Community Led Coastal Biodiversity Management Project in Cestos-Senkwen

SUPPORTING REPORTS AND PRODUCTS FROM PROJECT IMPLEMENTATION

Prepared for: Friends of Ecosystem and the Environment (FEE)

Prepared by: Green Globe Consultancy (GGC)

May 30, 2019

ACKNOWLEDGEMENT

Executive Summary

Liberia is home to many endemic species of wild fauna and flora. These species are distributed across various forests and protected area. The Cesto-Senkwen is part of the many areas that hold Liberia's biodiversity and species of global importance. Cestos-Senkwen is also internationally recognized as a Key Biodiversity Area (KBA). Liberia's population is estimated at approximately 4.5 million people cutting across its 15 political sub-divisions (counties). One of these counties is Rivercess with a population of approximately 71, 509 individuals and hosts the proposed Cesto-Senkwen Protected Area which is home to variety of plant and animal species as well as ecosystems.

This report constitutes all supporting reports and products developed during the implementation of the CEPF funded project "Community Led Coastal Biodiversity Management Project in Cestos-Senkwen. It comprises the following reports:

1.   Biophysical, Socio-economic and Livelihood Report;

2.   Biodiversity Conservation Awareness Manual;

3.   Report on Community Norms;

4.   Monitoring and Evaluation Report; and

5.   Converting NBSAP at Local Level

Biophysical, Socio-economic and Livelihood Report

INTRODUCTION

Liberia still hold extensive forest covers in the eco-region of the Upper Guinea rain forests of West Africa and is classified as one of the biodiversity hotspots in the world (Christie et al., 2007). The country is located within the tropical lowland rain forest of Africa and in the West Africa, it is surrounded by three countries; Guinea in the north, Ivory Coast in the East, Sierra Leona in the West and the Atlantic Ocean in the south. Its population is about 3.5 million people (LISGIS, 2008).

Liberia's mangrove swamps, lagoons, river marshes, made-made savannas and bush lands are spread within the high forest belt and form part of the resources along the coastal (Curry-Lindahl, 1969). Despite the fact that Liberia is known as a biodiversity hotspot, its forests remain under human induced pressures ranging from logging, mining, hunting, charcoal, fuel wood collection and human population growth (Laurine et al., 2013; Tuagben, 2012). Among the important plant species, mangroves have been listed as one of the most productive

ecosystems in the world. Their numerous roles include; providing clean water for coastal communities, producing valuable forest products for coastal economies, protecting coastlines, and most importantly support coastal fishing communities (Kathiresan &Bingham, 2001). However, mangroves endeavor and survive under high salinity, extreme tides, withstand fierce winds, elevated temperatures, muddy, and anaerobic soils (Kathiresan &Bingham, 2001). Globally, mangroves are found 118 countries and territories in the tropical and subtropical regions and only 6.9% are protected (Giri et al., 2011). The continent of Africa is cover with over 3.2 million ha about 19% of global coverage. Their distribution extends from the Western Atlantic (1.5 million ha, 37%), Central Atlantic (0.4 million ha, 14%) and Eastern India Ocean (1.2 million ha, 14%).

The Western Atlantic mangroves extend from Mauritania in the north to Senegal in the Saloum Delta, Lower Casamance through Guinea Bissau, South Guinea, to the Gulf of Guinea reaching the coastlines of West and Central Africa from Liberia to Angola (Ajonina et al., 2008).

In Liberia there are about six mangroves species known to occur along the coastline; *Acrostichum aureum, Avicennia germinans, Conocarpus erectus, Rhizophora mangle, Rhizophora harrisonii* and *Rhizophora racemosa* which is the most common species found across the coastline of Liberia (Corcoran et al., 2007). The total estimated area of mangroves in Liberia is about 202.6 km^2 (Tang et al., 2016). These mangroves however occurred mostly at the mouth of rivers and some area in lagoons due to lack of extensive wetlands along the coasts (Saenger &Bellan, 1995; Adam, 1970; Kunkel, 1966).

1.1 Importance of Mangroves
Mangroves are important assets to coastal communities and a source of food, medicines, timber and firewood. They also help to protect shorelines from sea erosion and level rise, ameliorate climate, and serve as a sink for carbon sequestration (Nagelkerken et al., 2000). Besides the ecological and economic benefits of mangroves, they also play a key role in terms of education and recreation (Barbier et al., 2011).

1.2 Extent and distribution of mangroves in Liberia
The coastline of Liberia is 560 km with almost 60% of the population dwelling in different cities and counties. However, about 13.5% of the total land area of Liberia is covered with water along the coastline (GoL, 2004, EPA, 2004) and an estimated 0.5% of the land area covered with mangroves which is about 500-kilometerwide belt (Gatter, 1988). However, mangroves are found at the mouths of rivers and in some area in lagoons. They stretch from Lake Piso except for few places in the central part where it is said that primary mangrove forest has been replaced by secondary mangrove forest.

1.3 Biodiversity

Mangroves are both diverse in forms and in flora and fauna (Ajonina, et al., 2008). About six species are known to Liberia; *Acrostichum aureum, Avicennia germinans, Conocarpus erectus, Rhizophora mangle, Rhizophora harrisonii* and *Rhizophora racemosa* (Corcoran et al., 2007). Among the mangroves are diversities of breeding fish and other marine species (Lugendo et al., 2007). They harbored mammal (monkeys, antelopes and manatees), mollusce (oysters, clams, mussels, scallops and periwinkles), crustaceans, fish, reptile and water birds (Ajonina et al., 2008).

1.4 Uses of Mangroves in Liberia

Many research works conducted on mangroves have reported that mangroves are used as fuel wood, charcoal, and poles for construction purposes, dye, drinking water and food (Corcoran et al., 2007). Moreover, about 75% of coastal community's income and livelihoods are derived from mangroves and other natural resource utilization (Tuagben, 2012).

1.5 Threats post to mangroves in Liberia

Even though mangroves are important to coastal community's economies and account for 75% of their livelihoods and incomes, this dependency has posed serious threats to mangroves. People heavily harvest them for charcoal production and firewood to smoke fish (Tuagben, 2012). Other threats include pollution from waste and land reclamation for housing construction. Additionally, the increased in population along the coast due to the civil war in Liberia at which time many people moved to Monrovia and other coastal areas caused mangroves to become a target by the population for their livelihoods (UNEP/Earthprint, 2007).

1.6 Conservation Status of Mangroves in Liberia

The six-mangrove species of Liberia are all placed under the IUCN threatened species category as Least Concern (LC) (Version 3.1) (IUCN, 2018). However, mangroves areas of high biodiversity are set aside as Important Birds Areas (IBAs) (Piso et al., 2007). Such as the Lake Piso Multiple Use Reserve coastal lacustrine, Marshall Inland Riverine, Mesurado coastal area, Gbedin Inland Swamp and Kpatawee Inland Riverine are all known as Ramsar sites except the Cestos-Senkwehn Inland Riverine which is still Proposed as a Nature Reserve (McAlpine, 2006).

1.2.0 Objectives and scope of the Assessment

The scope of this assessment is to conduct ecological surveys in two vegetation types (Forest and mangroves) and also conduct social economic and livelihood surveys in four communities within and around the Proposed Cestos-Senkwehn Nature Reserve. As part of the project activity, conduct ecological assessment training involving participants from the four communities.

1.2.1 Objectives of the assessment

The overall objective of the biophysical and socio-economic and livelihood assessments is to undertake a comprehensive and participatory assessment of the Cestos-Senkwen landscape including mangroves species, existing environment as well as other flora and fauna in four communities in Rivercess and to identify mangrove species and threat associated with them as well as fauna species associated with the mangroves and their distribution, main livelihood activities of the communities, norms, and conservation awareness. Specific objective of these assessments are to:

- Train project team members in ecological data collection and reporting;
- Identify all mangroves species, fauna, and habitat in Po-River, Gbargboe, Neegbah and Jaster towns. This assessment is to be carried out in consultation with relevant stakeholders.
- Identify existing or potential threat to the identified mangroves species and fauna
- Collect data in the primary forest and mangrove forests in the four communities
- Conduct Socio-economic and livelihood surveys in the four communities
- Provide recommendation for the management and protection of identified mangroves species and fauna in the project areas;

Methodology

The method used for this assessment include the followings; desk and web- based research, a field visit and a series of stakeholders' consultations, followed by several detailed field surveys to identify flora and fauna present in the study area as well as focus group discussion. This study considered four communities within and around the Proposed Cestos-Senkwehn Nature. There were two teams that conducted the study. The Social team was responsible to host stakeholder discussions and conduct interviews, while the ecological team was responsible to carryout surveys in selected areas using transect method with the application of quadrant from the start of the transect either left or right to the end. The distance between our sample plots were 100 meters apart. On each transect, the team measured a 20-meter by 10-meter quadrant identified and counted mangrove and other associated flora and fauna species present. Pictures of flora, fauna, mangroves and other land use were taken at each quadrant on transect as well. The Ecological team also conducted interviews with hunters, fishermen in the communities and attended town hall meetings.

The assessment team conducted stakeholders and field assessment from the 6th to the 12th of May 2019. Materials used *include;* datasheet, questionnaires, digital camera, GPS and smartphones. A detail methodology and description of the process followed for this assessment is presented below.

