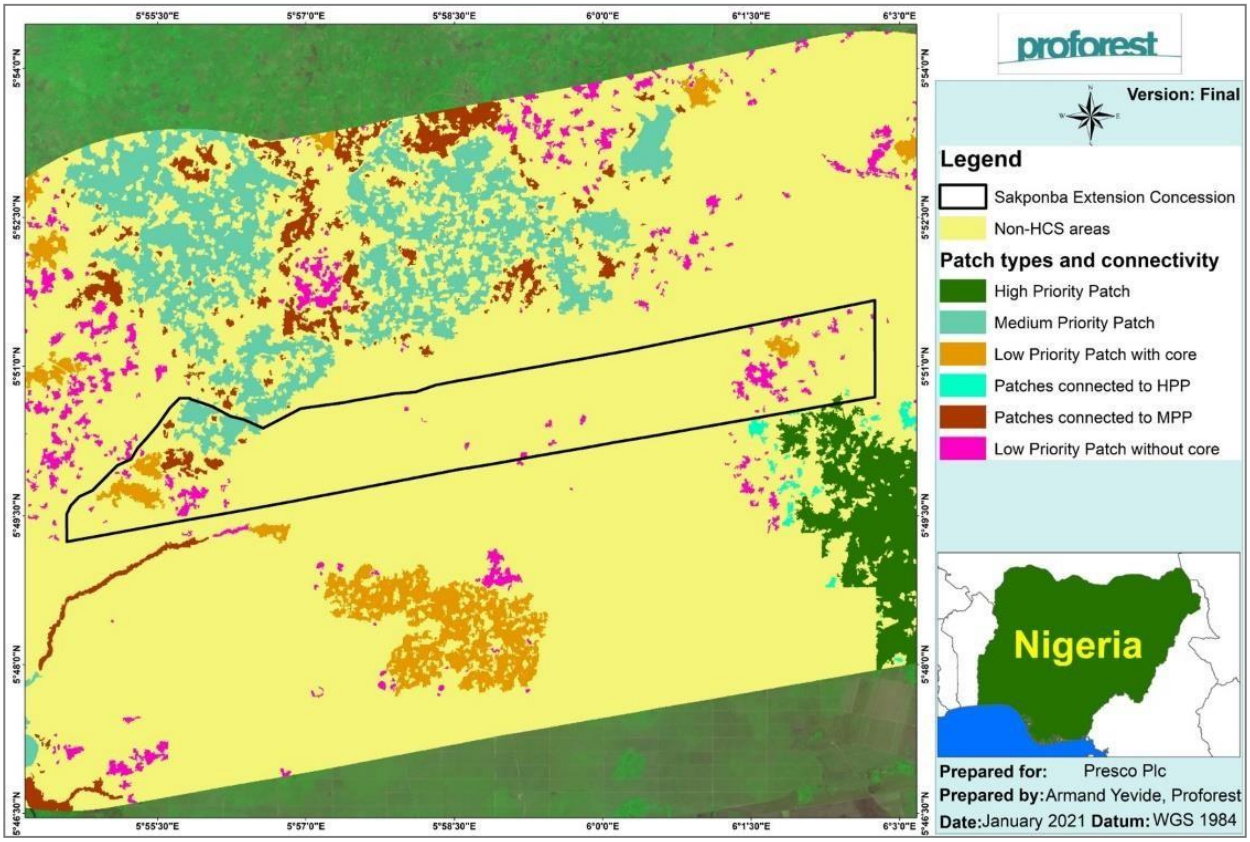


Figure 21: Map showing HCS patches categories and connectivity status.

Step 6 and 7

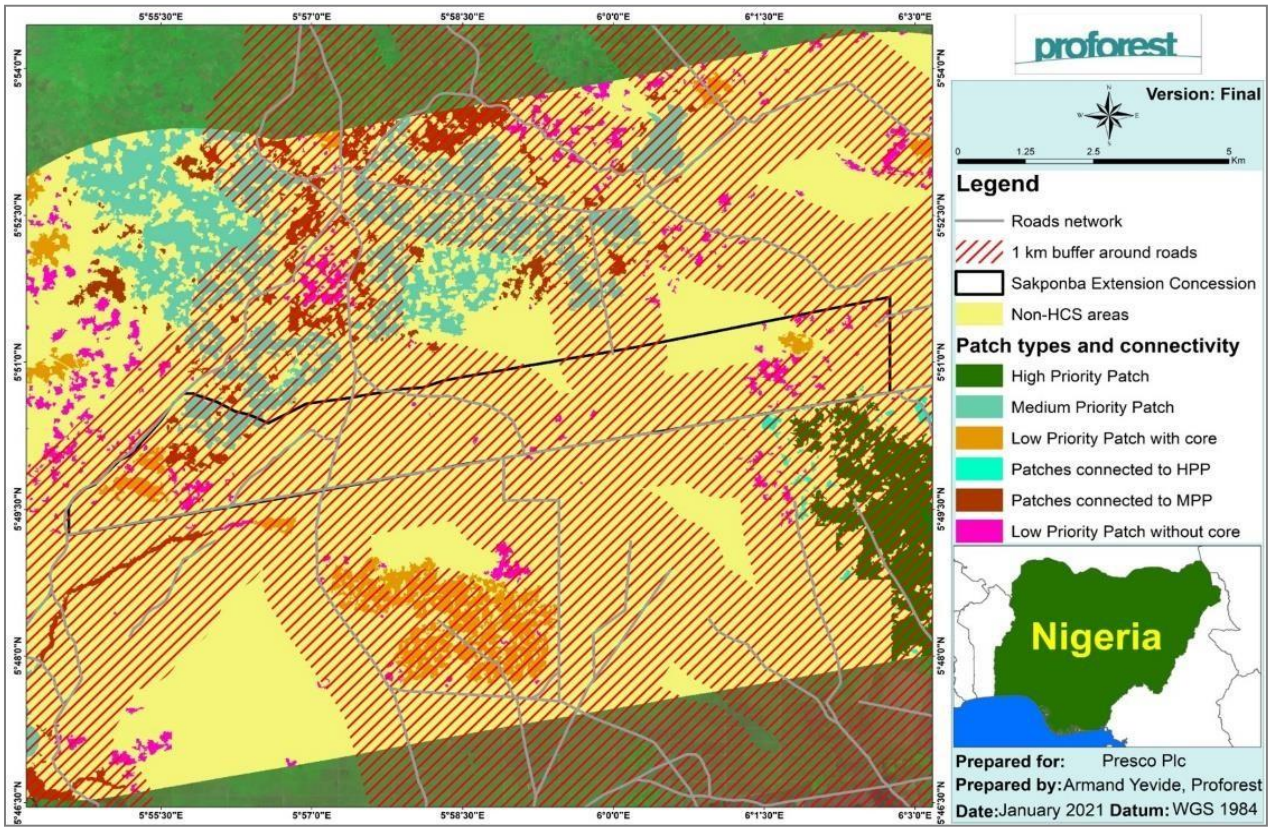


Figure 22: Map showing HCS patches categories and connectivity status overlaid road networks' buffer.

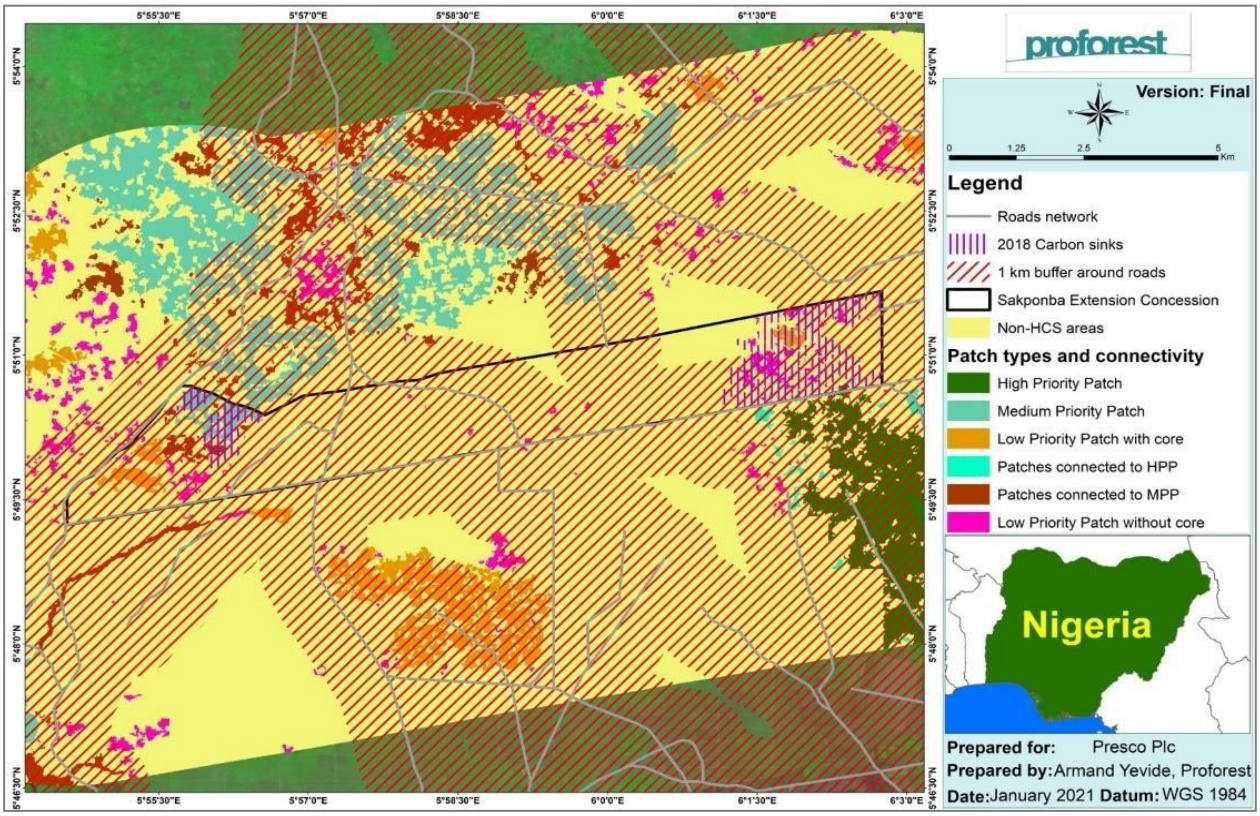


Figure 23: Map showing HCS patches categories and connectivity status overlaid road networks' buffer and the 2018 carbon sinks.

Step 8

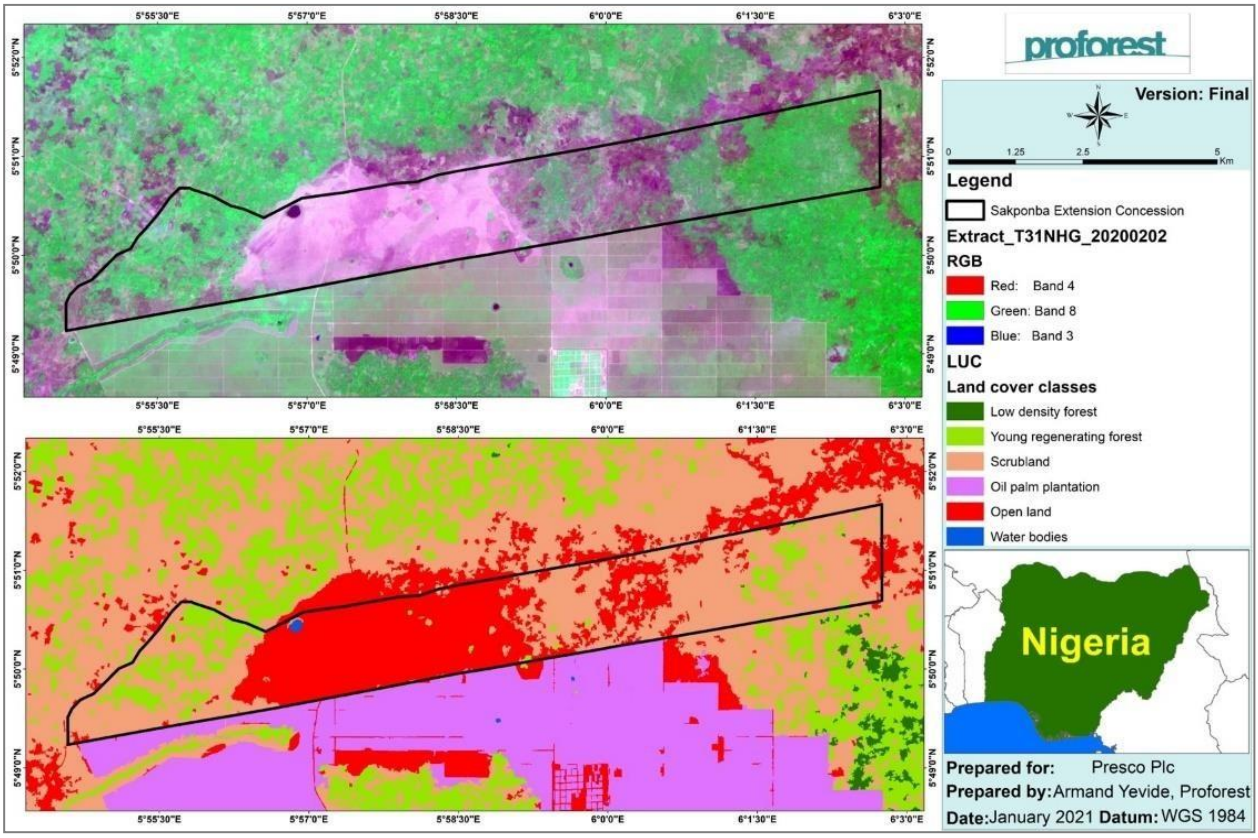


Figure 24: Map showing absence of large low density forest patch within the PDA.

