

1. BACK GROUND

The Ghana Rubber Estates Ltd (GREL) has rubber tree plantations estimated at about 13,000 hectares, out of which 4,800 hectares are over aged and under tapping and remain to be replanted in the foreseeable future. The company embarked on a project to fell all under tapping rubber plantations to be replaced with new plantations to revamp their operations.

The volume currently used by local charcoal producers , fire wood traders or carpenters are minimal, comprising less than 8% of the total volume of 150,000 tons per year.

Takoradi Renewable Energy Ltd (TREL) is registered company that undertakes to add value to this agro-industrial by-product by linking this by-product to major markets in Europe. The company signed an eight year contract with Ghana Rubber Estates Ltd to extract, process, transport and exports these rubber trees to major markets in Europe. The project aims to create value in the supply chain process through the application of appropriate technologies and investment to meet the investment goals.

Takoradi Renewable Energy Ltd will export wood products to major biomass industries in Europe and will need to justify that wood is from a controlled source that meets the Forest Stewardship Council principles and Guidelines. The company intends to obtain controlled wood standard that demonstrates conformance to FSC 2002 Principles and Guidelines to meet customer requirements.

Forests provide a wide range of products and services including the preservation of soil and water resources. These goods and services (e.g. bush meat, medicines and other NTFPs aesthetics, cultural values, etc) are essential for the livelihoods of rural communities who primarily rely on them for survival.

As a requirement, the exploitation must be done in line with requirements under the FSC and High Conservation value (HCVs) guidelines to ensure that wood being exported from the redundant plantations is from a certified source and to demonstrate

that forest management activities in the area from where the wood is being harvested do not threaten high conservation values and biodiversity in general.

It is against this background that HS+E Management & Consulting Services was engaged to assess the area under consideration and provide expert advice to TREL to confirm the presence or otherwise of HCVs and recommend mitigation measures for any identified stress factors.

2.0 RATIONALE

The Forest Stewardship Council (FSC) is an independent, non-profit, non-governmental organization. It was founded in 1993 by a diverse group of representatives from 25 countries worldwide, including environmental and social groups, the timber trade and the forestry profession.

The FSC has developed a set of Principles and Criteria of Forest Management (P&C) which define good forest management. Forest Management Units (FMUs) that show conformance to these requirements are well accepted by business units worldwide and the objective of Takoradi Renewable Ltd is to demonstrate that wood harvested is from certified sources and do not threaten the critical environmental values.

3.0 OBJECTIVES

The objectives of the assessment are for Takoradi Renewable Energy Ltd to:

1. Demonstrate to suppliers or third party certification bodies that the wood produced from the plantation is from a certified source that complies with FSC standards and HCV forests Guidelines
2. Provide evidence that the wood produced is from a legal and properly managed source
3. Demonstrate that the wood is not harvested in violation of traditional and civil rights,
4. Prove that the wood harvested is from forest management units (FMUs) in which High Conservation Values are not threatened.

4.0 PROJECT AREA

The project area is located within the Wet Evergreen zone of Ghana covering a total of 6,570Km². This area is considered to be the most floristically diverse and forests here generally have the Highest Genetic Heat Indices (GHI). GHI technically is a measure of the diversity of a forest.

The specific project site(s) covers an estimated area of 4,800 hectares which is part of the 13,000 hectare plantations belonging to the Ghana Rubber Estates Ltd. These plantations are under tapping and need to be felled and replanted. The site is a reserved area for rubber plantation development since independence through the landed Properties of Ghana Rubber Estate Ltd and Firestone Ghana Ltd (Miscellaneous Provision) Act 1977 and has been occupied by economic rubber plantations for more than 50 years now.

5.0 METHODOLOGY

This assessment is classified into two phases:

- Site visit assessment and collation of sensitive faunal and floral data and information using standard guidelines and procedures
- The environmental and ecosystem information and data will be classified according to their sensitivity and conformity with HCVs criteria and other international and national standards.
- Consultations with relevant stakeholders to solicit their views on potential impacts of the intended harvesting project on their livelihoods as well as other environmental effects.

