Sustainable & Thriving Environments for West African Regional Development (STEWARD) Community Forest Network

Plan Vivo Project Design Document
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Forest Committee Chairman indicates a rice swamp during a participatory land mapping in Sumata Village in northern Sierra Leone 2012. Photographer: Mike Riddell, Bioclimate.

STEWARD Program
25B Hill Cot Road
Freetown, Sierra Leone
West Africa

Cell Phone: +232-79595407
Email: dsamani@stewardprogram.com
Website: www.stewardprogram.org
Skype: destina.samani

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Executive summary

The STEWARD Community Forest Network aims to reverse degradation of forests in village lands in Sierra Leone and Guinea by establishing community forest areas, and supporting their effective management.

Individual management plans are produced for each participating village, and include measures to prevent unsustainable use of forest resources, and control threats from fire. The project has established two pilot sites (one in Sierra Leone and one in Guinea) and has potential to be expanded to other community forests in the region.

Climate benefits from project activities are expected to result from assisted natural regeneration of degraded forest areas brought under effective management. Over a five year project period climate benefits of at least 91.6 t CO_2e per hectare of degraded forest that is managed in a manner that allows its regeneration are expected.

The pilot project sites do not intend to generate Plan Vivo certificates during the first project period, but will channel Performance Based Support to community development funds in the participating villages, on successful achievement of activity-based monitoring indicators. For future project periods, or in new project areas, there is the potential to generate Plan Vivo certificates with minor revisions to the Technical Specifications.

Part A: Aims and Objectives

The Guinean Forest-Savannah Mosaic (GFSM) extends from Senegal to Eastern Nigeria and covers a total area of around 675,000 km^2 (Loveland et al. 2000). The GFSM is a transitional ecoregion between open savannah to the north and more continuous forest cover to the south. It is characterized by patches of forest interspersed with savannah and open grassland. The proportion of forest, woodland and grassland in the mosaic is determined by the amount of rainfall, severity of dry season fires, and by human activity (Cole 1992, Longman and Jenik 1992).

The GFSM is used by local communities for livestock grazing, shifting cultivation, and extraction of timber and non-timber forest products. Local communities therefore play an important role in determining the structure and species composition of GFSM landscapes. When practiced at low intensity local land use practices employ burn cycles and fallow periods that maintain soil fertility and allow natural regeneration to take place. Over recent years, however, population pressure has resulted in shortened fallow periods and more frequent burning in many areas.

Frequent burning alters the species composition and vegetation structure in GFSM and increases the proportion of open woodland and grassland in the mosaic (Longman and Jenik 1992). It is thought that climatic conditions over the past 2000 years would have led to an expansion of forest patches within GFSM were it not for human activities that have created the opposite pattern (Maley 1994). However, if burning is controlled and seed trees are available, regeneration of woody biomass on degraded areas of GFSM can occur (White 1983).

GFSM areas support the livelihoods of communities that depend on forest products for their own use or as a source of income; they provide habitat for unique and diverse species assemblages including endangered primates; and they provide ecosystem services including regulation of water supplies and carbon sequestration and storage. Degradation of the GFSM therefore threatens livelihoods, biodiversity and ecosystem services, as well as contributing to global greenhouse gas emissions.

The aim of the STEWARD Community Forest Network (SCFN) is to reverse the degradation of forests in village lands in Sierra Leone and Guinea.

To achieve this aim the SCFN has the following **objectives**.

1. To establish community forest areas in village lands that will be the focus of management activities to encourage regeneration
2. To establish community forest management institutions with the capacity to develop and implement management plans that allow degraded areas of GFSM in community forests to regenerate
3. To provide the training and resources required for communities to manage community forests in a manner that results in regeneration of degraded areas of GFSM

The approaches employed to meet these objectives will depend on the specific context of each community, but will be based around the formulation and enforcement of management plans that prevent unsustainable land use activities, and the development and implementation of fire prevention and control measures.

Part B: Site Information

B1 Project location and boundaries

The STEWARD Community Forest Network is comprised of community forests within the STEWARD project Priority Zone 1 (PZ1). PZ1 includes the Tambaka Chiefdom, Bombali District in the Northern Province of Sierra Leone, and in Guinea, the Madina Oula, Soya and Ouré Kaba sub-prefectures (see Figure 1).

Pilot project sites are established in Kanséma and Sumata community forests. The locations of Kanséma and Sumata, and other community forests where projects could be established, are shown in Figure 1.

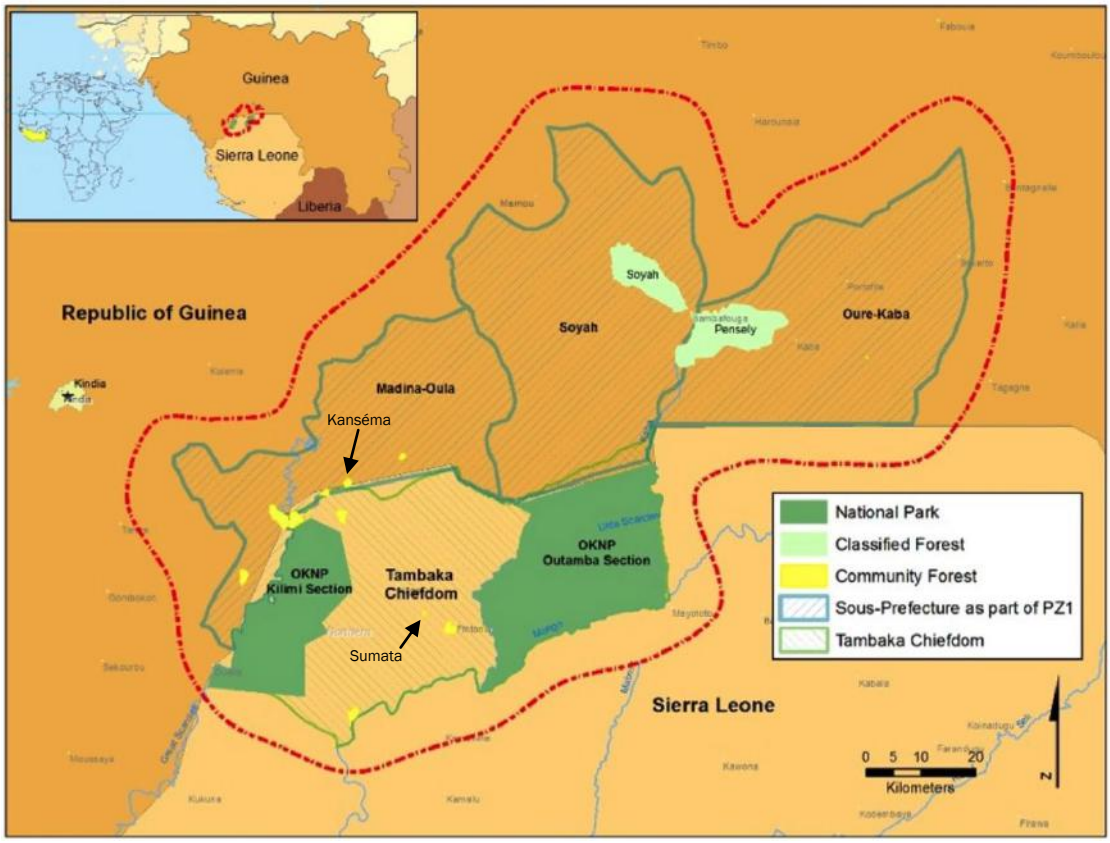


Figure 1. Regional map showing the extent of the PZ1, the Sous-prefecture and Chiefdom boundaries, and the location of pilot project sites (Kanséma and Sumata) and other community forest areas where projects could be established.

B2 Description of the project area

Geophysical conditions

PZ1 is characterised by a series of rolling hills in Sierra Leone that rise up to a dry plateau with rocky outcrops and dramatic ridges in Guinea. The area has a tropical savannah climate with mean monthly temperatures that range from 24 to 31°C, and average annual precipitation of around 2000mm*. The dominant soil type is classified as Leptisol, being shallow soil over hard rock or deeper soil that is extremely gravely or stony (Harmonised World Soil Database†).

Village land in PZ1 is a forest-savannah mosaic, with patches of gallery forest mainly along waterways. Forests vary in tree species and density depending on the gradient and biophysical characteristics of the landscape. Drier upland sites have a lower density of trees of a smaller stature than those closer to riparian corridors. Forest structure also varies as a result of different levels of disturbance by fire.

*http://apps.awhere.com/
†http://webarchive.iiasa.ac.at/Research/LUC/External-World-soil-database/HTML/

Presence of endangered species and habitats

Forest and savannah areas of PZ1 supports a rich array of animal and plant species, many of which are of special biological concern (Kormos *et al.,* 2003; Bakarr Mohamed *et al.,* 2004; JGI, 2007; World Bank, 2009; Bessike *et. al.,* 2012). The region supports large populations of primates. Chimpanzees are found in significant densities in the Outamba-Kilimi National Park (OKNP), and make use of forest-savannah mosaic around OKNP. In total there are nine recorded primate species in the area, including four threatened species. These include*: western chimpanzee (En), red colobus monkey (Vu), black and white colobus monkey (NT) and sooty mangabey (NT). A small population of forest elephant (En) occur at Outamba. Other large mammals include leopard (Vu), pygmy hippopotamus (Vu), water chevrotain (NT), maxwell duiker (NT) and savanna buffalo (NT). A small population of forest elephants (*Loxodonta cyclotis)* occur in the Outamba section of OKNP. The region also supports abundant and diverse bird populations, with 158 and 175 species of birds recorded in the Outamba and Kilimi sections of OKNP respectively in a 1994 IBA survey. In total 220 bird species have been recorded in OKNP, including 11 (40%) of the species considered to be dependent on the Guinea-Sudan savannah biome.

The biodiversity in forest savannah mosaic areas depends on the size of forest patches, forest composition and condition, and the position within the landscape, but all areas in this region have potential to support diverse species assemblages of considerable conservation interest.

Planned infrastructure development

The development of commercial mining operations in the vicinity of PZ1 is expected to lead to improvement of the rural road network. This would improve local producer's access to markets, and could lead to an increase in timber extraction or harvesting of trees for use as fuel, increasing the pressure on forest patches.

Climate risks

Climate projections for the region include rising temperatures, and more variable rainfall patterns that could result in more frequent occurrences of droughts. As well as directly impacting on food production longer and more pronounced dry periods increase the risk of wildfires that threaten forest patches in the landscape as well as people's homes, crops and livestock.

B3 Recent changes in land use and environment conditions

The main uses of village land in PZ1 are for agriculture, livestock grazing, timber and fuel wood extraction and Non-Timber Forest Product (NTFP) collection. The primary agricultural crop grown is upland rice which is cultivated in rotation with ground nuts, millet and vegetables following a pattern of shifting cultivation whereby an area of woodland or scrub is cleared and used for a number of years before being left to regenerate. The land area used for shifting cultivation is generally extensive allowing for long intervals between uses of a given patch. However, growing populations and migration into village areas result in an increased intensity of land use that leads to degradation over time.

B4 Drivers of degradation

Drivers of degradation in the forest-savannah mosaic areas of PZ1 include:

- Shifting cultivation, which prevents the regeneration of forest within the forest-savannah mosaic and maintains the landscape in a degraded state. When agricultural areas are expanding because of increasing demand for food or cash crops, or scarcity of fertile land, shifting cultivation causes further degradation of the forest-savannah mosaic.
- Fire affects large areas of forest savannah mosaic and causes degradation. Fire frequently escapes from areas being cleared for cultivation. Fires also result from wild honey collection, and are sometimes intentionally started as a part of hunting activities, or by children.
- Timber harvesting, when extraction rates are unsustainable, also leads to forest degradation.
- Livestock grazing.

* IUCN Red List (2012) status is indicated in parenthesis: En = Endangered; Vu = Vulnerable; NT = Near Threatened. http://www.iucnredlist.org/

Part C: Community and Livelihoods Information

C1Participating communities

Populations

The population of the project area (PZ1) is estimated at between 17,050 and 23,900 (CARE, 2012). The communities on the Guinea side (north) of the border within PZ1 are situated within the Prefecture of Kindia (sub-prefecture Madina-Oula) and the Prefecture of Mamou (sub-prefecture of Ouré-Kaba).The communities in Sierra Leone are situated in Tambakha chiefdom.

The project has been initiated in two communities, Sumata in Sierra Leone, and Kansema in Guinea.

Cultural ethnic and social groups

The majority of the population in the project areas are Susu (Soussou in French) who form part of the Mandé ethnic group. The Susu are predominantly farmers, fishermen and traders. The Susu originated from Guinea and migrated to Sierra Leone (Figure 2). Hence even the Susu in Tambakha chiefdom are regarded as Guinean by other Sierra Leoneans. Houses are generally relatively large, designed to accommodate extended family.

Figure 2. The geographical area populated by the Susu in Guinea and Sierra Leone. Source: www.joshuaproject.net

The other ethnic groups in the PZ1 include the Fulani (or Fulbe in Fula), Mandingo, Limba, Temne, Loko and Malinke. The Limba, Temma and Loko are tribes particularly found in Sierra Leone. The Limbas form a minority in the Tambaka chiefdom. The recent discovery of gold in Tambakha has led to the immigration of ethnic groups such as the Temnes, Limba and Loko.

In both the Guinean and Sierra-Leonean project sites, the predominant language spoken is Susu. Krio is also widely spoken in the Tambakha chiefdom, and Fula is widely spoken in the project area of Guinea. Across the PZ1 area, polygamy is common, and women rarely own any land (Bioclimate 2013)*.

Gender and age equity

*Bioclimate, 2013. Getting to know each other. Community Payments for Ecosystem Services: Findings and implications of a socioeconomic evaluation of two pilot sites. Bioclimate.

Women rarely own any land in the areas of the project, and men dominate formal community-level decision-making, meaning that women and youth are often excluded. This inequity has caused conflicts in the past, particularly between the young landless generation and the landed elders. with young men in some communities refusing to continue with project activities as they were essentially used as labour by the older generation who made all the decisions about land.

The majority of the population in the two pilot communities, Sumata and Kansema, are youth*. As a result, all activities in the project area have had to take into account the existing issues related to gender and age equity and involve both youth and women in the governance structures established for the management of community forests and activities developed by the project (Section E). In the communities where this project was piloted, all forest management activities now involve men, women and youth.

Within these communities the STEWARD programme has established Forest Management Committees (FMCs) in around 20 villages in PZ1. In Sierra Leone, FMCs are formally registered as Community Based Organisations (CBOs) and in Guinea, they are formally registered as *Comités de Gestion.* Target communities for project activities are villages in PZ1 with established FMCs that are representative of the whole community, and that lack the capacity for sustainable land management.

C2 Socio-economic context

The status of socioeconomic development in Sierra Leone and Guinea are summarised in Table C2. As much of Priority Zone 1 has been isolated from state services and access to basic infrastructure (such as functioning health centres, access to clean water and or employment opportunities for youth), these statistics are optimistic for most of the communities in PZ1, which illustrates the very low levels of socioeconomic development in the project area (see Figure 3).

Table C2: Socioeconomic development in Sierra Leone and Guinea (UN-HDI, 2011)

	Sierra Leone	Guinea
Human Development Index (of 187 countries)	180	178
Percentage of population in rural areas	63%	66%
Annual average population growth (2010-15)	2.1%	2.5%
Gross domestic production/ capita	US$808	US$1,048
Population below income poverty line (US$1.25)	53.4%	43.3%
Overall life satisfaction (0 least satisfied, 10 most)	4.1	4.3
Adult literacy rate	40.9%	39.5%
Gender inequality index (of 187 countries)	137	Data not available
Births attended by skilled health professional	42%	47%
Infant mortality (under 5, every 1,000 live births)	192	142
Population with a lack of access to cleanwater	50.3%	37.7%

Villages within PZ1 are difficult to reach because of poor road infrastructure. This means market access is extremely challenging for them. Access to fresh water in the dry season is limited, and women report having to walk long distances (over a kilometre) to fresh-water springs. A study by Hancock (2012)† shows that in general, due to the absence of adequate and accessible health facilities the general health of the population of Tambakha especially of women and children is poor. The lack of clean drinking water, toilet facilities, access and ability to affordable medicines, and the risk of malaria were identified as the main sources of poor health issues. The health issues are similar across the different villages in PZ1. The ebola outbreak that affected the region in 2014 and 2015, put further stress on meagre health services and severely restricted livelihood activities during the peak of the epidemic.