Step 9 and 10

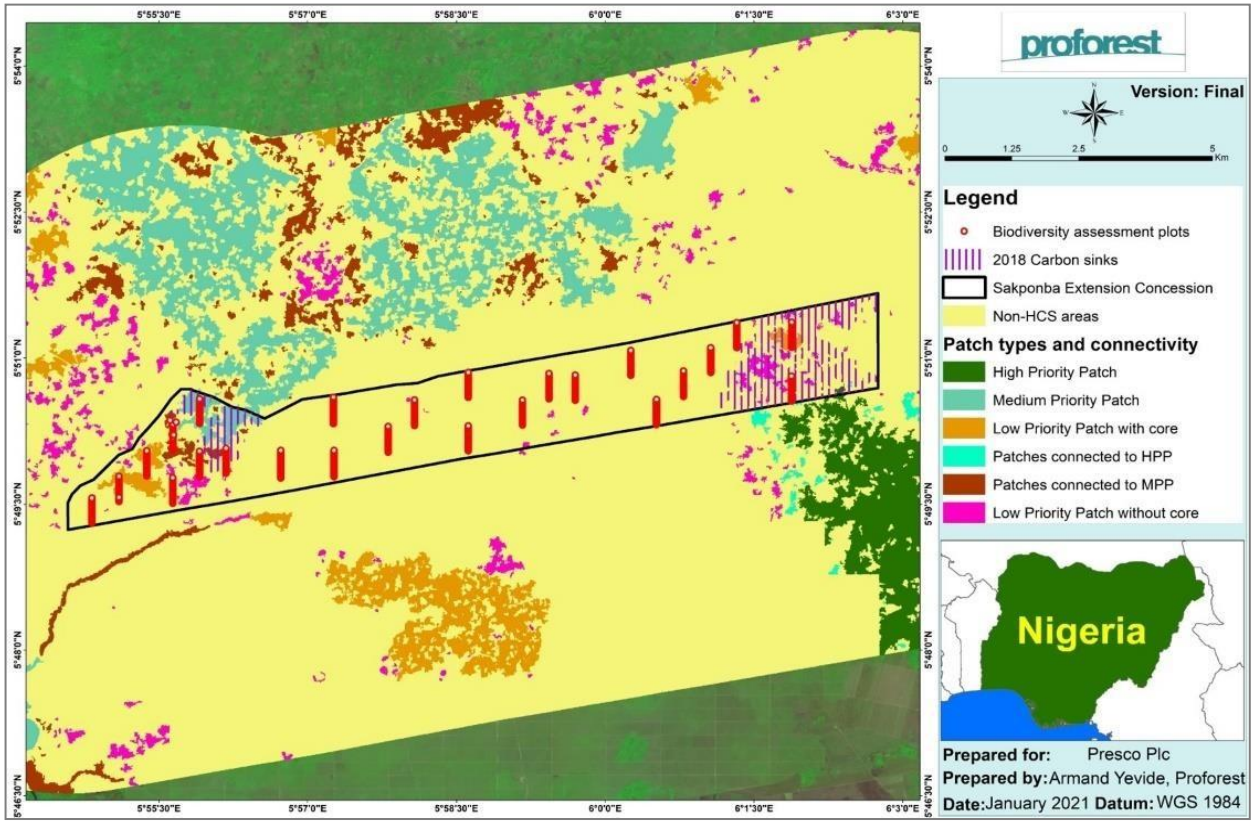


Figure 25: Map showing that HCV fauna and flora transects were laid in MPP and LPP.

Step 14

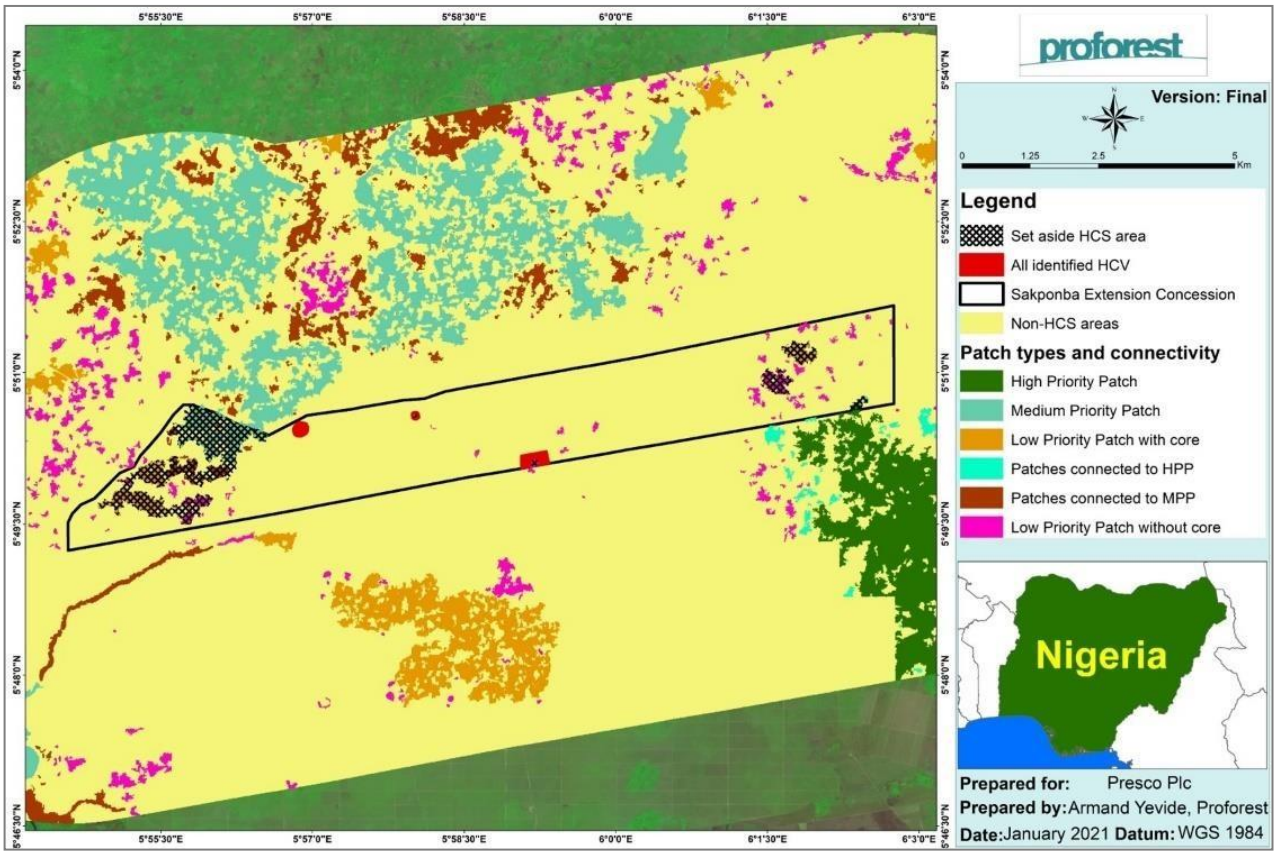


Figure 26: Map showing HCS set aside area overlaid with the HCS management area.

Section 5: FPIC

The following summary of the FPIC process with local communities is derived from the following documents:

1) High Carbon Stock Assessment of Presco's Sakponba Extension 1 Concession in Edo State, Nigeria dated 20 April 2021 by Proforest
2) Report on Participatory Mapping: Sakponba Estate Extension dated 1 April 2018 prepared by Paul Hameed of Presco Plc
3) Summary of Presco FPIC process in the Sakponba estate extension

5.1 Presco FPIC engagements with communities

Presco has committed itself to ensure that its operations do not unduly affect farmlands for food crop production and therefore maintained an ongoing FPIC process with the local communities. It is on this understanding that several engagements and consultations were conducted as part of its commitment to developing all its estate in a sustainable and socially acceptable manner.

Prior to the demarcation of the land by Forestry department of the Edo State Ministry of Environment, the immediate communities around the area were notified by the Ministry. Thereafter, Presco commenced engagement with the community in conjunction with officials of Edo State Ministry of Agriculture and Natural Resources. The engagement entailed townhall meetings with the communities made up of the Enogie, Elders, Women, Youths and other stakeholders in the community to explain the project, the area covered, affected communities and impacts of the project to the communities.

In order to ensure the communities who exercise user right to the land give their consent prior to the development of the proposed project, Presco initiated a FPIC process among all the surrounding communities within the project area. The process which include participatory mapping exercise was aimed at ensuring that all communities around the concession effectively participated in decision making about land use using their local knowledge. This helped the company to make an informed decision on how to use and develop the land without jeopardizing the culture and historical believe of the people.

Presco also developed a compensation mechanism through the compensation management standard operating procedure to Identify those entitled to compensations. Through this process, payment of adequate compensation was made to all asset owners within the concession. The community signed a FPIC declaration note to express their consent prior to project commencement.

The table below shows detailed steps of Presco FPIC engagements with communities within the assessment area.

Table 32: Highlights of the FPIC process between local communities and Presco Plc

Activity	Objectives	Responsibility	Timeline	End results	Status
Identification (or creation) of committees/councils in the local communities	Formalize all communication between the villages and the company	Relations Manager Socio-economist	Beginning of the Project January 2018	Identification of community representatives and relevant stakeholders	**Completed** Stakeholders list.
Letter of information	To communicate with the community and all relevant stakeholders about the land acquisition and the proposed development	MD/COO Relations Manager and socio-economist	Beginning of the Project January 2018	Evidence of communication to communities/ other stakeholders on the proposed development.	**Completed** All relevant stakeholders were reached and informed about the proposed development.
Meeting for launching FPIC	Identify and inform the stakeholders concerning the FPIC process	Relations Manager and socio-economist	January 2018	- Activities report, Pictures - Attendance list	**Completed** Meeting with all relevant stakeholders in place
Mapping with the communities (If necessary) all activities taking place inside Presco concession	Identify all activities carried out by each village inside the concession and identify as well the areas where these activities take place (this will be in conjunction with HCV/SIA/EIA process)	Mapping team Relations Manager Socio-economist External consultant/parties	February 2018 & October 2020 (Review)	- Maps validated by the local communities - Attendance list - Pictures, Videos where applicable - Written report	**Completed** Participatory mapping was carried out. ESIA & HCV Assessment conducted
Identification of the limits of Presco Plc concession	Ensure all stakeholders visualize where the limits of Presco's concession are	Survey team (eventually assisted by any other responsible officer)	February 2018	- Borders of the concession were marked by the opening of a small road and marking the trees at the right place	**Completed & Continuous** Insertion of pillars and boundary maintenance
A socio-economical study including the identification (done in a participatory way) of the perceived impacts and the expectations both	Obtain information concerning the villages which will lead to a better understanding of the needs and expectations of the local communities	GSM/MD/COO Relations Manager Socio-economist	March 2018 July 2018	- Questionnaires completed by locals - Reports (ESIA)	**Completed** ESIA Report

of the company and local communities in regard to the new cohabitation		Approved / Government SEIA consultant. Approved HCV-RN Assessor			
Information concerning Presco activities (RSPO engagement, EIA, HVC, etc…)	Inform local communities about the various phases of the extension project, about the positive and negative impacts	Relations Manager Socio-economist/sociologist Approved / Government SEIA consultant. Approved HCV-RN Assessor	December 2018	- Attendance list, - Summary of the studies - HCV, SI, and EIA Reports	**Completed** SIA, EIA, and HCV Report outcome communicated to all stakeholders.
Development with the local communities of procedures that will guide the FPIC process	Define in a participative way with the local communities the "rules of cohabitation" between the villages and the company in terms of means of communication, consultation, communities' representation, individual and collective compensation, and settlement process in case of grievance/complaints To communicate with the community's procedures and handbook	Relations Manager Socio-economist Sociologist	December 2018 November 2020 (Review)	- Social manual distributed to communities' representatives, the company Relations Manager and the Estate Managers	**Completed** Review of SOPs with communities.
Identification on the ground and on maps of the areas where the consent is given and of the areas where the consent reached for the establishment of a palm plantation	Physical identification and demarcation of the areas to be conserved (use paint or tape of practical physical means to identify those areas on the ground. GPS referencing of these areas is needed as well to make maps identifying the conservation areas (conserved for environmental reasons or social reasons)	Socio-economist, assisted by Surveyors/GIS Team with the supervision of the Relations manager	WEEK 2: January 2019	- Physical identification on - ground (tape, paint, etc.) - Pictures - Maps - Report	**Completed** Highlighted in the participatory map. HCV Maps
Carried out Compensation Process	To identify all people that are entitled to compensation and carried out fair compensation	Relations Manager Socio-economist/sociologist Presco GIS Team Edo State Ministry of Agric. /Edo GIS	WEEK 1: January 2019 Till February Ending, 2019	Compensation Report Maps of area compensated GIS data of the surface enumerated and paid for. -Enumeration Result	**Completed** All related and evidence of compensation available
Ending session/Public consultation to	Officializing the community-related by signing the FPIC	MD/COO Relations Manager	WEEK 1 February 2019	- Signed FPIC Declaration by all stakeholders,	Completed and Continous

officialize the agreements. Implementation of the mutual agreement and distribution of individual/collective compensations (if any)	Declaration form could also be part of the EIA public review exercise of the Project.	Socio-economist Sociologist HSE Manager RSPO Manager Estate Manager	December 2019 – March 2020	- Signed report listing compensations FPIC declaration form.	Enumeration has been completed payments made. FPIC Letter signed by Ologbo N`ugu community, and Orogho dukedom Chairman

5.2 Participatory mapping

The participatory mapping exercise was conducted amongst four local communities (namely: Orogho, Obanakhoro, Owuo and Ologbo N'ugu communities) surrounding the newly de-reserved 2,500ha out of the Urhonogbe Forest Reserve to Presco Plc for the development of Oil Palm plantation development.