Primary Data Collection Methodology

1.1.1 Flora Survey

For the Mangroves and other flora assessment, data was collected using walk through method from one transect to another transects within the project site. In order to ensure a fair coverage of the entire area of the project site; this allowed the team to take a clear view of the project area taking into consideration the size, shape, vegetation cover and layout of the project site. The objectives of the flora, fauna and mangroves studies were to determine:

- To record fauna and Flora species found in the forest and mangrove within the study area;
- To identify fast growing plant species that can be used to establish woodlots for the four communities as a means of protecting the forest and mangrove from being destroyed in search of wood for cooking, fish-drying, tie-die etc.;

- The most commonly occurring flora, fauna and mangrove species and their relative abundance and
- Identification of any rare, threatened and endangered species of conservation concern
- Identification of threats posed to fauna and flora species within the study area

The ecological team was responsible to carryout surveys in selected mangrove swamps and adjacent forests using transect method with the application of quadrant from the start of transects either left or right to the end. A total of six (6) transects were visited stretching 2 km in each site. The team had to use short trousers due to the inundation level of transects in mangrove forests. This is so because of the time the research was carried out during the rainy season. The distance between our sample plots were 100 meters apart. On each transect, the team measured a 20-meter by 10-meter quadrant identified and counted flora and fauna in the adjacent forests and mangroves and other associated flora species present. In order to ensure a fair coverage of the entire area of the project site, GPS were used to collect coordinates that will be used develop a map of the study area. A species list was compiled for the project site. The ecological significance and conservation status of the species encountered were defined using the IUCN and FDA ranking.

1.1.2 Fauna Survey

The Fauna expert carried out the fauna survey in the project area to assess the fauna composition of the site. Three methods were used during the process: ground trothing, opportunistic observations and interviews with local communities. A species list was compiled for the project site. Direct/opportunistic observation involved recording and fauna sightings while navigating in transects areas. Recordings included any sign left by living animal, such as feeding sites, regular

pathways, tracks footprints, fecal pellets, nest, etc. Some individuals in village around the project site were interviewed for information about the fauna of the areas. The interviews focused mainly on the identification of the various fauna that commonly occurred in key vegetation habitat within the area, and some indication of their abundance.

1.1.3 Bird survey

Across and within the mangrove swamps and adjacent forests of the communities visited, the team used the point count survey method to gather data on bird species occurring in each commune. The team also used pictures and gathered information from community members from the stakeholder meeting in each town or village. All birds were identified either visually, or by their calls and through interviews from the communities. A bird guide was used in both the interview and field surveys.

1.1.4 Surveys for Herpetology (Reptiles and Amphibians)

In the forests of Liberia, there are many reptile and amphibian species present. Among them are small and large reptiles and amphibians. Data was gathered through interviews and field data collections. An expert on reptiles and amphibians walked slowly along transects observing on both sides for reptile and amphibian species. Although reptile like chameleons are nocturnal animal and have different survey requirements to amphibian there are some general principles applying to both groups that stem from the purpose for carrying out the survey. Based on this, survey accounts significantly for amphibian presence in each study site.

Figure 1. Pictorial of a forest frog

1.1.5 Mammals surveys

The team used line transects method to collect information on mammal species in each of the selected community and the data collection considered; observation of signs such as; dungs, remains of crabs eaten, direct observation and sound of the mammal within 300 m range. The team also collected information from hunters either as key informants or focus group discussants.

Figure 2: Fresh Dung a Maxwell's duiker   Old Dung of a Black duiker

1.1.6 Focus Group Discussion

Focus Group Discussion (FGD) was used to bring together stakeholders representative with common interest/concerns into group to discuss key themes such as the kind of flora, fauna and mangroves species, livelihood activities and options, and other land use that exist within the project area. Firstly, consultative meetings were organized in the four communities. A total of four community meetings were held. A checklist of questions guided the discussion on a wide range of issues. E.g. current livelihood strategies, alternative livelihood activities to forest resources, socio-economic value of forest resources, and trends in forest resource use, contribution of the forest goods, and services to their livelihoods, access and use of the forest

resource, conflicts, regulatory policy and institutional frameworks, and community involvement in conservation activities, norms with respect to forest and other natural resource use.

Figure 3: Pictorial of a Focus Group Discussion

2.0 Existing Environment

2.1 Physical Environment of River Cess

The County is located 320 kilometers southeast of Monrovia, lying at 5 degrees 36'23N and 9 degrees 39' 31W, with an average altitude of 84 meters. River Cess has an area of 5,263.4 square kilometers and a coastline of 62 kilometers. The area is bound by four counties; Grand Bassa in the west, Nimba and Grand Gedeh in the North, Sinoe in the Southeast, and the Atlantic Ocean in the South. Prominent geographical features demarcating the County include River Timbo in the West, River Blonne in the East, and the Whomeh and Gienee Rivers in the North. Cestos City is situated on the coast, alongside the Cestos River. The nearest major town to Cestos is Buchanan in Grand Bassa County, some 140 kilometers away (Rivercess CDA, 2012).

2.1.1 Climate

The region experiences heavy rainfall, ranging from 160cms to 170cms annually, with the heaviest rains in August to September. Temperatures generally range from 25 to 32 degrees Celsius. The coastal areas experience high humidity during the months of November to January.

Wetlands and swampy areas are common in the County on account of the heavy rainfall. The climate during the months from December to May is most conducive for farming of rice, cassava, rubber, cocoa and palm trees. Dustladen harmattan winds blow down from the Sahara from December to March, and since it does not usually rain this season, the dust tends to remain noticeable in the air for two months RiverCess CDA, 2012).

2.1.2 Topography
River Cess County is generally considered lowland and partly thick green forest. The major mountain ranges in River Cess are found in Morweh District. The Cestos River runs through the lowlands into the Atlantic Ocean.

2.1.3 Geology
Soil types vary with location. In the Timbo district area, the soil is sandy. In Yarnee District, one sees mangrove swamps and water-logged soils. In the Central River District, the soil has a reddish color. In Morweh, the soil is both reddish and of the Mangrove type.

2.1.4 Vegetation
The vegetation of River Cess is both savannah and green forest, mostly the latter.

2.1.5 Demography
River Cess has a population of 53,669 according to a projection by the Ministry of Planning and Economic Affairs in 1997. Average household size is 5.5. The County has a dependency ratio of 1.43; higher than the national dependency ratio of 1.37. Households are mostly male dominated, with only 12% of households headed by females. The Bassa-speaking people are in the majority, making up 96 % of the County's population. Other ethnic groups in the County include the Kpelle (1%), the Kru (2%) and the Grebo (1%). As of 2008 population census, the county population estimate was 71,509.

2.1.7 Natural Resources

Timber
River Cess County has three major logging concession areas in Morweh, Central River Cess and Yarnee Statutory Districts respectively, exceeding 160,000 hectares of prime forest in total. There is also a special soft-grade timber stand of 50,000 hectares planted by GoL near Neezuin in Central River Cess. The area has a variety of species of trees with commercial potential, including Niangon (heritera utilities), tetra, abjura (mitragyna ciliate), ekki (lophira alata), lovoa, sipo, bozze and sapale. Of these, niangon and tetra are dominant, and are principally used for construction of houses and furniture making. The Forestry Development Authority (FDA) has declared the area of tropical rain forest in Cestos-Sahnkwehn as "Proposed Protected Forest". The Krahn-Bassa Forest in the Southwest of the County has also been declared as a National Forest (Rivercess CDA, 2012).

2.1.7 Fisheries

River Cess County has four principal rivers (Timbo, Cestos, Po and Sahnkuen) along with many smaller rivers that flow into the Atlantic Ocean, which provide breeding grounds for the wide range of fish resources including large pelagic, small pelagic and demersal fish, shrimp and lobster. These varieties can be exploited for domestic, regional, and international trade.

Fishing is the second-largest economic activity in the County after farming. Five fishing teams work out of Cestos City using motorboats for ocean fishing, and a number of unaffiliated fishermen use canoes on the ocean and in rivers. The industry remains in its infancy, and provision of inputs to fisher folk will have major benefits to the economy of Cestos City (Rivercess CDA, 2012).

3.0 Results from the Field data collection

The visited in all six out of 8 transects for both vegetation types Primary forest and mangrove forest in the project area. They recorded about 59 plant species from three communities (Po-River, Gbarboe, and Jaster) forests and recorded all six mangrove species found in Liberia from transects in three communities (Po-River, Gbarboe and Neegbah). Twenty-five (25) bird species were listed across the three community forests and ten (10) mammal species were recorded by the team in the field and 8 mammal species were gathered from interviews from local hunters who served as forest guides for the team. About six (6) amphibian species were gathered from the primary forests. Among the mangroves, the team recorded lobster, crabs, oysters and periwinkle.

In Po-River, the team was told that only the women and young men go to gathered periwinkles, crabs and oysters. As we were told, the women cut the roots of mangroves to gather the oysters since they are not patient to remove them carefully from the roots of the mangrove. Neegbah town is the closest town to a big fishing neighborhood in Cestos city. The Chief of the town informed the team that fishermen leave from Cestos city on Canoes cross to their side just to harvest the mangroves to dry their fish. As a result of this, there is a threat pose to the mangroves in Neegbah town. See the below the results;

Table 1: Some flora (commercial tree) species observed within the primary forest

No	Scientific names	Local names	FDA Commercial Species Class	IUCN Status
1	Napoleonaea heudelotii	Small tree of re- growth forest, with many branches in whorls and fibrous bark.		Not Assessed
2	Elaeis guineensis	The African oil palm.		LC
3	Chlorophora excels	Iroko(Odum Kambala)	A	NT

4	Lohira alata	Ekki (Azobe)	A	VU
5	Terminalia superba	Frake(Limba Afara)	A	Not Assessed
6	Costus duius	Herb to 2.5m, of primary and secondary forests and edges.		Not Assessed
7	Aframomum melegueta	Rhizomatous herbaceous plant with leafy stems to 1.5m, of shaded forest.		Not Assessed
8	Guibourtia leonensis	Forest trees to 25 m. None pioneer light demander.		Not Assessed
9	Amphimas pterocarpoides	Lati(Bokango)	C	Not Assessed
10	Schizocolea linderi	Shrub to 3m high, forest undergrowth.		Not Assessed
11	Palisota hirsuta	Perennial herb to 3m, of rain forest.		Not Assessed
12	Tetracera affinis	Scrambling or twining shrub to 12 m long.		Not assessed
12	Uapaca guinensis	Uapaca(Rikio)	C	Not Assessed
13	Dacryodes kliana	Monkey plum	C	Not Assessed
14	Dialium aubrevillei	Kropio(Eyoum)	C	Not Assessed
15	Xylopia aethiopica	Guinea pepper Tree(Okala)	C	Not Assessed
16	Calpocalyz aubrevillei	Badio(Calpocalz)	C	Not Assessed