* For example in Bombali District 43.4% of the population are under 14 years of age, Sierra Leone National Census, 2004

†Hancock, C. (2012) Short Report on Health and Payments for Ecosystem Services in the Bombali District, Northern Sierra Leone: Bioclimate, Research and Development, Edinburgh

Although the areas in PZ1 are rich in land and natural resources, in most areas local community members lack formal land tenure (see Section C3), access to markets, technology, and skills to increase the productivity of their activities. Women particularly marry early, and as a result the majority miss out on education. The project area in Guinea is relatively accessible (tarmac and then gravel road from Kindia), and has a higher level of State presence and services than in Tambakha.

Figure. 3: Photos illustrating the socioeconomic context of PZ1: a) Susu men in a meeting in Fintonia Town. Men dominate formal community-level decision-making in PZ1; b) Women and children collecting water and washing clothes in a fresh-water spring in Fondikori community forest; c) The mosque in Sumata; d) Burnt out houses illustrate the physical impact of the civil war in Fintonia; e) Houses in Kansema in Guinea; f) A newly built railway joins the African Minerals Tonkolili mine and the port of Pepel; g) Crossing the Kaba river by ferry. The river is a border of the Tambakha chiefdom, and OKNP, and acts as a barrier to market penetration to Tambakha chiefdom; h) A women's group and the village spokesperson give the team a friendly greeting in Sanya village.

Livelihood activities

In PZ1 most people rely heavily on agriculture, farming rice, groundnuts, beans, pepper. Agriculture provides a source of food and cash income, and many people live below the income poverty line of US$1.25/day.All agriculture is rain fed, and the rainy season lasts for up to seven months (usually from April through to October/November), and the dry season starts in early November, through to March. Clearing fields occurs between January and February, and planting before the rains around April-May. Permanent cash crops such as coffee, oil palm and rubber are also grown in some villages.

People also make a living from the use of forest resources, small trade, artisanal mining, and keeping livestock (see Figure 4). The most frequently cultivated crops include rice (lowland swamp rice and upland rice), groundnuts, pepper and maize. However, millet and various other crops are also grown, and women practice some market gardening. Peanut, pepper and upland rice are the most frequently cultivated crops.

Figure 4: Livelihood activities in PZ1: a) A pepper nursery near Fondikori village; b) Young girls podding *Parkia biglobosa,* an NTFP high in protein; c) Lowland rice farming near Kortor village; d) Drying wild yam in Yanah village; e) Cattle grazing around Sanya village; f) Artisanal gold panning near Kortor village.

Artisanal gold and diamond mining is practiced largely by young men in the Tambakha chiefdom. Women

also use NTFPs for subsistence, and in some cases for sale*. There are also some trade activities in villages on both sides of the border, and small businesses such as village stores and restaurants. In the towns such as Madina Oula there are also a number skilled labour opportunities such as mechanics and public sector jobs.

Cultural and religious context

The majority of the population across the project areas are Muslims. In the Sierra Leone side there is also a minority Christian community. In Both Sierra Leone and Guinea areas, polygamy is common.

Assets, income and poverty status

Apart from the Fulani who depend on keeping livestock for their livelihood, the majority of people in rural villages PZ1 are dependent on agriculture for their livelihood and source of income.

The principal cash income sources in PZ1 are agriculture (upland rice, swamp rice, vegetable sales), small trading, remittances, and labour activities (CARE 2012)†. Upland rice income is predominantly available during the rainy season, while trading and labour are less affected by season. Both male headed and female-headed households (FHHs) have similar sources of income, although FHHs are more likely to depend on upland rice sales than lowland rice or other sources of income (CARE 2012).

During the rainy season communities in the project areas focus on agricultural activities and rely on farming of groundnut, pepper and beans as their key source of income. The crops that are cultivated the most in PZ1 are rice (84.58%), groundnut (49.16%), pepper (30.80%) and okra (20%) (CARE, 2012:28). Additional crops that are produced at a lower scale include banana, maize, sweet potatoes and sorghum which are produced by 5% of households.

Although most households would sell rice, a part of the rice production is used for household's consumption. Thus, rice production is profitable because of its subsistence value rather than cash income value. Pepper was identified as the most profitable source of income followed by groundnut which has been identified as an important source of income for women who rely on revenues from ground to pay their children's school fees. Groundnut can be used for household consumption as well as an important source of income and can be easily conserved and processed in different forms (dried, grilled and grounded into peanut butter).

During the dry season, women identified vegetable growing (okra and aubergine), poultry (chickens and ducks) sales and palm oil processing as a key source of to their income. Although women rear chicken, they are rarely used for household consumption. During the dry season, livestock including goats and sheep are usually sold by men as an additional source of income.

For the Fulani community of Kansema, the main source of livelihood is cattle. Each household owns significant numbers of cattle which graze freely during the day, and are taken back to settlements or camps at night. In the dry season, from January onwards, herders move over the border into Sierra Leone (e.g. Sanye) to find water. The Fulani are farm rice and cassava. The poor road infrastructure and the lack of affordable means of transport limit the access of communities to markets beyond neighbouring villages.

The most common asset owned by community members was housing which is owned by 80% of household surveyed (CARE, 2012). Other domestic assets include household items such as beds (46.3%), sewing machines (38.3%), motorcycles (26.6), chairs and household kitchen utensils (cooking pot, cup, plate, spoon, pan and knife) (15.8%), table (11.6%) and radio (11.30%). In terms of productive assets, households in the project area have assets including hoes, axes, shovel and machete which are owned by the 10.8 % of households and tree crop (9.2%).Households also reported to own livestock assets including goat (43.75%),

* Wild yams are collected during times of hunger, while in Guinea women transform the seeds of *Lophira lancelata* into a cooking oil for sale in local markets (40,000F/litre, US$5.7 In addition, there is a high abundance of other NTFPs, although they are rarely commercialized. These include for example: *Parkia biglobosa*; *Saba senegalensis*; *Detarium senegalensis*; *Pycananthus angolensis*; *Thaumatococcus daniellii*; *Piper guineense* (Black pepper); *Xylopia aethiopica* (African pepper); *Aframomum meleguetta* (Grain of paradise); and *Voacanga Africana*.

†CARE International-Sierra Leone, 2012. The socio-economic baseline for the STEWARD III; Implementation Phase PZ1. Freetown, Sierra Leone: Care International

sheep (40.8%), poultry (24.1%) and cows (4.16%). However, amongst the Fulani communities there is higher ownership of cattle because they also depend on it as a source of their main livelihood.

C3 Land tenure & ownership of carbon rights

Customary law governs land tenure in village land in PZ1 on both sides of the border. While customary rights of land tenure are recognised in Sierra Leone throughout the country, we believe that rights to carbon within the project areas will be less likely to be disputed if customary lands are formally registered as managed by a legal community entity. In Guinea, customary land can be recognised by the state, but this requires a lengthy and difficult registration process that is not guaranteed to succeed. However, community forestry law in Guinea is advanced, and as in Sierra Leone, this offers the most obvious legal mechanism to ensure communities retain carbon ownership.

In the Tambaka chiefdom of Sierra Leone, forests are located on customary land. Community Forests make up a small proportion of the landscape (there are eight community forests, ranging in coverage from 60 to 407 hectares). According to the 1988 Forestry Act, Community Forests should be managed by the Chiefdom Council or another responsible entity*, who can receive technical support and assistance from the Forestry Division†. Revenue accruing from timber exploitation from Community Forests is divided between the landowners (40%), the local council or government (20%), the paramount chief (10%), and the chiefdom administration (30%). However, other revenue from the utilization of Community Forests in Sierra Leone may be paid to the Chiefdom Council or to the entity responsible for managing the community forest‡. Registered Community Forest entities (community agroforestry cooperatives in this case) should therefore be able to legally receive Payments for Ecosystem Services, and manage them on behalf of the community. This is the mechanism adopted in Sierra Leone.

In Guinea, the 1999 Forestry Code provides for the formation of Community Forests. To form a Community Forest (a communal form of land tenure, on community land) a community entity must make a management plan. This is usually done in conjunction with the Forestry administration that provides technical support and advice. Community Forest management plans will be signed by the Ministry of Environment, Water and Forests. The legal entity (usually a Forest Management Committee) has the right to manage all funds raised in the forest area, conforming to Guinean law and taxes. The Decentralisation Law in Guinea defines the legal regime and rights of local entities in Community Forest management. Community forest entities can receive all revenue from the Community Forest and conform to tax regulations.

In neither Sierra Leone nor Guinea is there any legislation directly relating to carbon payments that we are aware of, so we refer directly to Community Forest legislation. Only a national law on carbon (e.g. a carbon tax) would supersede community forest legislation.

* The Forestry Act 1998, section 19.2 lists the entities that can be responsible for managing the forest. “A community forest not on State land shall be managed by the Chiefdom council, or pursuant to an agreement with the Chiefdom council; by a community forest association, co-operative or other association of persons or the Forestry Division.”
† The Forestry Act 1998, section 19.3 “The Forestry Division shall provide all necessary advice and assistance for the management of community forests, including the preparation for a management plan for any community forest which the Chiefdom Council may request.”
‡ The Forestry Act 1998, section 20.4 describes how fees can be managed. “All fees and prices paid in respect of a community forest shall be retained by the Chiefdom Council or other entity responsible for managing the forest, subject to the terms of any applicable agreement under sub-section (1) or (2) or section 19.

Part D: Project Interventions & Activities

D1 Project interventions

The project intervention is ecosystem restoration through assisted natural regeneration of degraded forest-savannah mosaic (ANRFSM). Community forests will be restored through the process of assisted natural regeneration to promote the restoration of the natural ecosystem and species composition.

D2Project activities

Specific project activities will be determined for individual community forests through participatory land use planning processes. The types of activity that will be supported are summarised in Table D2. For further details see Section G1.

Table D2. Description of activities

Intervention	Project activity	Description	Target group	Ecosystem services contracted (yes/no)
Assisted natural regeneration of degraded areas of forest-savannah mosaic	Establishment of community forests	Identify community forest areas and record their locations	Poor rural communities in PZ1 who lack capacity for sustainable land management	No
	Development of community forest management institutions	Establish representative groups with capacity to develop and implement plans for community forest management		
	Community forest management	Capacity building and provision of resources required for effective community forest management	Forest management committees	Optional – Could be used to develop Plan Vivo Certificates or alternative means of Performance Based Support
	Fire management	Capacity building and provision of resources required for fire prevention and control	Fire monitoring and fire management groups	

D3 Effects of activities on biodiversity and the environment

Project activities are designed to assist natural regeneration of the forest savannah mosaic, by reducing pressure from unsustainable agricultural and pastoral practices and timber harvesting, and reducing the occurrence of wildfires. This will improve the quality of habitat for forest dependent species in the region, allowing existing populations to increase their range and/or population sizes; and, if sufficient areas are bought under sustainable management, movement corridors between existing areas of relatively intact forest could be created. Threatened, endangered and endemic species present in the region whose habitat would be improved include:

- Primates – e.g. western chimpanzee, red colobus monkey, black and white colobus monkey, sooty mangabey
- Large mammals – e.g. forest elephants, leopards, pygmy hippopotamus, water chevrotain, Maxwell

duiker, savannah buffalo
- Birds – including 11 species endemic to the Guinea-Sudan savannah biome.

Allowing degraded areas of forest savannah mosaic to recover is also expected to improve the capacity of the ecosystem to capture water, reducing seasonal water shortages; and preventing further degradation and allowing degraded areas to regenerate is expected to reduce soil erosion and the fertility of degraded soils to regenerate

Assisted natural regeneration is therefore expected to have a positive impact on biodiversity and ecosystem services.

Part E: Community participation

E1 Participatory project design

Understanding the local context

Bioclimate was brought in as a technical partner in the STEWARD programme, to support with the implementation of a pilot trans-boundary Community PES project in Priority Zone 1 (PZ1). Once the two PES pilot sites Kanséma and Sumata were selected, a socio-economic assessment of the two communities was considered as the first most crucial step to undertake before developing specific project activities to be linked to PES. During the evaluation five areas were assessed including land tenure and community natural resource use systems, community demographics, livelihood activities and strategies, local institutions and governance and wellbeing. The methodologies used for the assessment formed the first stage of participatory activities as it was conducted with support and involved of community members. Focus groups and group discussions were used throughout the socio-economic assessment.

The findings from the socio-economic assessment contributed to the design of project activities that were based on local context and community needs. It also ensured that project took into account the needs of the most vulnerable community members. The socio-economic assessment also ensured that the project to be designated would be sustainable. Ultimately, the project has been able to work with existing local governance structures to put in place forest management committees.

Working with communities – meetings and participatory techniques

Prior to the design of the PES programme, different meetings were held with communities in both Kanséma (Guinea) and Sumata (Sierra Leone). During these meetings, communities' needs and the different types of PES support available were discussed with community members. The majority of the meetings were held in 2013 and discussions about PES payments were finalised and agreed in 2014.

The Community PES Project is designed in order to facilitate the engagement of the community in the protection of their forest and in the performance of forest management activities. The PES project aims to improve the capacity of community members so that they have the skills required to effectively manage their forest, the materials required and that they have an incentive that will ensure that they continuously manage their forest for the long term.

Once an assessment of local skills was completed, the need for training community members in forest management techniques and support with governance structures became apparent. Together with the community, several activities were completed to facilitate the implementation of training support in terms of forest management activities and support needed to improve agro forestry livelihood activities. The activities included: a participatory threat assessment (threats to community forest), participatory mapping of resources, and training of Forest Management Committees (FMCs) in each of the project villages, Participatory Land Use Research (PLUR) and assessment of communities' need in terms of agro forestry livelihood activities.

Once FMCs were trained and community support was implemented, several meetings were held to agree on the specific activities to be performed by FMC's and community groups in return for the PES support to be

received. These committees have now been working toward protecting and managing existing community forests in Sumata and Kanséma. The local implementing body, BWA, holds monthly meetings with the FMCs and community members to assess progress of activities and identify any support or training needed by the community to adequately undertake identified forest management activities.

The project primary targets are communities in PZ1. Although any community with a community forest management plan can participate in the programme, only Kanséma and Sumata were selected as PES pilot sites. However, the projects have been working with other communities with forest management plans. These communities have benefited from training support and support with the implementation of selected agro forestry activities to support their livelihood such as tree planting and the establishment of tree nurseries.

Within the selected communities, the specific target groups include FMCs and community members including both women and youth who are not necessarily member of the FMCs. In the past, the involvement of women and youth in the forest management activities has been limited. This is due to the cultural context were these groups are often excluded for village meetings and any important decisions. Women are often the ones most impacted by forest degradation. On the other hand, youth are most capable of contributing to forest management activities which require regular patrols and physical force. The project played a key role in ensuring that both women and youth were included within the FMCs and involved in forest management activities.

The institutional structure for the management of community forests in Kanséma and Sumata includes groups that have been registered under the Forest Management Committees (FMC). The FMCs are the formal committees responsible for the management of the community forests. Each FMC has at least six members, and all members must be from different households.

In addition to the FMCs, the forest management institutions include two additional groups formally recognised and engaged in the management of the community forces: a Fire Force, whose role is cutting fire-breaks, and managing fires should they occur; and Community Forest Monitors (CFMs) which are responsible for forest protection and enforcement of conservation by-laws through regular patrols and forest monitoring. This group also serve as research assistant during activities including research and surveys being undertaken within the community forest by external actors.

Prior to initiating discussions about the sharing and use of benefits from PES and the community forests, the project team designed a Community Engagement and Gender Policy with communities in order to ensure the engagement of women, the youth and groups such as the Fulani. Thus, the benefit sharing process ensured that the minimum requirements established by the team are respected and that processes included in the Community Engagement and Gender in Community PES projects policy documents were respected. The PES support was offered with the understanding that, the benefits from Community Forests need to be shared equitably. This means avoiding elite capture and the marginalisation of women, youth, particular ethnic groups, and people who are less well-off in the community.

At the beginning of the project, the presence of women, youth and Fulanis in community meeting was limited. Now, the presence of women and youth is noticeable during formal meetings and forest management activities. The involvements of youth and women in the forest management activities have ensured their sustainability in the recent years and this has also facilitated the implementation of the civic projects in both Kanséa and Sumata.