5.1 BIOLOGICAL ASSESSMENT (Flora and fauna-presence of relevant HCVs)

In each block or stand access lines hundred meters apart were laid across the length of the block. Reconnaissance surveys were taken of all plant species in each of the stands. Since each of the stands was even aged monoculture rubber plantations some level of homogeneity was expected. Sample plots of dimensions 50m x 50m were randomly laid in each stand. All natural

regeneration including woody plants, shrubs, and herbs were identified and counted. Their habit and star ratings were determined and entered into the field book. These were later validated in the office and assigned the appropriate Star Rating based on Forest Protection in Ghana (Hawthorne and Abu Juam, 1995). Also all wildlife species and or breeding grounds that were sited were recorded. According to this system of rating, each species in Ghana has been assigned a star category based on its rarity in Ghana and internationally, with subsidiary consideration of the ecology and taxonomy of the species and have been weighted as described in the table below.

Table 1.0 Star Ratings and weights of Species in Ghana

STAR	WEIGHT FOR GHI	COMMENT
BLACK	27	Urgent attention to conservation of populations needed. Rare internationally and at least uncommon in Ghana. Ghana must take particular care of these species.
GOLD	9	Fairly rare internationally and /or locally. Ghana has some inescapable responsibility for maintaining these species.
BLUE	3	Widespread internationally but rare in Ghana or vice versa. It may be in Ghana's interest to pay attention to protecting some of these species
SCARLET	1	Common but under serious pressure from exploitation. Exploitation need to be curtailed if usage is to be sustained. Protection on all scales vital.
RED	1	Common but under pressure from exploitation. Need careful control and some tree by tree and area protection
PINK	1	Common and moderately exploited. Also non-abundant species of high potential and value
GREEN	0	No particular conservation concern
OTHERS	0	Filtered out. Non forest species, or excluded from analysis for other reasons.



Picture 1.0: Field Assessors decide on Flora Species



Picture 2.0: Field Assessor detects Frog Species

5.2 ECOLOGICAL ASSESSMENT (presence of protected areas/other sensitive habitats-presence of relevant HCVs)

Along each access line all streams, rivers, swampy areas, wildlife breeding grounds, cultural sites and other environmental concerns that are significant for consideration as forest stands of High Conservation values (HCV) and the FSC requirements for certification are observed and recorded. This include all environmental and (or) ecological risks, current and anticipated within the operational area and mitigation measures.



Picture 3.0: Aposro River flows down across plantation



Picture 4.0: Assessor detects swampy wetland

5.3 SOCIOECONOMIC ASSESSMENT (livelihood and other cultural issues-presence of relevant HCVs)

Stakeholder consultations and meetings were held with some identifiable key stakeholder including stool owners, chiefs, community members, environmental NGOs, Civil society organizations, educational institutions etc to assess the socioeconomic values of the project.



Picture 5.0: Assessors consult a Tapper at the field



Picture 6.0: Stakeholder explains during site consultation



Picture 7.0: Consultation at ACLANGO Secretariat



Picture 8.0: A section of School Children (Extra Classes)

6.0 FIELD OBSERVATIONS AGAINST FSC PRINCIPLES AND CRITERIA

6.1 Compliance with Laws and FSC Principles

TREL intends to manage the harvesting of wood in compliance with all applicable laws of Ghana and other international treaties and agreements to which Ghana is a signatory and also with FSC Principles and criteria.

The project has been examined against the following regulations pertaining to forest and environmental projects in Ghana.

- **Environmental Protection Agency Act (490) ,1994 and Environmental Assessment Regulations (LI1652), 1999 and its Environmental Assessment(amendment) LI 1702 , 2002**

This will satisfy the statutory requirements under the Environmental Assessment Regulations 1999 (L.I.1652) of the Environmental Protection Agency (EPA). The company Preliminary Environmental Assessment report had been submitted to EPA in accordance with the requirements for environmental permit acquisition and has been approved:

- **Ghana Free Zones Boards Act, 1995 Act (504) and Free Zone Regulations, 1996 (L.I. 1618)**

This act is aimed at promoting economic development through, inter alia, the attraction of direct foreign investment, employment creation, transfer of technology, enhancement of the technical and managerial skills of Ghanaians and the diversification of experts. L.I.1618 defines the free Zone enterprise obligation to the environmental regulations of Ghana. TREL seeks registration to the Ghana Free Zone Board and is in the process of acquiring the free zone status. Employment opportunities have been offered to some Ghanaians already and shall be continued when projects starts

- **Ghana Investment Code 1985,PNDCL Law 116**

The 1985 Investment Code PNDCL 116, requires that the effects of an enterprise on the environment be taken into consideration. This has been assessed through the environmental assessment procedures to which a permit authorization has been granted

▪ **Factories, Offices and Shops Act, 1970 (Act 328)**

The Factories, Offices and Shops Act, 1970 requires registration of the company with the Department of Factories Inspectorate to enable inspections of the premises of the project by an inspector of factories to ensure compliance with provisions of Act relating to Health, Welfare and Safety of Workers. The company has duly registered their operation offices and warehouse facilities in compliance with the requirement of Act.