17	Manniophyton fulvum	Woody liana to 20-30 m long, common in most forest types, but especially in more disturb patches.		CR
18	Pentaclethra macrophylla	Oil- bean tree	C	Not Assessed
19	Garcina cola	Bitter cola	B	VU
20	Erythrophleum ivorensis	Tali(Sassawood)	B	Not Assessed
21	Canarium Schweinfurthii	Aiele	A	Not Assessed
22	Heiriteria utilis	Niangon, Whimore	A	VU
23	Fagara macrophylla Fagara	Olondu	C	Not Assessed
24	Psychotria peduncularis	Shrub to 2 meter variable with many varieties, lowland shrub and forest		Not Assessed
25	Landolphia dulcis	Forest climber to 10m.		Not Assessed
26	Piptadeniastrum africanum	Dahoma	A	Not Assessed
27	Sacrophrynium brachystachyum	Semi-woody herb		Not Assessed
28	Raphia hookeri	Tall, common wine palm to 10m usually		Not Assessed
29	Lovoa trichiliodes	Lovoa(Dibetou)	A	LC
30	Musanga cecropioides	African corkwood	C	Not Assessed
31	Maesobotrya barteri	Bush cherry		EN
32	Cryposepalum tetrapyhllum	African pine	C	Not Assessed
33	Pycnathus africanus	Llomba	B	Not Assessed

34	Funtumia elastica	Funtuma(Mutunda)	C	Not Assessed
35	Anthonotha fragrans	Anthonotha(Kibokoko)	C	Not Assessed
36	Piper guineense	Liane 4-20 m tall, climbing into trees; wet places in evergreen forest.		Not Assessed
37	Sarcrophrynium prionogonium	Semi-woody rhizomatous herb in clumps to 2 m tall, in understory of non- swampy forest.		Not Assessed
38	Anthocleista nobilis	Cabbash tree	A	Not Assessed
39	Psidium spp	Wild guava		Not Assessed
40	Scadoxus multiflorus	Fleshy monocot herb with a large bulb leaves to 25cm in rainy season, with an ornamental inflorescence.		Not Assessed
41	Laccosperma acultiflorum	Large rattan palm of wet forest.		Not Assessed
42	Anopyxis klaineana	Kokoti	B	VU
43	Parinari excelsa	Parinari(songue)	C	Not Assessed
44	Gilbertiodendron preussii	Limbali	A	Not Assessed
45	Culcasia angolensis	Robust root climber to 30m high, in forest.		Not Assessed
46	Xylia evansii	Dan(Mano)	C	Not Assessed
47	Ceiba pentandra	Ceiba (Fromager)	A	Not Assessed
48	Halopegia azurea	Rhizomatous, Large herb to 1.3m, in wet places of dense forest.		Not Assessed
49	Entandrophragma angolense	Tiama(Edinam)	A	VU
50	Entandrophragma candollei	Kosipo(Abourd Kro)	A	VU
51	Entandrophragma cylindricum	Sapele sapelle Aboudikro)	A	VU
52	Tiliacora leonensis	Liane comonin most in forests and widespread.		Not Assessed
53	Klainedoxa gabonenss	Klinodoxa(Eveuss)	C	Not Assessed
54	Alstonia boonei	Emien	C	Not Assessed
55	Albizzia Zygia	Zygia	C	Not Assessed
56	Ficus sur	Tree 5-12m tall in open woodland.		Not Assessed
57	Newtonia aubrevillei	Pellegrin	C	Not Assessed

| 58 | Eremospatha macrocarpa | Climbing rattan palm of swamp forest. | | LC |
| 59 | Maesobotrya liberica | Bush cherry, a newly discovered species in Liberia | | EN |

Figure 3: Pictures of Acrostichum aureum, Rhizophora racemosa and Rhizophora mangle

A. Acrostichum aureum   **B. Rhizophora racemose**   **C. Rhizophora mangle**

Table 2: Mangrove species observed

No	Science names	Local names	IUCN Status

1	Rhizophora mangle	Red mangrove	LC
2	Rhizophora racemosa	Red Mangrove	LC
3	Rhizophora harrisonii	Leechman/Balanta	LC
4	Avicennia germinans	Black mangrove	LC
5	Conocarpus erectus	Buttonwood	LC
6	Acrostichum aureum	Swamp fern	LC

Table 3: Some bird species observed within the primary forest

No	Science names	Local names	IUCN Status	Observation Type
1	Hedydipna collaris	Collared sunbird	LC	Sighted
2	Baeopogon indicator	Honeyguide Greenbul	LC	Heard
3	Pogoniulus atroflavus	Red Rumped Tinkerbird	LC	Heard
4	Lophoceros fasciatus	African Pied Hornbill	LC	Sighted
5	Thescelocichla leucopleura	Swamp Palm Bulbul	LC	Heard
6	*Eurillas virens* erythroptera	Little Greenbul	LC	Heard
7	*Pycnonotus barbatus*	Common bulbul	LC	Sighted
8	*Chrysococcyx cupreus*	Emerald Cuckoo	LC	Sighted
9	Pogoniulus subsulphuresus	Yellow throated Tinkerbird	LC	Sighted
10	Gymnobucco peli	Bristle-nosed Barbet	LC	Heard
11	*Dendropicos goertae*	African grey woodpecker	LC	Sighted
12	Pogoniulus scolopaceus	Speckled Tinkerbird	LC	Heard
13	Hylia prasina prasina	Green Hylia	LC	Heard
14	Oriolus brachyrynchus	Western Oriole	LC	Heard
15	Nicator chloris	Western Nicator	LC	Heard
16	Camaroptera chloronota kelsalli	Olive-green Camaroptera	LC	Sighted
17	Bleda canicapillus canicapillus	Grey-headed Bristlebill	LC	Sighted
18	Criniger barbatus	Western-bearded Greenbul	LC	Sighted
19	Criniger olivaceus	Yellow bearded Greenbul	Vu	Sighted
20	Camaroptera brevicaudata tincta	Grey-backed Camaroptera	LC	Sighted
21	Apalis sharpie	Sharpe's Apalis	LC	Heard
22	Camaroptera superciliaris	Yellow-browed Camaroptera	LC	Heard
23	Macrosphenus concolor	Grey Longbill	LC	Heard
24	Chlorocichla simplex	Simple Greenbul	LC	Sighted
25	Eurillas gracilis	Little Grey Greenbul	LC	Heard

Table 4: Some mammal species observed within the primary forest

No	Science names	Local names	IUCN Status	Observation type
1	Dephomys defua	Defua Rat	LC	Habitat

2	*Nandinia binotata*	African palm civet	LC	Track
3	*Potamochoerus porcus*	Red river hog	LC	Track
4	*Protoxerus stangeri*	Forest Gian squirrel	NT	Sighted
5	*Tragelaphus scriptus*	Bushbuck	LC	Track
6	*Hyemoschus aquaticus*	Water chevrotain	LC	Track
7	*Cephalophus niger*	Black duiker	LC	Dung
8	*Atherurus africanus*	African brush-tailed porcupine	LC	Sighted
9	Cephalophus maxwellii	Maxwell's duiker	LC	Dung
10	Cercopithecus petaurista	Lesser spot-nosed monkey	LC	Heard

Table 5: List of Amphibians observed within the primary forest

No	Science names	Local names	IUCN Status	Observation Type
1	Arthroleptidae arthroleptis spp	West African screeching frog	LC	Sighted
2	Phlyctimantis boulengeri		LC	Sighted
3	Phrynobatrachus plicatus		LC	Sighted
4	Amnirana albolabris		LC	Sighted
5	Hyperolius guttulatus	Dotted reed frog	LC	Sighted
6	Chiromantis rufescens		LC	Sighted

Figure 4: Pictorial of Amnirana albolabris

Table 6: List of Reptile Species recorded and gathered through interviews

No	Scientific Name	Local Name	IUCN Status	Observation Type
1	Bitis gabonica	Cassava snake	-	Gathered
2	Atheris chlorechi	Green snake	-	Sighted
3	Varanus niloticus	Nile monitor	-	Gathered
4		Black snake		Gathered
5		Tree Cobra		

Table 7: List of animal species gathered from interviews with hunters

No	Science names	Local names	IUCN Status
1	Pan troglodytes verus	West African Chimpanzee	CR
2	Varanus niloticus	Nile monitor	LC
3	Procolobus badius	Red Colobus	EN
4	Procobus verus	Olive Colobus	NT
5	Cephalophus maxwelli	Maxwell's duiker	LC
6	Atherurus afrienus	African bush tail porcupine	LC
7	Atherurus afrienus	African bush tail porcupine	LC
8	Cercopithecus diana	Diana Monkey	EN

Table 8: GPS Coordinates

No	Communities	Transect #	GPS Coordinates Start point		GPS Coordinates End point		Vegetation Type
			X	Y	X	Y	Primary Forest
1	Po-River	Transect #1	00930151	0523764	00930048	0523423	
2	Po-River	Transect #2	00929913	0522975	00929828	0522968	Mangrove
3	Gbarboe	Transect #3	00931358	0525014	00931082	0524906	Primary Forest
4	Gbarboe	Transect #4	0441444	0597445	0439807	0598423	Mangrove
5	Jaster	Transect #5	00932007	0526340	00932216	0526561	Primary Forest
6	Jaster	Transect #6	**XXXXXXX**	**XXXXXXX**	**XXXXXXX**	**XXXXXXX**	Mangrove
7	Neegbah	Transect #7	**XXXXXXX**	**XXXXXXX**	**XXXXXXX**	**XXXXXXX**	Forest
8	Neegbah	Transect #8	00933636	0525884	00933532	0525472	Mangrove

Threats observed in two vegetation types (Primary forest and mangrove forest)

Threats on the Primary forest
Human activities such as hunting (snares or empty gun shells), NTFPs harvesting such (Xylopia aethiopica, Guinea pepper, honey) were observe across the various community forests that the team visited. On transect No. 1, at GPS coordinates **N 0444508 and W 0595925;** the team observed that over 30 trees of Xylopia aethiopica were fell down just to harvest the seeds for the NTFPs market.

