

Plan Vivo Project Design Document (PDD)

Trees for Global Benefits



**Implemented by Environmental Conservation Trust of Uganda
(ECOTRUST)**

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SECTION A. General project description

A.1. Title of Project

Trees for Global Benefits: A Cooperative Community Land-Use Carbon Offset Project, Uganda

A.2. Description of Project Aims and Activities:

Background

There is considerable interest within Uganda concerning the potential of carbon trading to fund small-scale, farmer-led forestry projects. Two relatively large-scale carbon funded afforestation projects have been started in Uganda by the Dutch Forests Absorbing Carbon dioxide (FACE) Foundation. However, the potential of carbon trading to have direct beneficial effects on local communities has yet to be realised. An assessment was conducted by Edinburgh Centre for Carbon management (ECCM), to explore the potential of a community-based scheme. The assessment involved discussions with the Uganda Forest Sector Coordination Secretariat (UFSCS), the Forest Department (FD), CARE international, The World Agroforestry Centre (ICRAF), ECOTRUST, Uganda Wildlife Authority (UWA), the National Environment Management Authority (NEMA), and Makerere University. The results of the assessment recommended that a pilot project be developed with The Environmental Conservation Trust of Uganda (ECOTRUST) taking on the coordination role while CARE offers advisory services to farmers and ICRAF takes the lead in development of technical specification. The pilot project was initiated in Bushenyi District in 2003 and has currently rolled over to other districts (Hoima and Masindi) within the Albertine Rift

Project Aims

The project code-named **Trees for Global Benefits** has been designed as a **cooperative community . based carbon offset scheme with livelihood components emphasising sustainable land-use practices.** The aim of the project is to produce long-term, verifiable voluntary emission reductions (VERs) by combining carbon sequestration with rural livelihood improvements through small-scale, farmer led, forestry/agroforestry projects while reducing pressure on natural resources in national parks and forest reserves.

Project Activities

Carbon sequestration / emission reduction benefits will be generated by a suite of land-use activities involving afforestation and reforestation as well as agroforestry. The project is currently focusing on development of agroforestry systems of mixed native and naturalised tree species on smallholder lands. This mainly involves the planting of native and / or naturalised hard wood and fruit tree species on private land. The communities are currently planting native trees such as *Maesopsis eminii*, mahogany (such as *Khaya anthotheca*), *Melicia excelsa* and *Terminalia spp.* The fruit trees include kackfruit, avocado and mangoes. The farmers choose the land-use system they would like to use in their individual *plan vivos* (management plans). Currently there are two options; *Maesopsis eminii* woodlots or mixed native woodlots. Other methodologies will be developed as and when the communities express interest in those systems. Below are some additional systems that the project is planning to expand into:

- **Afforestation on forest reserve land by farmers**

The project plans to expand through supporting the planting of native trees in central forest reserves within the project area. The project will facilitate the negotiation of collaborative management arrangements which will result into management agreements (among others) with the National Forest Authority.

- **Establishment of boundary and bufferz**

Another area where the project plans to expand is the planting of trees between lands managed by the Uganda Wildlife Authority (UWA), National Forestry Authority (NFA) and private lands. ECOTRUST operates a Land Trust programme through which it promotes private land management for biodiversity conservation. Under this programme, ECOTRUST acquires land of conservation significance which is not under the current protected areas system. This land is then jointly managed by ECOTRUST and the surrounding community.

- **Forest conservation and rehabilitation**

The communities have also expressed interest restoring communal forests and forest reserves. Through the USAID/PRIME-west funded project, ECOTRUST is supporting these communities to register Communal Land Associations (CLA), which would enable them to manage the communal forests legally under a community arrangement. Through this arrangement ECOTRUST anticipates that they would also use their organization to access carbon funds for forest restoration. For the forest reserves as well as communal forest restoration, the farmers will be guided to use colonizers such as *Maesopsis sp.* In addition, the communities are planning to use credits from avoided deforestation for forest conservation/management activities. ECOTRUST has supported these communities to

produce community-based management plans for the communal forests. The project is targeting enrichment planting of the communal forests of Ongo and Alimugonza as well as forest reserves of Budongo and Bugoma. The communities have also expressed interest in avoided deforestation.

Project Baseline

Based on the National Biomass Study (NBS), an exploratory inventory covering the whole of Uganda with systematic sampling at a 5km by 10km grid, on farm tree stock biomass in Bushenyi is generally low compared to places such as central Uganda. For example the average on tree biomass stock in Bushenyi is 5 tonnes (air-dry) per hectare which translates to approximately 2.5 tones carbon per hectare (NBS data base 1995-1999). On farm tree density in Bushenyi is so low. In Hoima and Masindi however, on farm tree stock biomass is higher ranging from 5 . 13 tones (air dry) per hectare (NFA, 2005) which translates to 2.5 . 6 tones C per hectare. The baseline data based on NBS exploratory inventory provides an overview, but specific household farm management information is crucial for individual households to access carbon credits. Thus for every interested farmer, data will be collected on current farm management system and tree diversity and biomass (carbon equivalent). The area to be planted for each farmer will be measured using a simple hand held GPS. In addition the trees currently growing on the plan will be measured and the initial tree carbon calculated. The project will also determine specific estimates for each of the new areas of project expansion (i.e. forest reserves and buffer zones).