E2Community-led implementation

Development of project activities will involve Bioclimate's extension staff working closely with village groups. Systems for on-going feedback from the communities and reconciliation of any disputes within the community or between the community and project staff will be established to ensure effective working relationships are maintained.

The steps to registering a community forest land management plan (plan vivo) with the project are:

1. Establish the community forest. The target community identifies the area, the boundaries are marked on the ground and mapped in a GIS. Hard copies of the maps, annotated in the local language, will be held by the forest management committee and the project coordinator. The project coordinator will also maintain digital copies of all maps.
2. A PES agreement that identifies the community forest, describes the management activities, monitoring indicators and thresholds linked to the release of performance-based support is drawn up and signed by the forest management committee on behalf of the broader community.
3. Initial monitoring indicators assessed at the start of the project will be used to assess whether the management plans are sufficient to achieve the expected climate benefits, and to ensure there is no potential that project activities could undermine the livelihood needs and priorities or reduce the food security of participants. This assessment will be carried out by Bioclimate West Africa, then reviewed by Bioclimate Research and Development and revised if necessary before being documented in the initial monitoring report.

E3 Community-level project governance

With support from Bioclimate West Africa (BWA), the FMC committee meets once a month. During these meetings, FMC members agree on specific activities to be undertaken, discuss progress of ongoing activities and raise any outstanding issues to be resolved. The FMC meetings also serve as a forum where community forest management plans and by-laws are discussed and agreed.

Since the Forest Management Committees were selected by community members, they also represented the community as a whole. FMC members are often designated by community members to sign agreement on be-half of the community. The FMC committees also ensure that activities are regularly undertaken and with support from the field team, the training needs and capacities of FMC members are regularly improved. During these monthly meetings, BWA identifies communities' needs in terms of training, support with agro-forestry livelihood activities and progress of monthly activities to be undertaken. It is during these meetings that discussions for PES and community needs were regularly undertaken with community members and the BWA team.

Grievances related to PES and or any other issues related to the project are raised during the monthly meetings with FMCs. Each community with support of BWA has put together a list of by-laws. The by-laws were developed for the management of community forests in both Kanséma and Sumata. These include detailed actions where there are issues linked to activities that presents a threat to the community forest management.

However, where other grievances related to the project come up or complaints are raised, these are discussed during the FMC meetings or brought to the attention of the village elders before the meetings. Village elders are also members of the FMCs and usually an agreement is reached once the matters have been brought to their attention. However, where the village elders cannot reach an agreement, or if serious, grievances are to be taken to higher authorities including the chiefdom tribunal and/or formal administration such as the district level authorities.

So far there has been no major grievance raised from the community. The monthly meetings are recorded and if any issues come up in the future, this would be recorded as part of the meeting minutes.

Part F: Ecosystem Services & Other Project Benefits

F1 Climate benefits

Table F1 Expected Climate benefits per hectare over the 5 year project period

Intervention type (Technical specification)	1 Baseline GHG emissions (tCO_2e/ha)	2 GHG emissions with project (tCO_2e/ha)	3 Expected GHG emissions from leakage (tCO2e/ha)	4 Climate benefit (tCO_2e/ha)
Assisted Natural Regeneration of Degraded Forest-Savannah Mosaic Landscapes	0	-91	Estimated for each project area that generates Plan Vivo Certificates	91 (minus leakage emissions for project areas that generate Plan Vivo Certificates)

F2 Livelihoods benefits

Table F2. Expected impacts on livelihoods

Food and agricultural production	Financial assets and incomes	Environmental services (water, soil, etc.) Energy	Timber & non-timber forest products (incl. forest food)	Land & tenure security	Use-rights to natural resources	Social and cultural assets
NEUTRAL Agricultural production within the community forests will not be allowed. However this is not expected to reduce overall food production since sufficient land is available outside community forest areas	**NEUTRAL** No negative impacts are expected.	**POSITIVE for whole community** Woodland regeneration will contribute to the maintenance and enhancement of ecosystem services provided by forest patches including prevention of soil erosion, and maintenance of water supply and water quality; provision of dead wood as a source of energy and supply of non-timber forest products. **NEGATIVE in the short term for those practicing unsustainable timber harvesting (unless alternative livelihood activities are developed)** Where unsustainable timber harvesting was practiced in the community forest project activities may result in a reduction in timber supply. If this is the case alternative livelihood activities should be developed to replace income from logging.		**POSITIVE for whole community** Establishment of community forests helps to formalise land and resource use rights in the participating villages		**POSITIVE for whole community** Many of the community forests in the project area include sacred areas which will be protected by allowing surrounding degraded forest to regenerate.

There is potential for negative impacts on the livelihoods of community members practicing unsustainable timber harvesting within the community forest area. If local timber harvesting activities are identified as a

cause of forest degradation, and new controls on timber harvesting are introduced in community forest management plans; project activities, for example establishment of alternative sources of income, should be identified to ensure that those practicing timber harvesting are not adversely affected.

F3 Ecosystem & biodiversity benefits

Table F3. Expected impacts on ecosystems and biodiversity

Intervention type (Technical specification)	Biodiversity impacts	Water/ watershed impacts	Soil productivity/ conservation
Assisted Natural Regeneration of Degraded Forest-Savannah Mosaic Landscapes	Project activities are designed to assist natural regeneration of the forest savannah mosaic, by reducing pressure from unsustainable agricultural and pastoral practices and timber harvesting, and reducing the occurrence of wildfires. This will improve the quality of habitat for forest dependent species in the region, allowing existing populations to increase their range and/or population sizes, and if sufficient areas are bought under sustainable management movement corridor between existing areas of relatively intact forest could be created. Assisted natural regeneration is therefore expected to have a positive impact on biodiversity	Allowing degraded areas of forest savannah mosaic to recover is expected to improve the capacity of the ecosystem to capture water, reducing seasonal water shortages	Preventing further degradation and allowing degraded areas to regenerate is expected to reduce soil erosion and the fertility of degraded soils to regenerate

Part G: Technical Specification

Technical Specification title	Assisted Natural Regeneration of Degraded Forest-Savannah Mosaic Landscapes (ANRFSM)
Version	V1.0
Area of applicability	Sustainable & Thriving Environments for West African Regional Development (STEWARD) project priority zone 1 (PZ1) on the northern Sierra Leonean and southern Guinean border
Ecosystem service benefits	Climate services
Project intervention type	Ecosystem Restoration
Project activities	Assisted natural regeneration of forest-savannah mosaic areas through establishment and management of community forests
Approved approaches used	"Estimating leakage from displacement of agriculture, livestock, and timber harvesting"
Eligible for Plan Vivo Certificates?	Optional
Author	Bioclimate
Applicability conditions	This technical specification is applicable to areas of forest-savannah mosaic within the STEWARD programme priority zone 1 (see Figure 1) that have been degraded by some or all of the following: • Unsustainable agricultural or pastoral practices • Unsustainable timber extraction • Wildfire And that are unlikely to regenerate naturally without intervention from the project. It is not applicable to areas of forest-savannah mosaic that have been deliberately degraded for the purpose of meeting the applicability conditions stated above, or to areas covered by other projects or initiatives providing financial support for Ecosystem Regeneration. This technical specification is applicable to land managed by individuals or entities that lack capacity for sustainable land management and/or fire prevention and control. It is not applicable to areas where introduction of controls on agricultural practices or timber extraction, or the control of fire would negatively affect the livelihoods or wellbeing of any members of local communities.

G1 Project intervention and activities

The climate benefits described in this Technical Specification are expected to accrue through the assisted natural regeneration of degraded areas of forest-savannah mosaic. It is assumed that the activities described in this section are sufficient to result in natural regeneration.

Establishment of community forests

The project must work with the target community to identify discrete areas of village land that meet the applicability criteria described in Section 1, and where it is in the interests of the community to introduce sustainable management and fire control measures. The designation of community forest areas must follow a participatory process that ensures the interests of all members of the community are represented in the final decision over the location of the community forest.

The boundaries of community forest areas must be recorded in georeferenced maps, and clearly marked on the ground prior to the start of the project period. If ownership or tenure of land within the community forest is unclear or disputed then appropriate measures must be taken to ensure local and national recognition of the rights of the local community to the climate benefits expected from assisted natural regeneration within the community forest.

The inputs required for this activity are likely to include:

- Participatory mapping activities and workshops to determine the boundaries of community forest areas
- Collection of GPS data describing community forest boundaries and production of GIS maps
- Painting trees with markers along the boundaries of the community forest
- Facilitation of the process for formal recognition of community forests
- Creation of a community forest management plan

Community forest management institutions

For each community forest, management groups that fulfil the following functions must be formed if existing groups are not already present. All groups must be provided with training and equipment required to fulfil their function prior to the start of the project period.

- **Forest Management Committee.** Responsible for the formulation and enforcement of bylaws and management plans governing the use of the community forest, overseeing the performance of forest monitoring and fire management groups and recording data and information required in the monitoring plan.
- **Forest Monitoring Group.** Responsible for assessing and monitoring biodiversity, and adherence to bylaws and management plans within the community forest.
- **Fire Management Group.** Responsible for creating and maintaining fire breaks, conducting early burning activities, and fighting wildfires.

The inputs required for this activity are likely to include:

- Facilitation of process for establishing representative management institutions
- Training for forest management committee in bookkeeping and administrative skills
- Training of forest monitoring group in monitoring techniques, and data recording
- Provision of GPS and cameras to forest monitoring groups
- Training of fire management group(s) in fire prevention techniques including establishment and maintenance of fire breaks, early burning, and fire fighting techniques
- Provision of protective clothing and fire fighting equipment for fire management groups
- Provision of tools for clearance of fire breaks and early burning activities

Community forest management

Prior to the start of the project period the Forest Management Committee must develop and agree a list of bylaws and/or a management plan that is sufficient to ensure the management of the community forest in a manner that results in the eradication of unsustainable agriculture and pastoral practices and timber

extraction. The formulation of bylaws and management plans must follow a participatory process that ensures that the interests of all members of the community are reflected in the final version adopted. The bylaws and management plans must be upheld throughout the project period.

Inputs required for forest management activities are likely to include:

- Facilitation of the process of bylaw formation

Fire management

Fire protection practices that must be implemented to prevent further degradation of forest-savannah mosaic area by fires, and to allow areas of forest savannah mosaic that have been degraded by fire to regenerate must include:

- Raise awareness of need for controlling fire with local community
- Early burning (if appropriate)
- Fire breaks around fire prone areas of the community forest to be cleared prior to the start of the burning season in each year of the project period. Fire breaks must either be a:
    - 5 to 15m wide strip cleared of all vegetation
    - 30 to 40m wide strip treated with early burning, and strips 5m either side of this cleared of all vegetation
    - 30 to 40m wide strip planted with peanuts or cowpeas with perimeter ditches either side

A system that enables local community members to respond quickly and effectively to control fires that occur within the community forest must be established prior to the start, and maintained throughout, the project period.

Inputs required for fire management activities are likely to include:

- Community outreach programs to raise awareness of the need for fire management
- Maintenance and replacement of firefighting equipment
- Maintenance and replacement of tools for clearance of fire breaks and early burning activities.

G2 Additionality and Environmental Integrity

Regulatory surplus

In Sierra Leone the principal legislation guiding management and regulation of forestry is the 1988 Forestry Act. . In Guinea the 1999 Forest Code guides forestry: this code has a provision for the formation of community forests for those communities interested and willing. Neither the Guinean Forest Code, nor the Sierra Leone Forestry Act requires the establishment or management of community forests or any measures to prevent or control fires. The activities described in this Technical Specification are therefore additional to legal requirements throughout PZ1.

Barrier analysis

This technical specification is only applicable in rural poor communities that lack capacity for sustainable land management. These communities face financial, technical and institutional barriers to the implementation of sustainable land management and fire control. A summary of these barriers, and the actions the project will take to overcome them, are summarised in Table G2.

Table G2 Barriers to sustainable land management in potential target villages

Barrier	Actions to overcome barrier
Financial Target communities lack financial resources to support the establishment and management of community forests, and take actions to prevent and control wildfires	The project will provide the finance necessary to demarcate and register areas of community forest, and provide equipment for forest monitors and fire control groups
Technical Target communities lack the technical expertise to define sustainable rates of timber extraction, and develop effective fire control plans	The project will work with Forest Management Committees to design Community Forest Management plans that describe approaches to be employed to allow for natural regeneration within the community forest; and will provide training to forest monitoring and fire control groups
Institutional Target communities lack the institutional capacity to effectively manage areas of Community Forest	The project will support the establishment of legitimate and representative Forest Management Committees and fire control groups with responsibility for developing and implementing community forest management plans and fire control activities. The project will also support the establishment of Village Savings and Loan Associations as a means to manage project finances and to provide a structure for long term financial management within the communities.

Double counting

To our knowledge there are no existing initiatives applicable within PZ1 that are producing, or aim to produce payments for ecosystem services from management of forest-savannah mosaic areas. If such initiatives are developed within the project period, appropriate agreements must be developed to ensure that the climate benefits from project activities are not eligible for credit under more than one PES scheme.

Environmental integrity

Since there has been no history of carbon projects in PZ1 prior to the STEWARD programme, local understanding of how climate benefits are assessed and monitored has only been developed though this project. There is therefore very little chance that communities in the four pilot villages would have deliberately degraded areas with the intention of claiming performance related support for their regeneration.

As project activities are expanded to other villages in the region the chance of intentional degradation to maximise climate benefits becomes a theoretical possibility. Although this is probably unlikely in practice mapping work carried out when new community forest areas are brought in to the project should include an assessment of whether recently cleared areas have been used for agricultural production.

G3 Project Period

The quantification period for projects using this Technical Specification is 5 years. This is the period over which climate benefits are estimated. Climate benefits are expected from assisted natural regeneration of degraded areas of forest-savannah mosaic. A 5 year quantification period is appropriate as it is unlikely that rates of natural regeneration will be sufficient for degraded areas (defined as having 75% or less of their potential biomass) to reach their maximum potential biomass within this period. A period of 5 years is also an appropriate length of time for Forest Management Committees to commit to maintaining and managing the areas of Community Forest.

After the five year quantification period, projects are required to re-evaluate the areas of degraded forest-savannah mosaic present, revise management plans, and submit revised project design documents to the Plan Vivo Foundation.

Monitoring should be carried out throughout the quantification period. A monitoring period of 5 years is therefore required.

G4 Baseline scenario

Carbon pools and emission sources

The climate benefits that accrue from project activities are quantified from changes to carbon stocks in above-ground live woody biomass. If this technical specification is not used to generate Plan Vivo Certificates, a full assessment of carbon pools and emission sources is not required. For projects that generate Plan Vivo Certificates, a justification for the focus on this single carbon pool is provided in Tables G4.1 and G4.2.

Table G4.1 Selected carbon pools

Carbon pool	Selected	Justification
Above-ground live woody biomass	Yes	The main carbon pool that will be affected by project activities
Below-ground live wood biomass	No	*Conservatively excluded*. Project activities will increase this pool, but rates of reduction in the baseline scenario are uncertain
Non-tree biomass	No	*De-minimus*. This carbon pool will not be significantly affected by the project activities.
Dead wood	No	*Conservatively excluded*. Project activities will increase this carbon pool, but the magnitude of the positive impact is not accounted for in this Technical Specification.
Litter	No	*De-minimus*. This carbon pool will not be significantly affected by the project activities.
Soil organic carbon	No	*De-minimus*. This carbon pool will not be significantly affected by the project activities.
Wood products	No	*Conservatively excluded*. Project activities will increase this carbon pool, but the magnitude of the positive impact is not accounted for in this Technical Specification.

Table G4.2Emission sources

Source	Gas	Selected	Justification
Biomass burning	CO_2	No	Accounted for as carbon stock change in above-ground live woody biomass
	CH_4	No	*Conservatively excluded*. Project activities will decrease this emission source pool, but the magnitude of the reduction is not accounted for in this Technical Specification.
	N_2O	No	*De-minimus*. This emission source will not be significantly affected by the project activities.

Baseline conditions

This technical specification is applicable to degraded areas of forest-savannah mosaic that are not expected to regenerate without the project's intervention. A conservative assumption for baseline conditions in these areas is therefore that the land cover and carbon stocks at the start of the project would remain unchanged throughout the quantification period if the project does not intervene.

Projects using this technical specification should therefore adopt a baseline scenario that assumes the land

cover present at the start of the project will be maintained throughout the project period.