Xylopia aethiopica is an aromatic tree, of the Annonaceae family that can grow up to 20m high. The hunter who was leading the transect walk told the team that it is a common practice across the various communities. He further stated that the reason people fell Xylopia is that, the trees are tall and the only means of harvesting more is to cut it down even though the seeds of xylopia fall off and people go to gather them. Other threats observed in the forest, is the harvesting of some important timber species for canoe making. River-Cess is known among fishermen for producing high quality timber for canoe making. Craftsmen produce canoes and supply Grand Bassa, Margibi, Montserrado, Bomi and Grand Cape Mount counties. They put the value of a canoe at US$1000-1500 depending on the size. Our key informant told us that from one standing timber, they can produce up to two canoes. Shifting cultivation (slash and burn) agriculture practices were observed in two forest Jester and Gbarboe town. The team also saw snares and empty gun shells as can be seen below in figure 6;

Figure 5: Pictorial of the site on transect 1 where over 30 Xylopia aethiopica trees were fell down

Figure 6: Picture of a trap   **Picture of a gun shell**

Threats on mangrove forest

The threats observed from the mangroves forests from Po-River and Jester town mangroves include, cutting of the roots and stems for oyster's collection mostly by the women. However, the threats were not as severe as Neegbah where mangroves are harvested for fuelwood and

transported to Cestos-city to be sold to fish-dryer. Please see below a pictorial of mangrove roots cut by the women.

Figure 7: Pictorial of mangrove roots cut for oysters harvesting

Table 9: Livelihood Activities

Livelihood Activities	Dependent Natural Resources			Activity Sector		Income
Activity	Marine	Terrestrial	None	Primary	Secondary	LRD
Agriculture-Cassava		(terrestrial)		(primary)		
Agriculture-Rice		(terrestrial)		(primary)		
Agriculture- Vegetables		(terrestrial)		(primary)		
Agriculture-Coconut		(terrestrial)		(primary)		
Forestry – NTFPs eg. Wild honey, Xylopia-country-spot		(terrestrial)			(secondary)	
Business - Dried fish sales	(marine)			(primary)		
Business - Coconut Seller		(terrestrial)		(primary)		
Building pole collection		(terrestrial)			(secondary)	
Business - Firewood Seller		(terrestrial)			(secondary)	
Business - Fishmonger (non-refrigerated)	(marine)			(primary)		
Community worker/leader			(none)	(primary)		
Fishing - Canoe based; inside mangroves	(marine)			(primary)		
Fishing – Deep water ; Nets & lines	(marine)			(primary)		
Employment -Teacher			(none)	(primary)		
Employer- Nurses			(none)	(primary)		
Shell collection	(marine)				(secondary)	
Traditional medicine		(terrestrial)			(secondary)	
Transport (on motorbikes)			(none)	(primary)		
Fuelwood (Mangroves and other tree species) collection	(marine)	(terrestrial)			(secondary)	
Housewife	(marine)	(terrestrial)		(primary)		
Livestock – Goats		(terrestrial)			(secondary)	
Hunting -Snares & guns		(terrestrial)			(secondary)	

The blue color accounts for activities in the marine environment, the orange accounts for activities in the terrestrial environment, the purple represents activities that are not related to neither of the two studied areas (marine and terrestrial), the orange accent 6, represents primary (mean) sources of income with respect to livelihood activities of the communities, while the green color represents the secondary sources of income with respect to livelihood activities.

The communities visited are across the cesto-River the east of Cesto city the capital of Rivercess. Motorbike is the only means of transportation from one town to another. At the river, unmotorized canoes and motorized canoes are used to cross people to the city for basic social services like schooling, attending hospitals, purchase of other commodities. The survey captured communities that have some basic social services, see table below.

Table 10: Access to Basic social Services

Name of Town	School	Hospital	Electricity	Alternative Sources of energy for heating/light and cooking
Po-River	Yes	Yes	Yes	Firewood
Jaster town	No	No	No	Touch-light, firewood
Gbargoe town	Yes	No	No	Touch-light, firewood
Neegbah	No	No	No	Touch-light, firewood

REFERENCES

Adam, J-G., 1970a. La végétation du cordon littoral et lagunaire du Cap des Palmes (Cap Palmes) (Libéria). Bull. Soc. bot. Fr. 117:419-428.

Ajonina, G., Diamé, A., & Kairo, J. (2008). Current status and conservation of mangroves in Africa: An overview. *World Rainforest Movement Bulletin*, *133*.

Barbier, E. B., Hacker, S. D., Kennedy, C., Koch, E. W., Stier, A. C., & Silliman, B. R. (2011). The value of estuarine and coastal ecosystem services. *Ecological monographs*, *81*(2), 169-193.

Christie, T., Steininger, M. K., Juhn, D., & Peal, A. (2007). Fragmentation and clearance of Liberia's forests during 1986-2000. *Oryx*, *41*(4), 539-543.

Corcoran, E., Ravilious, C., & Skuja, M. (2007). Mangroves of Western and Central Africa.

Curry-Lindahl, K. (1969). *Report to the Government of Liberia on Conservation, Management, and Utilization of Wildlife Resources* (No. 24). International Union for Conservation of Nature and Natural Resources.

Environmental Protection Agency Of Liberia (**EPA,2004**) ... **Report** of **Liberia** to the United Nations Framework Convention on Climate.

Gatter W. 1988. The coastal wetlands of'Liberia: their importance for wintering waterbirds. International Council for Bird Preservation, Cambridge.

Giri, C., Ochieng, E., Tieszen, L. L., Zhu, Z., Singh, A., Loveland, T. ... & Duke, N. (2011). Status and distribution of mangrove forests of the world using earth observation satellite data. *Global Ecology*

Government of Liberia. 2004. CBD Strategy and Action Plan – Liberia (Part I, English version). Available at www.biodiv.org/doc/world/lr/lr-nbsap*Biogeography*, *20*(1), 154-159.

IUCN Red List of Threatened Species. http://www.iucnredlist.org/details/178851/0 (online). Last seen 30/05/2019

Kathiresan, K., & Bingham, B. L. (2001). Biology of mangroves and mangrove ecosystems.

Kunkel, G., 1966. Über die Struktur und Sukzession der Mangrove Liberia und deren Randformationen. Ber. Schweiz. Bot. Ges. 75:20-40.

Liberia Institute of Statistics and Geo-Information Services (**LISGIS**) National Population and Housing Census of 2008.

Lugendo, et al., 2007. Relative Importance of Mangroves As Feeding Habitats for Fishes : A Comparison Between Mangrove Habitats With Different Settings. , 80(3), pp.497–512.

Nagelkerken, I., Van der Velde, G., Gorissen, M. W., Meijer, G. J., Van't Hof, T., & Den Hartog, C. (2000). Importance of mangroves, seagrass beds and the shallow coral reef as a nursery for important coral reef fishes, using a visual census technique. *Estuarine, coastal and shelf science*, *51*(1), 31-44.

Piso, L. et al., 2007. Report prepared for the project "Taking Biodiversity Conservation to the Proposed Lake Piso Nature Reserve in Liberia.", pp.1–30.

Saenger, P., & Bellan, M. F. (1995). The mangrove vegetation of the Atlantic coast of Africa: a review.

Tang, W., Feng, W., Jia, M., Shi, J., Zuo, H., & Trettin, C. C. (2016). The assessment of mangrove biomass and carbon in West Africa: a spatially explicit analytical framework. *Wetlands ecology and management*, *24*(2), 153-171.

Tuagben, D.S., 2012. The Vulnerability of the Coast of Liberia to Marine Oil Spills:Implications for Biodiversity and Renewable Natural Resource Utilization. , p.27.

UNEP/Earthprint, 2007. *Mangroves of western and central Africa*. No. 26..