The method adopted for this exercise, involved three stages: opening session / interactive discussions with different stakeholders, field mapping exercise and validation of the maps.

Different community representatives and age groups were consulted to ensure a broad representation. A community outreach was conducted involving relevant stakeholders, gender and different age groups. Elders are often the most knowledgeable about sites of historical and cultural importance but this discussion was not limited to their knowledge alone.

The GPS field work exercise involved a group of 5 to 6 representatives from each of the communities to capture boundaries and places of interest in the field. Both auto-tracking and points were used for the geolocation.

5.2.1 Methodology and Approach

The method adopted for this exercise involves three stages: opening session/interactive discussions with different stakeholders, field mapping exercise and validation of the maps.

Opening season/interactive discussion:

At this stage, different community representatives and age groups were consulted to ensure good representation. Community outreach consultations were conducted involving all relevant stakeholders, gender and different age groups. Elders are often the most knowledgeable about sites of historical and cultural importance but this discussion was not limited to their knowledge alone as other working groups especially the youth and the women were also actively involved. The local knowledge of spatial understanding was adopted for effective interaction and understanding of their resources within the area.

Communities define what key values in the landscape need mapping other than farming areas: schools, churches, mosques, halls, cemeteries, hunting zones, fishing zones, logging zones, non- timber forest products (NTFPs) collection areas, sacred shrines, water points (wells, rivers, ponds), pillars, bridges, access roads, and swamps etc.

With the help of local knowledge and understanding of the area, the people were able to delineate on the ground their area and of land use with a specific focus on the area utilized for farming purposes. This exercise was done with the involvement of all participants, attesting to the sketch of the area on ground.

Field mapping/map production exercises:

Following the community opening session to share and to define what key values in the landscape need to be mapped, the community representatives and Presco team engaged in field mapping exercises using Global Positioning System (GPS) to map out all relevant areas. With the participation of the community representatives and integration of the local knowledge and understanding of the area, the team was able to delineate community boundaries and farming zones within the project area.

i) Field GPS work

Specifically, the GPS fieldwork exercise involved a group of 5 to 6 representatives from each of the communities to capture boundaries and places of interest in the field. Both auto-tracking and points are used for the geolocation.

ii) Data integration within GIS

After the GPS data gathering, the results were downloaded and integrated into the GIS system using the Arc GIS Software, to produce a sketch map for endorsement. The maps were presented at a general meeting with various stakeholders in the community for endorsement.

5.2.2 Findings of FPIC and Participatory mapping

The following are the outcome of the exercise with each community.

Orogho community:

The Enogie's representative raised issues which led to the disruption of the exercise at the first stage of the exercises, He challenged the Edo State Government`s approval of the area which was de-reserved for Presco, and opined that the concession should be named Orogho/Uronigbe Forest Reserve. He also asked that Presco should not visit any other community apart from Orogho community when it comes to issues of the de-reserved Urhonigbe FR.

However, after exhaustive deliberation and discussions on the issues raised, the team were invited back to the community for the completion of the exercise.

The community showed the team ancestral pond (Izabumwen shrine) and other notable significant areas which were mapped.

Obanakhoro Community:

The mapping exercise at Obankhororo community revealed some areas in contention with their neighboring communities. The participants described the oil well located in the area as the bone of contention with some communities in Delta state who also claimed ownership of the area. In addition, the common boundary between Obanakhoro and Orogho community was mapped which was described as "kpanada junction''.

Apart from the oil well location in the area, the community members also acknowledged that the area is a forest reserve and that according to the government regulations they are not allowed to cultivate any permanent crops such as oil palm and fruit tree crops within the area. Thus they are only allowed carry out annual cropping. Their farming areas were mapped out according to their local knowledge of the area and interpreted on the GIS map.

Owuo Community:

The activities at Owuo community involved the participation of several key stakeholders and more clarification about Presco's new acquisition. The outcome of the participatory exercise clarified most of their anxieties and concerns over the project. Specifically, during the mapping process the community were made to know that the area acquired by Presco does not involve the community land which was initially believed to be part of the acquisition. The Osagie camp which was purported to be part of the acquisition was discovered to be outside the acquired area. The exercise within the Owuo community was robust as the community representatives who were part of the survey exercise were the ones who described the area. Several individuals with their local knowledge mapped out the area for the clarification of other members of the community who thought the newly acquired area was part of their family land.

Ologbo N`ugu Community:

The mapping exercise was done in several phases to ensure that all relevant stakeholders understand the process and assimilate the local knowledge with the spatial and GIS system to produce a map that will be understood and interpreted by both parties. The first phase was done in collaboration with the HCV assessor during the HCV assessment process to set up the basis for the participatory mapping. A site verification was also conducted jointly with the community representatives to ascertain the extent of the acquired area within the forest reserve. The areas of significant interest to the community were sketched out and identified. These areas were outside the acquired area, which includes Olokun (river goddess) located near the Ehinwin River and the Osadolor camp.

Furthermore, after the verification exercise, the two communities proceeded to delineate a portion of the concession acceptable to both parties as the harmonized boundary between the communities (Orogho and Ologbo N'ugu). The area borders the already existing Presco acquisition at the south, separated by Etefe road which was the boundary between the forest reserve and the free area. The unnamed junction which was the border between Orogho and Ologbo N`ugu used to be a forestry-gantry used as a loading bay to transport logs from the forest reserve across River Ethiope to Lagos in the 1970s.

The exercise, however, helps to understand the area at which different activities are been carried out and identified people who utilized those areas for their livelihood support which in turn will guide Presco towards the planning and development of the area for sustainable agricultural production.

Adolosa Community:

Adolosa community is a satellite community of Ologbo. It was indirectly included into the actual participatory mapping exercises because the camp does not fall within the 2,500ha concession area even though it reflected in the 3,100ha initially demarcated by the forestry officials out of which 2,500 ha was ultimately approved.

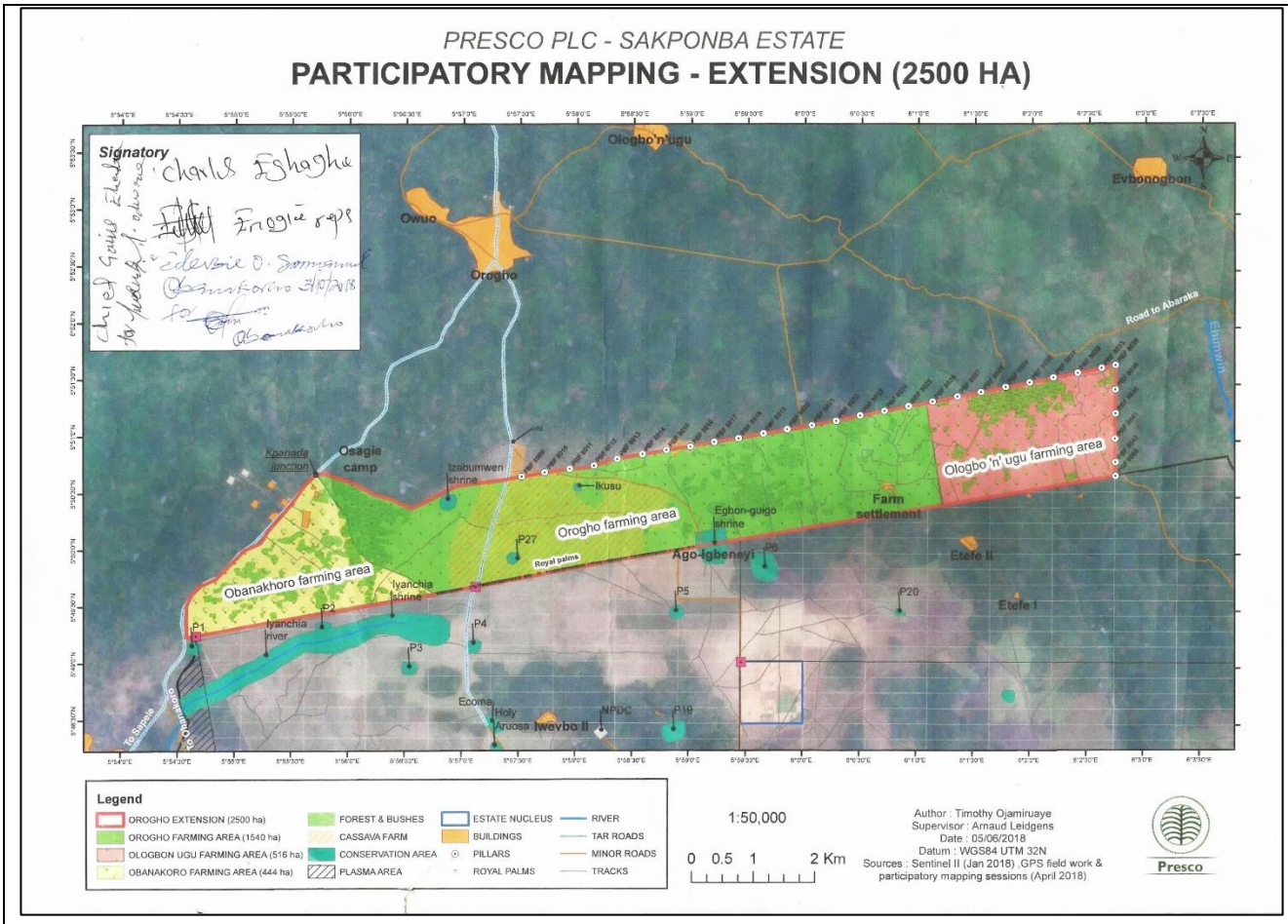


Figure 27: Participatory mapping area agreed and signed by local community representatives

Section 6: Soil and topography

The soil and topography assessment was conducted as part of the Environmental and Social Impact Assessment (ESIA) of the Proposed Sakponba Extension of Oil Palm Plantation Development Project at Orhionmwon Local Government Area, Edo State, Nigeria was conducted by Foremost Development Services Limited and submitted for approval to the Federal Ministry of Environment, Abuja.

Date of EIA assessment report: August 2019

Dates of field data gathering for ESIA: 18th to 20th July 2018, 20-21 August 2018, 14th and 19th September and October 1st 2018

Assessor Designation and Company: Foremost Development Services Limited (Consultant)

See Section 3 for further details of assessment team qualifications and report.

6.1 Geomorphology

The site is located within a zone of continental massive coarse grained porous and permeable landforms. It has relatively plain landforms with surficial sands and little clay to silty sand distribution across site terrain. It possess beautiful great landforms dominated by plain land and verygentle slope to low depressions wherever available.

6.2 Topography

The topography is generally that of relatively flat land across the site with an average elevation of about 25m above mean sea-level. Meanwhile, the relief is characterized by stable grounds.

6.3 Soil Area description

The terrain is very flat and no slopes of more than 15º are present. Several small ponds are found across the area on the western half and these are usually surrounded by a seasonally flooded swamp area.

The geology consists of sedimentary rocks of Coastal Plains Sands from the Pleistocene/Oligocene with more recent Alluvium nearer to the rivers (based on the 1957 Geological Survey of Nigeria by Shell-BP, Sheet 70).

6.4 Soil Assessment method

Using an estate map a systematic grid of 1km (west-east) by 1km (north-south) was drawn and used for the soil sampling with the auger over the entire planted area, representing a total of 165 sampling points. These sampling were taken to a depth of 120cm and the cores were laid out in a white plastic sheet next to a ruler so that they can be properly described.

A total of 11 profile pits were located across the estate. Refer to Table 7: EIA Sampling Points and Controls under Section 3: SEIA for details of soil sampling points. The locations were chosen based on the findings from the grid sampling either because they were believed to be representative of the soils within the larger area or because there was uncertainty of the soil type in the given area. Profile pits were made to a depth of 200cm and the profile description included: number and depth of the different horizons in the soil, structure, consistency, presence of mottles and stones, rooting system and drainage condition for each horizon.

The soil samples were sent to the analytical laboratory of IITA in Ibadan in April 2018. Analysis carried out were: particle size (% sand, silt and clay), pH (in H_2O), OC %, N% (total, NO_3 and NH_4), Olsen P, Cation contents (Ca, Mg, K and Na), exchangeable acidity and ECEC. Texture class was determined based on the particle size composition using a soil texture calculator based on the USDA soil Soil Survey Sakponba texture triangle. Base Saturation was calculated based on the ECEC and the cation composition.

6.5 Soil Suitability Results

The soils in Sakponba estate have physical properties that are adequately suited for oil palm cultivation.

The 11 profiles examined each had 4 horizons and only 4 of them had a top horizon of loamy sand with the thickest one being 50cm. All the horizons examined had at least 10% clay content that increases with depth.

The pH is slightly acidic and tends to decrease with depth. Fertility is quite low with ECEC rarely exceeding 1.5 cmol/kg and base saturation is always above 50%.

Using the FAO WRB taxonomy and classification key the soil profiles observed and analyzed across the estate are identified as nitisols or lixisols. This is not unexpected as these soils are recognized as being major soil types in the south of Nigeria. The pond and swamp areas are classified as gleysols.