The carbon stocks, biodiversity and other ecosystem services supported by the landscape should also be conservatively assumed to remain constant at the levels present at the start of the project in the absence of project interventions.

Baseline emissions

Since this technical specification is only applicable to lands that are degraded and are not expected to regenerate without the intervention of the project, baseline emissions from woody biomass per hectare over the project period can be conservatively assumed to be zero.

$$BE_{ha} = 0$$

[Equation 1]

Where:

BE_{ha} is the emissions expected per hectare of degraded forest-savannah mosaic in the baseline scenario (tCO_2e/ha).

G5 Ecosystem service benefits

Climate benefit methodology

Under the project scenario, above-ground woody biomass is expected to regenerate. The annual greenhouse gas emissions per hectare expected from this pool during the project period under the project scenario are calculated using Equation 2. This results in a negative value for project emissions indicating an increase in carbon stocks.

$$PE_{ha} = -\frac{44}{12} R \cdot T$$

[Equation 2]

Where:

PE_{ha} is the emissions per hectare in project scenario (tCO_2e/ha);
R is the expected rate of regeneration of carbon stocks in degraded forest-savannah mosaic ($tC/ha/year$);
$\frac{44}{12}$ is the ratio of molecular weights of CO_2 and carbon; and
T is the project period (years).

The emission reductions expected per hectare are then calculated with the equation:

$$ER_{ha} = -1 * (PE_{ha} - BE_{ha})$$

[Equation 3]

Where:

ER_{ha} is the emission reductions expected per hectare (tCO_2e/ha).

The emission reductions expected in a project area *A* over the project period are then calculated with the equation:

$$CB = A \cdot ER_{ha} - LE$$

[Equation 4]*

Where:

CB is the climate benefit expected in the project period (tCO_2e/ha);
A is the area of degraded forest-savannah mosaic within the project area at the start of the project period (ha); and
LE is the emissions expected from leakage over the project period (tCO_2e/ha).

* For projects that do not receive Plan Vivo Certificates subtraction of emissions from leakage is not required when estimating climate benefits

Expected climate benefits

The expected climate benefit per hectare of degraded forest-savannah mosaic, calculated from Equations 1 to 3, is **91 t CO_2e ha^{-1}**. Descriptions of the parameters used in this calculation are provided in Table G5.1.

Table G5.1 Parameter values for Equations 1 to 4

Parameter	Value	Justification
ER_{ha}	5 tC/ha/year	The average value for regeneration of West African savannah woodlands determined from a review of relevant literature (See Appendix A).
T	5 years	See Section 3.1
A	Defined for each project area	Projects must estimate the number of hectares of degraded forest-savannah mosaic within the community forest. This can be done by mapping using high resolution remote sensing and/or ground based survey and mapping.
LE	Defined for each project area	For projects that will issue Plan Vivo credits, the amount of leakage expected must be determined using an appropriate approach described in Section 4.3.4

The values calculated for Equations 1 to 3 are summarised in Table G5.2.

Table G5.2. Values calculated in Equations 1 to 4

Parameter	Value	Uncertainty
BE_{ha}	0 tCO2e/ha	The potential for uncertainty in the baseline emissions is related to the identification of areas that would not regenerate naturally without the intervention of the project. Given the growing pressures on land within the area of applicability increasing degradation is a more likely future scenario than unassisted natural regeneration. An assumption that all degraded areas are unlikely to regenerate without the project can therefore be applied with a high level of certainty.
PE_{ha}	-91.6 tCO2e/ha	The potential for uncertainty in the project emissions is related to the likelihood that the expected rate of regeneration can be achieved within the project area if the project activities are carried out as described in this technical specification. The literature review of regeneration rates in West African savannah woodlands (see Appendix A) showed considerable variation between different study areas. The value adopted here is the average from these studies. Variability between studies was largely based on the differences in the implementation and success of different management interventions. Adoption of the average value for an estimate under the condition that the management interventions are carried out as described therefore provides a conservative estimate, despite the uncertainty.
ER_{ha}	91.6 tCO2e/ha	As for BE_{ha} and PE_{ha}
CB	Calculated for each project area	Sources of uncertainty in climate benefit estimates include those described for ER_{ha} as well as any uncertainty associated with mapping the extent of degraded forest-savannah mosaic within the project area – which is minimised through the use of adequately ground truthed, recent, high resolution remote sensing data but which will always include some uncertainty because of the subjective assessment degraded versus relatively undisturbed areas. Wall-to-wall biomass mapping with a cut-off value determined for identifying relatively undisturbed areas would reduce potential for bias from this process. The amount of leakage expected is also a potential source of uncertainty, although following the required approved approach should ensure that any leakage estimates are conservative.

G6 Leakage

For project areas that do not intend to generate Plan Vivo Certificates emissions from leakage do not have to be accounted for so in Equation 4, the parameter LE can be set to zero.

Project areas that do intend to generate Plan Vivo Certificates must estimate the emissions expected from displacement of agricultural activity, livestock grazing, and/or timber harvesting as appropriate. A relevant Plan Vivo Approved Approach for accounting for leakage should be used for this.

Part H: Risk Management

Risks to climate benefits are managed with the following approach:

- Describe the risks that expected climate benefits will not be realized within the project period, the risk that climate benefits will not be maintained beyond the project period, and approaches that will be taken to mitigate these risks;
- Make an assessment of the impact the risk would have if it is realized, and the likelihood of the risk being realized; and
- Assign a proportion of climate benefits that will be held in a risk buffer that is proportional to the identified risks.

H1 Identification of risk areas

A summary of risks to the delivery of ecosystem services and sustainability of project interventions factors is in provided in Table H1. These risks should be reviewed at least every 5 years when the PDD is revised.

Table H1. Factors that put delivery or maintenance of climate benefits at risk

Risk factor and risk level	Impact	Mitigation	Likelihood
Social			
Moderate Land tenure and/or rights to climate benefits are disputed	**High** If the rights of the community to manage community forest areas is not upheld these areas would be vulnerable to degradation though commercial logging, agricultural operations, or mining	Project activities require local recognition of tenure and/or user rights prior to the start of the project, and for the process for national recognition of these rights to be initiated	**Low** If tenure and/or user rights are recognized and the process for national recognition of these rights is underway the likelihood that these rights will not be upheld during the 5 year project period is low.
Low Political or social instability	**Moderate** Disputes among different groups within the communities could lead to management plans not being followed, and/or a failure to coordinate project activities in a manner that results in forest regeneration	Project activities include the formation of forest management institutions that represent the interests of all members of the community, and that have mechanisms for resolution of conflict or disputes	**Low** If representative and functional forest management institutions are maintained these should be able to respond to and address threats to management activities that arise from political or social instability.
Low Maintenance of community support	**Moderate** The success of project activities requires member of the community to uphold controls on land use within the community forest, and to implement fire prevention and control practices, otherwise climate benefits from forest regeneration will not be realised	The participatory planning process is designed to ensure that the interests of all members of the community are reflected in management plans, and that sufficient incentives are in place to encourage their implementation	**Low** If management plans are well designed, and communities receive performance-based support throughout the project period, the likelihood that community support will not be maintained is low.
Economic			
Low	**Moderate**	Initial monitoring indicators	**Low**

Insufficient finance secured to support project activities	Once established, community forest management activities can be maintained with little or no additional finance; Constructing fire breaks and effectively fighting fires will require provision and maintenance of appropriate equipment.	require the design of management plans that are achievable with the finance that is available for the project period.	Since management plans are based on available finance, the risk that insufficient funding will prevent activities being carried out is low.
Low Alternative land uses become more attractive to the local community	**Moderate** It is possible that villagers will decide to revert to previous land uses within the community forest, which would undermine the climate benefits for the project by preventing forest regeneration.	The process of participatory land use planning involves consideration of alternative land use options, and communities that decide to develop Plan Vivo projects will have agreed that this is the most beneficial alternative for them, over the project period.	**Low** The development of forest management plans that benefit the community means the risk that alternative land use practices will be carried is low.
Low External parties carry out activities that reverse climate benefits	**Moderate** It is possible that villagers will allow community forests to be exploited by outside interests such as logging or mining companies. This would be unlikely to affect the whole community forest area, but it would retard regeneration in affected areas.	Strengthening forest management institutions, will help local institutions to prevent incursions from outside interests.	**Low** Deals made with outside interests usually only benefit a small proportion of the community. Having strong and functioning forest management institutions, combined with the benefits from effective community forest management, will keep the risk of incursions from outside interests low.
Environmental			
Moderate Fire	**High** Wild fires are an important cause of degradation and if they continue to occur within the community forest then regeneration will be prevented in affected areas	Prevention and control of fires is a main focus of project activities, see Section 7.1 for details.	**Moderate** The design and implementation of fire prevention and control measures are expected to reduce the number of fires and prevent those that do occur from escalating to a level where they burn out of control. Even with these measures in place there remains a small chance that some fires will burn out of control and cause some damage within the community forest, so the likelihood of this risk occurring is moderate.
Low Pest and disease attacks	**Low** Since the climate benefits from this project are expected to accrue from regeneration of natural	No project activities are targeted at addressing this risk	**Low** The likelihood that pest or disease attacks will undermine climate benefits is low, as natural vegetation

	vegetation which is adapted to local pests and diseases, this is not a significant risk factor		is resistant to local pests and diseases.
Low Extreme weather or geological events	**Moderate** High winds, or earthquakes could cause damage to community forests, undermining climate benefits in the areas affected	No project activities are targeted at addressing this risk	**Low** The project area does not have a history of being affected by high winds, and is not in an area associated with seismic activity. The likelihood of these events undermining climate benefits is therefore low.
Technical			
Low Project activities fail to deliver expected climate benefits	**Moderate** There is a chance that the climate benefits expected to result from project benefits has been over estimated, if this is the case it may result in a slight overestimation of climate benefits, but a drastic difference is unlikely since expected benefits are derived from conservative estimates based on observed results in similar environmental contexts.	All assumptions about the impacts of project activities are assessed during the validation of the project design document, and initial indicators require an assessment of whether planned management interventions are sufficient to achieve expected benefits.	**Low** Since projects that do not adopt management practices that have a high likelihood of achieving expected climate benefits will not be allowed to proceed, the likelihood that project activities will fail to deliver expected climate benefits is low.
Low Project activities fail to deliver expected livelihood benefits	**Moderate** If sufficient finance for performance based support to project activities is not secured, or if community forest management does not result in the direct livelihood benefits anticipated by communities there may not be sufficient incentive for communities to continue management activities.	Projects are required to secure finance for the entire project period before starting project activities, and project activities are designed through a participatory process that maximizes the livelihood benefits.	**Low** Since the required finance will be available, and activities are designed with a good understanding of local land use and socio-economic conditions, the likelihood that activities will not deliver expected livelihood benefits is low.
Low Technical capacity to implement project activities is not maintained	**Moderate** The project activities are not highly technical, but do require some training and provision of equipment. If a sufficient number of trained individuals, and the necessary equipment is not maintained realization of climate benefits could be undermined.	Training of individuals within management institutions and plans for procurement and maintenance of necessary equipment is required to fulfil initial performance indicators. Establishment of stable and functional management institutions should help ensure that knowledge from training	**Low** Since projects are required to demonstrate that individuals have received necessary training and that there is a plan for procurement and maintenance of equipment the likelihood that capacity to implement project activities will not be maintained is low.

		courses is maintained in institutional memory.	
Administration			
Low Capacity of the project coordinator to support the project is not maintained	**Moderate** Achieving climate benefits will requires the ongoing support of the project coordinator. If this is not maintained throughout the project period, the ability of community groups to carry out project activities could be undermined, especially if mechanisms for delivery of performance based support are not maintained.	The local project coordinator receives support from Bioclimate through the USAID funded STEWARD programme.	**Low** Bioclimate is an established organization with a proven history of managing community PES projects. The likelihood that the capacity of the project coordinator will be maintained throughout the project period is therefore high.

H2 Risk buffer

The highest risk level for each type of risk factor in Table H1, is summarised in Table H2. A risk buffer, proportional to these risk levels was determined by assigning buffer percentages of 20% for a high risk level, 10% for a moderate risk level, and 1% for a low risk level in each category. A total risk buffer of 23% was then calculated by summing the percentages under each risk category.

Table H2 Risk buffer calculation

Risk type	Risk level	Risk buffer
Social	Moderate	10%
Economic	Low	1%
Environmental	Moderate	10%
Technical	Low	1%
Administration	Low	1%
	TOTAL	**23%**

Part I: Project Coordination & Management

I1 Project Organisational Structure

The project coordinator is Bioclimate West Africa (BWA). Bioclimate West Africa was registered with the Ministry of Finance and Economic Development as an Indigenous Non-Governmental Organisation on the 10th of May, 2013 (Sierra Leone registration number NNGO/467/2013-2014).

Bioclimate West Africa is supported by Bioclimate Research and Development. Bioclimate Research and Development was registered as a company in 2002 and became a charity in 2013 (Scottish charity number SC044007).

The responsibilities of Bioclimate and Bioclimate West Africa are summarised in Table I1.

Table I1. Roles of Bioclimate UK office and Bioclimate West Africa in coordination of the STEWARD Community Forest Network projects

Role	Bioclimate UK office	Bioclimate West Africa
Administrative		
Registration and recording of plan vivos and sale agreements		✓
Managing the use of project finance and making payments to producers	✓	
Coordinating and recording monitoring		✓
Negotiating sales of Plan Vivo Certificates	✓	
Reporting to the Plan Vivo Foundation	✓	
Contracting project validation and verification	✓	
Managing project data	✓	✓
Technical		
Providing technical support and training to producers in planning and implementing project activities	✓	✓
Developing, reviewing and updating forestry and agroforestry systems (technical specifications)	✓	
Evaluating plan vivos		✓
Monitoring plan vivos		✓
Social		
Conducting preliminary discussions and continued workshops with communities	✓	✓
Gathering socio-economic information for project registration and reporting purposes	✓	✓
Helping groups/individuals to demonstrate land-tenure	✓	✓
Advising on issues such as mobilisation, setting up bank accounts, dispute resolution etc.	✓	✓
Technical Support/Project Development Services		
Technical aspects of project design and development	✓	
Providing training to project technicians	✓	✓
Developing carbon modelling and technical specifications	✓	

Bioclimate's recent activities include:

- Community Partnership Project, Pakistan, 3 year project funded by UK Department for International Development (DFID) Global Poverty Action Fund
- Thari Women's Water, Food and Enterprise Project, Pakistan, 4 year project funded by Scottish Government, South Asia Development Programme
- Women's Intertidal Resource Management Project, Mozambique, 3 year project funded by UK Department for International Development (DFID) Global Poverty Action Fund and The Waterloo Foundation
- Enhancing Socio-ecological Resilience in Coastal Mozambique Project, 3 year project funded by UK

Department for Environment, Food and Rural Affairs (DEFRA) Darwin Initiative
- STEWARD Trans-boundary Community PES, Sierra Leone and Guinea, 3 year project funded by USAID through the US Forest Service (USFS)
- Arlomom Patako, 3 year project as part of the part of a larger European Union funded regional UNDESERT project
- Learning from Community Payments for Ecosystem Services in Cameroon, developing policy briefs with funding from the UK Department for International Development (DFID) Knowfor Rapid Response Mechanism
- Supporting development of Plan Vivo projects in Burkina Faso (Tree AID), Cameroon (WWF) and Indonesia (FFI)

For full project details see http://www.bioclimate.net/en/projects

Bioclimate West Africa (BWA) has staff living and working within Kanséma and Sumata. Their presence has improved the relationship between BWA and community members. Communities can easily approach field staff and field staff can easily support communities on a regular basis. BWA has a team of five core staff who work and live amongst local community members, three of whom were recruited from local communities See Table I1). This offers BWA the advantage of working with staff who understand the local dynamic as well as being able to communicate in the local languages. By hiring members of the local community as staff, the project also empowers community members by offering them employment opportunity, training opportunities and equipping them with additional skills needed for forest management activities.