ANNEXES

Annex 1 List of stakeholders interviewed

Po-River Community

Attendances

No.	Name of Participants	Community/Town	Position	Signature & Date
1,	Daniss Sebo	Po-River	Commisner	April 25, 2019
2,	Emmanuel	Tapuh		
3,	Ogashe A. Gaye			
4'	Henson Juah			
5,	Rose Kowbah			
6,	Faimon Yanvan			
7,	Titus Yanvan			
8,	Anitta Sebo			
9,				
10,				
11,				
12,				
13,				
14,				
15,				
16,				
17,				
18,				
19,				

CRITICAL ECOSYSTEM
CRITICAL ECOSYSTEM
PARTNERSHIP FUND

GFWA
GUINEAN FORESTS
OF WEST AFRICA

BirdLife
INTERNATIONAL

Jaster Town

Attendances

No.	Name of Participants	Community/ Town	Position	Signature & Date
				APriy 26 2019
1,	George Roberts	Jaster	sec commun	
2,	Daniel Ben sr	Jaster	member	
3,	Daniel King	Jaster	member	
4'	James williams	Jaster	member	
5,	Verney Kainaka	Jaster	member	
6,	James Johnson	Jaster	member	
7,	morrison W. Teah	Jaster	member	
8,	Rev. David Johnson	Jaster	member	
9,	ferry F Treh	Jaster	member	
10,	Lycon Paye	Jaster	member	
11,	Patrick teah	Jaster	member	
12,	Hirettha Johnson	Jaster	member	
13,	Rev. James Johnson	Jaster	member	
14,	Daniel Ben Jr	Jaster	member	
15,	G. Abinadab Brown	Jaster	member	
16,	Emmanuel teah	Jaster	member	
17,				
18,				
19,				

Gbargboe Town

Attendances

GFWA — GUINEAN FORESTS OF WEST AFRICA

CRITICAL ECOSYSTEM PARTNERSHIP FUND

BirdLife INTERNATIONAL

No.	Name of Participants	Community/Town	Position	Signature & Date
1,	lawrence Pailey	Gbargboe	Town chief	
2,	Austin Brown	Gbargboe town	Asst Townchief	
3,	Elizebeth Smith	Gbargboe town	women leader	
4'	Isaac P. Sobor	Gbargboe	Teacher	
5,	Moses Tarr	Gbargboe	Elder	
6,	Sam Jackson	Gbargboe	Youth leader	
7,	Berry Kpehyou	Gbargboe	Town member	
8,	Cecelia Moore	Gbargboe	Town member	
9,	Othello Waysieh Jackson	Gbargboe	Town member	
10,	Andrew Willie Jr	Gbargboe	Town member	
11,	Andrew Willie Sr.	Gbargboe	Town member	
12,	Oretha Menyon	Gbargboe	Town member	
13,	Daniel Menyon	Gbargboe	Town member	
14,	Hellena Kpehyon	Gbargboe	Town measa	
15,	Joseph Kpehyou	Gbargboe	Town member	
16,	Alfred Samuel	Gbargboe	Town member	
17,	Janet Pailey	Gbargboe	Town member	
18,	Josephine Samuel	Gbargboe	Town member	
19,	Anthony Morris	Gbargboe	Town member	

27 08 2019

20. Sundayway Waysieh - Gbargbee - Town mem -
21. Doris Waysieh - Gbargbee - Town member
22. Yarvoe Samuel - Gbargbee - Town member
23. Amelia Samuel - Gbargbee - Town member
24. Otis Samuel - Gbargbee - Town member
25. Ruth Anthony - Gbargbee - Town member
26. Te-Tee Waysieh - Gbargbee - Town member
27. Regina Gbartoe - Gbargbee - Town member
28. Annie Jackson - Gbargbee - Town member
29. Promise Brown - Gbargbee - Town member
30. Maryou pel Waysieh - Gbargbee - Town member
31. Joseph Willie - Gbargbee - Town member
32. Bob Toe - Gbargbee - Town member
33. Johnson Gbeso Gbargbee - Town member
34. Mary Willie - Gbargbee Town member

Neegba Town

Attendances

CRITICAL ECOSYSTEM PARTNERSHIP FUND

GFWA GUINEAN FORESTS OF WEST AFRICA

BirdLife INTERNATIONAL

Signature & Date APR 28 2019

No.	Name of Participants	Community/Town	Position	Signature & Date
1,	Daniel M. Zeo	Neegbah	Town chief	Wase 4-28-10
2,	Samuel Yalley	"	Teacher	Sep. 4/28/2019
3,	Marmone Zeo	"	Farmer	4/28/2019
4'	Johnson T. Karley	"	Elder	4/28/2019
5,	Dorris Zeo	"	Farmer	4/28 2019
6,	Mamve Zeo	"	Farmer	4/28 2019
7,	Opong Karley	"	Student	4/28 2019
8,	Fedrick morris	"	Farmer	4/28 2019
9,	Retha minore	"	Farmer	4/28/2019
10,	B. Onugor Zeo	"	Teacher	04/28/2019
11,	mamve Zeo	"	Farmer	04/28/2019
12,				
13,				
14,				
15,				
16,				
17,				
18,				
19,				

Biodiversity Conservation Awareness Manual

Introduction

This manual is intended to help FEE staff and the project communities to plan impactful awareness activities about the biodiversity in the Proposed Cesto-Senkwen Protected Area. It provides an overview of key concepts in communications, with examples to guide the reader through the development and implementation of community outreach programs. The manual presents photographs and technique that is best suited for the project communities under consideration.

Overall Objective of the manual

The overall objective of this manual is to provide guidance on awareness rising about biodiversity within and around communities surrounding the proposed sector Cesto-Senkwen Protect area.

Identifying Goals, Objectives and Target Audiences

Before beginning any outreach, it is important to take the time to plan and strategize. Planning will help ensure more effective messages that reach your target audience, a wiser use of resources, and increased capacity to measure results and demonstrate success.

Step 1: Determine your Goal.

A goal is a broad statement or purpose that aligns with the overarching aim of your conservation project or mission. Ask yourself, "What is the problem the campaign is trying to address?" and "why is this problem important to people?" Examples of goals:

- To increase support for mangrove managed areas.
- To reduce threats to primary forest
- To contribute to the conservation of natural resources and the environment in Liberia through the provision of tangible biological data and consultancy services (FEE).

Step 2: Define your Objectives

Objectives are formal statements that specify your exact intended outcome. You will use your objectives to measure your success, so take time to draft them carefully. It is not enough to say your objective is to "build more awareness," you must consider why awareness is important and what specific outcomes it will have for the project.

Examples of objectives:

- To increase support for marine managed areas among fishers and coastal communities from "medium" to "high" by year 2.
- To foster participatory management of the mangrove reserve (FEE).

Step 3: Decide your Audience

Don't list the "general public" as your target audience, outreach should consider and celebrate the uniqueness of each community or group. People are more likely to listen when a message hits close to home, so narrow down your target audience and get to know them. Consider your resource users and jot down categories (eg. fishermen, hoteliers, tourists, business owners, school children). Consider questions such as: What motivates them? Where do they go for information? Where do they spend their time? What are they concerned about? What is their education level? What do they have the power to change?

Table 1: Showing different audiences, knowledge gain, where to go and activities

Audience	Knowledge/ Attitude to Gain	Where?	Activities
Fishers	Availability of alternative sustainable livelihoods within protected areas	Town hall	Reading loud the list of protected fish species, and Evening video event of best fishing practices
Students	The impacts of harvesting NTFPs	School	School visits to project site
Farmers	Agro-forestry as an alternative sustainable livelihood	Town/field	PowerPoint presentations and visits to project woodlot sites
Hunters	The impact of unsustainable hunting	Town	Presentation and lectures

Note: All objectives should be S.M.A.R.T. S – Specific, M - Measurable, A - Achievable

R-Relevant, and T - Time-bound.

Why Biodiversity conservation awareness?
Liberia is known as a biodiversity hotspot in the Upper Guinea rain forest and host species of global importance including the African forest Elephant (Loxodonta Africana), Chimpanzee (Pan troglodytes), Pigmy Hippopotamus (Choeropsis liberiensis), Zebra duiker (Cephalophus zebra), Diana monkey (Cercopithecus Diana), Manatees (Tichechidae), Leatherback sea turtle (Dermochelys coriacea), Tetra (Tetraberlinia tubmaniana) and important birds of conservation concern. (Greengrass, 2011; FDA, 2006; EPA, 2013). In the ecosystems of Liberia, they are estimated as 225 timber tree species, 2000 flowering plant species, 140 mammal species, 600 bird species, 75 amphibian and reptile species and over 1000 species of identified insects which

conservationists and natural resource managers are all calling for conserving, utilizing equitably and managing them sustainably (GoL, 2017). Hence, the country has endeavored to set up a number of protected areas across the various forest landscapes of Liberia (GoL, 2017). However, with all these efforts to conserve biodiversity, set up protected areas it was observed that communities continue to carryout activities in protected areas (Tuagben, 2012). Besides, there is low level of awareness about biodiversity and climate change in Liberia (EPA, 2013). Moreover, the concept of biodiversity is still not well understood by many people around the world (Lindemann 2008 & Jones et al., 2011).

Based on the above the need for biodiversity conservation awareness is urgent and is greatly needed in today's Liberia. And this can only be achieved when the poor, rich, government officials, Business owners are involved in the awareness raising program (Braschler et al., 2010).

Who should be involved?
During the planning of an effective awareness raising program, one key component is "who should be involved" your audience?

Think about your audience and what they would consider interesting and fun. Children may respond best to hands-on activities and moving quickly through educational programs (Braschler et al., 2010). Fisher-folks, farmers, hunters may prefer to hold meetings outdoors. High-level business, governmental or scientific participants might prefer informational PowerPoint presentations.