Additionality Analysis

ECOTRUST has since its inception been working with the communities in the Albertine Rift promoting sustainable natural resource management with growing of trees as one of the activities. The experience is that the community groups are more attracted to fast growing exotics such as pine and eucalyptus. This is because prior to the project, there was virtually no system in the country supporting (financially and technically) the growing of native Ugandan trees. The communities have cited lack of planting materials to support growing of indigenous species. In addition, the communities lack technical expertise, especially in the production of quality planting materials. This is compounded further by the fact that communities lack disposable income to purchase seedlings as well as to afford extension services from technical experts. The project therefore provides the required finances for the farmers to invest in small scale long-term agro-forestry enterprises of native trees on their land. In addition, the project provides technical support and training especially in the area of sourcing quality seed and technical skills in collection and handling of the seed to raise good

quality seedlings. After the commercial nurseries have been established, the farmers are then further supported with credit to purchase seedlings and this advance is subtracted from their first payment.

A.3. Project Participants:

Participant	Type of organization	Nationality	Role
ECOTRUST	Non Profit, Non Governmental Organisation	Ugandan	Project coordinator acting as fund manager, Administering and coordinating carbon offset activities as well as acting as a central archive and clearinghouse for all documentation and data generated by the project.
ICRAF/NaFORRI*/FFNC**	Research Organisations	Uganda	Development of technical specifications and baseline
ECCM		UK	Technical assistance in carbon modeling and baseline specification as well as capacity building of project implementers
CARE	Non Governmental Organisation	Uganda	Service provider to the farmers
Farmer Groups	Community Based Organisations	Uganda	Farmer recruitment
UFSCS/NFA	Governmental parastatal	Uganda	Financial support
USAID	Donor	Kampala	Financial support
DFID	Donor	United Kingdom	Financial support

*National Forestry Resources Research Institute

**Makerere University Faculty of Forestry and Nature Conservation

A.4. Description of Location and Boundaries of the Project:

The project is located in the **Albertine Rift in Uganda**, an area stretching from the Virungas on the border between Uganda and Rwanda up to the northern tip of Lake Albert (see fig 1 below). The project was **initiated in Bushenyi District** (Western Uganda) covering the sub-counties of Bitereko, Kanyabwanga, Kiyanga, Kichwamba and Ryeru bordering the forest reserves of Kasyoha . Kitomi, Maramagambo and Kalinzu as well as Queen Elizabeth Protected Area (see figure 2 below). The project has now expanded (see Fig 1 below) to Hoima District in Kyangwali, Kiziranfumbi and Kabwoya sub-counties neighboring Bugoma Central Forest Reserve as well as to Masindi District in Budongo, Pakanyi, Karijuba and Bwijanga sub-counties neighboring Budongo Central Forest Reserve.