Table I1. Bioclmate West Africa core staff

Name	Role	Languages
Gbessay Ehlogima Sam Momoh	Project Manager	English, Susu, Krio
Isata Sesay	Project Officer	Enlgish, Susu, Krio, Limbra
Lamin Kamara	Project Officer	English, Susu, Krio
Elie Kékoura Mansare	Project Officer	French, Susu, Krio, Kissi, Malinké
Dauda Dauda Siafa	Finance Officer	English, Susu, Krio

BWA acts as the project coordinator and has five staff who have all received extensive training from Bioclimate Research and Development. BWA is a registered Non-Governmental Organization in Sierra Leone, with its office based in Fintonia. BWA can legally operate in Guinea under the umbrella of the STEWARD program, which has an agreement between authorities in Sierra Leone and Guinea on the trans-boundary nature of the program. As a registered NGO BWA can legally enter into PES agreements with communities, and has already done so in both Sierra Leone and Guinea. BWA has already managed the implementation of the two stages of the PES delivered to communities in Kansema and Sumata.

Other stakeholder groups and organisations at potential project sites in Sierra Leone and Guinea are described in Figure I1.

Sierra Leone	Importance	Influence
National authorities		
Ministry: Ministry of Agriculture, Forestry and Food Security (MAFFS)	High	Medium
Department: Forestry Division of MAFFs	High	Medium
Local authorities		
Paramount chief	High	High
Section chiefs	Medium	Medium
Rural councillors	Medium	Medium
Village level authorities		
Local leaders and traditional authorities	Medium	High
Compound heads *(Kabilabirinkonye)*	Medium	Medium
Clan and family heads (*Kabilakonye*)	Medium	Medium
Forest Management Committee	Low	Low
Intra-community		
Youth leaders	Low	Low
Religious leaders: pastors and Immams	Medium	High
Farming families	Low	Low
Other actors		
Outamba-Kilimi National Park (OKNP).	Medium	Low
Biodiversity Conservation Project	Low	Low

Guinea	Importance	Influence
National authorities		
Ministry: Ministry of Environment and Sustainable Development	High	Medium
Department: Directorate of National Forests and Wildlife (DNFF)	High	Medium
Local authorities		
Section chiefs	Medium	Medium
Rural councillors	Medium	Medium
Village level authorities		
Local leaders and traditional authorities	Medium	High
Compound heads *(Kabilabirinkonye)*	Medium	Medium
Clan and family heads (*Kabilakonye*)	Medium	Medium
Forest Management Committee	Low	Low
Intra-community		
Fulani herders	Low	Medium
Youth leaders	Low	Low
Religious leaders: Immams	Medium	High
Farming families	Low	Low
Other actors		

Figure I1. Stakeholder diagram

I2 Relationships to national organisations

The project is part of the STEWARD programme that is covered by a Memorandum of Collaboration between the Government of Sierra Leone Ministry of Agriculture, Forestry and Food Security (MAFFS), and the Ministry of Environment, Water, and Forests in Guinea.

Bioclimate has built strong relationships with local and national representatives from the Ministry of Agriculture, Forestry and Food Security in Sierra Leone and with the local and national representatives from the Ministry of Environment, Water and Forestry in Guinea. Both ministries were approached at the start of the project and have been involved on different levels throughout the project.

Specifically, project staff hold regular meetings with both local and national government representatives to inform them of the project progress and activities. The last meetings with government stakeholders were held in July 2015 in Sierra Leone and in August 2015 in Guinea in a workshop to generate feedback on the projects. In September a training workshop was organized by Bioclimate and BWA to train government representatives as well as representatives from regional institutions and local NGOs. The training workshop covered both the technical and socio-economic aspects of PES projects including project design, implementation, monitoring and lessons learned. Currently, there are no similar government projects in PZ1.

I3 Legal compliance

BWA is an equal opportunities employer and staff include both male and female employees. In addition, staff members also include youth who have now been equipped with both technical and social expertise in forest management.

Prior to the implementation of the PES projects in Kanséma and Sumata, different government legislations were assessed. The programme ensured that all of its activities were in accordance with both formal and customary legislation governing land in Guinea and Sierra Leone. By taking into account the different legislation, the project ensured that all of its activities were compliant with legislation in the countries which host the PES pilot projects.

All community forests in PZ1 have been demarcated in accordance with national and local legislation. In Guinea all community forests are registered and recognised by the government. Although in Sierra Leone community forests are not registered, community tenure is secured through the customary management on the local level, which is supported by national legislation. In both Guinea and Sierra Leone, although the majority of land is unregistered customary land, rural communities have use-rights to the land.

I4 Project management

A two-phased approach to project development and implementation was used at the pilot sites. An initial project development phase; which involved the design of project activities, management plans, benefit sharing mechanisms and PES agreements; began in August 2012. The project implementation phase started in November 2013. At the pilot sites a three year project period was adopted - running from 1 November 2013 to 31 October 2016. Monitoring against initial indicators (see Table K1.1) was carried out at the start of the project period, with subsequent monitoring carried out annually (see Table K1.2).

Agreed Performance Based Support is released to the participating communities that demonstrate all indicator thresholds have been met in line with the activity based monitoring plan (Section K1), on approval of monitoring reports. Funding for Performance Based Support was made available for the first project period, through the STEWARD programme. For subsequent project periods additional sources of finance will need to be secured by BWA.

BWA produces a monthly record of project activities and financial expenditures which are presented in a monthly summary report. FMCs take meeting minutes during their monthly meetings and these notes are kept in a note book which was supplied by BWA and given to each FMC group. Each FMC has a record of all community meetings held. BWA has a record of all, PES agreements, monitoring results and all PES disbursed to participants. Project records are kept in paper and digital forms in the BWA office, and digital copies are backed up on the Bioclimate Research and Development server. All data that is relevant to the community is shared with them. BWA staff includes a qualified accountant, and all staff have received training in data storage and management.

BWA together with FMCs are responsible for preparing the annual report and submitting it to Plan Vivo.

I5 Project financial management

BWA has a monthly project budget which allows them to support community activities and is separate from the PES budget. All PES activities have been budgeted and accounted for in the monthly budget for field activities. The PES funds are clearly labelled as PES project funds. All expenses made for PES have been agreed for between the community, BWA, BUK and STEWARD. All expenses executed have been accounted for and communities have signed for reception of materials over the life of the project.

Furthermore, BWA presents a monthly financial report which includes all the monthly expenses with receipts for any activities executed by the project. The PES budget is marked as PES and this is different from the regular monthly project activity expenses. The PES fund for the pilot project was provided by STEWARD. Additional PES payment would hopefully be secured through future marketing activities.

The PES project has been financed by STEWARD (USFS). The Design and development of this Plan Vivo project has been financed by STEWARD (USFS).

I6 Marketing

No Plan Vivo certificates will be issued during the first project period at the two pilot sites. Instead participating communities will receive performance, based support that is released when monitoring thresholds are met. PES finance has been secured for all Performance-based Support for the first project period at both pilot sites.

To extend the project for subsequent periods additional sources of finance will be required. Bioclimate are currently exploring the possibility for additional grant funding to support Performance-based Support for future project periods at the pilot sites, and to extend project activities to other community forests in the project area.

There is also the potential that Plan Vivo certificates could be issued for the climate benefits from future project periods at the pilot sites, or at new project sites. This would require some additional development of

technical specifications. If this route is perused BWA will approach private companies to explore potential markets for Plan Vivo certificates as well as exploring opportunities with known Plan Vivo certificate buyers and resellers such as U and We and Fair Climate Fund. BWA would use reports and documents from the pilot phase to market the PES projects and illustrate the positive impacts it has had on local communities in Guinea and Sierra Leone.

I7 Technical Support

The BWA field staff has received three years of technical support and training in the management and conservation of community forests. The team has already coordinated the implementation of two pilot PES projects in Kanséma and Sumata. The team has been trained in the process of management and establishment of PES fund. BWA is now well equipped to manage the project in the future. BWA has been mapping the community forests, training the FMC's, supporting forest management activities and assessing community development needs. Staff are now well equipped to maintain and monitor forest management activities as well as offer trainings. BWA can also rely on Bioclimate UK for remote technical support as needed.

Part J: Benefit sharing

J1 PES agreements

BWA began working in the communities in Sumata and Kanséma in August 2012. Discussion about PES started with community members in 2013 after one year of activities and relationship building between BWA, local communities and local and national stakeholders. Once communities were aware of the importance of ecosystems services and the benefit that they could gain by protecting their community forests, they became more interested in community forest management activities.

In April 2013, letters of support for BWA's work were signed by communities in Kanséma and Sumata. The letters showed communities' interest and willingness to support and continue forest management activities and also support BWA and STEWARD's work. The principles and concept of PES was explained to communities during meetings in 2013. In July 2013 discussions were held with community members to identify community needs and the type of support that they would like to receive once PES funds were granted. Each community decided how PES funds should be used through a process of consultation led by the FMC.

Prior to the implementation of the PES project, guidelines for equitable benefit-sharing were established as well as key performance indicators to serve as a basis for the on-going monitoring of forest management activities. Prior to entering the PES agreement with communities, all guidelines, monitoring indicators, responsibilities and obligations of project participants and project coordinators were extensively discussed with community members. Details of Performance-based support from PES funds, and how it will be distributed and used are documented in the PES agreements for each participating village. For the first commitment period, pilot villages received 100% of the available PES funds (see Section J2). As representatives of the broader community, the FMC has responsibility for signing the PES agreements, and the details are discussed and refined prior to finalisation through a series of community meetings so that the interests of all community members are taken into account.

The potential for elite capture was identified as a potential risk, and this was mitigated through the provision of community level in-kind benefits. In the first instance through the implementation of a civic project that would benefit the whole community. In addition, the guidelines for benefit-sharing also played a key role in ensuring that the project would not be exclusive and it is accessible to the whole community. Furthermore the Community Engagement and Gender Policy also facilitated the engagement of youth and women in project and ensured that their needs were also taken into account for the purpose of benefit sharing.

J2 Payments & Benefit Sharing

Funds from USAID totalling US$15,000 were made available to pilot the PES mechanism in the two villages. These funds were secured and labelled for delivery to community projects. In November 2013 an agreement was made to provide this PES support to communities. The agreed PES support was in-kind support for community forest management activities (direct management costs) and civic projects (community incentive) to communities in Sumata and Kanséma. This support was to be delivered in two instances; the first one was delivered in December 2014 and it included fire fighting equipment and forest management tools needed by communities in order to adequately undertake forest management activities. The second in-kind PES support was disbursed based on satisfactory monitoring and evaluation of the activities identified above and the monitoring indicators. Payments have been dependent on the successful implementation of the activities listed in the forest management plan and the delivery of monthly activity reports.

The initial payment* for management materials and equipment was based on a plan developed together between BWA and the FMC. After evaluation of the forest management activities, and in accordance with the PES agreements performance indicators and payment schedule, each community was granted $5,000 in

* The value of the initial payment to communities was $1500 for each community. This was based on a budget elaborated with the FMC, and based on the community forest management plan. This material was delivered by BWA, in-kind, with purchases being made in neighbouring towns with members of the FMC present.

2015 to contribute to their selected civic project. Both of the pilot villages elected to construct community meeting places with surplus PES funds (after financing the costs of project activities). These community meeting places double-up as FMC offices in each community, which was a need identified during the needs assessment in 2014. The community meeting places are now complete.

The total available pilot PES funds are $15,000.00, $13,000.00 of which has already been disbursed. The remaining $2,000 will be disbursed to communities upon satisfactory completion of community forest management activities, as per the PES agreement.

All the PES funds which have been disbursed were transferred to the BWA bank account in Sierra Leone. BWA assisted community members with the purchase of material and management of activities, rather than transferring the funds directly to communities. FMCs do not have bank accounts or other means of holding and managing cash.

The PES period (in the PES agreement) covers January 2014 - September 2016 (2 years and 8 months), but this would be extended beyond this period if the project is certified by the Plan Vivo foundation, and if the project receives further support from the STEWARD program.

The only reason why PES payment will not be disbursed is if communities fail to meet their responsibilities with regard to established forest management activities or the monitoring indicators are not satisfactory. However the communities remain engaged and motivated to protect their community forest and it is unlikely that they will do anything that would prevent them from receiving the agreed PES support.

To ensure equitable and transparent benefit sharing by the project, Bioclimate trained the BWA team and established guidelines on equitable benefit-sharing in Community Forest Payments for Ecosystem Services projects. The PES project in Sumata and Kanséma is related to protection and restoration of community forests, and in this case the benefits are communal rather than individual. The guidelines on equitable benefit sharing also served as a basis for Bioclimate and community members to work together and establish the building blocks of the agreement.

Part K: Monitoring

K1 Ecosystem service benefits

The monitoring of climate benefits achieved through the application of this Technical Specification is based on the assumption that if the activities described in Section G1 are carried out as planned the climate benefits estimated in Section G5 will be achieved. Acceptance of this Technical Specification by the Plan Vivo Foundation indicates that this assumption has been approved by expert reviewers as being valid for project areas that meet the applicability conditions in Section G.

The monitoring required to demonstrate that the expected climate benefits have been achieved is therefore based on demonstrating that activities have been carried out as planned. This activity-based approach provides a cost-effective method for monitoring, and only requires participant communities to collect and report information that is directly relevant to their management activities. Performance indicators, targets and monitoring methods to be used are described below.

Activity-based monitoring

Activity-based indicators are used to demonstrate whether the project is on track to achieve the expected climate benefits. Each indicator has annual performance thresholds throughout monitoring period, as well as an initial threshold that must be met at the start of the project period (See Tables K1.1 and K1.2). The project coordinator is responsible for assessing whether annual performance thresholds have been met, based on information and evidence provided by the FMC. Thresholds are provided for three levels of performance:

- Green – indicating that the project is on track to achieve the expected climate benefits, and that any performance related payments or in kind support should be made in full.

- Orange – indicating that project activities have fallen short of those required to achieve the expected climate benefits. If projects have one or more indicator at the orange performance level, corrective actions may be required and part of the performance related payment or in-kind support for that monitoring period should be withheld until it can be demonstrated that the a green performance level has been reached for all indicators. The proportion of payments withheld and the corrective actions required should be determined by the project coordinator in collaboration with the FMC and documented in the annual report.

- Red – indicating that project activities have fallen far short of those required to achieve expected climate benefits. If projects have one or more indicator at the red performance level, corrective actions are required and no performance related payments or in-kind support should be made until a green performance level has been reached for all indicators.