Awareness Material
The biodiversity awareness targets local communities around the proposed Cesto-Senkwen protected area, materials to be used include the followings; the FDA protected species list, Video and photographs are incorporated in the manual to be used for the biodiversity awareness. See below figure 1.
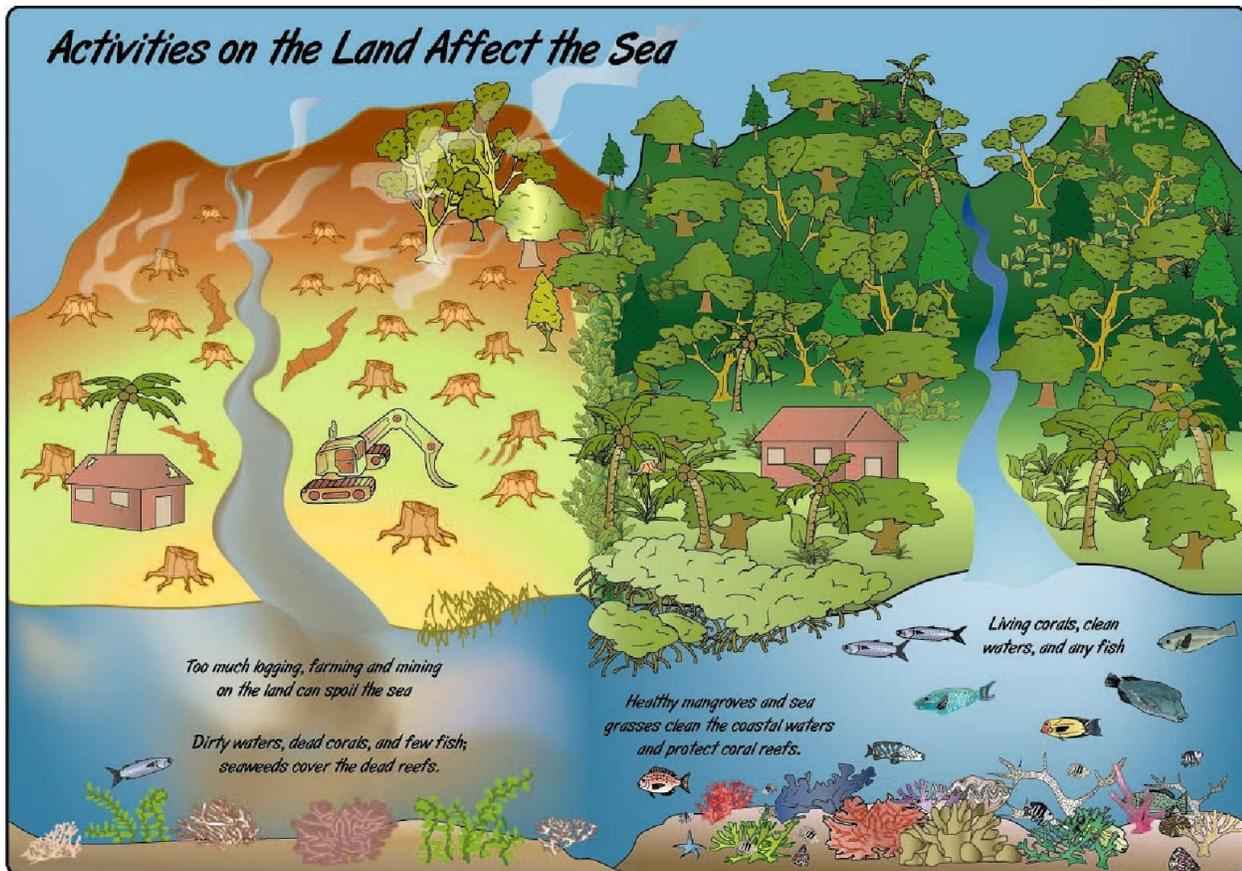
Figure 1: Protected Wildlife of Liberia   **Use of video**
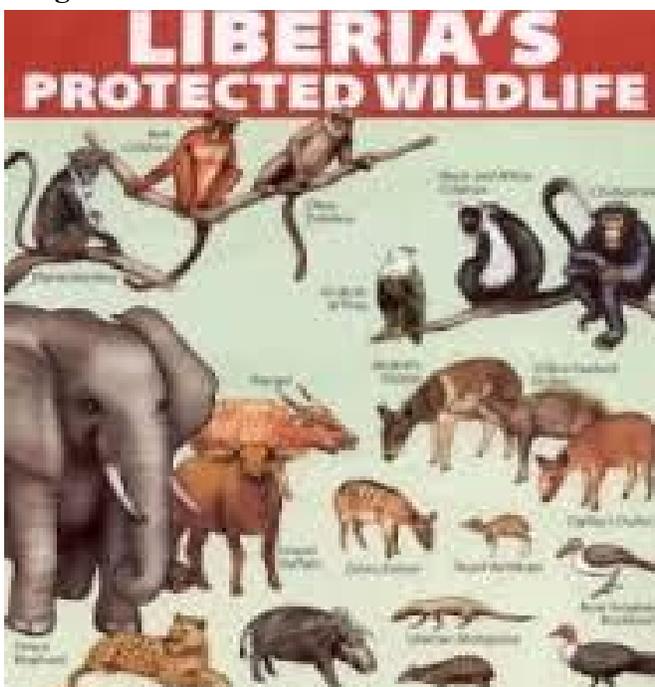
Figure 2: Picture of activities on the land that affect the sea

Approach to be used for Biodiversity Conservation awareness

For the setting under consideration, the project team should consider involving the local authority in selecting the targeted audience in fishing and farming communities. For schools, the school authorities should be contacted. The time for each activity should be discussed and agreed upon prior to hosting an event.

Messages/Topics to be considered/covered

The message is the most important part of any communication product and each word should be chosen purposefully.

Positivity:

People respond best to positive messages and studies show that scare-tactics are not as effective. Instead of telling people what NOT to do, remind them why they should care about the biodiversity, and how they will personally benefit from its protection.

Credibility:

Do thorough research. Biodiversity messages should always be backed by sound science/research.

Length:

Less is more! People can only process a limited amount of information at a time. The more you add, the less your audience will remember. Avoid oversimplifying, but that is exactly what you need to do! Focus on people and nature, not projects details.

- For most audiences, a fact sheet should be about 2 pages and a video should under 3 minutes.

References

Braschler, B., Mahood, K., Karenyi, N., Gaston, K. J., & Chown, S. L. (2010). Realizing a synergy between research and education: how participation in ant monitoring helps raise biodiversity awareness in a resource-poor country. *Journal of Insect Conservation*, *14*(1), 19-30.

EPA (2013). *Liberia's Initial National Communication* (INC) to the *UNFCCC.*

FDA (2006). The National Forest Reform Law of Liberia.

GoL (2017). NATIONAL BIODIVERSITY STRATEGY AND ACTION PLAN-ii 2017-2025

(Greengrass, *2011), Fragmentation and Clearance of the Liberia's forests during 1986-2000*

Jones, J. P., Collen, B. E. N., Atkinson, G., Baxter, P. W., Bubb, P., Illian, J. B., ... & Nicholson, E. (2011). The why, what, and how of global biodiversity indicators beyond the 2010 target. *Conservation Biology*, *25*(3), 450-457.

Lindemann-Matthies, P., & Bose, E. (2008). How many species are there? Public understanding and awareness of biodiversity in Switzerland. *Human ecology*, *36*(5), 731-742.

Tuagben, (2012). The Vulnerability of the coast of Liberia to marie oil spills: Implications for Biodiversity and Renewable Natural Resource Utilization.

Report on Community Norms

INTRODUCTION

Liberia is located in sub-Saharan Africa. It has a population of 3.5 million people (LISGIS, 2008). The official language is English. However, the population belongs to sixteen tribes; Gola, Kissi, Mende, Gio, Mano, Vai, Mandigo, Gbandi, Kpelleh, Loma, Krahn, Bassa, Dei, Grebo, Kru and Belle. The major religions are; indigenous beliefs which constitute 40%, Christian are about 40% and Muslim 20% (Culture Crossing, 2007). The indigenous African are in majority about 95% (including Kpelle, Bassa, Gio, Kru, Grebo, Mano, Krahn, Gola, Gbandi, Loma, Kissi, Vai, Dei, Bella, Mandingo, and Mende), Americo-Liberians 2.5% (descendants of immigrants from the US who had been slaves), Congo People 2.5% (descendants of immigrants from the Caribbean who had been slaves) (Culture Crossing, 2007).

The country has 15 counties with 9 counties situated along the coast and 6 inland counties. Majority of the population is situated along the coast (EPA, 2019). Norms are highly respected in every community especially where there are coconut plantations (Mott, 2010). Today in Liberia, tribal culture is still prevalent and most indigenous tribes have held on to their beliefs and traditions. These culture beliefs have helped in many ways in protecting some biodiversity species in parts of Liberia. For example, the Sapo people near the Sapo National park in South-East Liberia have some culture belief attached to the West African Chimpanzee. It is forbidden for a son or daughter of that to kill or cook chimps. Another tribal belief is the people of Gbaota of Bong county along the road to Ganta from Monrovia, they belief that the catfish in a stream are members of their family and it is forbidden to fish them. And many with trees in villages, towns and segment of a town this traditional belief exist.

Therefore, address conservation issues in Liberia, will require integrating informal institutions in the governance and the use of wild species (Fraser et al., 2006; Jones et al., 2008; Negi, 2010; Jimoh et al., 2012). The long standing history of these institutions has contributed greatly to the preservation of biodiversity (Jeeva et al., 2006). However, the use of economic incentives to integrate rural population into biodiversity conservation through community based programs has

been an age old problem that has no met its objective (Virtanen, 2002; Jimoh et al., 2012). Hence, efforts should be gear towards on the role of culture and traditions in building support for conservation. Moreover, forest dependent people are knowledgeable and skilled and they are cable of putting in laws that a whole community can abide by in the management or resources and production activities (Laird, 2010).

In the four project communities, the project intends to use the existing traditional structuring of the district and its authorities to promote the implementation of local laws in the area. The purpose of this report is to identify norms in the four project communities that will be used along with national policies governing the use of natural resources in Liberia.

Methods

Study Area and the Human Population
This study was conducted from April 26 to June 25 in the four project communities in Po-River, Jaster, Neegbah and Gbarboe towns in Rivercess county Liberia. People in the study area rely on small scale agriculture, harvesting of forest products for subsistence use or sale and fishing. The communities are found within and near the proposed Cesto-Senkwen protected area. We use questionnaire survey in a focus group discussion to ascertain the views of our respondents. We used the protected species listing of Liberia to show the different species that are protected by national laws and to identify the ones they are also protecting by their local traditional laws.