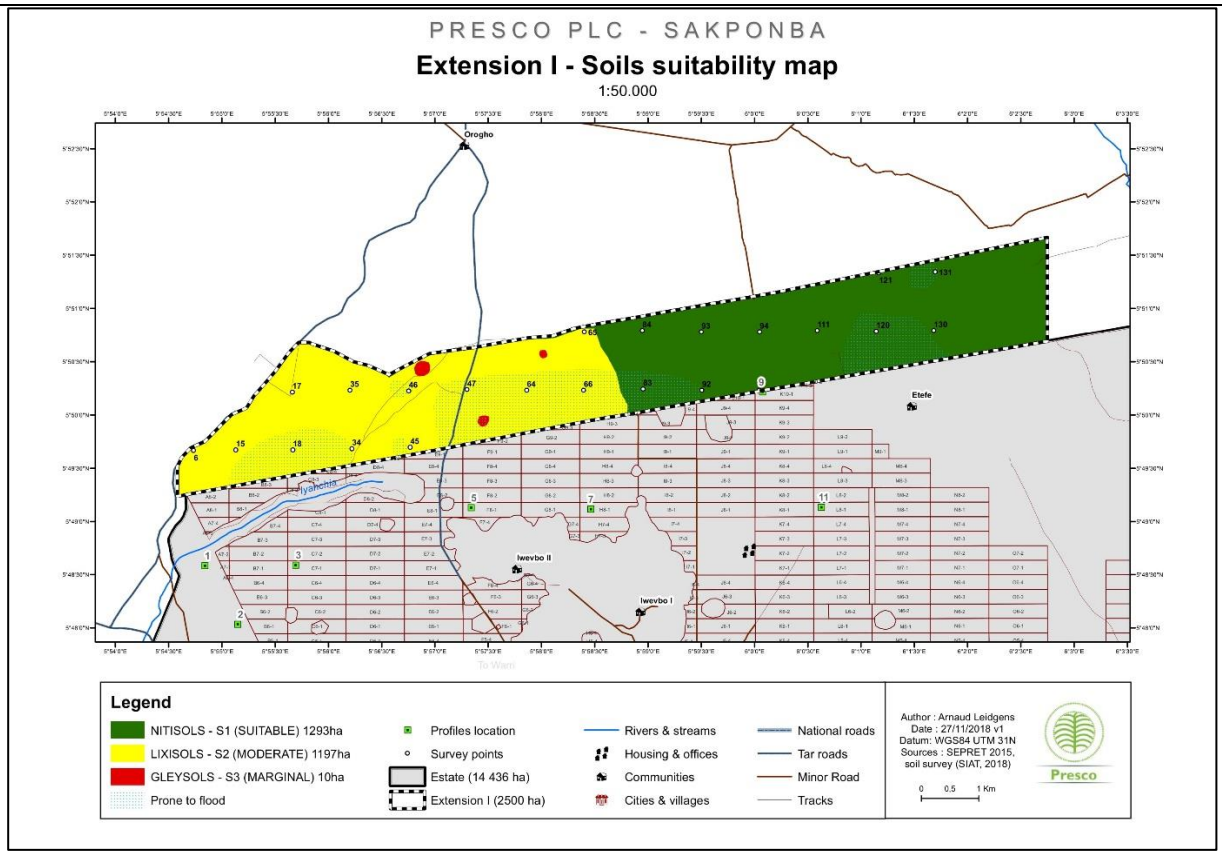


Figure 29: Sakponba Extension I Soil Suitability Map

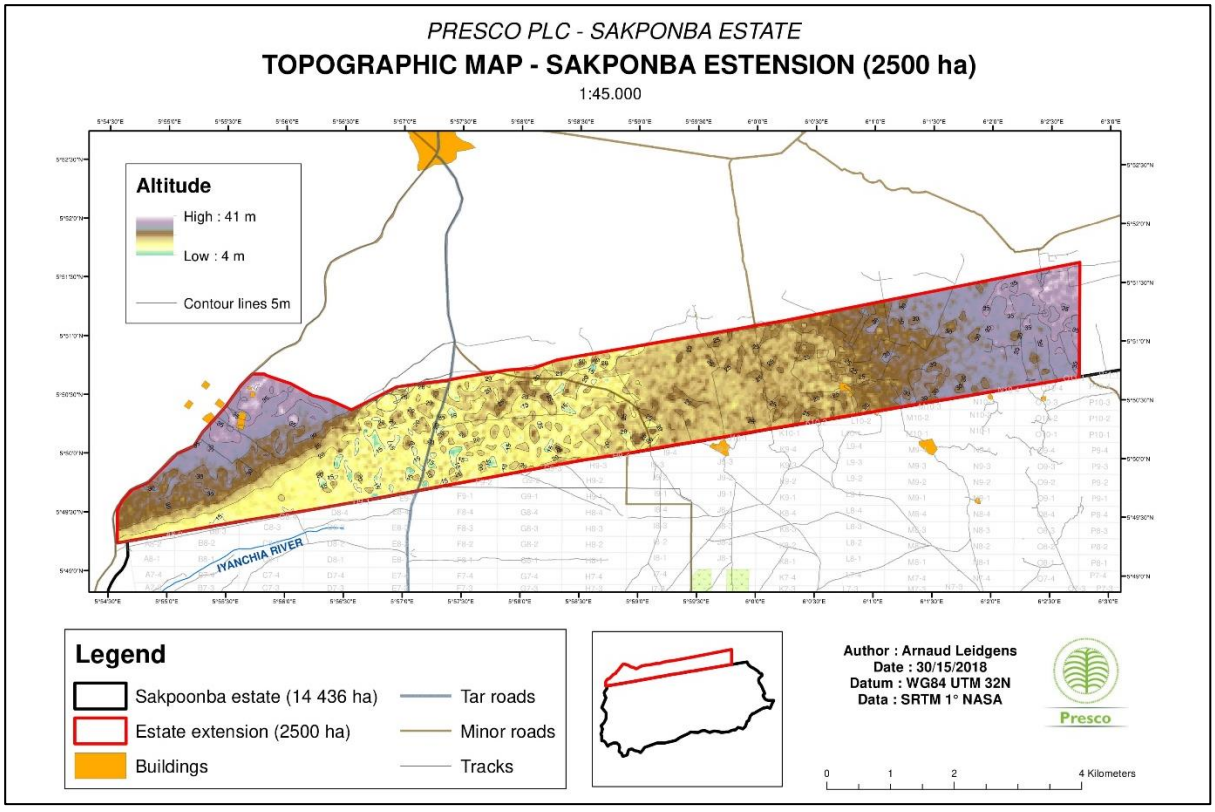


Figure 30: Sakponba Extension I Topography Map

Section 7: Greenhouse Gas (GHG)

7.1 Summary of GHG Assessment

The Carbon Stock Assessment and GHG Emission Report for Presco's Sakponba Extension Concession in Edo State in Nigeria was conducted by Proforest.

Date of Assessment Report: 1 February 2019

Name of Assessor: Abraham Baffoe

Assessor Designation and Company: Lead Assessor, Proforest

7.2 GHG Assessors and their Credentials

Table 33: List of the assessors and their qualification.

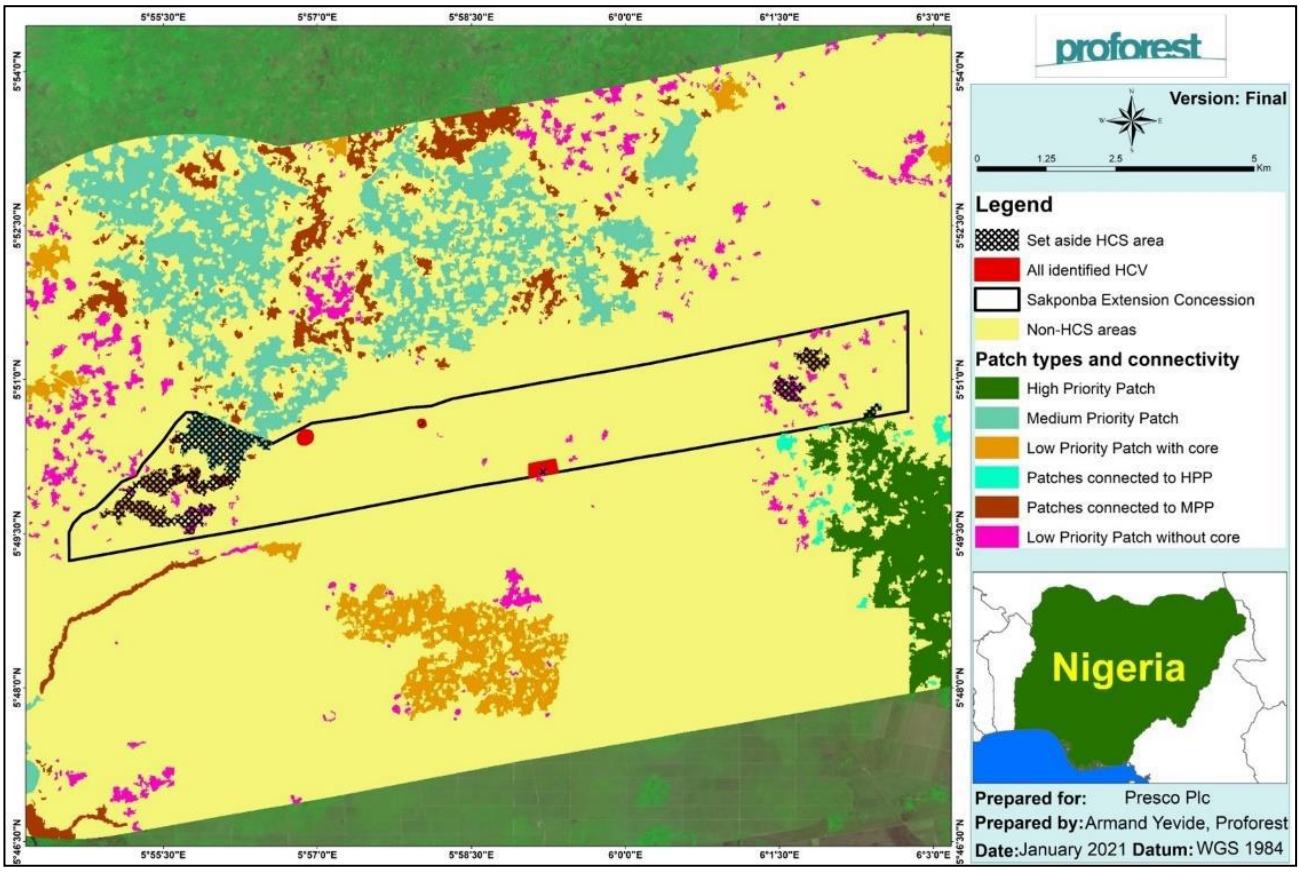
Name	Organisation/company	Role in the assessment
Abraham Baffoe	Proforest	Assessment oversight and Ecology/landuse planning
Michael Abedi-Lartey	Proforest	Assessment Coordination
Armand Yevide	Proforest	Flora survey coordination plus GIS and mapping
Aristotle Boaitey	Proforest	GIS and community consultation
Adesoji A. Adeyemi	Federal University of Technology	Botanists/Flora survey

7.3 Methodology and procedure used

7.3.1 Desk review

A desk review of documents including paper and cadastral maps provided by Presco was carried out prior to the field assessment while a combination of satellite images of the wider landscape was used. This included publicly available Google Earth imagery which was used in the initial planning for the assessment. Satellite imageries were thereafter used to aid the assessment of the study area and to determine the land cover classes in the area

as shown in



presents the key outputs of the land cover classification.

7.3.2 Sampling and experimental design

An approximately 1% sampling rate was used to determine the sample size for the estimation of the total carbon stock for the proposed concession. 25 sampling plots were laid across the proposed concession (Figure 31). These plots were distributed along 20 transect lines oriented North-South and, which were at least 500 m from each other. Each plot was a rectangle of 1 ha (length 500 m and width 20 m) which was subdivided into 25 quadrats of 20x20 m (400 m2) each. Only live trees and lianas with trunk diameter at breast height (dbh) ≥10 cm were measured, using a diameter tape. In addition to the dbh measurements, the height of each individual tree was estimated visually.

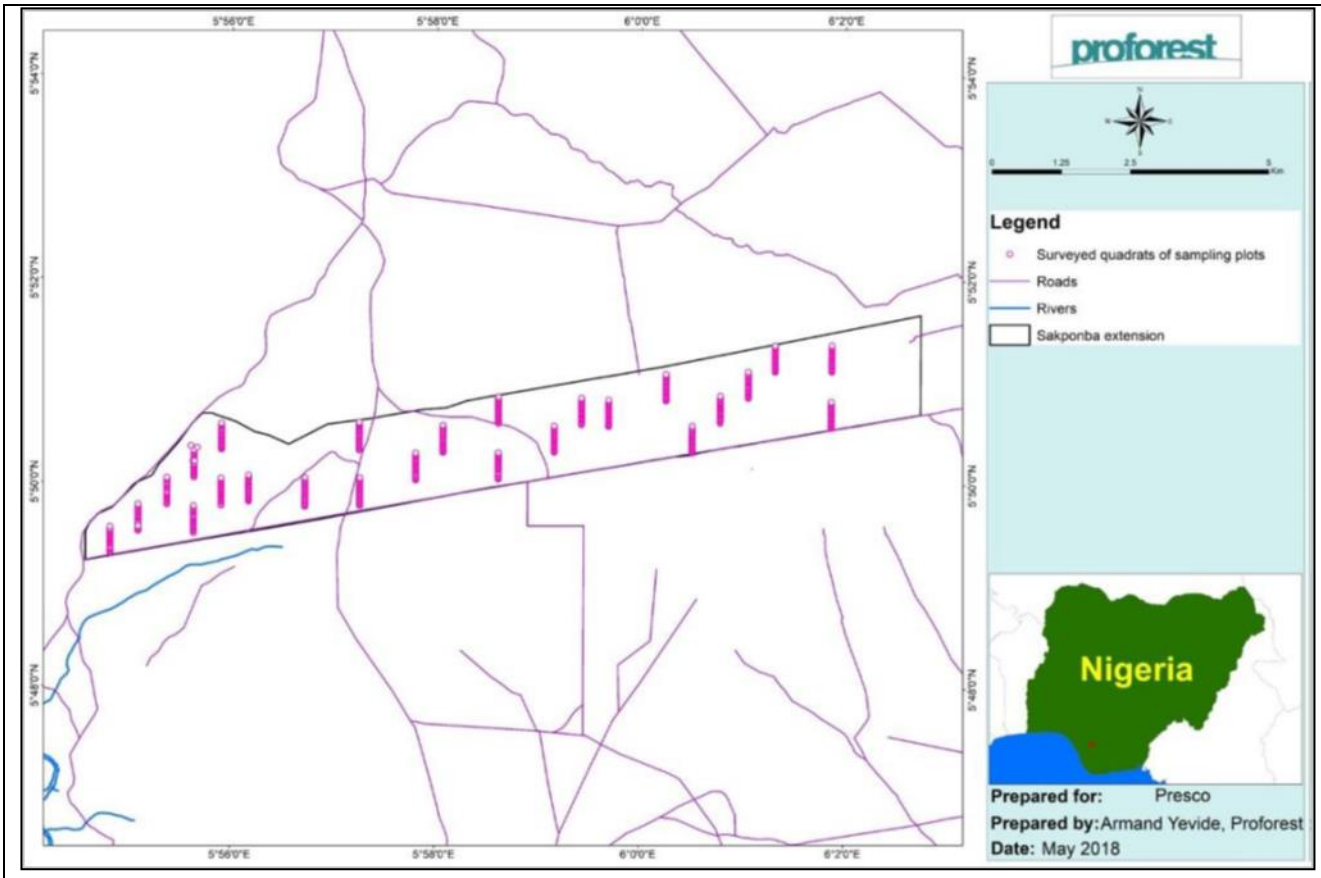


Figure 31: Distribution of Sampling Plots Along Transect Lines Across the Proposed Concession

7.3.3 Data Analysis

Above-ground biomass was estimated using the latest improved allometric model of Chave et al. (2014) which uses tree height, stem diameter, and wood density as covariates. The biomass was estimated for each individual tree (including all stems for multi-stemmed trees) using the equation below: AGB = 0.0673× $(\rho D^2 H)^{0.976}$

Where AGB is aboveground dry biomass (in kg); ρ is wood density (in g/cm3) D is diameter at breast height (in cm) and H is the height (in m).