Table K1,1. Performance indicators and thresholds to be assessed at the start of project period

Indicator	Thresholds			Means of Verification
1.Community forest boundary	● Green – Community forest boundary is: a. Agreed by all members of the community; and b. Clearly marked with paint; and c. Recorded in a GIS	● Orange – Community forest boundary has been defined, but: a. It has not been agreed by all members of the community; and/or b. It is not clearly marked; and/or c. It is not recorded in a GIS	● Red – Community forest boundary has not been defined	a. Meeting records, maps, and participant lists for process of agreement the community forest boundary b. Visual inspection c. GIS data files
2 Rights and Tenure	● Green – User rights and the community tenure of the community forest are locally recognised; and these rights are also nationally recognised or the process for national recognition is underway	● Orange – Process for recognition of user rights and/or tenure over the community forest has been identified, but local recognition has not been granted and/or no further action has been taken to secure recognition	● Red – Process for recognition of user rights and/or tenure over the community forest has not been identified; or there is a clear barrier to recognition of user rights and/or tenure	Report describing process and progress of applications for user rights and/or tenure
3 Project area	● Green – Area of degraded forest-savannah mosaic within the community forest has been estimated and mapped	● Orange – Area of degraded forest-savannah mosaic within the community forest has been estimated, but mapping is not complete	● Red – Area of degraded forest-savannah mosaic within the community forest has not been estimated	Maps of project area

4 Management plan	● Green – A Management Plan has been created that: a. Includes: - Bylaws and/or management plans that are sufficient to ensure the management of the community forest in a manner that results in the eradication of unsustainable agriculture and pastoral practices and timber extraction; - A plan for community forest monitoring that is sufficient to assess compliance with the bylaws and management plans; - A plan for wildfire prevention and control that is sufficient to prevent further degradation of forest-savannah mosaic area by fires and to allow areas of forest savannah mosaic that have been degraded by fire to regenerate. b. Is achievable with the capacity and resources available; c. Has been created and agreed with the relevant management institution (forest management committee, fire management group or forest monitoring groups); and d. Has been accepted by the whole community	● Orange – A Management Plan has been created, but: a. It is insufficient: community forest in a manner that results in: - to ensure the eradication of unsustainable agriculture and pastoral practices and timber extraction; and/or - it is insufficient to assess compliance with the bylaws and management plans; and/or - it is insufficient to prevent further degradation of forest-savannah mosaic area by fires and to allow areas of forest savannah mosaic that have been degraded by fire to regenerate; and/or b. It is not achievable with the capacity and resources available; and/or c. It has not been agreed with the relevant management institution; and/or d. It is not accepted by the whole community	● Red – A Management Plan has not been created	Management Plan and report on details of their creation and agreement by the community

5 Management institutions	● Green – A forest management committee, forest monitoring group, and fire management group are in place and: a. Are representative and recognised by the community; b. Training needs have been identified, and group members have received training required; c. Resource needs have been identified, and required resources have been provided or there is a feasible plan for their procurement	● Orange – A forest management committee, forest monitoring group, and fire management group are in place, but: a. It is either not representative of, or its authority is not recognised by the entire community; and/or b. Training needs have not been identified, or required training has not been received; and/or c. Resource needs have not been identified, or required resources have not been provided and there is no feasible plan for their procurement	● Red – No forest management committee, forest monitoring group or fire management group is in place	a. Lists of group members and reports detailing the process for formulating the groups b. Details of training needs assessment conducted; training curricula; and details of training conducted including participant lists c. Details of resource needs assessment conducted; and resources supplied or procurement plans

Table K1.2 Annual performance indicators and thresholds to be assessed throughout the project period

Indicator	Thresholds			Means of Verification
1.Community forest boundary	● Green – Community forest boundary is clearly marked with paint	● Orange – Community forest boundary is marked, but is difficult to see	● Red – Community forest boundary is not marked	Visual inspection
2. Rights and Tenure	● Green – User rights and the community tenure of the community forest are locally recognised; and these rights are also nationally recognised or the process for national recognition is underway	● Orange – Process for local recognition of user rights and/or tenure over the community forest is underway	● Red – Process for recognition of user rights and/or tenure over the community forest has not been identified; or there is a clear barrier to recognition of user rights and/or tenure	Report describing process and progress of applications for user rights and/or tenure
3. Project activities	● Green – In the last 12 months: a. All bylaws and/or management plans have been adhered to, and management has been carried out as described in the management plan; and b. Monitoring has been carried out as described in the monitoring plan, and all monitoring reports are complete; and c. Fire prevention/control activities have been carried out as described in the management plan	● Orange – In the last 12 months: a. All or most bylaws and/or management have been adhered to, and management has largely been carried out as described in the management plan, but there have been some minor infringements or omissions; and/or b. Most of the monitoring activities have been carried out as described in the monitoring plan, but there have been some minor omissions and/or failure to complete monitoring reports; and/or c. Most of fire prevention/control activities have been carried out as described in the fire management plan, but there have been some minor omissions	● Red – In the last 12 months there have been: a. significant infringements of bylaws and/or omissions of activities described in the management plan; and/or b. major omissions from the planned monitoring activities and/or an absence of monitoring reports; and/or c. major omissions from the planned fire management activities and/or an absence of monitoring reports	Monitoring reports, and reports on management activities

4. Management institutions	● Green – The committee/group: a. Has met at least once every three months for the last year; and b. Has the capacity and resources required to fulfil its role or a feasible plan for appropriate capacity building and/or resource procurement.	● Orange – The committee/group: a. Has met less than once every three months in the previous year; and/or b. Lacks the capacity or resources to fulfil its role, and has no feasible plan for appropriate capacity building and/or resource procurement	● Red – The committee/group has not met in the last 6 months	Meeting reports, and training/resource needs assessments

Validation of the Technical Specification

The assumption that expected climate benefits will be achieved by the activities described in the Technical Specification must be validated using evidence from the project area prior to the start of a second (or subsequent) project period. In addition to activity-based monitoring, projects should therefore also make direct measurements to assist with this validation.

The main parameters that must be validated prior to the start of a new project period, for projects that do not account for leakage, are summarised in Table K1.3.

Table K1.3. Parameters that must be validated and revised at the start of each project period

Parameter	Description	Value	Validation approach
A	Area of degraded forest-savannah mosaic within the project area at the start of the project period (ha)	Measured for each project area	• New maps of the community forest area should be produced at the start of each project period to ensure that any areas that have recovered sufficiently to be classified as 'forest' rather than 'degraded forest' are not included in estimation of climate benefits.

R	Expected rate of regeneration of carbon stocks in degraded forest-savannah mosaic (tC/ha/year);	Assumed to be 5.4 (Annex A)	• Update literature review in Annex A to include information from relevant studies published during the project period, and update as appropriate
			• Re-measure permanent sample plots established inside project areas at the start of the project period to determine whether regeneration of degraded forest occurred was above or below the updated value.
			  ○ If the average change in permanent sample plots is less 90% of the value expected from the literature review, the average change seen in thesample plots should be used in the subsequent project period.
			  ○ If the average change observed is equal to or greater than 90% of the literature review value, the value from the literature review should be used.

BE_{ha}	Emissions expected per hectare of degraded forest-savannah mosaic in the baseline scenario (tCO_2e/ha).	Assumed to be zero	• Re-measure permanent sample plots established outside project areas at the start of the project period to determine whether any increase in carbon stocks has taken place.
			  ○ If there is an average increase in carbon stocks across permanent sample plots the baseline should be revised accordingly
			  ○ If average carbon stocks decline, an assumption of zero should be maintained

Community involvement

Reporting activity-based indicators is the responsibility of the relevant management institution, who will be supported by the project coordinator. Copies of all monitoring reports will be held by these management institutions and will be presented annually at a full village meeting.

K2 Socio-economic impacts

The expected socio-economic impacts of the project activities are described in Section F2. The activity based monitoring approach described in Section K1 will give some indication of whether the project is on track to achieving the expected livelihood benefits.

In addition to this the project will develop a simple plan for monitoring changes in key indicators at a household level within the first year of validation. Monitoring socioeconomic changes will be done in two parts: 1) Monitoring expected socioeconomic impacts of the project activities as described in Section F2; 2) Monitoring changes in overall household well-being using locally-defined indicators of well-being. The former allows the project to verify the assumed links between project activities and peoples' livelihood activities. The latter sees improved well-being as an outcome of more sustainable livelihoods due to the both project and other initiatives and socioeconomic changes in the communities and region.

K2.1 Monitoring expected impacts

Within one year of validation, information on the attributes listed below will be collected through a household survey of a representative sample of households in order to monitor indicators on the positive, and potential negative, impacts of project activities as outlined in Section F2. Focus group discussions (FGDs) will be used to define specific indicators for these attributes prior to the survey, and focus groups will then be used on a frequent basis to qualitatively assess the changes and reasons for changes in these indicators. The household survey of a sample of households will be repeated every three years to assess quantitative changes in these attributes. The attributes will include:

- Agricultural productivity
- Access to water
- Fuelwood availability
- Availability of Timber and NTFPs
- Income from natural resource based livelihood activities

K2.2 Monitoring well-being

In 2012 a full village census was completed in Kansema and Sumata, and a Participatory Wellbeing Assessment (PWA) was completed. This allowed the project to generate well-being indicators for all households in both villages, and will allow changes in well being (based on these indicators) to be re-assessed after five years. Examples of the indicators to be monitored are shown in Box 2.

Box 2: Description of well-being indicators to be monitored

There was broad consensus during the PWA on the indicators of health, financial security, food security, and physical capital. Rather than absolute numerical indicators, these well-being indicators are based on *Susu* terms and expressions that are well established in these communities, and allow for a binomial response (yes or no) for each household.

- *Sentiya* - Being well enough to work on a regular basis
- *Kobirie fuyie* - Enough money to meet basic needs – feeding family; schooling children; clothing; transport.
- *Baloi kamalikhie* - Able to eat (any food) every day
- *Donsefanyere* - Able to eat food with a good sauce that builds your body every day
- *Kharandesare* - Able to send children to school
- *Bankhifanyire* - Good house (defined as: solid cement house, zinc roof, good beds and furniture)

Information on these indicators will be collected during the household survey of a representative sample of households within one year of validation, and then collected every three years. Focus group discussions will be used to qualitatively assess the changes and reasons for changes in these indicators.

K2.3 Socioeconomic monitoring plan

The proposed socioeconomic monitoring plan is shown in Table K2.3.1. To implement this plan, within the first year after project validation the project will:

- Review the information available in a household survey conducted in collaboration with CARE in 2012, which includes a broader set of villages in the PZ1 landscape.
- Design a template for focus group discussions to define the indicators for the expected project impacts, and conduct these FGDs.
- Design a questionnaire survey to collect information on these indicators and well-being indicators.
- Conduct the questionnaire survey with a representative sample of households.
- Analyse the information for each indicator and present this information in a socioeconomic baseline report.
- Design templates for focus group discussions that can be used on an annual basis to explore changes in both the indicators of expected impact, and well-being indicators.

Table K2.3.1 Socio-economic monitoring plan

Method	Indicators	Year of baseline; year to be completed	Frequency of assessment
Participatory wellbeing assessment	Six locally-defined well-being indicators shown in Box 1	2013	Every three years: to be combined with the household survey below
Focus group discussions (indicator design)	Definition of indicators for the attributes shown in K2.2	2017	One-off
Household survey	Well-being indicators Indicators of attributes in K2.2	2017	Every three years
Focus group discussions	Well-being indicators Indicators of attributes in K2.2	2017	Annually

K3 Environmental and biodiversity impacts

Since project activities are expected to have a positive impact on natural woodland habitats, the monitoring of climate benefits described in Section K1 will also provide an indication of positive impacts on biodiversity and ecosystem services. In addition to this an initial assessment of biodiversity within the community forest area should be carried out using participatory biodiversity assessment approaches (see Box 1).

Box 1. Participatory Biodiversity Assessment

- Community members, including all members of forest monitoring groups are trained to recognise and describe key species that may make use of the community forest, and how to identify signs of their presence such as nest sites, spore, scat, and calls. The emphasis of training should be on ensuring that the species and signs that community members are able to recognise are accurate and consistent throughout the group. Large colour photographs of each species should be used to ensure consistency.
- Participants are then asked to list all of the key species they have observed within the community forest over the last week, month, and year.

Direct observation of significant species, or signs of their presence should also be recorded by forest monitors during all patrols, and a participatory biodiversity assessment should be repeated out once per year throughout the project period. The biodiversity data recorded with these approaches will not be sufficient to estimate population sizes, and should not be relied upon to determine whether particular species have been lost from a community forest. They will give an indication of whether there is key species continue to make use of the community forest areas, however. If significant species that were present in the initial survey are not observed or reported during one of the monitoring periods, a more intensive biodiversity survey should be conducted to determine whether the presence or absence of that species within the community forest. The biodiversity monitoring approach is summarised in Table K3.1.

Table K3.1 Biodiversity indicators to be monitored throughout the project period

Indicator	Monitoring approach	Responsibility
Signs of significant species identified during initial participatory biodiversity assessment	During all monitoring patrols, forest monitors record any direct sightings, calls heard, or signs of nest sites, spore or scat that can be attributed to one of the focal species. All records are reported to the FMC, and compiled in an annual report.	Forest patrol groups responsible for collecting and recording information. Forest management committees responsible for compiling annual reports for delivery to the project coordinator.
Reports of significant species encountered by community members	An annual participatory biodiversity assessment (see Box 1) should be conducted with a representative group from the community. Where possible the same group should be used each year. Members of the group should be asked to recall whether or not they have encountered each of the significant species within the community forest area over the last week, month and year. The results should be compiled in an annual report.	Representative community group responsible for providing information on animals they have encountered in the community forest. Project coordinator responsible for facilitating participatory biodiversity assessment and compiling results.

Annexes

Annex 1. List of key people involved with contact information

Destina Samani, Director
STEWARD Programme
25B Hill Cot Road, Freetown, Sierra Leone
dsamani@stewardprogram.com
www.stewardprogram.org

Willie McGhee, Director
Bioclimate
UN House, 4 Hunter Square, Edinburgh, EH1 1QW, Midlothian, Scotland
info@brdt.org
www.bioclimate.net

Gbessay Ehlogima Sam Momoh. Project Manager
Bioclimate West Africa
Fintonia, Sierra Leone
info@brdt.org

Annex 2. Information about funding sources

All project development activities, and funds for performance based support in the pilot villages have been provided by the STEWARD programme - a forest conservation and sustainable livelihoods program supported by the United States Agency for International Development (USAID) and the United States Forest Service (USFS).

Annex 3. Producer/group agreement template

Community PES Agreement between BWA, the Project Coordinator, and the Forest Management Committee (FMC) in [village] Village	
Title:	PES Agreement for Community Forest Conservation in [village]
Start Date:	[start date]
End Date:	[end date]
Area Covered:	[village] Community Forest
Project coordinator	Bioclimate West Africa (BWA)
Community group	[village]FMC

Introduction

The Community Payments for Ecosystem Services (PES) project is funded by the STEWARD program. The project aims to pilot the application of PES in the context of community forests within the villages of the STEWARD Priority Zone 1 in Sierra Leone and Guinea. This agreement describes the roles and responsibilities of the project coordinator, Bioclimate West Africa, a non-governmental organization registered in Sierra Leone, and the Forest Management Committee responsible for the management of the [village] Community Forest. The agreement includes the conditions that govern the generation of ecosystem services through forest protection against degradation and deforestation.

Ecosystem services arise from the processes by which the environment produces resources needed by humans, such as clean air, water, food and materials. For the purposes of this contract, ecosystem services are those services arising from forest protection and related management activities. The provision of the ecosystem services is indicated by the completion of activities expected to enhance ecosystem services provided by the project area; and verified by monitoring changes in tree and forest cover.

The Community PES Project is intended to facilitate the engagement of the community in the protection of their forest and in the performance of forest management activities. The PES project aims to improve the capacity of community members so that they have the skills required to effectively manage their forest, the materials required and that they have an incentive that will ensure that the continuously manage their forest on a longer term.

Roles and responsibilities of the parties

The PES project is coordinated by Bioclimate West Africa. .

This Agreement is made on the [date] between:

1. Bioclimate West Africa, and

2. The FMC in [village].

Whereas

- BWA is the coordinator of the community PES project. As the project coordinator, BWA is responsible for planning and coordinating forest and socioeconomic monitoring and making PES payments to the [village] FMC. Specifically BWA shall:
    a. Work with the [village] FMC to provide training and support needed to implement the agreed management plan (see Annex 1)
    b. Plan and coordinate monitoring activities with the FMC of [village] in line with the requirements described in agreed monitoring plan (see Annex 1).
    c. Undertake evaluation of project progress and activities in line with the requirements described in the Project Design Document.
    d. Submit Annual Reports to the Plan Vivo Foundation
    e. Support the FMC of [village] to undertake corrective actions where necessary.
    f. Oversee the implementation of the benefit sharing agreement as described below.

- The FMC is the community agency responsible for the effective management of forest management activities. It is their responsibility to:

    a. Protect the community forest from degradation and deforestation in accordance with their agreed forest management plan (Annex 1).
    b. Ensure that forest management activities are implemented in accordance with their agreed forest management plan (Annex 1).
    c. Continuously monitor the forest and protect it from identified threats included in the monitoring plan (see Annex 1).
    d. Work closely with community members to ensure the distribution and use of PES finance in accordance with the benefit sharing agreement
    e. Communicate frequently with the broader community concerning forest management activities and the distribution and use of PES

The [village] community members are considered as the sole beneficiaries of PES payments including youth, women, elders and men.

PES payment schedule and benefit sharing agreement

The total payment for the PES contract period is $[amount] to be used as described in the benefit sharing agreement (Annex 2). Payments are made from Bioclimate to BWA, and are conditional upon the completion of the management activities described in the agreed management plan (Annex 1) in accordance with the thresholds described in the Project Design Document Tables K1.1 and K1.2 and reproduced in Annex 3 of this agreement. Note that payments will be partially or fully withheld and corrective actions will be required if any indicators fail to reach the 'green' thresholds in these tables. The proportion of payments withheld and corrective actions required should be agreed by BWA and FMC prior to inclusion in annual reports.

Table 1: Payment schedule

	Payment date			
	[date 1]	**[date 2]**	**[date 3]**	**Total**
Total	$[amount 1]	$[amount 2]	$[amount 3]	$[total amount]

Contract term

- This contract shall remain in force for a period of [number] months from the date of signing
- The parties agree to the terms and conditions contained in this contract and all Annexes.