▪ **Forest and Wild life Policy ,1994**

This policy seeks to ensure all forests in Ghana are managed in a sustainable manner while preserving environmental quality, biodiversity conservation and equity flow of benefits to all segments of the society. The company has undertaken assessment to identify HCVs zones and to propose management prescription for them where ever they may be found. Refer to attachment of assessment flora and fauna status of the area in

Appendix 1: Botanical Assessment of the Area

The company management activities are guided by commitment to comply with all laws of Ghana, observing payment of all necessary fees, royalties, taxes or and other social responsibilities agreements between company and other interested parties.

As part of the commitment, TREL will ensure that wood harvested is from legal and authorized sources only and to demonstrate this commitment by complying with the principles and guidelines of the FSC 2002 standard. A contractual agreement has been signed between TREL (Operator) and GREL (owner) defining zones for harvesting and subsequent replanting of trees to ensure sustainable operations.

6.2 Land Tenure and Use Rights

The 13,000 hectare plantation is owned by Ghana Rubber Estates Limited. The land was acquired through the landed Properties of Ghana Rubber Estate Ltd and Firestone Ghana Ltd (Miscellaneous Provision) Act 1977.

TREL has an agreement with GREL to harvest the redundant rubber trees only from defined zones within the plantation.

There are no competing claims of title to the land occupied by the plantation. The surrounding communities have access to the plantations for other domestic use rights such as firewood, and other non-timber forest products.

6.3 Indigenous People's Rights

Indigenous people rights are respected by the owner of the plantations. To ensure that the concerns of indigenous people are adequately addressed, an association of Chiefs on whose Land GREL Operates (ACLANGO) has been formed. Through this platform, the developmental needs of indigenous people are addressed. TREL is committed to ensure that its operations are in line with the existing programme of GREL.

Though one Sacred Grove was identified at Tetrem, it was clearly demarcated and protected in respect of cultural and indigenous rights. TREL will ensure the preservation of such rights during its operations and to give it the needed protection.



Picture 9.0: A sacred Grove was detected by assessors, but found to be adequately protected

6.4 Community Relations and Workers Rights

The Association of chiefs in the Area in which GREL operates is a platform for community interest and relations. This association meets annually to review issues concerning company-community relations. All developmental programmes are drawn and managed by the association, who operates at a modern secretariat built by GREL for the association. Other benefits include the alternative dispute resolution mechanism adopted by GREL and the communities to resolve issues and to find a win-win solution to all problems. GREL has promoted the economic and social advancement of the area it operates through the human resource development such as building of schools, providing sponsorship for extra classes for school children in catchment areas, providing scholarships to selected students within its operational areas.

Workers of GREL are unionized and their rights are respected during negotiations. The assessment did not reveal any deviations in respect of workers' rights and compensations issues



Picture 10.0: Secretariat of ACLANGO



Picture 11.0: GREL Basic Schools
at Nsuam

6.5 Benefits from the Plantations

The management of the plantation by GREL has encouraged the efficiency in the use of plantation multiple resources to ensure economic viability and a lot of environmental and social benefits.

The assessment reveals that people can use the products and services from the plantations to meet their economic and social demands. Farmers are allowed to make farms within the plantations such as cassava farms, pick dead and fallen rubber trees as firewood for free, and pick medicinal herbs from the plantation.



Picture 12.0: Cassava Farm within plantations

6.6 Environmental Impacts

Environmental concerns identified with the proposed project may be categorized into the design phase and the operational phase impacts. Whereas the operational phase of the extraction of the plantation is a well known activity only limited to small scale businesses of fire wood traders, charcoal producers and carpenters, the commercialized harvesting using heavy machinery and equipment will create impacts on the plantation resources. The constructional phase impacts are varied depending upon the scale of the project, the geographical location, land use of the vicinity, materials used for the construction and the demands of the local authority.

6.6.1 Constructional Phase Impacts

These will involve the preparation of the land and the construction of access routes into the plantations. The impacts associated with this phase will be:

- Loss of vegetation cover
- Change of landscape from the uprooting of roots of trees and construction of access routes into the plantations.
- Noise nuisance from the operation of earth-moving equipment.
- Generation of dust from soil disturbance during land clearing and movement of vehicles through untarred surfaces.
- Occupational safety and health hazards
- Construction waste management
- Traffic management at the roadside and entrance to construction site
- Socioeconomic benefits from employment generation and its multiplier effect for the people of the project districts.