7.4 CS Result of Carbon Stock Assessment:

Table 34: Size of land-use types of Sakponba extension concession

Land use classes	The total area covered (ha)	Proportion (%)
Barren or open land	130.3	5.21
Mosaic of natural vegetation and farmland	1,873.0	74.91
Old fallow or young regenerating forest	495.2	19.81
Water bodies	1.6	0.06
Total	**2,500.1**	**100.00**

NB: The figures in the table come from the land cover classification of the satellite imagery retrieved from the EarthExplorer webpage of the United States Geological Survey (USGS).

Table 35: Total Carbon Stock Estimated in The Different Vegetation Types of Presco's Sakponba Proposed Extension

Vegetation types	Sampled area			Total concession	
	Sampled area (ha)	Total carbon (tC)	Carbon (tC/ha)	Total area (ha)	Total carbon (tC)
Barren or open land	6.44	3.54	0.55	130.3	71.67
Mosaic of natural vegetation and farmland	17.96	48.07	2.68	1,873.0	5,019.64
Old fallow or young regenerating forest	0.6	15.54	25.90	495.2	12,825.68
Water bodies	0	0	0	1.6	0.00
Total	**25.00**	**67.15**	**2.69***	**2,500.16**	**17,916.99**

* this value is equal to the total carbon obtained for the sampled area (67.38 tC) divided by the total sampled area (25.00 ha).

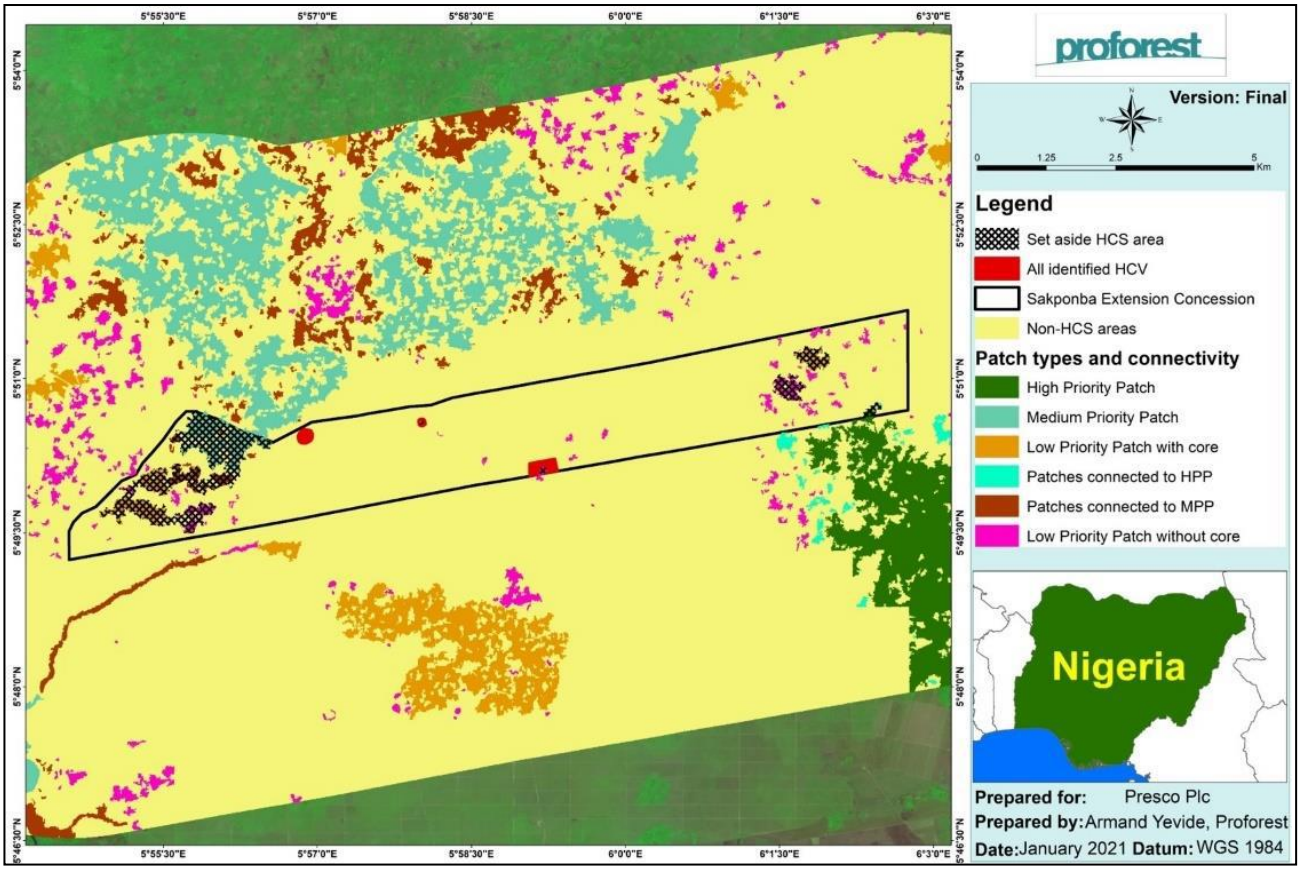


Figure 32: Old Fallow or Young Regenerating Forest and Suggested Set Aside Patches Within Sakponba Extension

7.4.1 GHG Emission sources

The most likely emission sources from this project would be the following:

- Emissions from land use change
- Emissions associated with fertiliser use

• Emissions associated with FFB transport

• Emissions from Palm Oil Mill Effluent

• Emissions associated with fossil fuel and electricity

7.4.2 GHG Scenario analysis

Six main scenarios that include various combination of set-aside areas (HCVs areas and carbon sinks) were considered and analysed. The estimation of the GHG emissions were done using the New Development GHG Calculator provided by RSPO and downloaded from the link below: http://www.rspo.org/certification/ghg-assessment-procedure. The table below presents the characteristics of the six scenarios considered for the analysis.

Table 36: Characteristics of the scenarios used for the GHG emission estimations

	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6
Concession lease	2,500	2,500	2,500	2,500	2,500	2,500
Set aside area for Carbon credit (HCV + buffers)	25	25	25	25	25	25
Land cleared for other use (5.5%)	113	113	122	122	136	136
Potential conservation (Carbon sinks + buffer)	**428**	**428**	**265**	**265**	**0**	**0**
Possible planting area	1,934	1,934	2,088	2,088	2,339	2,339
Percentage of possible planting area (%)	77.36	77.36	83.52	83.52	93.56	93.56
POME Treatment Conventional	Y	-	Y	-	Y	-
POME Treatment Methane Capture	**-**	**Y**	**-**	**Y**	**-**	**Y**
EFB sent back to the field	70%					
EFB for other uses (e.g burn in boiler)	30%					
Barren or open land	130	130	130	130	130	130
Mosaic of natural vegetation and farmland	1,848	1,848	1,848	1,848	1,848	1,848
Old fallow or young regeneration forest	**67**	**67**	**230**	**230**	**495**	**495**
Water bodies	2	2	2	2	2	2

Table 37: Carbon Emissions/Sequestration Under Four Different Scenarios

	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6
Land clearing	271	271	439	439	714	714
Crop sequestration	-18,110	-18,110	-19,552	-19,552	-21,896	-21,896
Fertilisers	359	359	388	388	434	434
N_2O	190	190	205	205	230	230
Field fuel	290	290	313	313	350	350
Peat	0	0	0	0	0	0
Conservation credit	-1,626	-1,626	-1,007	-1,007	0	0
POME	6,067	862	6,550	931	7,335	1,042
Mill fuel	201	201	217	217	243	243
Purchased electricity	0	0	0	0	0	0
Credit (excess electricity)	0	0	0	0	0	0
Credit (sale of biomass)	0	0	0	0	0	0
Field emissions & sinks	-18,626	-18,626	-19,213	-19,213	-20,168	-20,168
Mill emissions & credit	6,268	1,063	6,767	1,148	7,578	1,285
Total emissions (field and mill)	**-12,358**	**-17,563**	**-12,446**	**-18,066**	**-12,590**	**-18,883**
t CO2e/t CPO	-1.501	-2.132	-1.400	-2.032	-1.264	-1.896
t CO2e/t PK	-1.501	-2.132	-1.400	-2.032	-1.264	-1.896

The outputs of the scenarios analysis show that, there would be a net sequestration of more than 12,358 tCO2e for all the scenarios tested.

7.4.3 CS, GHG Result of assessment and emissions calculation

Forest patches covering 428.32 ha and the HCVs areas 25.07 ha (see HCV assessment) were recommended to be set aside for conservation purposes, scenario 2, Table 36 and 37. Presco has conducted additional field works to connect the nearest forest patches and retained patches that are less fragmented.

The Figure 33 presents the new forest patches (new carbon sinks) overlaid with those recommended by the Carbon Stock assessment report.

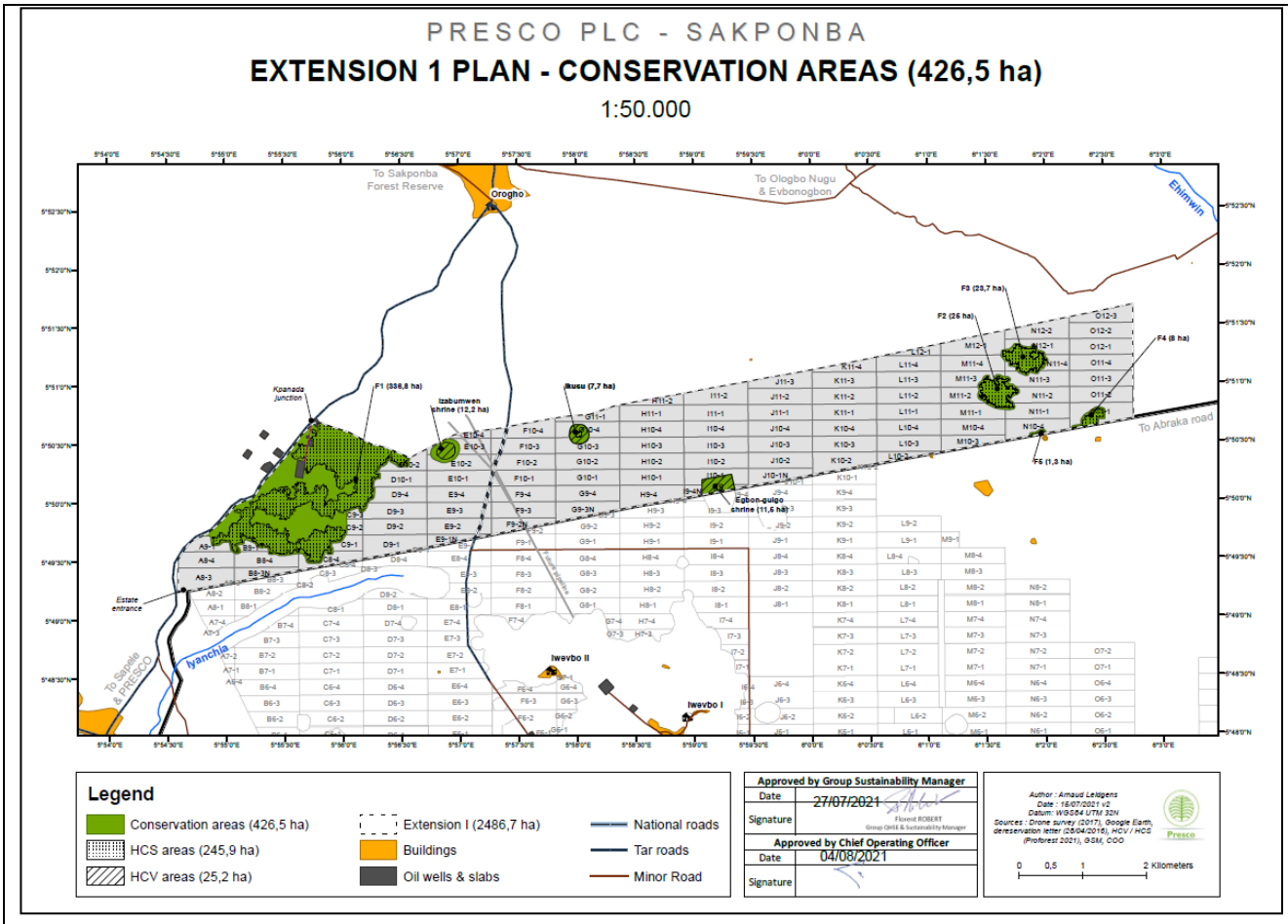


Figure 33: Map Showing the New Delineation of Forest Patches Overlaid With The Cs Recommended Patches

Section 8: Land Use Change Analysis (LUCA)

8.1 Summary of LUCA

The Land Use Change Analysis for Sakponba Extension I was done internally by SIAT staff and documented in Report on Land Use Change Analyses for the Proposed Sakponba Extension I New Oil Palm Development, Orhionwon LGA, Edo State, Nigeria, updated January 2021.