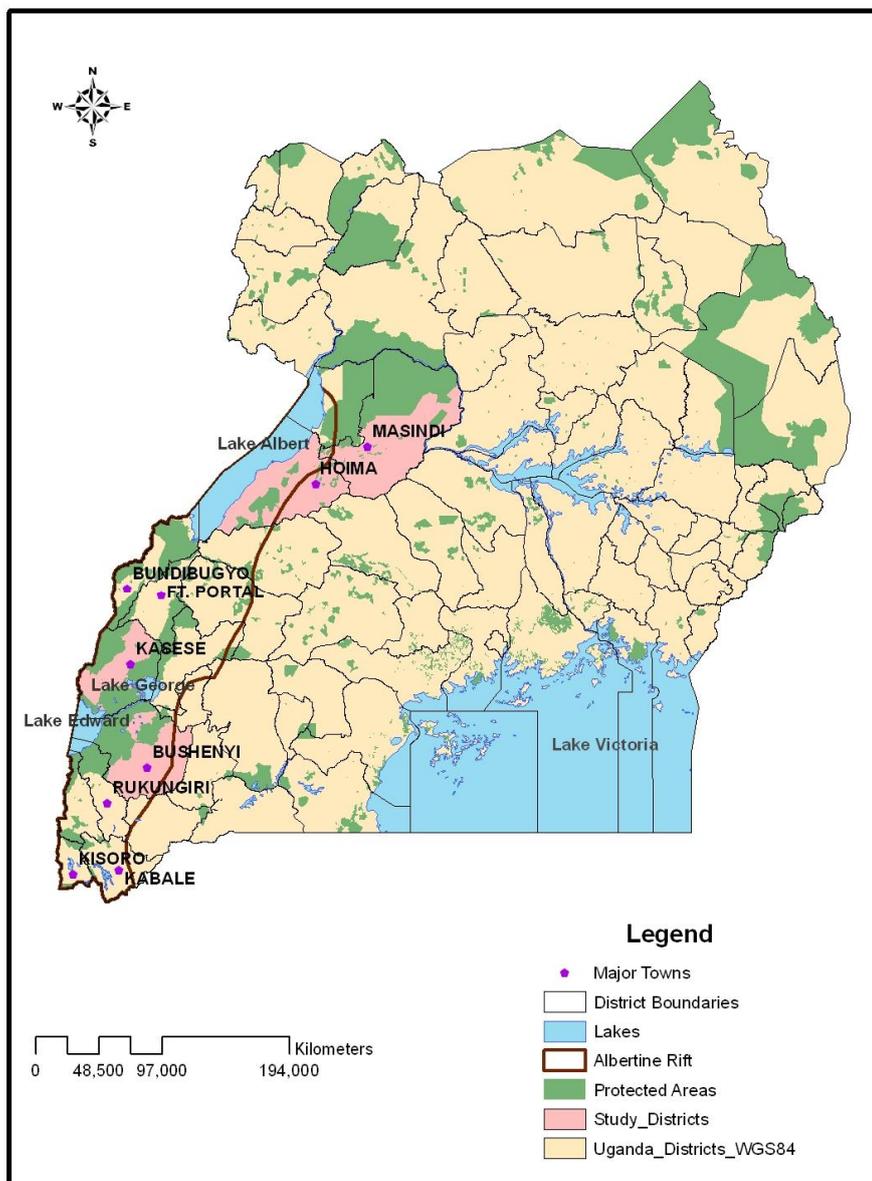


Figure 1: Map of Uganda showing the location of the Albertine Rift and the targeted Districts (Bushenyi, Kasese, Hoima & Masindi)