BWA, Project Implementer	[village], Forest Management Community
Signature	Signature
Name	Name
Position	Position
Date	Date

Annex 1

[Insert copy of agreed management plan]

Annex 2

[Insert copy of benefit sharing agreement]

Annex 3

[insert copy of Tables K1.1 and K1.3 from the PDD]

Annex 4. Database template

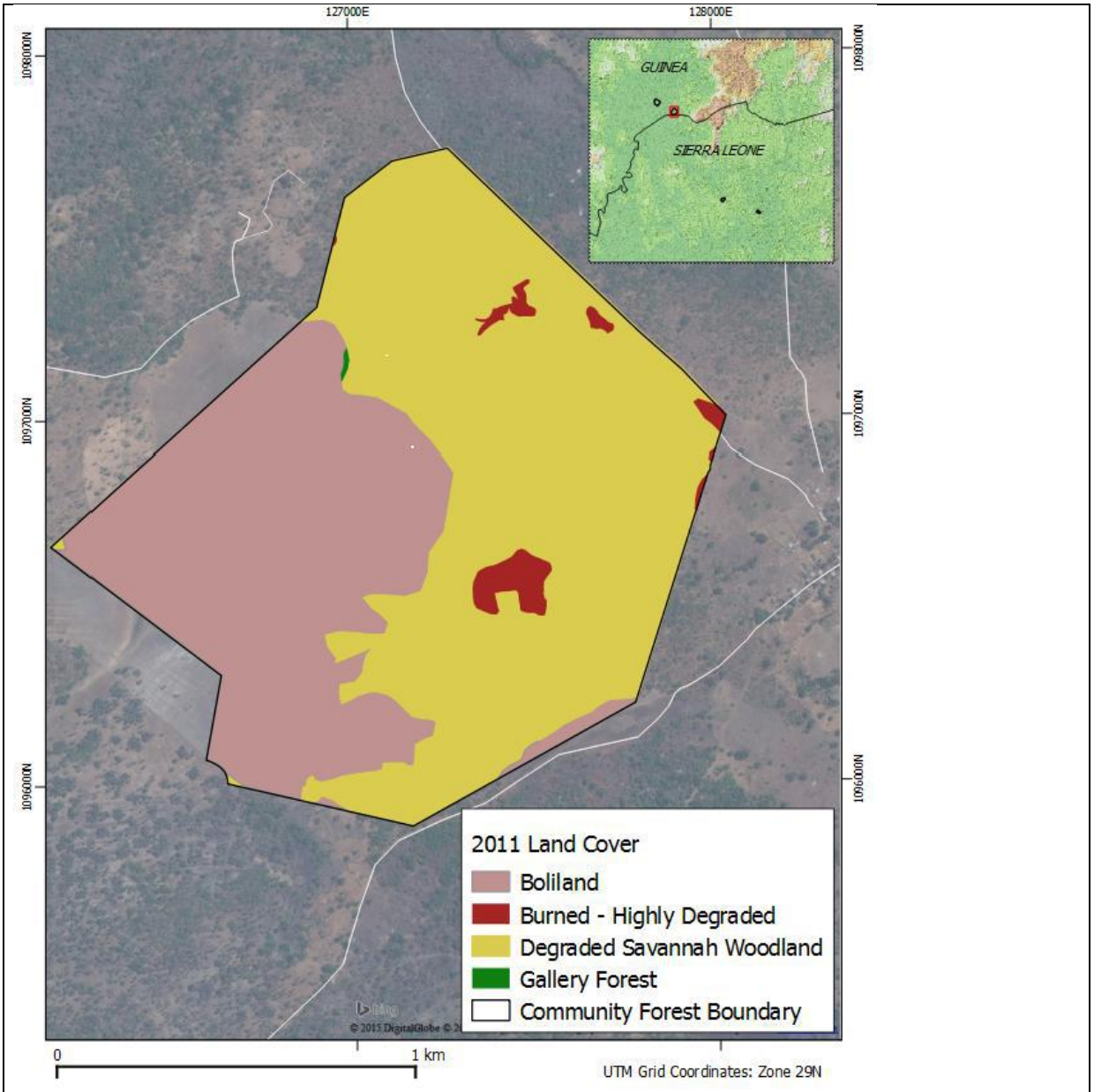
For project areas where Plan Vivo certificates are issued, a modified version of the existing Plan Vivo database will be used.

Annex 5. Example forest management plans/plan vivos

Kansema Community Forest

1. Project intervention area

Village Name:	Kansema
Location:	Kindia Region, Guinea
Coordinates:	lat: 9.902890°, lon: -12.388250°
Area of community forest (ha)	198.0 ha
Area of degraded woodland (ha)	115.3 ha



Map of land cover inside the agreed community forest

2. Management activities

Development of community forest management institutions	Management groups • Forest Management Committee (FMC; 9 members) • Forest Monitoring Group (FMG; 5 members) • Fire Control Group (FCG; 8 members). Training • Bookkeeping and administrative skills for FMC • Monitoring techniques and data recording for FMG • Fire prevention and firefighting techniques for FCG Equipment • GPS and cameras for FMG • Protective clothing, firefighting equipment, and tools for clearing firebreaks

	for FCG
Community forest management	The following by-laws will be enforced: **A. Fire** 1. Fire is not allowed in the community forest. If caught but the act was not deliberate, the person will be fined the sum of GNF25, 000 and the person will provide and plant 50 trees. 2. If the act done that led to fire was deliberate, the person will be fined GNF50,000 and should provide and plant 100 trees during the start of the rains. 3. If anyone refuses to join others in making fire belt or put off fire that person will be fined-GNF20, 000. This law applies only to young and able bodied males. 4. If the fire escape and damage people's property the two parties will decide what to do. 5. If someone sets fire and it caused damage but he/she is not identified, the whole community will recite the Al-fatiah in the Mosque. **B. Logging** No logging is allowed in the community forest .If anyone is caught logging in the Community Forest, the person will be fined the sum of GNF200,000 and also confiscated the machine and logs. **C. Hunting** Hunting (of any kind eg dog hunting, traps and snares etc) is prohibited. If caught the person pays the sum of GNF25000 and also confiscate the gun and animals. **D. Cattle rearing** No settlement is permitted in or near the community forest. The community however did not agree on any fine but resolved to forward the matter to the highest authority to relocate cattle settlers from their community forest. **E. Farming** Farming is not allowed in the Community Forest, if caught, the fine is GNF 25,000 and stop the person. Farming should be ½ a mile away from the buffer zone. **F. Honey harvesting** Honey harvesting is not allowed in the Community Forest. If anyone is caught harvesting wild honey in the community forest, the fine is GNF15,000 and also cease the honey and materials. **G. Tree cutting** Tree cutting is allowed only if it is community driven and should be after 10 years from now. Tree cutting by individuals is not permitted. If caught the person will be fined the sum of GNF10,000. IF ANYONE REFUSES TO PAY THE FINE, THE MATTER WILL BE REPORTED TO THE HIGHEST AUTHORITY – SECTION CHIEF AND OR NATIVE ADMINISTRATION.
Fire management	• Awareness raising and firefighting training for whole community • Clearance of 10m wide fire breaks around all vulnerable areas of the community forest.

3. Climate benefits

	Value	Source
A. Expected climate	91.6	Technical Specification

benefit per hectare (tCO_2e/ha)		
B. Leakage (tCO_2e/ha)	0	Leakage is not accounted for as Plan Vivo certificates will not be issued
C. Area of degraded woodland (ha)	115.3	Management Plan
D. Climate benefit (tCO_2e)	10,561	(A-B)*C
E. Risk buffer (tCO_2e)	2429	23% of D
F. Carbon credits (tCO_2e)	8132	D – E

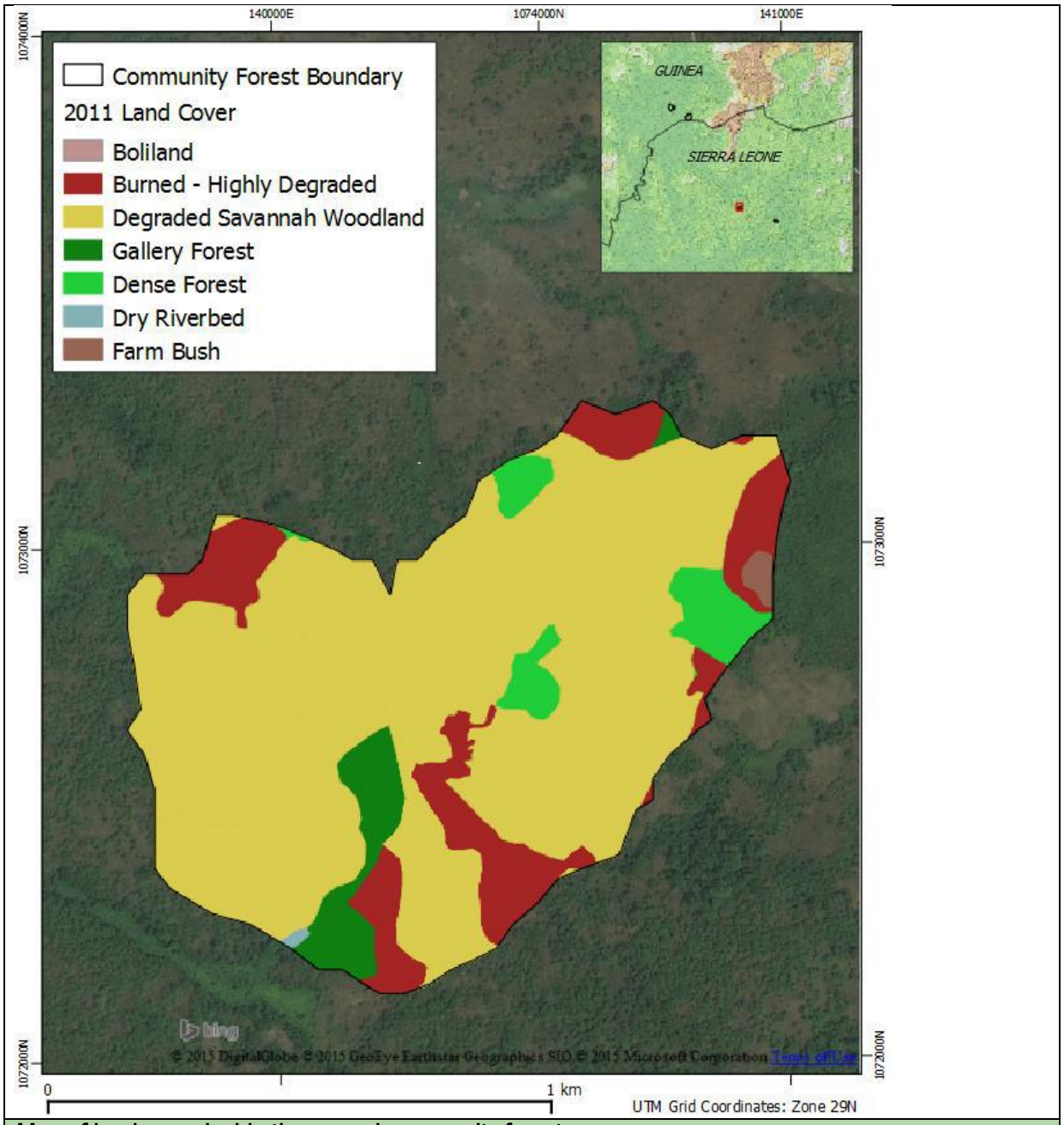
4. Monitoring plan

Activity	Details	Responsible group(s)	Frequency
Forest patrols	A forest patrol is conducted along a predetermined route that covers all areas of the community forest. Any signs that by-laws have not been followed are recorded and reported to the FMC. All observations or signs of key species included in biodiversity monitoring are recorded.	FMG and FMC	1 patrol per month
Management group meetings	All management groups (FMC, FMG and FCG) meet and discuss whether the management plan is being carried out, and if the group has the necessary skills and resources required. The minutes from the meeting, and any financial transactions are documented.	FMC, FMG and FCG	Each group meets at least once every 3 months
Activity-based monitoring	Reports from forest patrols and management group meetings are inspected and spot checks on field activities are carried out to determine if thresholds for monitoring indicators in the PDD have been fulfilled	Project Coordinator	Once per year
Participatory Biodiversity Assessment	A participatory biodiversity assessment is carried out following guidelines in the PDD.	Project Coordinator	Once per year

Sumata Community Forest

1. Project intervention area

Village Name:	Sumata
Location:	Bombali District, Sierra Leone
Coordinates:	lat:9.691710°, lon: -12.268310°
Area of community forest (ha)	94.4 ha
Area of degraded woodland (ha)	71.2 ha



Map of land cover inside the agreed community forest

2. Management activities

Development of community forest management institutions	Management groups • Forest Management Committee (FMC; 9 members) • Forest Monitoring Group (FMG; 4 members) • Fire Control Group (FCG; 7 members). Training • Bookkeeping and administrative skills for FMC • Monitoring techniques and data recording for FMG • Fire prevention and firefighting techniques for FCG Equipment • GPS and cameras for FMG • Protective clothing, firefighting equipment, and tools for clearing firebreaks for FCG
Community forest management	The following by-laws will be enforced: **A. Fire** 1. Wildfire caused by any factor in the community forest be it intentionally or unintentionally is prohibited. If caught the person pays, Le50,000. 2. Wildfire caused by involuntary act should pay the sum of Le20,000. 3. If anyone refuses to join others to make fire break/fire belt or put off uncontrolled fire, the person will be fined Le 50,000 except if permitted or sick or absence with permission. 4. If someone damages another person property through uncontrolled fire be it deliberate or not, the case will between the two parties. **B. Hunting** Hunting with gun or dogs or setting traps in the community forest is prohibited in the community forest. If anyone is caught doing such, he or she will be fined based on the size of the beef: • For large mammals the fine is Le10,000 • For small mammals, the fine is Le5,000 The animal will also be confiscated. If caught the second time, the person will pay the sum of Le50,000 and if he is caught the third, time, his gun will be confiscated. **C. Logging** 1. Logging is prohibited in the community forest. 2. If a citizen is caught logging in the community forest, his machine will be confiscated and fined the sum of Le300,000. 3. If a stranger is found guilty of logging in the community forest, he will be fined Le300,000, machine confiscated and ask to leave the village. **D. Honey harvesting** Any honey harvesting which may lead to the cutting of trees or uncontrolled fire is not allowed in the community forest. Anyone caught will be fined, the sum of Le5,000 and the harvested honey confiscated. **E. Mining by-laws** 1. Mining is not accepted in the community forest. If a citizen is caught mining in the community forest, he will be fined the sum of Le10,000, confiscate the minerals and the mining equipment. 2. If a stranger is caught mining in the community forest, he will be fines the sum of Le500,000, confiscate the minerals, the mining equipments and ask to leave the village.

	F. **NTFP harvesting** NTFP harvesting is only allowed if it is done sustainably without damaging the forest and its plant. Anyone who cuts or damages the plant will be fined the sum of Le5,000. **G. Farming** 1. Farming closed to or within the community forest is prohibited. Farming should be half a mile away from the community forest. Anyone caught will be fined the sum of Le20,000 and ask to leave the brushed forest. 2. No one is allowed to brush the community forest for any purpose or reason. If caught, the person will be fined Le30,000. 3. If anyone farms near a river or stream, he should not brush close to the river but should leave at least five yards off the banks of the river **H. Fishing** 1. Smoking fish in or the community forest is not allowed. If caught, the person should be fined Le10,000 and the fish confiscated. 2. No one should use fire to brush fishing inlet and outlet. If caught the person will be fine the sum of Le10, 000. IF ANYONE REFUSES TO PAY THE FINE, THE MATTER WILL BE REPORTED TO THE HIGHEST AUTHORITY – SECTION CHIEF AND OR NATIVE ADMINISTRATION.
Fire management	• Awareness raising and firefighting training for whole community • Clearance of 10m wide fire breaks around all vulnerable areas of the community forest.