6.6.2 Operational Phase Impacts

Potential operational phase impacts will be the following:

- Aerial emissions from machinery engaged in the harvesting of the rubber trees,
- Solid waste (particularly wood off cuts and leaves) generation and management
- Fuel spillages from the refueling activities

- Occupational safety & health hazards (Noise, fire, stress, heat exposure, etc)
- Biodiversity impact
- Socioeconomic benefits
- Community relations
- Traffic management

6.6.3 Assessment of Impacts

The constructional, operational and socio-economic impacts are discussed and evaluated with respect to:

- i) Their nature, magnitude and effect on human health and general environment.

Residuality, that is, impacts that might remain after mitigation measures have been applied and may therefore require monitoring.

6.6.3.1 Analysis of significance of impacts

Impact magnitude is determined by assessing the extent, duration, severity and probability of occurrence and reversibility of impact.

Table 2.0 Criteria for Predicting Impact Magnitude

Criteria	Low Impact (1-4)	Medium Impact (5-8)	High Impact (9-12)
Extent	Restricted to Site	Restricted to project stakeholders	Beyond the project partners affect local communities or public
Duration	At a particular activity	During project life	Beyond project
Severity	Small changes	Small & incurable losses	Substantial losses
Probability of occurrence	Possible	Will most likely occur	Will definitely occur
Reversibility	Can be reversed	Possibly reversible	Reversibility highly unlikely

Table 3.0: Table of Analysis of Impacts

Impact	Extent	Duration	Severity	Probability	Reversibility	Total	Significance
<u>Construction phase</u> Vehicular Traffic at Road side	4	7	4	4	5	24	M
Compacting of soil	4	1	8	6	11	30	M
Landform change & earthworks	3	2	10	10	12	37	M
Ambient Noise Levels	4	6	3	7	3	23	M
Ambient Air Quality	8	3	5	5	3	24	M
Construction waste generation	2	4	6	8	1	21	M
Drainage	3	5	3	4	5	20	L
Socio-economic benefits	11	8	4	12	6	41	H

Scale Index	1 – 20	Low (L)
	21 – 40	Medium (M)
	Above 40	High (H)

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<u>Operational phase</u>							
Traffic management	4	7	4	4	5	24	M
Ambient Air Quality	8	6	6	5	3	28	M
Workplace Air quality	2	6	4	4	2	18	L
Workplace temperature	1	5	5	4	2	17	L
Employment	12	8	5	12	11	48	H
Increased Noise	4	6	5	5	5	25	M
Increased Risk of Fire	6	8	9	3	1	27	M
Sanitary waste disposal	1	5	2	8	1	17	L
Solid Waste Mgt (refuse)	9	6	3	4	3	25	M

Analyses of impacts

High Impacts

There are positive high impacts across the project phase basically due to the socio economic influence on local charcoal production, carpentry, fire wood traders and employment generation for some Ghanaians.

Construction phase

- Socioeconomic benefits which are positive

Operational phase

- Employment opportunities

Medium Impacts

The magnitude of impacts here was rated medium.

Construction Phase

- Vehicular traffic at the road side
- Vegetation loss
- Landscape changes and earthworks
- Ambient Noise Level
- Ambient Air Quality
- Construction Waste Generation
- Compacting of soil

Operation Phase

- Traffic management
- Ambient air quality
- Increased level of noise
- Increased risk of fire
- Occupational health and safety issues
- Solid wastes (wood /dirt/refuse) management

Harvesting Phase

- Ambient Air Quality
- Climatic Conditions
- Increased Noise Level

Low Impacts

The magnitudes impacts were rated low.

Construction Phase

- Construction waste management
- Drainage alterations and increased land invert levels relative to low land
- Occupational health and safety issues

Operational phase

- Workplace air quality
- Wetland siltation and contamination
- Sanitary waste and process wastewater disposal
- Increase in ambient temperature & work environment temperature leading to stress of workers

This environmental assessment was the subject of an environmental permit authorization granted to TREL by the Environmental Protection Agency of Ghana.

7.0 Plantation Management Plans

The assessors examined the harvesting management plans proposed by TREL. Considering that GREL has already established effective protective measures to manage the plantation resources, environmental limitations, land use and ownership status, TREL objective will be to sustain these measures during the harvesting activities.

8.0 Maintenance of High Conservation Values

Three main high conservation values were detected during the assessment in all the divisions and blocks visited from which rubber trees are going to be harvested.