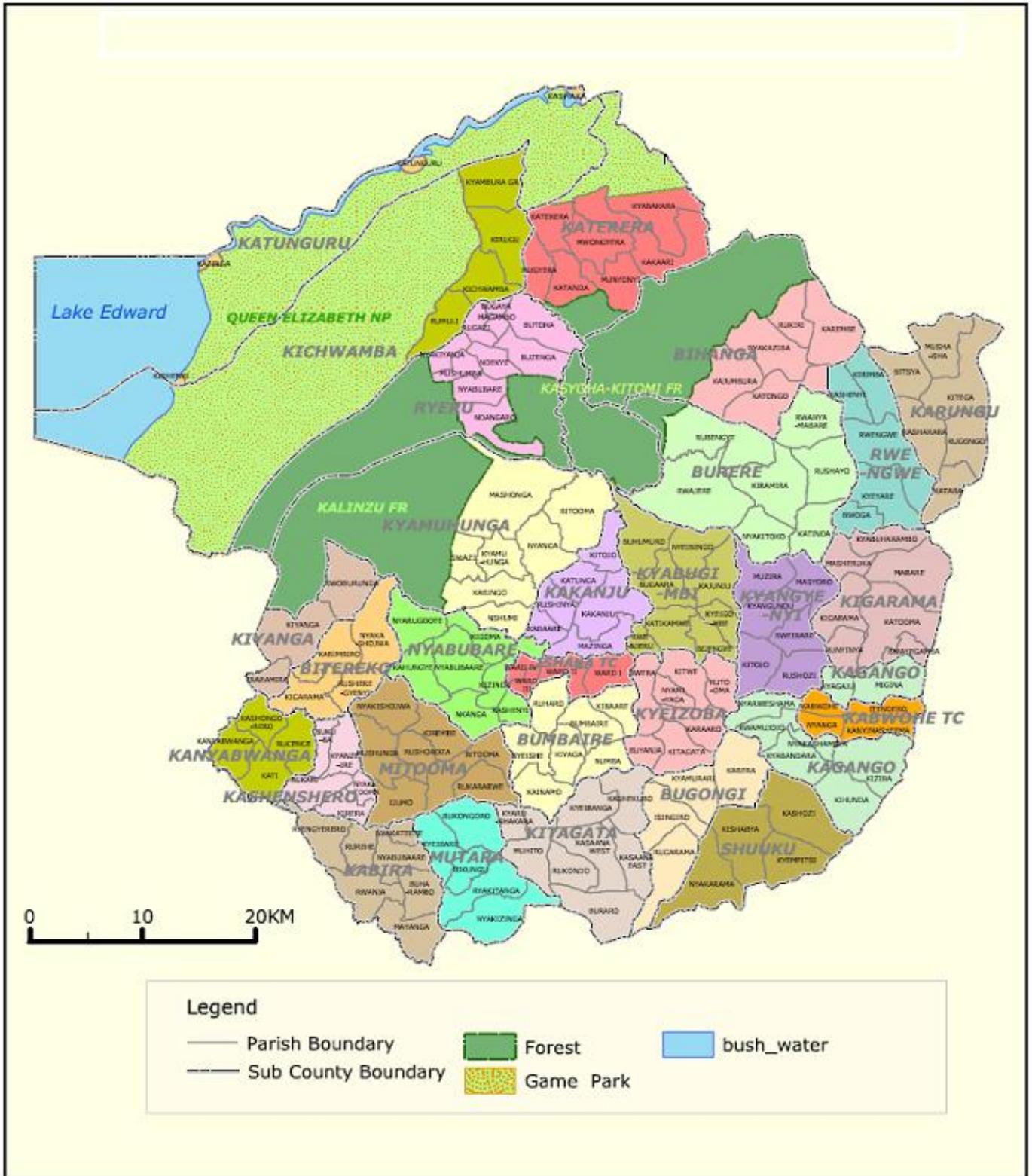


Figure 2: Map of Bushenyi District (the Pilot Area) showing the location of the targeted sub-counties of Bitereko, Kanyabwanga, Kiyanga, Ryeru & Kichwamba as well as the neighboring Protected Areas of Kalinzu & Kasyoha – Kitomi Forest Reserves and Queen Elizabeth National Park

A.5. Description of the Project Objectives and Target Groups:

The aim of the Trees for Global Benefits project is to produce long-term, verifiable voluntary emission reductions (VERs) by combining carbon sequestration with rural livelihood improvements through small-scale, farmer led, forestry/agroforestry projects. Tree growing on private and government land is expected to contribute to reducing pressure on natural resources in the neighboring national parks and forest reserves. The income from carbon credits will be used by farmers to invest in small scale agroforestry enterprises on their land

The pilot project activities are undertaken with established groups of farmers in the Kiyanga, Bitereko Kichwamba and Ryeru sub-counties of Bushenyi District. These are small scale landholder farmers with an average of 2 to 5ha of land. The focus will be on agroforestry systems and small scale woodlots to improve incomes, provide increased access to fuel wood and building materials, and reduce deforestation pressures.

The pilot project has evolved into a model that is being replicated in other parts of Uganda, specifically targeting Collaborative Natural Resource Management community groups within the Albertine Rift. The project has been expanded to include communities involved in participatory natural resource management targeting the forest reserves as well as communal forests in the districts of Hoima and Masindi. Communities are engaged through the Plan Vivo process of community consultation and participatory meetings with farmer coordinators and organised Collaborative Forest Management (CFM) Groups. All the CFM groups have signed agreements with the National Forest Authority to participate in the management of Forest Reserves (Budongo and Bugoma). In addition, two groups in Masindi are in the final stages of acquiring titles of Communal Ownership for Ongo and Alimugonza communal forests. The communities need availability of a long term source of income to facilitate the forest management activities. It is envisaged that carbon finance will provide that source of income.

A.6. Description of the Project Area:

The Albertine Rift is a biodiversity hotspot (Conservation International), Endemic Bird Area (Birdlife International) and a priority Eco-Region (WWF). Due to its biodiversity conservation importance, the project area is home to several protected areas including national parks (e.g. Queen Elizabeth and Rwenzori), wildlife reserves (e.g. Kyambura, Kabwoya, Kaise-Tonya & Bugungu) forest reserves (e.g. Kalinzu, Maramagambo, Kasyoha-Kitomi, Bugoma & Budongo), Ramsar sites (e.g. Lake George), man and biosphere reserve (e.g. Queen

Elizabeth National Park) as well as UNESCO World Heritage sites (Rwenzori Mountains). The Rwenzoris are a World Heritage Site due to its cultural and environmental values. Notably among the environmental services, the Rwenzoris were declared a World Heritage Site partly due to its role in the hydrological cycle. The project targets communities that are neighboring with protected areas and plans are underway to extend the project to other areas of ecological importance within Uganda. The areas for expansion will be selected based on their ecological conservation importance as well availability of land, mainly privately/communally owned. The project has identified communities around Agoru-Agu and Mt Otzi Forest Reserves as well as East Madi Wildlife Reserve as possible areas of expansion. These protected areas are within the greater Albertine Rift (also known as the Albertine Graben)

Generally, the project area is characterised with tropical high forests with several forest reserves and isolated pockets of forests on private land. The isolated pockets of forest on private land are more pronounced in the Masindi . Hoima forest system. The forests are mainly riverine, tropical high and medium altitude, moist semi-deciduous rain forests. It is estimated that 43% and 56% of the land cover in Hoima and Masindi respectively is either tropical high rain forest or woodland.