3. Climate benefits

	Value	Source
A. Expected climate benefit per hectare (tCO_2e/ha)	91.6	Technical Specification
B. Leakage (tCO_2e/ha)	0	Leakage is not accounted for as Plan Vivo certificates will not be issued
C. Area of degraded woodland (ha)	71.2	Management Plan
D. Climate benefit (tCO_2e)	6521	(A-B)*C
E. Risk buffer (tCO_2e)	1500	23% of D
F. Carbon credits (tCO_2e)	5021	D – E

4. Monitoring plan

Activity	Details	Responsible group(s)	Frequency
Forest patrols	A forest patrol is conducted along a predetermined route that covers all areas of the community forest. Any signs that by-laws have not been followed are recorded and reported to the FMC. All observations or signs of key species included in biodiversity monitoring are recorded.	FMG and FMC	1 patrol per month
Management	All management groups (FMC, FMG and FCG)	FMC, FMG and	Each group

group meetings	meet and discuss whether the management plan is being carried out, and if the group has the necessary skills and resources required. The minutes from the meeting, and any financial transactions are documented.	FCG	meets at least once every 3 months
Activity-based monitoring	Reports from forest patrols and management group meetings are inspected and spot checks on field activities are carried out to determine if thresholds for monitoring indicators in the PDD have been fulfilled	Project Coordinator	Once per year
Participatory Biodiversity Assessment	A participatory biodiversity assessment is carried out following guidelines in the PDD.	Project Coordinator	Once per year

Annex 6. Permits and legal documentation

The project is part of the STEWARD programme that is covered by a Memorandum of Collaboration between the Government of Sierra Leone Ministry of Agriculture, Forestry and Food Security (MAFFs). A copy of this agreement is provided as a separate document.

Appendix A
Carbon stocks and regeneration potential in a West African Forest-Savannah Mosaic landscape

Introduction

The Guinean Forest-Savannah Mosaic (GFSM) extends from Senegal to Eastern Nigeria and covers a total area of around 675,000 km^2 (Loveland et al. 2000). The GFSM is a transitional ecoregion between open savannah to the north and more continuous forest cover to the south. It is characterized by patches of forest interspersed with savannah and open grassland. The proportion of forest, woodland and grassland in the mosaic is determined by the amount of rainfall, severity of dry season fires, and by human activity (Cole 1992, Longman and Jenik 1992).

The GFSM is used by local communities for livestock grazing, shifting cultivation, and extraction of timber and non-timber forest products. Local communities therefore play an important role in determining the structure and species composition of GFSM landscapes. When practiced at low intensity local land use practices employ burn cycles and fallow periods that maintain soil fertility and allow natural regeneration to take place. Over recent years, however, population pressure has resulted in shortened fallow periods and more frequent burning in many areas.

Frequent burning alters the species composition and vegetation structure in GFSM and increases the proportion of open woodland and grassland in the mosaic (Longman and Jenik 1992). It is thought that climatic conditions over the past 2000 years would have led to an expansion of forest patches within GFSM were it not for human activities that have created the opposite pattern (Maley 1994). However, if burning is controlled and seed trees area available, regeneration of woody biomass on degraded areas of GFSM can occur (White 1983).

To assess the potential for biomass regeneration in degraded areas of GFSM we carried out a survey of carbon stocks, and mapped land cover in two villages in a GFSM landscape on the boarder of Sierra Leone and Guinea. We also reviewed relevant literature from studies of regeneration rates in West African woodlands where sustainable forest management and fire control practices were successfully implemented.

Material and Methods

Carbon stock survey

A carbon survey was conducted in and around two villages – Kansema in Guinea, and Sumata in Sierra Leone (see Figure A1a). These villages were selected as they provide typical examples of land cover present in this GFSM region. Within the village land of these two villages survey plots were established either from randomly selected coordinates or, where dense vegetation made access to entirely random locations impractical, at randomly determined distance and direction from woodland tracks.

A total of 97 0.1ha plots were surveyed: 60 in woodland, savannah, and old fallows; 15 in forest patches, 17 in gallery forest, 4 in Boliland, and 1 in an active field (see Figure A1c and d). A total of 2016 trees with a diameter ≥ 10cm were measured. The above-ground biomass of each tree was estimated using an allometric model for tropical dry forests (Chave et al. 2005). The total carbon stock in above ground biomass for each plot was then calculated.

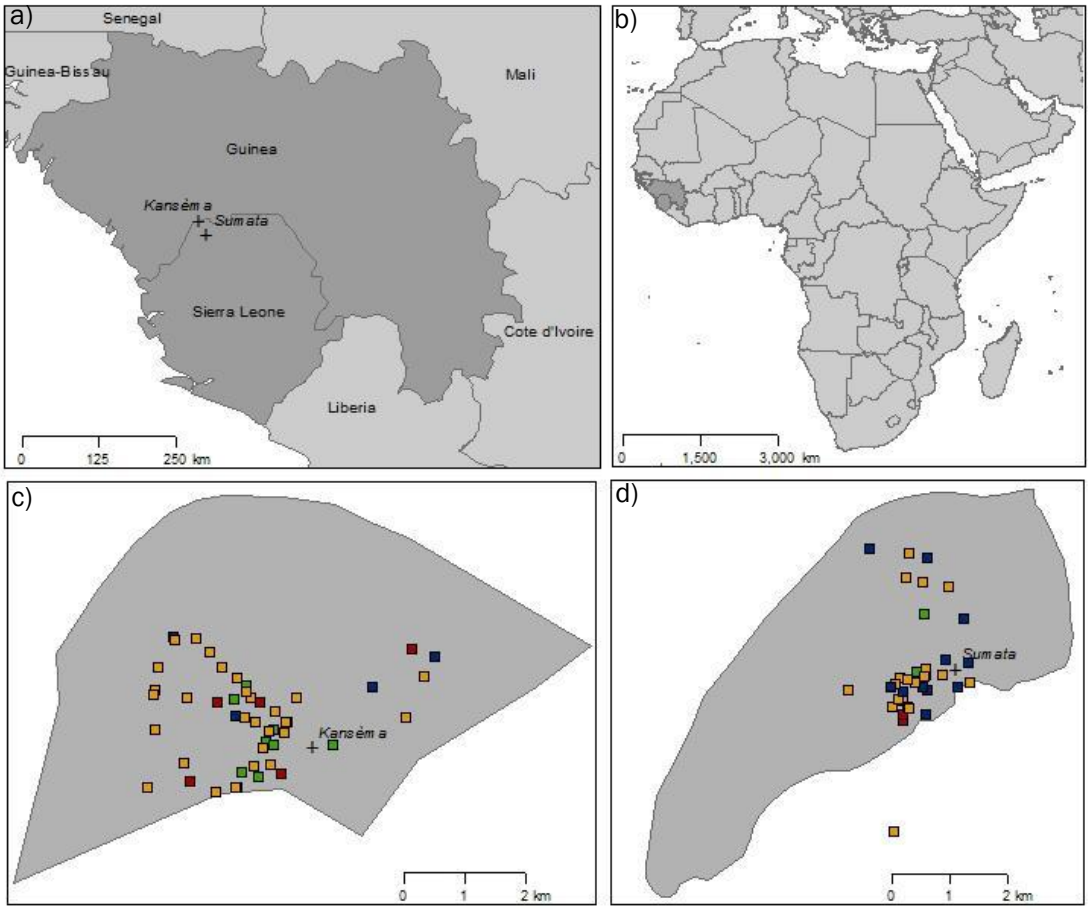


Figure A1. Location of a) Kansema in Sumata in b) Guinea and Sierra Leone; and location of sample plots within the village land of c) Kansema, and d) Sumata. Yellow squares = Woodland, savannah, and fallow plots; Green squares = Forest plots; Red squares = Active field and boliland plots; Blue squares = Gallery forest plots.

Land cover mapping

Land cover was mapped in the village land around Kansema and Sumata using participatory mapping approaches to produce sketch maps of the main land use and land cover types present, which were then geo-referenced with visual interpretation of high resolution remote sensing data (4m resolution multispectral data from Orbview-3 acquired in December 2011).

Literature review

To determine rate at which degraded GSFM could be expected to regenerate, we reviewed published case studies that report changes in above-ground woody biomass when community forest management was successfully implemented in West African woodland and savannah areas. Although the literature available was scarce evidence from 10 community forests in Senegal, Guinea-Bissau, and Mali was identified. The average change in carbon stocks in above-ground woody biomass was calculated for each of these case studies.

Results

The estimated carbon stocks in above-ground woody biomass recorded from the survey carried out in the village land of Kansema and Sumata are summarized in Table 1.

Table 1. Mean ±SD above ground biomass carbon stocks recorded in a survey of 99 sample plots in Kansema and Sumata

Land use/Land cover		n	Carbon stock (tC ha^{-1})
Forest-Savannah Mosaic	Forest	15	116.2 ±62.0
	Woodland	36	83.1 ±47.8
	Savannah	17	79.1 ±30.0
Shifting cultivation	Active field	1	7.1
	Fallow field	7	76.0 ±60.5
Other	Boliland	4	14.5 ±21.1
	Gallery forest	17	59.9 ±54.3

Land cover within Kansema and Sumata village land is shown in Figure A2. In Sumata the village land is dominated by woodland and savannah with patches of forest, and gallery forest along waterways. In Kansema a similar pattern is present, but there are also large areas of Boliland.

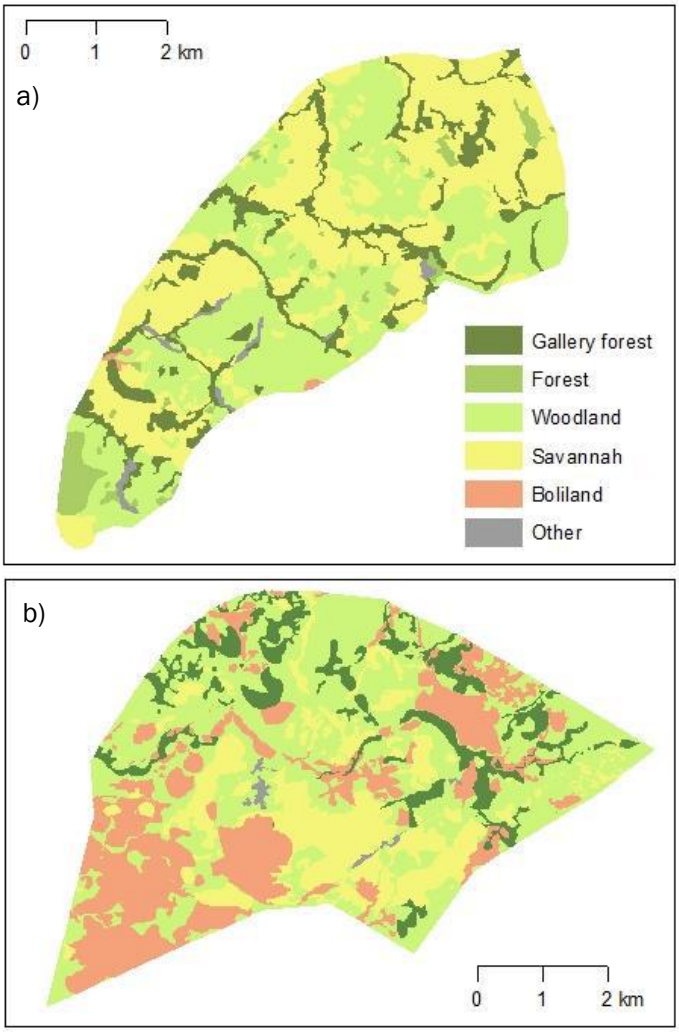


Figure A2. Land cover in a) Sumata, and b) Kansema village land, derived from a combination of participatory mapping and visual interpretation of high resolution remote sensing data from December 2011.

The changes in carbon stocks in above-ground woody biomass reported from case studies of successful

community forest management in West African woodland and savannah areas is summarised in Table 2. The average regeneration rate (± 95% confidence interval) was 8.8 ± 3.4 tC/ha/yr.

Table 2. Regeneration rates reported for successful community forest management in West African woodland and savannah areas.

Country/Source	Community forest	Vegetation type	Measurement period (years)	Initial biomass (tC/ha)	Regeneration rate (tC/ha/year)
Senegal[1]	Tomboroconto	Bushy forest	5	38.0	13.5
Senegal[1]	Tomboroconto	Woody savannah	5	40.3	6.3
Senegal[1]	Tomboroconto	Shrub savannah	5	19.6	1.26
Guinea-Bissau[1]	Djalicunda	Woody savannah	3	176.4	6.3
Guinea-Bissau[1]	Buro	Woody savannah	3	114.8	20.88
Guinea-Bissau[1]	Ga Quebo	Woody savannah	3	127.8	3.78
Guinea-Bissau[1]	Sitato	Woody savannah	3	72.9	11.34
Guinea-Bissau[1]	Djalocunda	Woody savannah	2	60.2	8.64
Mali[1]	Safecoro	Lowland savannah	3	26.18	7.92
Mali[2]	Bougoula	Woody savannah	4	13.09	8.3

[1]Skutsch and Solis (2010)
[2]Skutsche and Ba (2010)

Discussion

The inventory data highlight the high potential carbon stocks in forest-savannah mosaic areas. The relatively undisturbed forest areas had an average carbon stock 116.2 tC ha^{-1}, while the carbon stocks in more degraded woodland and savannah areas had carbon stock of around 70% of this amount. The inventory did not provide a basis for discriminating between woodland, savannah and fallow fields, which all had average carbon stocks of around 80 tC ha^{-1}, highlighting the continuum of land cover that characterises the forest-savannah mosaic and makes distinctions between some land cover types quite arbitrary.

Variation in the carbon stock values in forest-savannah mosaic areas was around 50% of the mean for all of the land cover types, highlighting the heterogeneity in the landscape even within these land cover classes. Fallow fields had higher variation indicating that a range of fallow ages was represented in the sample.

The carbon stock values reported for gallery forest were lower than expected for this land cover type that is characterised large trees that are sparsely distributed. Given the small size of the sample plots employed in the inventory it is likely that large trees were under-represented in the sample, additional plots with a larger area would therefore be needed to accurately characterise the carbon stocks in gallery forest areas.

Both of the areas that were mapped were a mosaic of different land cover types. The presence of forest and gallery forest patches within the mosaic indicate that the more degraded savannah and woodland patches could have the potential to regenerate if pressures from unsustainable use and unmanaged fire are brought under control.

An estimate for the rate at which these woodland and savannah areas could be expected to increase in biomass if successful community forest management is implemented, can be derived from existing studies which, although they were carried out in different landscapes had initial biomass values within the range of those recorded in our biomass survey. To ensure this estimate is conservative we suggest that the lower 95% confidence interval for annual increase in above-ground woody biomass of 5.4 tC/ha/yr could be applied to estimate biomass change in effectively managed woodland and savannah areas in the region where our biomass survey was conducted, over a 5 year period.

References

Chave, J., Andalo, C., Brown, S. et al. (2005) Tree allometry and improved estimation of carbon stocks and balance in tropical forests. Oecologia, 145, 87–99.

Cole, M. 1992. Influence of physical factors on the nature and dynamics of forest-savanna boundaries. In Nature and Dynamics of Forest-Savanna Boundaries. P.A. Furley, J. Proctor J.A. Ratter, Eds. Chapman and Hall, New York. pp. 37-62.

Longman, K.A. and J. Jenik. 1992. Forest-savanna boundaries: general considerations. In Nature and Dynamics of Forest-Savanna Boundaries. P.A. Furley, J. Proctor J.A. Ratter, Eds. Chapman and Hall, New York. pp. 37-62.

Loveland, T.R., B.C. Reed, J.F. Brown, D.O. Ohlen, Z. Zhu, L. Yang, and J.W. Merchant. 2000. Development of a global land cover characteristics database and IGBP DISCover from 1 km AVHRR data. International Journal of Remote Sensing. 21:1303-1330.

Maley, J. 1994. The African rain forest – main characteristics of changes in vegetation and climate from the Upper Cretaceous to the Quaternary. Pages 31-74 in I. J. Alexander, M. D. Swaine, and R. Watling, editors. Essays on the ecology of the Guinea-Congo rain forest. Proceedings of the Royal Society of Edinburgh Series B 104.

Skutsch, M. and Solis, S. (2010) How much carbon does community forest management save? The results of K:TGAL´s field measurements. K:TGAL project report. http://www.communitycarbonforestry.org/NewPublications/How%20much%20carbon%20does%20community%20forest%20management%20save%20website%20version.pdf

Skutsch, M. and Ba, L. (2010) Crediting carbon in dry forests: The potential for community forest management in West Africa. Forest Policy and Economics 12(4): 264–270.

White, F. 1983. The vegetation of Africa: A descriptive memoir to accompany the UNESCO/AETFAT/UNSO Vegetation map of Africa (3 Plates, Northwestern Africa, Northeastern Africa, and Southern Africa, 1:5,000,000). UNESCO, Paris.