Figure 1: protected species of Liberia
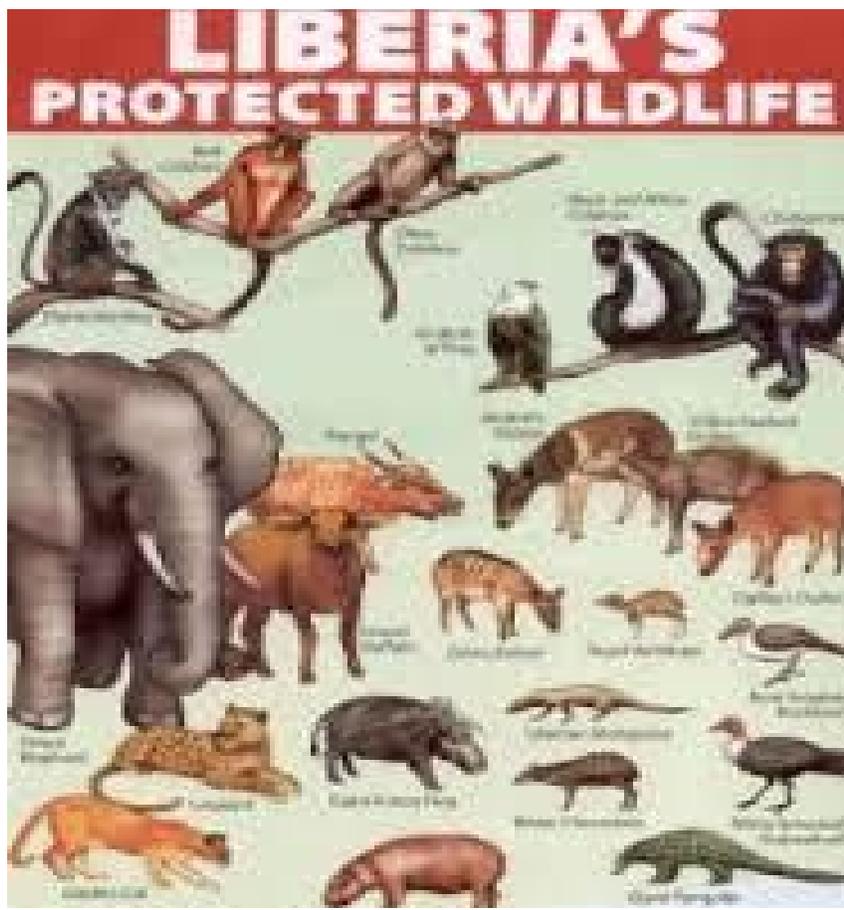
According to the following provisions of the National Forestry Policy the forestry reform Law of 2006 of the Forestry Development Authority; section 8.2 Sustainable Management and Utilization of Forest; section 9.11 Wildlife Conservation; section 9.12 Protected Animals, Hunting, and Trade in wildlife. These provisions prohibit forest dependent people from hunting the listed animals in figure 1 from both the protected areas and unprotected areas of Liberia.

Table 1: Towns within and around the proposed Cesto Senkwen protected area of Liberia, where we carried out field work

Name of Town	Indigenous belief	Christian	Muslim	Dominate ethnic group	Approximate population
Po-River	0	2	0	Bassa	150
Jaster	1	2	0	Bassa	300
Gbarboe	2	1	0	Bassa	261
Neegbah	2	1	0	Bassa	500

1- Represents absent of a religion in a community, 1-represents fewer of a particular religion exist in a community, and 2- represents dominate religion in a particular community.

The general characteristics of the study area

The study area falls east to the Atlantic Ocean and north to the Cesto Senkwen forest, west to the larger portion of the Cesto Senkwen forest, and south to the Cesto –River. Neegbah and Gbarboe towns are two communities nearest to Cesto-city and they are dominated by traditional beliefs. There, they practice both the Poro and Sande societies. The Poro society is straightly for men and the Sene is straightly for women. The two communities have secret society bush known as "Zoe Bush" while the two communities Jaster and Po- River are dominated by Christians. There is a Christian mission in Po-River where two American missionaries live along with other staff of the mission and school. Almost all of the communities have primary and mangrove forests surrounding them.

Table 2: Local laws (norms) captured during the survey

Town	Norms in town	Norms on Forest species	Norms on Agricultural crops	Penalties
Po-River	Church attendance		Forbid overharvesting of coconut	Once one does not go to church regularly, he or she is driven out of the town and for coconut, once one violates the law, a fine of LRD1,500 impose.
Jaster		Forbid fishing in (Tuayobah creek near the town)	Forbid overharvesting of coconut	The gods will punish anyone fishing in the creek and for coconut, once one violates the law, a fine of LRD1,500 impose.
Jaster	Meeting are not held after 6 pm		Forbid overharvesting of coconut	No one will attend a meeting after 6pm and for coconut, once one violates the law, a fine of LRD1,500 impose.
Garboe town			Forbid overharvesting of coconut	and for coconut, once one violates the law, a fine of LRD1,500 impose.
Neegbah			Forbid overharvesting of coconut	and for coconut, once one violates the law, a fine of LRD1,500 impose.
			One cannot whistle in a newly cultivated farm	Once one violates this law, the penalty is a raw pepper (chili) is given to the violator to chew.

National and International Polices on Biodiversity conservation and Protection
- o The United Nations Convention on Biological Diversity
- o National Forestry Policy (FDA, 2006)
- o Section 8.2 Sustainable Management and Utilization of Forest Resource of the Forestry Reform Law of 2006
- o Section 9.11 Wildlife Conservation of the Forestry Reform Law of 2006
- o Section 9.12 Protected Animals, Hunting, and Trade in Wildlife of the Forestry Reform Law of 2006
- o Section 10.1 Community Empowerment of the Forestry Reform Law of 2006
- o Section 13.4 Timber Products in Domestic Trade of the Forestry Reform Law of 2006

There result of the exercise shows there are existing laws and institutions that are highly respected by the people of the study communities. The goal of this project is to identify the norms and have stakeholder discussions and presentations of the findings to the leaders, chiefs, and people of the project communities. Moving forward, the national and international laws will be presented along with the norms captured in this report to the communities.

REFERENCES

Fraser, D., Coon, T., Prince, M., Dion, R., & Bernatchez, L. (2006). Integrating traditional and evolutionary knowledge in biodiversity conservation: a population level case study. *Ecology and Society*, *11*(2).

http://guide.culturecrossing.net/basics_business_student.php?id=117   2017   culture crossing-Liberia; last seen July 4, 2019 at 1:00pm

Jeeva, S., Mishra, B. P., Venugopal, N., & Laloo, R. C. (2006). Traditional knowledge and biodiversity conservation in the sacred groves of Meghalaya.

Jimoh, S. O., Ikyaagba, E. T., Alarape, A. A., Obioha, E. E., & Adeyemi, A. A. (2012). The role of traditional laws and taboos in wildlife conservation in the Oban Hill Sector of Cross River National Park (CRNP), Nigeria. *Journal of human ecology*, *39*(3), 209-219.

Jones, J. P., Andriamarovololona, M. M., & Hockley, N. (2008). The importance of taboos and social norms to conservation in Madagascar. *Conservation biology*, *22*(4), 976-986.

Laird, S. A. (Ed.). (2010). *Biodiversity and traditional knowledge: equitable partnerships in practice*. Routledge.

Mott, T. E. (2010). African refugee resettlement in the US: the role and significance of voluntary agencies. *Journal of Cultural Geography*, *27*(1), 1-31.

Negi, C. S. (2010). Traditional culture and biodiversity conservation: Examples from Uttarakhand, Central Himalaya. *Mountain Research and Development*, *30*(3), 259-266.

Virtanen, P. (2002). The role of customary institutions in the conservation of biodiversity: sacred forests in Mozambique. *Environmental Values*, 227-241.

Monitoring and Evaluation Report

Purpose of Trip:

❖ The trip was intended to carry out monitoring activities and provide support to the field project team in Yarnee Statutory District, Rivercess County, Liberia.

DELIVERABLES:

❖ Meeting with project field officer for briefing on the activities of the projects.
❖ Monitoring & Evaluation impacts of implemented activities.
❖ Meetings with project communities and other relevant stakeholders.

FINDINGS

With the means of vehicle travel, a monitoring team comprising staff of Society for the Conservation of Nature of Liberia (SCNL) and Friends of Ecosystem and the Environment (FEE) completed a one-week visit sanctioned by thorough investigation of progress made so far on the project, "Community Led Coastal Biodiversity Management in Cestos-Senkwen, Rivercess County". The

visit enabled the team to have a greater understanding of the current level of project implementation as well as the status of the projected activities.

As first step, a meeting was held with FEE Field Project Officer in Po river, one of the four project communities. An update was provided by the Project Officer to the monitoring team about the achieved and ongoing activities. In furtherance, a workplan was developed to guide the team's mission while undertaking the exercise. In each of the project communities, the monitoring team convened meeting with the local project implementation team and that of the community visited to carry out tracking of the project activities.

The four communities confirmed the launch of the project that took place in Cestos City in November 2018. That six (6) persons were selected in each of the project communities to attend the launce and the towns chiefs of the four communities confirmed their full participation and consultation in every meeting conducted by the project team.

With reference to capacity development and training conducted, the monitoring team posed several questions including the following to the project implementation team members such as:

- Were any trainings conducted here by FEE?
- What were the topics?
- Where the training necessary?
- How many persons were trained?
- What did you learn from the training?
- Are you applying the knowledge acquired from the training?

The four communities responded in the affirmative that they attended series of trainings, outlined those areas in which they were trained as: biodiversity conservation awareness, biodiversity field data collection and woodlot nursery establishment and that of transplanting and expressed their gratitude to FEE for the opportunity. They confirmed that they were now applying the knowledge from the training to plant and manage their woodlots, protect their mangroves and other biodiversity and wildlife, etc. Importantly, the locals mentioned that, when it comes to biodiversity field data collection, it was a complementary knowledge as they had some local knowledge on identification of fauna species. They however learned that the data collection should consider direct and indirect observations. They commented that the awareness components had helped them to understand the importance of biodiversity conservation and the sustainable management of natural resources at large.