The geography of the Bushenyi area includes highly populated highlands with fertile but nutrient-depleted soils, mid-elevation high-intensity mixed farming systems. There is barely an area located on flat terrain. Although some areas have slopes ranging from 2° - 5°, most areas are located on steep slopes of between 20 and 70°. The area is highly susceptible to erosion due to steep slopes that are devoid of vegetation.

The project area, just like most parts of Uganda, has a tropical climate with a bimodal rainfall distribution allowing for two planting seasons in a year. This region experiences moderate temperatures with a long term mean temperature of 21°C (NSOER 2006/06).

Land Degradation

Despite the conservation importance of the project areas, they have been subjected to widespread and rapid degradation even within some of the Protected Areas. The pilot area around Kyambura Wildlife Reserve and Kasyoha-Kitomi, Kalinzu & Maragambo Centra Forest Reserves has lost forest cover due to extensive encroachment for agricultural land. The tropical high forest and woodlands in Hoima and Masindi, have been degraded over the years, resulting in fragmentation of once densely forested or wooded areas. This applies to both private/communal forests and central forest reserves. Plumptre (2002) estimates that

between 1986 and 2002, over 110 km² of forest was cleared within 15 km of Bugoma, and about 90km² was cleared within 15km of Budongo. The loss of vegetation cover has greatly contributed to a reduction in corridor connectivity of the different forested areas in this landscape.

This degradation is driven by a range of factors, including the expansion of small scale subsistence agriculture and large scale commercial agriculture. In the Hoima . Masindi area for example, the degradation is mainly due to large scale commercial agriculture (sugar, and tea), and in particular, the tobacco growing industry, which is practiced on a small scale by tens of thousands of (often migrant) farmers. Tobacco thrives on newly cleared, previously forested land, and this is reported by many local residents to be one key driving force in the initial clearance of forest, followed by food crop farming. In addition, the communities depend on the forest for poles needed to construct tobacco kilns.

A.7. Description of socio-economic context and land tenure:

A.7.1 Land Use

The project area is characterized by a wide range of physical, agricultural and ecological land cover types as well as a range of socio-economic conditions. The project is targeting small scale landholder farmers with established community groups neighboring protected areas. The pilot project covered Kiyanga, Bitereko, Ryeru and Kichwamba sub-counties of Bushenyi. Bushenyi district has developed Sub-county Environment Action Plans (SEAPs) and District Environment Action Plan (DEAP) where the need for tree planting featured prominently. With adequate land availability, especially the bare hills in Bushenyi, it was thought that this project would be well received in the areas. The project will roll out by identifying areas with tree planting needs as well as adequate land for the tree growing.

The baseline study for Bushenyi identified subsistence agriculture as the dominant occupation amongst the households visited. The main crops grown include bananas locally known as matooke, maize, beans, millet etc. A few household members are public servants, business people and wage earners. For Hoima and Masindi however there is large scale commercial agriculture (sugar and tea), and the tobacco growing industry, which is practiced on a small scale by tens of thousands of (often migrant) farmers. 19% and 33% of the land in Masindi and Hoima respectively is under subsistence agriculture (National Biomass Study 2004).

A.7.2 Anticipated Socio-Economic Benefits

Initiating a Plan Vivo system in Uganda will result in significant ancillary benefits beyond sequestering carbon. The focus is on agroforestry systems and small scale plantations to improve incomes, provide increased access to fuelwood and building materials, and reduce deforestation pressures on nearby forests. The contribution of trees and tree products to the livelihood security of farmers cannot be overemphasized. While working towards establishment of tree stands for carbon sequestration, the trees at the same time provide multiple products to the Farmers thereby improving their incomes and livelihood security.

Revenue generated through initial sales of carbon will largely offset start up costs for small-scale forestry activities in Uganda, thus enabling rural communities to invest in sustainable resource management using income from environmental services. Participants will also gain access to local and national markets for timber, pole wood and fuel wood, fruit and fodder. Nursery establishment and production of seedlings will also provide additional income to rural communities. In addition, the project will build local capacity and develop generic carbon management systems that may be replicated in other communities throughout the country. The project is also targeting to support other income generating activities within the carbon trees. For example bee keeping, passion fruit growing, some neglected and under utilised plant species that are resilient to the adverse climatic conditions such as *Dioscorrea* spp.

Furthermore, small-scale production of fuel wood and timber will alleviate pressure on nearby forest reserve and national park resources. Tree planting contributes to soil conservation, and the intended emphasis on native tree planting will contribute to habitat restoration and protection in rural Uganda.