These are River bodies, swampy areas on large lands with bamboo and raphia stands, and sacred Grove. None of these values were seen to be disturbed as a result of the plantations and TREL will take every necessary step to preserve these values during the harvesting activities.

9.0 Analysis and results discussions

A total of one hundred and forty one (141) plant species were recorded over the survey area. Out of this number 120 species representing 85.1 percent were green star species, 8 species representing 5.7 percent, 7 species representing 5 percent, 4 species representing 3 percent and 1 species representing .71 percent of Pink, Blue, Scarlet, Red and Black stars respectively were recorded. Appendix 1: Botanical Assessment of the Area

This indicates that the area is generally of no conservation concerns in terms of the flora composition since 85.1 percent of the species were rated green. However, Fine Grain measures are recommended for the protection of the single Black Star species as well as the scarlet star species during the operation.

The Wildlife species encountered during the survey included mostly rodents such as African giant squirrels, ground squirrels, and grass cutters. Common mammals sighted include the bushbucks. Bird species sighted include grey head broadbills hornbills, parrots, variety of sun birds, Warbler bird species, and starlings. Thus from the faunal species listed none is classified under the IUCN red list as well as the Ghana protected species list.

High Conservation Value areas that were identified during the assessment include a sacred grove/Fetish Ground which is located within one of the plantation stands close to the Tetrem village. The importance of this grove has been duly recognized by GREL and accordingly has been demarcated and zone out from its operations. This grove is made up of purely indigenous plant species and a buffer around it so as to preserve its originality and functions.

Another HCV identified during the assessment is a stream called Apusuro which runs through the plantation. The water from this stream serves the water needs of the people within the Abura and Ajumako communities.

To mitigate the risk of destroying this important source of water, a buffer zone of at least thirty meters (30m) is allowed on either side of the stream to arrest any possible siltation from operational activities from the plantation upstream as well provide the necessary natural microclimatic environment required for the provision of clean source of water.



Picture 13.0: Aposoro River in gentle flow downstream showing adequate protection from both banks

A number of swampy areas dominated by bamboo stands were also present in some of the areas assessed. However, areas occupied by the bamboo stands as compared to the entire stands were minimal. Despite the small size of the bamboo stands relative to individual plantation stands their values have already been recognized and are zoned out wherever they occur as very important source of NTFPs which is used by the community to roof their houses and for other purposes. Thus the operations of GREL have no negative effects on the bamboo stands and the swamps in which they stand.



Picture 14.0: Swampy area detected with Bamboo stands, which was well protected.

10.0 Conclusion and Recommendations

From the analysis of the data and observations gathered from the site during assessment, very few HCVs were identified. Botanically, there were no endemic, endangered or rare plant species identified in the area. About 85% of all plant records were rated as green star species indicating the area generally has no conservation concerns.

Similarly, no animal species listed under the IUCN red list and the Ghana Restricted species list was identified in the area during the assessment.

Other HCVs encountered during the assessment were perennial stream (Aposoro River), a Sacred Grove of cultural significance and a bamboo / raphia stand. However, GREL has put in adequate mitigation measures for the protection of these identified HCVs to ensure that they continue to provide the relevant ecosystem services and goods to the beneficiary communities. It is important to state that the stress intensity on these HCVs identified are minimal and do not pose any threat to eroding their current values.

In the light of the above results, we wish to recommend the following:

- TREL operations are in line with requirements of the FSC Standards and we recommend the company to proceed with the intention to seek certification to the controlled wood standards. This, however, will require the guidance of technical experts in areas of documentation necessary for this certification.
- The operators should ensure that Fine Grade measures and other already delineated buffer zones to identified HCVs should be maintained and enhanced during the extraction of the rubber trees to provide wildlife habitats and maintain the remnants natural forest within the plantations.
- A monitoring programme not covered in this baseline assessment should be considered by TREL (Operator) during the extraction period; this will help provide evidence on the level of protection prescribed for the few identified HCVs.
- There is generally very low awareness on the presence of these HCVs, and we recommend the operator to involve experts to sensitize the workers and all those involved in the plantation activities on the need for conservations of these values.

- The operators (GREL & TREL) should continue with the existing social responsibility programmes already in place with the community, especially the ASSOCIATION OF CHIEFS ON WHOSE LANDS GREL OPERATES (ACLANGO) annual projects, Human Resource development programmes and Free transport services to the people within their operational areas.

From the evaluations of all observations and findings it can be concluded that the area is generally managed in conformance with standard management practices applicable to plantations development and poses no threat to HCVs.