Name of Assessor: Arnaud Leidgens

Assessor Designation and Company: Group GIS & Land Use Manager - SIAT Group

The LUC analysis was undertaken to complement the HCV assessment. The analysis included a systematic land use change analysis utilizing satellite imagery. The Carbon Stock analysis was conducted by Dr Sedami Igor Armand Yevide from Prforest. The imagery analyses was done by Arnaud Ledgends Siat group Surveyorm, the study consisted of a systematic land use change analysis with the use of comparative satellite imagery which shows the land use of the proposed area for the period 2005-2018. The analysis confirms Proforest's findings that the proposed development is dominated by Mosaic of natural vegetation-farmland and old fallow or young regenerating forest respectively 75% and 20% in proportion of the landscape.

30m resolution satellite imageries retrieved from the USGS's EarthExplorer webpage (http://earthexplorer.usgs.gov/) were used to stratify the landscape of the proposed concession. The retrieved satellite image (Scene Identifier: LC81890562018032LGN00) was acquired on the 1st February 2018. Once retrieved from the Earth Explorer, the raw satellite image was pre-processed and classified into 6 classes (degraded forest, riparian forest, old fallow or young regenerating forest, mosaic of natural vegetation and farmland, barren or open land, and water bodies.) using the maximum likelihood algorithm. The overall accuracy was 98.3% and the Kappa coefficient was 98.0%.

8.2 LUCA Method Image Classification

The land cover classification was carried out with ArcGIS which uses an object-based image classification method. During the HCV and Carbon Stock assessments conducted in February-March 2018, ground-truthing data was collected and used as training sample through the maximum likelihood algorithm to classify the vegetation of Sakponba Extension 1 landscape for the year 2018 into four classes as seen in Table 38 and Table 39.

8.3 LUCA Results

Table 38: General evolution of the land cover

	2005	2007	2009	2010	2014	2016	2017	2019	2020
Grassland or open land (ha)	879,3	844,3	999,2	999,2	854,4	861,7	920,9	955,2	1010,41
Other vegetation types (ha)	1618,8	1653,8	1498,9	1498,9	1643,6	1636,3	1577,0	1538,6	1429,13
Water bodies (ha)	2,1	2,1	2,1	2,1	2,1	2,1	2,3	6,4	3,1

Table 39: Tree Cover Loss from 2000 to 2020

Period	Surface (ha)	Repartition (%)
No tree cover loss	2077	83.1%
Tree cover loss (2001)	13	0.5%
Tree cover loss (2002)	22	0.9%
Tree cover loss (2003)	2	0.1%

Tree cover loss (2004)	2	0.1%
Tree cover loss (2005)	1	0.0%
Tree cover loss (2006)	13	0.5%
Tree cover loss (2007)	6	0.2%
Tree cover loss (2008)	16	0.6%
Tree cover loss (2009)	3	0.1%
Tree cover loss (2010)	4	0.2%
Tree cover loss (2011)	28	1.1%
Tree cover loss (2012)	2	0.1%
Tree cover loss (2013)	13	0.5%
Tree cover loss (2014)	27	1.1%
Tree cover loss (2015)	19	0.8%
Tree cover loss (2016)	59	2.3%
Tree cover loss (2017)	165	6.6%
Tree cover loss (2018)	26	1.1%
Tree cover loss (2019)	0	0.0%
Total	**2498**	**100.0%**
Total loss (2001-2019)	**421**	**16.9%**