A.7.3 Land Tenure

The pilot districts were selected based on the availability of land that is both state (Forest Reserves) and privately owned. Besides land availability, the two districts have relatively secure land tenure systems. Security of land tenure is one of the key considerations for development of a carbon management project for a reason that there should be long-term commitment by the landowner to have land under a forestry system for a number of tree rotations. Communities in most of the rural parts of Uganda hold land under customary

tenure. However, the majority are able to demonstrate the long-term rights to such land. Ability to demonstrate these long-term rights will be one of the major determinant factors for all the districts the project is expected to cover.

The pilot project baseline study indicated that forty seven percent of all the respondents in the pilot area had between 5-10 acres of land, of which 23% were purchased, and about 21% inherited. The project will ensure that each participant is able to demonstrate long-term ownership/rights to the land under carbon management. This will be evidenced by documents such as purchase agreement, land title as well as certificate of customary ownership. In addition, a local leader (political head of the village) will approve/consent that the land is for the applicant.

A.8. Description of the proposed Plan Vivo technical specifications (methodologies):

Carbon quantification is based on conservative estimates of the expected average increase in carbon stocks in above and below-ground woody biomass over 100 years (IPCC standard), adjusted in the case of the TFGB project for a fifty-year timeframe. The carbon benefits of each eligible land-use system are calculated using the relevant project technical specification. The technical specification for each land-use system specifies the carbon potential based on a simple carbon accounting model and the associated management regime. The project through a farmer led approach will identify the preferred farming systems and develop technical specifications for those systems. The actions required to develop each technical specifications will include baseline studies, biomass surveys, carbon modelling, training workshops and community meetings, and biodiversity and socioeconomic impact assessments.

For the pilot phase, the project is using technical specifications for two farming systems; Woodlots . mixed native - AFM-TB01-01, which is for the establishment and management of mixed native species woodlots on small farm plots¹ and woodlots . *Maesopsis emnii* - AFM-TB02-01, which is for establishment and management of *Maesopsis emnii* timber woodlots on small farm plots². Technical specifications for each of the desired land use systems will be submitted to the Plan Vivo Foundation, which will confirm that the methodology for the land-use system is robust and compatible with Plan Vivo Standards

¹ <http://www.planvivo.org/content/fx.planvivo/resources/TechSpecMixedNativeWlotUg.pdf>

² <http://www.planvivo.org/content/fx.planvivo/resources/UgandaTechSpecMaesopsis.pdf>

Table A.8.				
Title	Type of activity	Objectives	Brief Description	Target areas / groups
Woodlots . mixed native - AFM-TB01-01	Afforestation and Reforestation	Timber, poles, firewood, medicinal	<i>Measopsis eminii</i> , <i>Prunus Africana</i> , Mahogany. Thinning, pruning and other silvicultural practices are done for some species.	Small holder farmers- They grow coffee, potatoes, maize, bananas etc.
Woodlots . Maesopsis emnii - AFM-TB02-01	Agroforestry and afforestation	Timber, firewood	<i>Measopsis eminii</i> . This is a self pruning species	Small holder farmers- They grow coffee, potatoes, maize, bananas etc.

A.9. Description of land tenure in relation to the rights to provide carbon services

Land tenure is one of the key requirements for any potential carbon producer. Most people in the project area have individual or private land ownership. The two districts were selected based on the availability of secure land tenure that is both state (Forest Reserves) and privately owned. The small scale landholder farmers in this area are private landowners and are therefore able to enter into agreements. With regards to state-owned land, the project will work with groups that have land rights through the collaborative forest management agreements with the National Forest Authority.

A.10. Project organisational structure, governance and community participation:

Figure 3 below presents the project organisational structure for the pilot phase

CARBON TRADING IN UGANDA - PROGRAM STRUCTURE

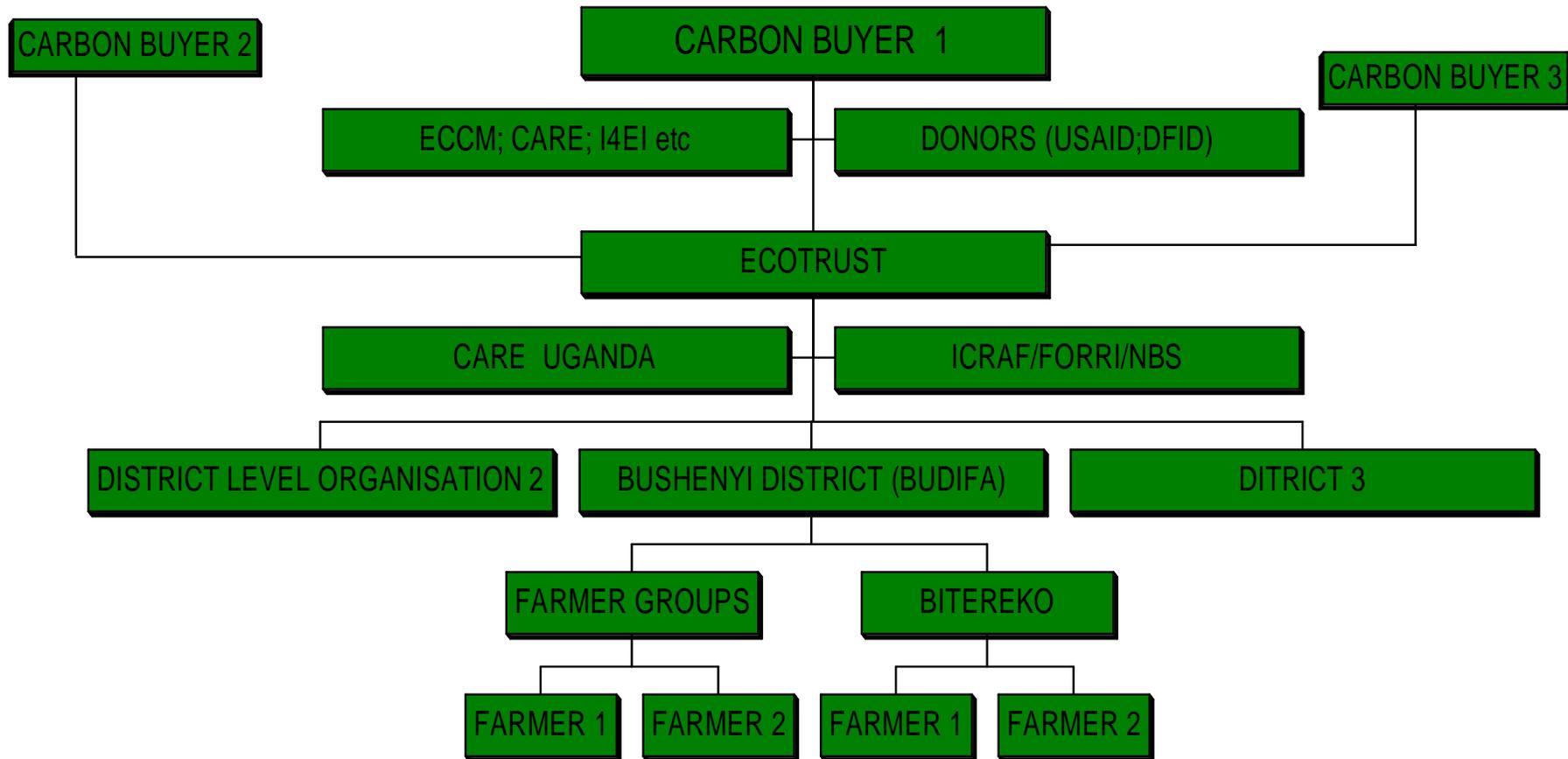


Figure 3: Project organisational structure

A.11. Relationship to national organisations:

The project is working with communities that are collaborating with protected areas authorities to jointly manage natural resources. The project facilitates the development of a relationship between the community and government agencies to enable the community access extension services from the government agency. **The current activities are on privately owned land** and as such do not require the approval of national authorities. Where the communities express interest in carbon on state owned land, the approval of the state agency such as the National Forest Authority will be required. ECOTRUST has a longstanding relationship with government agencies and has facilitated negotiation of user rights for communities living around protected areas. The project will employ the same process should there be a need to establish project activities in government owned land.

A.12. Technology transfer and training:

The project is working towards building **local capacity to manage carbon sequestration projects**. The **Edinburgh Centre for Carbon Management (ECCM)** provided the initial technical assistance in the establishment of the pilot project mainly in project design and **BioClimate Research & Development (BR&D)** provided assistance in capacity building of project implementers. Furthermore, ICRAF provided assistance with carbon modeling and baseline specification. With the experience from the implementation of the pilot, ECOTRUST has developed the capacity to establish similar projects elsewhere in the country as well support other groups/organisations in developing similar projects

Furthermore, the project is building **farmer capacity to manage agroforestry enterprises on their private land**. The capacity building areas include **establishment of nurseries for good quality seedlings, general agroforestry practices, land use planning, group dynamics etc**. A detailed capacity building plan for the project will be developed

A.13. Project financial structure:

The pilot project was established with financial support from the UK Department for International Development (DFID) and USAID. ECOTRUST has continued to

fundraise from various donors for the project start up costs for each of the new areas where the project needs to expand. The finances from the initial carbon sales have been largely administered in conformity the BR&D (now Plan Vivo Foundation)/ECOTRUST agreement with ECOTRUST deducting 28.5% of the sales to cover administrative costs. The administrative costs do not include the Certificate Issuance fees as well as cost of third party verification. The project will from time to time review the pricing structure in consultation with the Plan Vivo Foundation.

Although the funds (less admin costs) go directly to the individual farmers, the farmers will make a contribution from their share to the establishment of a Community Development Fund. This fund will be established to promote initiatives that are for the benefit of the general community where the project is operational. This is intended to create a spill over of the carbon benefits to other members of the community. However, the fund will also act as insurance for some of the risks to project permanency.