The monitoring team gathered that, based on some realities on ground, the communities themselves and the project team decided through aware of the nursery establishment, to rather go for the use of wildlings for the establishment of the various woodlots. With such a consensus, one woodlot was established in each of the project communities. That the establishment of woodlots, according to

FEE project team should be carried out in degraded areas. Therefore, each project town identified an existing degraded spot for the purpose of the woodlot establishment. The project team along with other community members enthusiastically devoted time for the project. The various project communities revealed that they were delighted to have been encouraged by FEE project team in providing feeding and rain gears for a work that will benefit their communities. They said that they will remain devoted to support the project so that, FEE can bring to them another project. Interestingly, all the sites provided by the various communities are all in the middle of high forests while the piece of the allocated lands were all previously occupied by cassava farms. Therefore, they promised to increase the area sizes when the cassava farms are harvested even after the project.

In terms of details on the woodlots, below are few information to consider:

Basic information on Po-River community woodlots:

PO-River Community Woodlot site/ consultation meeting was held on the 26th of April 2019. Clearing of site started on the 28th of April 2019 and ended May 3, 2019. While pegging of site started May 6 and ended on May 11, 2019. Planting of wildlings started May 7, 2019 and ended May13, 2019. PO- River Community has completed clearing, pegging, planting and now carrying out replacement and watering of the seedling where necessary. Meaning PO- River community has established woodlot.

Type of species planted: Exotic Species (Acacia sp).
Population / beneficiary: 150 persons
Size of lot: 177ft by 238ft
Distance between plants: 9ft by 9ft
Number of wildlings planted: 567 trees

List of PO - River workers
1, Henry Tequeah
2, Titus Tugbeh
3, Titus Hhmgbeh
4, Denis Solomon
5, Philemon Jarvan
6, Isaac Kannedy

Basic information about Jaster community woodlot establishment
Jaster Town site identification was done on the 29th of April 2019, while clearing started on the same 29th of April.

Pegging started May 13, 2019 and ends May 20, 2019
Planting of seedling started: 27th of May 2019
Types of Species: (Lesser known spices)

Size of Lot: 200ft by 250ft
Total number of wildlings planted: 1076 trees
Population / Beneficiary: 300
Distance between plants: 7ft by 7ft

List of Jaster town workers
1, Simeon Teah
2, Daniel King
3, Anette Johnson
4, Cecelia Bango
5, Junior Ben Jr
6, Garjay Johnson

Information on Gbarboe town woodlot establishment
Gbarboe Town- Site selection and recruitment of manpower consultation / meeting was done on the 28th of April 2019.
Date of clearing: 30th of April 2019
Size of woodlot: 285ft by 200ft
Date of Pegging: May 24, 2019
Planting started May 24, 2019
Type of species planted: Exotic (Acacia sp.)
Distance between plants: 9ft by 9ft
Population/ Beneficiary:
Total number of trees planted: 759

List of Gbarboe Town workers
1, Lawrence Pailey
2, Othello Waysieh
3, Barry Kpehyou
4, Cecelia Moore
5, Sam Jackson
6, Boyou Willie

Neegba woodlot basic information
Neegba Town is done with clearing, pegging and planting while replacement of seedling is ongoing.
Date of clearing: April 30 to May 20, 2019
Pegging started May 21, 2019
Planting of seedling started: May 21, 2019
Types of Spices: Exotic (Acacia sp.)
Size of Lot: 313ft by 194ft
Total number of wildlings planted: 730
Population / Beneficiaries: 500
Distance between plants: 9ft by 9ft

List of Neegba town workers

1. James Cooper
2. Augustus Williams
3. Abednego Wesseh
4. Gardayee D. Zeo
5. Ojuku Davis
6. Steven Jaye

With reference to assessments on Green Globe Consultancy Inc. (GGC), the firm that was sub-contracted by FEE, the project team and the community dwellers confirmed that people went in their communities and asked them questions on their livelihood activities. That they even went in the forest alongside with the project local team. Detailed outcomes of what happened are outlined in the livelihood impact report, biophysical baseline report and socio-economic report.

Challenges / Constrains

Below are the challenges and constrains faced in getting to Cestos, Rivercess County.
- Timbo bridge is one of the major challenges in getting to Rivercess County at large.
- Road to Cestos City is in the worse condition thereby causing traveling to be very difficult.
- Canoe crossing on Cestos river poses danger to the lives of FEE staff
- Soil type in two of the project communities (sandy soil).

Recommendations:

Below are the recommendations:

- Sign boards or billboards need to be planted at the four woodlot sites.
- Poster for protected species
- Develop conservation agriculture initiatives (vegetables)
- Develop health and sanitation project in the area
- Print T- shirt for environmental clubs' leadership

Converting NBSAP at Local Level

INTRODUCTION

The successful implementation of the project "Community Led Coastal Biodiversity Management Project in Rivercess County" cannot be achieved in the absence of ensuring the proper understanding of existing legal instruments include policies, guidelines, strategic plans, etc. by the affected communities. With a better interpretation in the simplest form to the understanding of the project affected stakeholders, they will have a better understanding of what plans and actions the government and its partners have already been making to enhance

biodiversity conservation and sustainable management of the environment and natural resources in Liberia. For the purpose of this project as outlined in its workplan, FEE selected the National Biodiversity Strategic Actions Plan II (NBSAP – II) among the existing legal documents guiding biodiversity conservation in Liberia to interpret it to the understanding of the local community within the project site.

The National Biodiversity Strategic Actions Plan II ((NBSAP – II) (2017 – 2025)) is a policy document developed by the Environmental Protection Agency (EPA) as required under the Convention on Biological Diversity (CBD). The strategic planning document outlines what Liberia envisage to achieve in the next eight (8) years in relations to the conservation of Liberia's unique biodiversity, the environment and associated ecosystems. Since this document guides the conservation of biodiversity, FEE saw it prudent to use it as a guidance and take it to the communities to ensure their understanding of the reasons why they should ensure the sustainable management of the biodiversity and ecosystem. FEE therefore hired the services of Green Globe Consultancy (GGC), a biodiversity consultancy firm, to perform this task on its behalf. GGC began its task by critically reviewing the documents and selecting those components that relate directly to the project implementation to enable them be more specific in implementation of their task. After the careful review and analysis of the entire NBSAP, GGC simplified the document into a brochure/booklet form and took it to the communities for interpretation which were used at most of the awareness meetings.

The NBSAP is divided into four major sections with each of them addressing specific areas of interest to biodiversity conservation and management. The various sections as outlined below, were simplified to the understanding of the communities' inhabitants and in some cases was presented through the use of their local Bassa dialect:

Section one: Introduction
This section focuses on the importance of biodiversity in its forms and the national context that provides the physical information of Liberia. This first section of the document clearly laid proper context that support coastal biodiversity management which is the focus of the currently funded CEPF project.

Section two: Threats to biodiversity
The second section of the document provides information on issues related to threats affecting biodiversity at various levels. Those threats were categorized as direct threat, indirect threat, Liberia's Most Threatened Ecosystem, and Agro-industrial, Small-scale Agricultural and Tree Crop Production. In line with this project, there are several realities observed on the project site that confirm the usefulness of the NBSAP for the project. The NBSAP also stated that one of the four existential threats humankind faces today is the loss of biological diversity. The others are climate change, food insecurity and poverty.

Section three: Strategy and action plan for biodiversity management

The third section of the NBSAP focuses on the approach to find solution to the issues of country specific concerns. A complete strategic plan showing the vision, mission, guiding principles and strategic goals and national targets.

In addition to the guiding principles that are outlined to ensure the timely and successful implementation of this policy document, it is paramount to showcase the strategic goals of the plan. Hence, the document established five goals with each of them being independent of the others:

GOAL ONE: Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society

GOAL TWO: Reduce the direct pressures on biodiversity and promote sustainable use

GOAL THREE: Improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity

GOAL FOUR: Enhance the benefits to all from biodiversity and ecosystem services

GOAL FIVE: Enhance implementation through participatory planning, knowledge management and capacity building

Section four: Implementation mechanism, monitoring, evaluation and reporting

The forth section characterizes the actual implementation of the strategy including the monitoring and evaluation scheme, followed by reporting as major requirement. In so doing, the capacity needed to implement the strategy and the institutional arrangement were outlined. To promote information dissemination about the implementation of this NBSAP II, a sound communication strategy is planned to be developed.

RESULTS

These four sections were repeatedly presented in the simplified versions at several stakeholders and awareness meetings during the implementation of the project. Project communities' members were very happy to know that there exists such document that guides biodiversity conservation to the extent to which the NBSAP presents it. They also appreciated FEE for breaking down and bringing such important document to their level of understanding and committed themselves to always reference the NBSAP to guide future conservation initiatives in their communities. As a result of this exercise, communities have a greater understanding of the various threats affecting their biodiversity and the various approaches to remedying those threats. The project communities' inhabitants already started applying the lessons learned from this exercise.

CONCLUSION AND RECOMMENDATIONS

Following the series of meetings and consultations with community dwellers in FEE's project site, information within the policy document were discussed. Nevertheless, the analysis of the NBSAP provides good understanding of the provisions outlined to support coastal biodiversity management.

As the CEPF funded project implemented by FEE was able to carry out livelihood impacts assessment and biophysical survey, the issue of threats to global biodiversity and that of the mangroves were confirmed as highlighted in the NBSAP. At local level, systematic thematic groups studies to pull out more data at site level is needed in the soonest possible.

With the capacity building component of the CEPF funded project, communities were trained in biodiversity awareness techniques which confirms the communication strategy's provisions in the NBSAP document. There is a need to support the implementation of the communication strategy at the site level through the design of specific project. Empowerment of schools through a Mangrove Conservation Clubs will be a better means of dissemination of information.

In terms of threats posed to mangroves, the establishment of woodlots remains a sustainable way to mitigate the pressure and effect of climate change. There is a need to establish and maintain more woodlots in areas that have been degraded due to the impacts of livelihood activities.