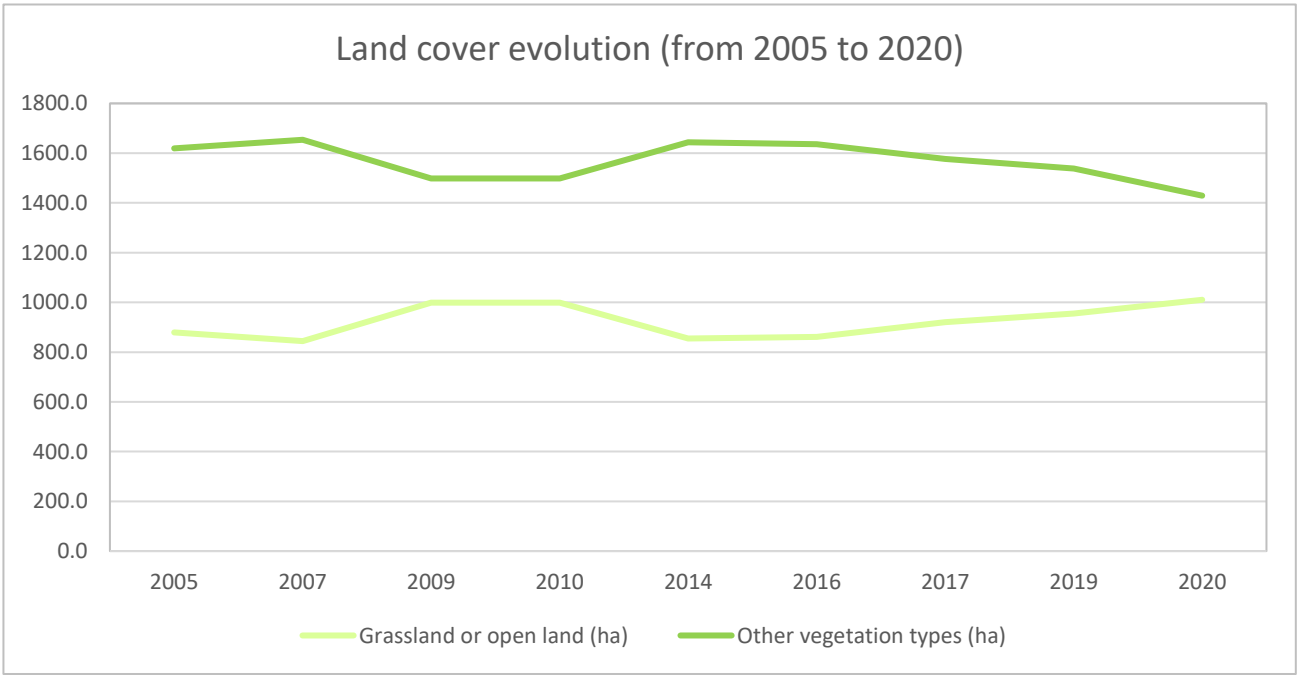


Figure 34: Land Cover Evolution from 2000 to 2020

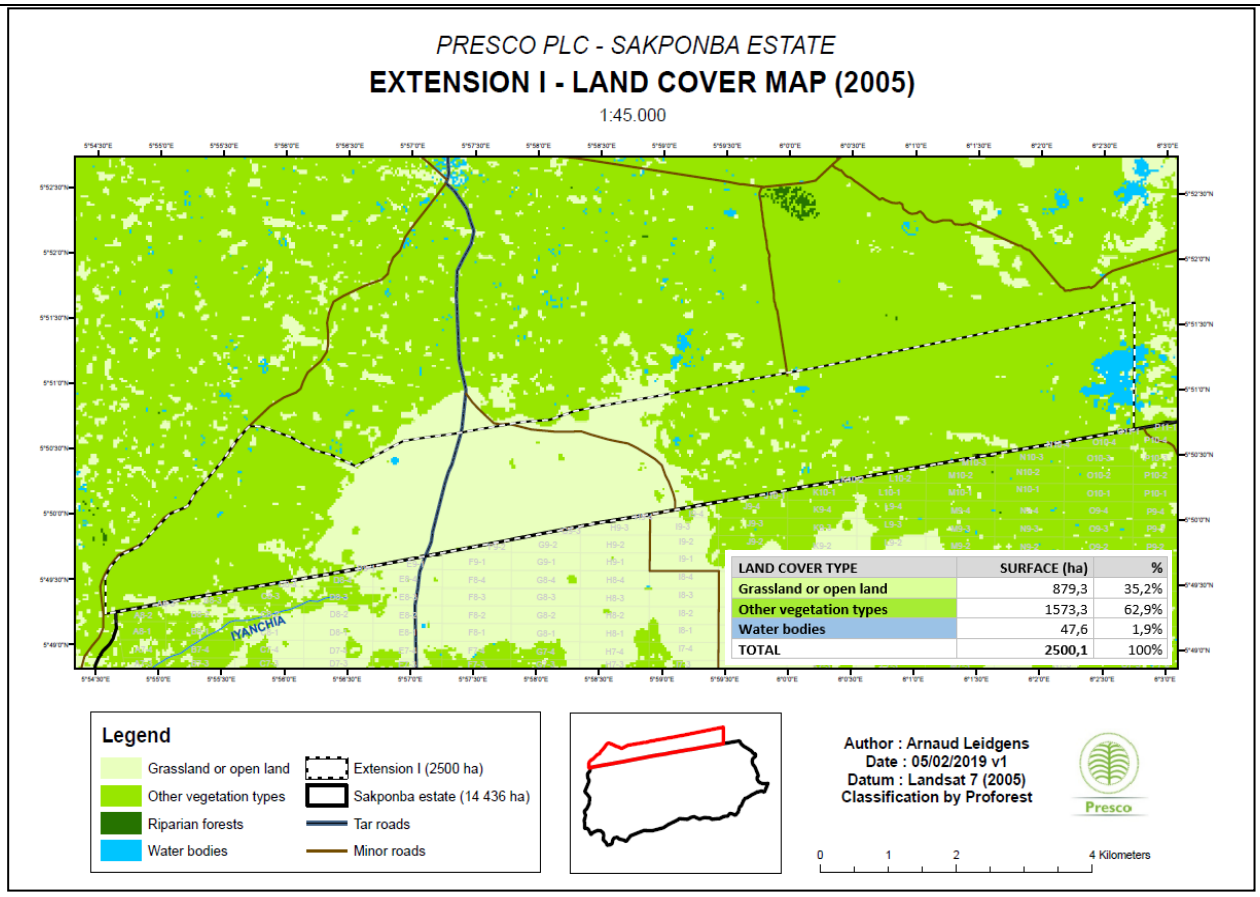


Figure 35: Land cover map of Sakponba extension 2005

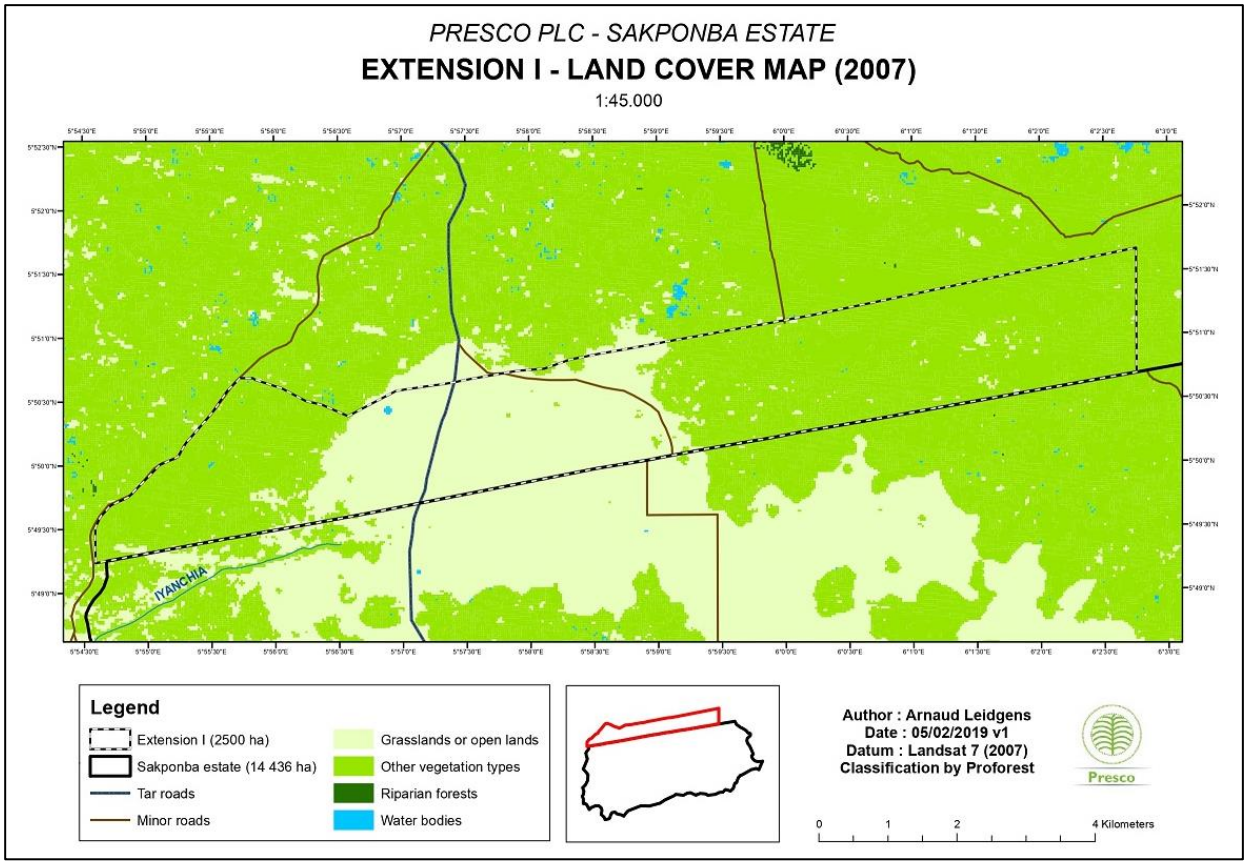


Figure 36: Land cover map of Sakponba extension 2007

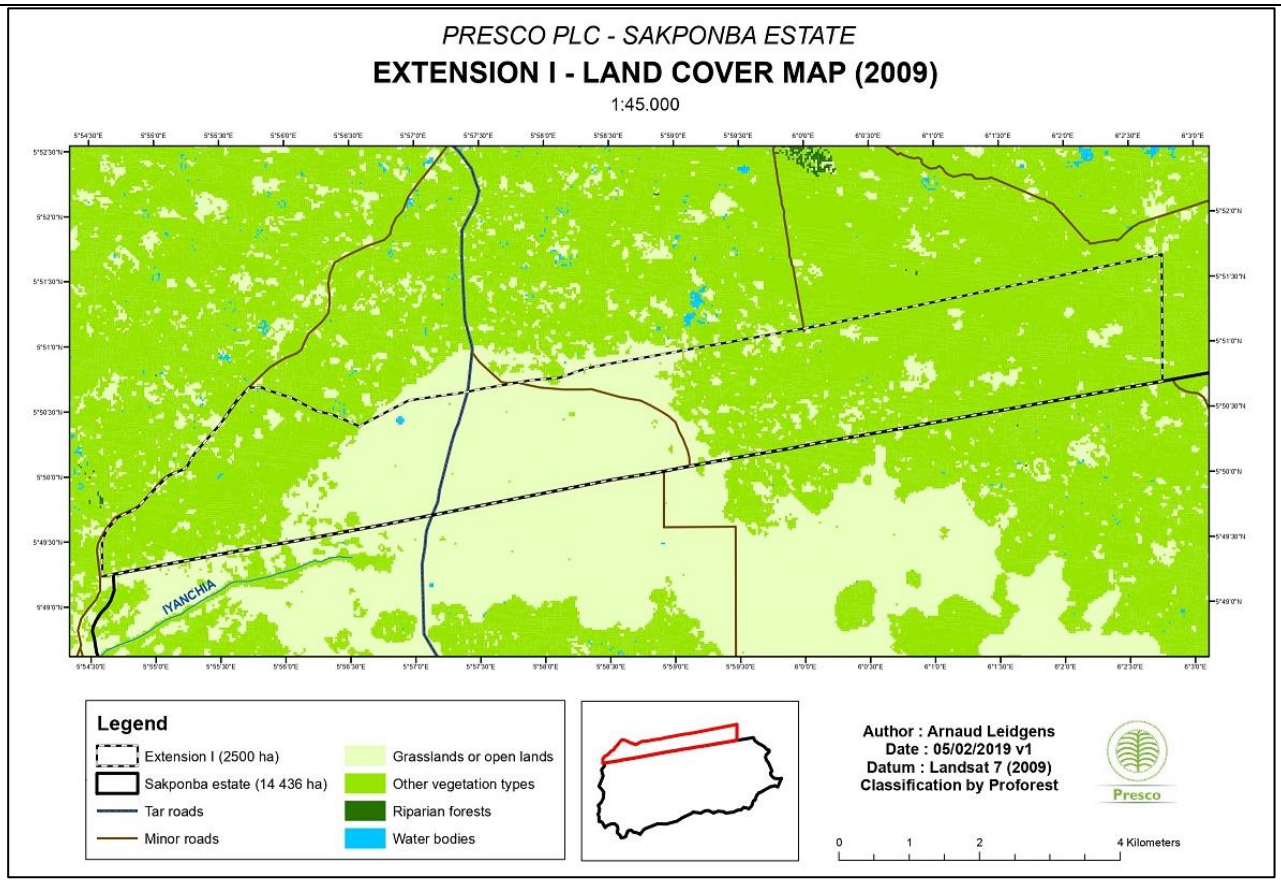


Figure 37: Land cover map of Sakponba extension 2009

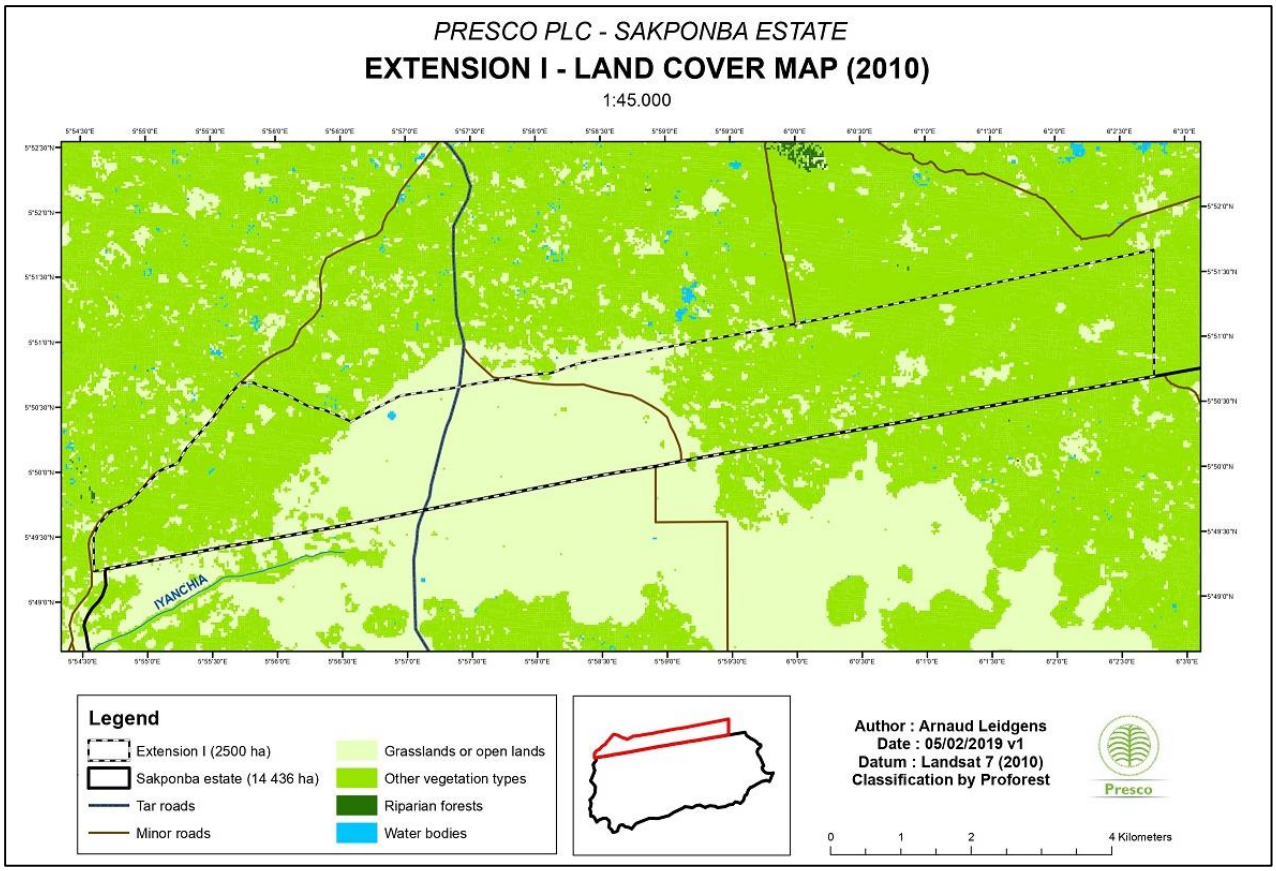


Figure 38: Land cover map of Sakponba extension 2010

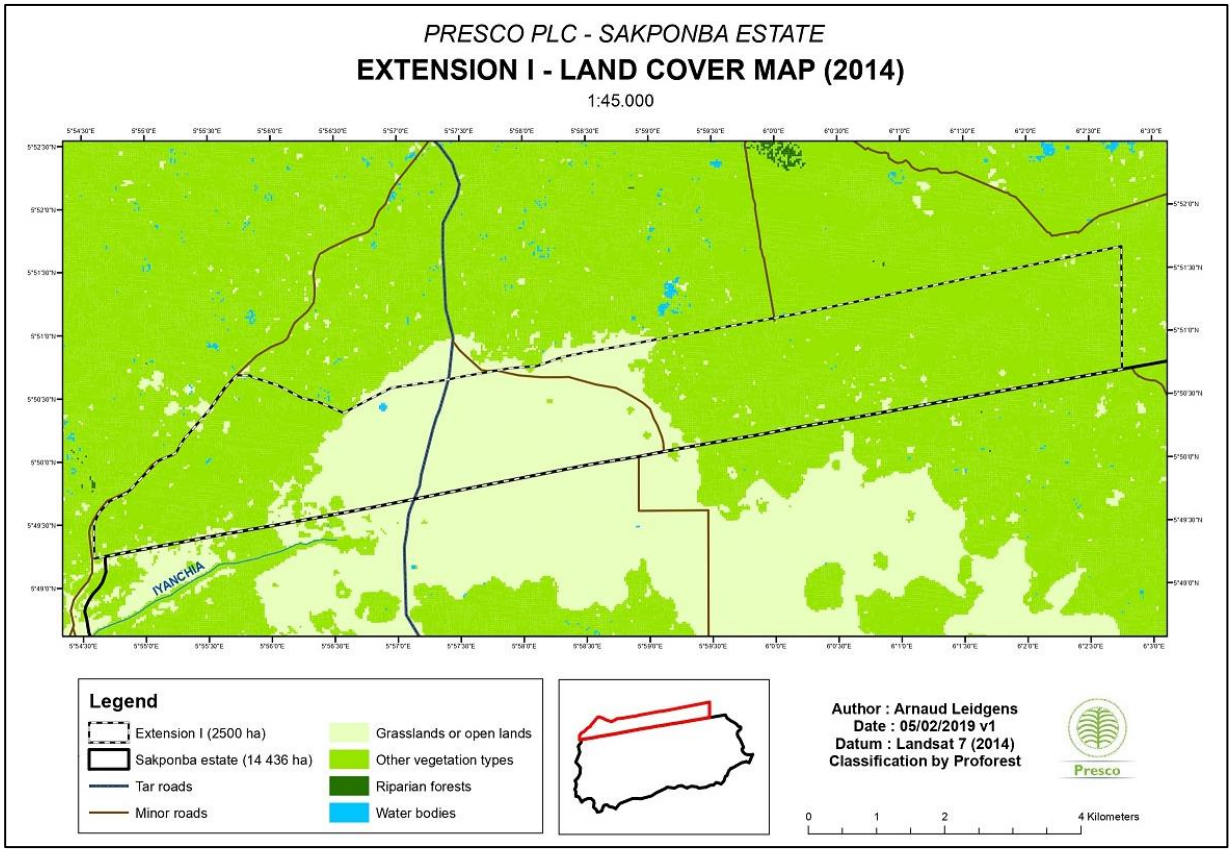


Figure 39: Land cover map of Sakponba extension 2014

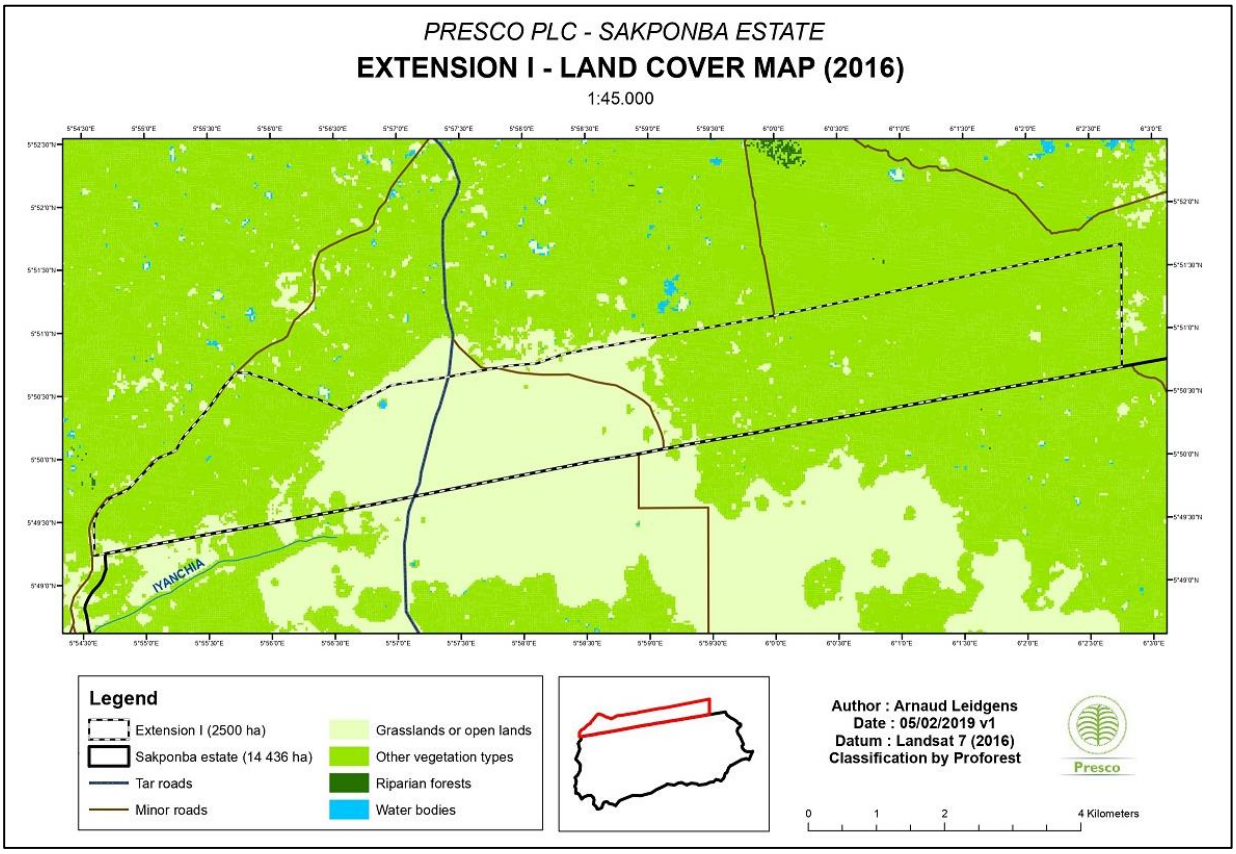


Figure 40: Land cover map of Sakponba extension 2016

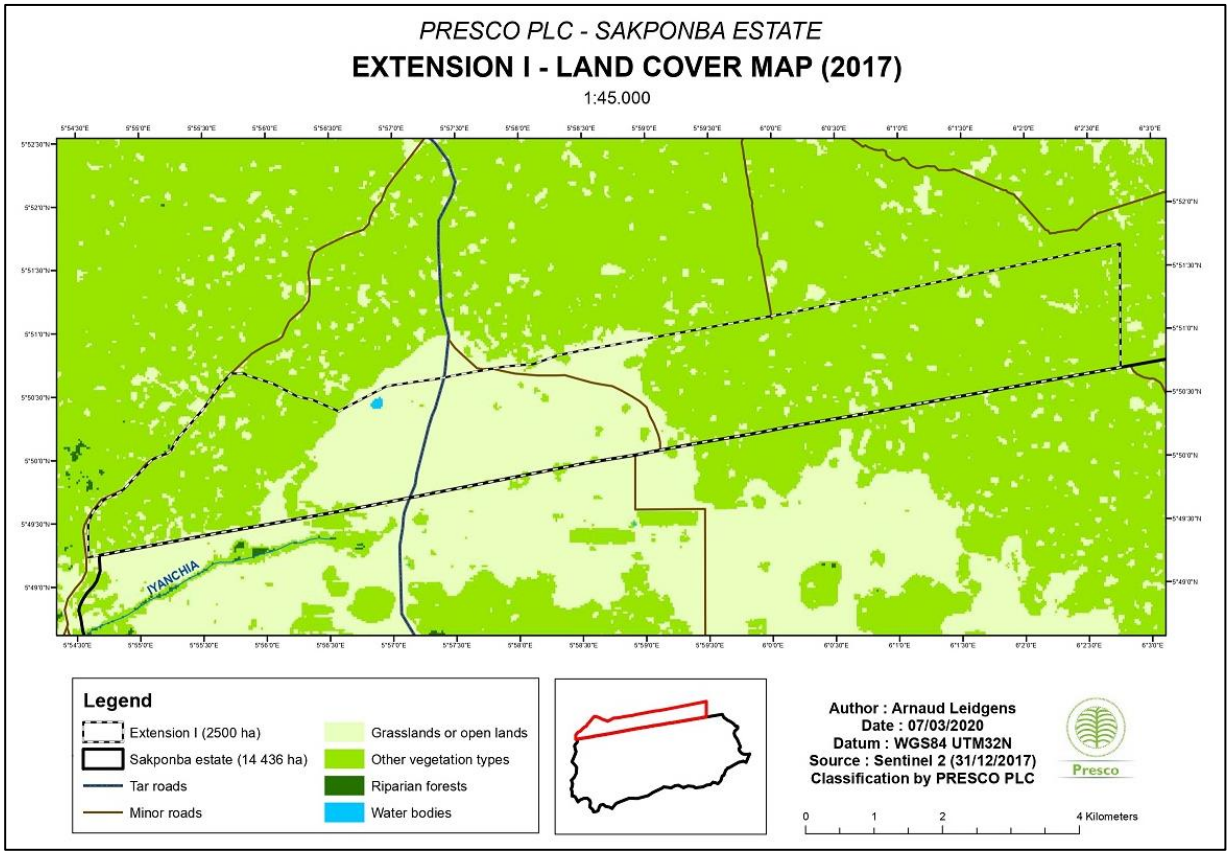


Figure 41: Land cover map of Sakponba extension 2017

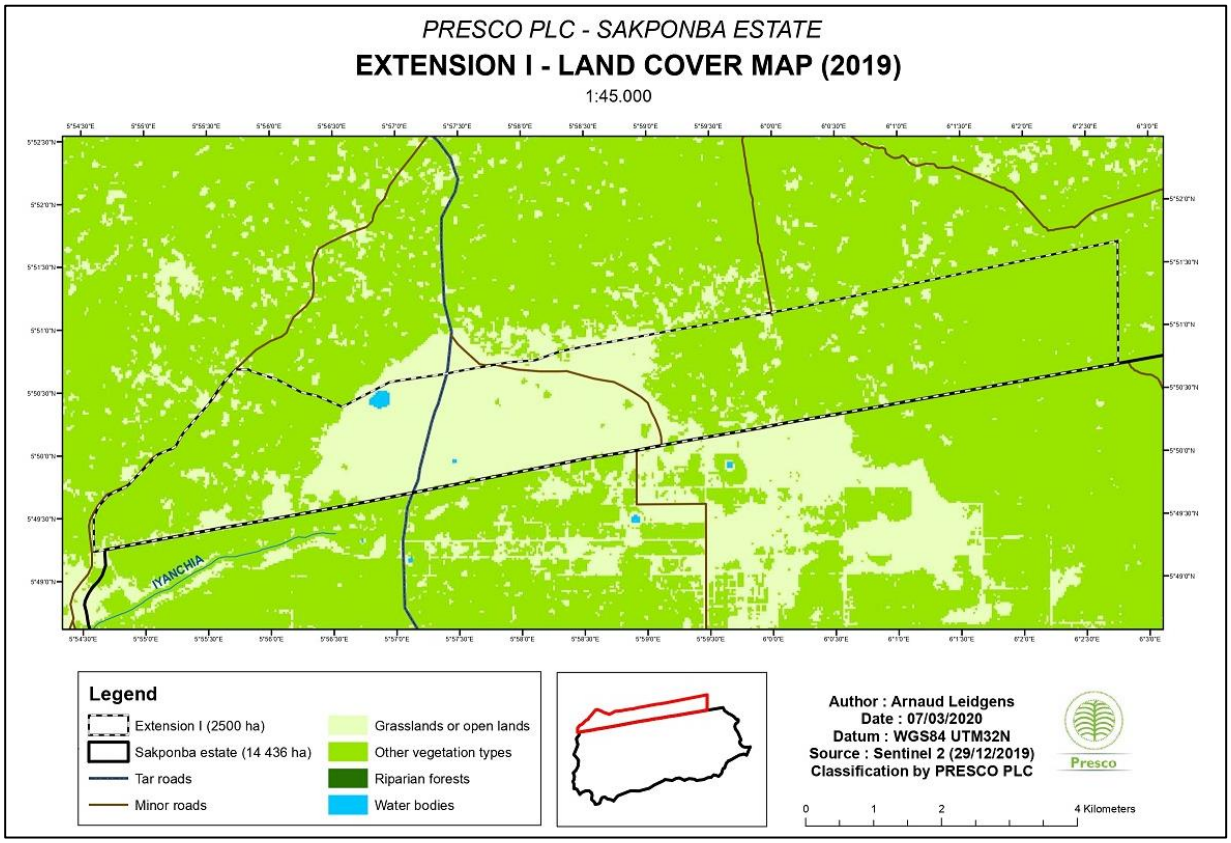


Figure 42: Land cover map of Sakponba extension 2019

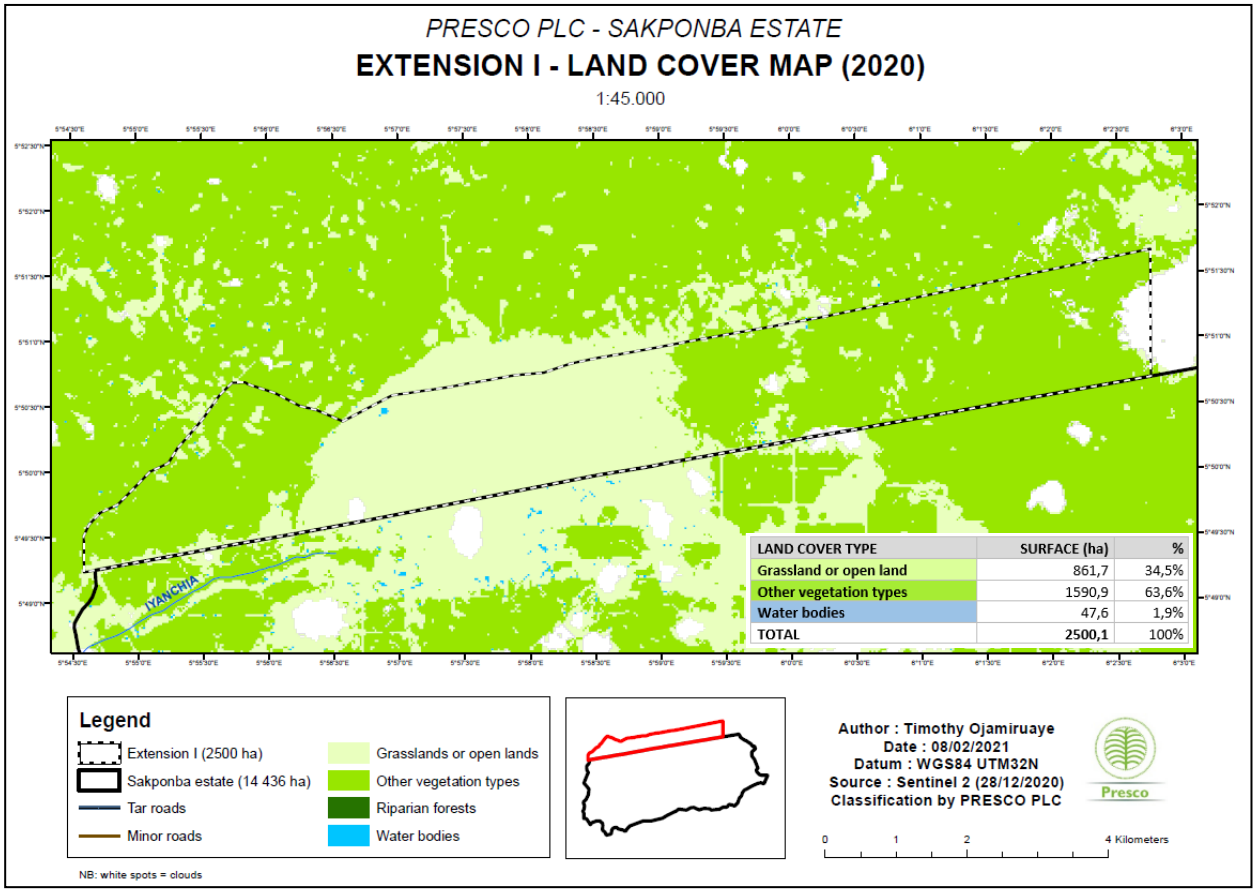


Figure 43: Land cover map of Sakponba extension 2020

Section 9: Conclusions

Based on the result of the assessments, there were no primary forest, peat, riparian buffer zones, high sloped or marginal soils areas identified within the proposed new planting area. All assessment were conducted in accordance with the requirements of the New Planting Procedure with no significant risk of noncompliance to the NPP requirements identified.

A management plan has been comprehensively developed covering the whole proposed new development area. Findings from the various assessments and the FPIC processes have been incorporated into the development and operations planning of the proposed new development; and management recommendations from the various assessments and FPIC processes are integrated into the NPP Integrated management plan.

The integrated management plan takes into consideration as a minimum, but is not limited to the following:

- Impact of the development on customary rights of local peoples which have been identified through the assessments and related FPIC processes.
- Exclude planting on areas identified through the HCV-HCSA assessment.
- Provide for the maintenance and/or enhancement of all identified HCVs and HCS forest that have been agreed upon through the FPIC process and/or following appropriate management recommendations from relevant assessments.
- Minimise net GHG emissions from the development in ways which take into account the avoidance of land areas with high carbon stocks and/or maximise sequestration options.

Section 10: Confirmation of Report

Statement of acceptance of responsibility for assessment and formal signing off of management plans

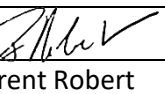
This document is the public summary of the integrated ESIA, HCV and HCS management for the proposed new oil palm development of Sakponba Extension 1, Edo State Nigeria, which has been approved by the management of Presco.

All management, mitigation and monitoring recommendations would be implemented by the responsible persons below following the timeline indicated into the management plan.

Table 40: Responsibilities for Implementation of Action Plan

	Responsible 1*	Responsible 2*	Verification*
CS, GHG Management and Mitigation	COO	HSE	GSM
HCV-HCSA Management and Monitoring	HSE	COO	GSM
EIA Mitigation measures and environmental management plan	HSE		GSM
SIA Mitigation measures and environmental management plan	CRO	HSE	GSM

* Abbreviations: GSM = Group Sustainability Manager, COO = Chief Operation Officer; HSE = Health Safety and Environment, CRO = Community Relation Office

Date of Completion	25 November 2021
Signature	
Name	Florent Robert
Position	Sustainability Manager, Certification Specialist, Quality, Environment, Health and Safety Manager