A.14. Estimated amount of net anthropogenic GHG removals by sinks and avoided GHG emissions over the project lifetime:

Table A.14				
Technical Specification	Estimated long-term potential carbon benefit t CO₂e			
	Areas established in Year 1	Areas established in Year 2	Areas established in Year 3	Estimated realisable potential
Woodlots . mixed native - AFM-TB01-01	100ha	150ha	200ha	2,000ha established over the project's first ten years with an estimated 400,000 tCO ₂ in 25years-
Woodlots . Maesopsis emnii - AFM-TB02-01	100ha	150ha	200ha	2,000ha established over the project's first ten years with an estimated 400,000 tCO ₂ in 20years-
Fruit orchards (mango, avocado, jackfruit) <i>not yet approved</i>				1,000ha established over the project's first ten years with an estimated 100,000 tCO ₂ in 20years-

SECTION B. Duration of the project activity and crediting period:

B.1. Proposed duration of project activities and carbon benefits:

This is a long term project generating ex-ante carbon credits, which are calculated over a 20 year crediting period in the case of *Maesopsis emnii* Woodlots (AFM-TB02-01) and 25 years in the case of mixed native woodlots (AFM-TB01-01).

The project is now in its sixth year and has the capacity to generate up to 100,000 VERs annually. The aim of the project is to establish 5,000ha over the first 10 years of the project; the sequestration potential of project activities will therefore be approximately 900,000 VERs generated within the first 25 years from the establishment of woodlots.

SECTION C. Technical specifications to be used:

C.1. Estimated long-term carbon benefits for project activities, per hectare:

It is estimated that significant carbon credits can be generated through afforestation/reforestation activities in Uganda. The area planted each year is dependent on the number of farmers recruited annually. The pilot phase of the project has involved recruiting 30 to 50 farmers annually with between 1ha and 5ha of land per farmer. With expansion of the project, the number of participants could extend to 400 farmers recruited annually each with an average 4ha.

The average net accumulated carbon uptake by year 25 is expected to be 226 tCO₂ per ha. This is based on the technical specifications for Woodlots . mixed native - AFM-TB01-01³; and Establishment and management of mixed native species timber woodlots on small farm plots and Woodlots . *Maesopsis emnii* - AFM-TB02-01⁴: Establishment and management of *Maesopsis emnii* timber woodlots on small farm plots.

³ <http://www.planvivo.org/content/fx.planvivo/resources/TechSpecMixedNativeWlotUg.pdf>

⁴ <http://www.planvivo.org/content/fx.planvivo/resources/UgandaTechSpecMaesopsis.pdf>

SECTION D. Measures to ensure permanence and address leakage:

D.1. Measures to Address Risks and Ensure Permanence:

The project is subject to stringent leakage and permanence requirements, as detailed in the Plan Vivo Standards. The main risks faced by the project include pests and diseases, fires and natural disasters such as floods and drought. The project supports farmers to carefully select tree species that suit the local conditions. In addition, the project provides training in general agroforestry practices and supports communities to implement these measures. Moreover, the project has set up a Carbon Community Fund to provide some form of insurance to address unavoidable loss due to natural disasters. The table below describes some of the measures for each of the potential risk. Levels of risk are reasonably low given the staged nature of implementation, long-term role of Ecotrust working with the communities, and protection provided by the community fund and other mitigation measures. The buffer level has been set at 10% (a reserve of unsold credits taken from each plan vivo), to safeguard against unforeseen losses.

Permanence Risks	Management Measures
Fire and natural disasters such as drought and floods	<ul style="list-style-type: none"> - The farmers will be supported with funds from the Carbon Community Fund to replace lost trees due to unavoidable natural disasters - Continued training of farmers in fire management practices such as establishment of fire lines, and fire resistant hedges
Pests and Diseases	<ul style="list-style-type: none"> - Careful selection of trees species that suit the local conditions - Supporting farmers to access extension services from local service providers - Group training in dealing with common pests and diseases
Destruction from grazing	<ul style="list-style-type: none"> - Protecting (esp saplings) with sticks around the plants - Replanting whenever some of the seedlings or saplings are destroyed - Farmers using the leaves from the trees as fodder to zero grazed animals as opposed to letting the animals graze in the woodlots
Raising land opportunity costs	<ul style="list-style-type: none"> - Supporting additional tree based enterprises e.g. apiary, fruits, fodder

D.2. Measures to Address Leakage:

Leakage is unintended loss of carbon stocks outside the boundaries of the project resulting directly from project activity. There are two potential sources of leakage envisaged in this project and these are; displacement of agricultural activity and emissions due to project management activities.

The project is a participatory project that involves working with the farmers to develop a plan (*plan vivo*) for their land or community land. The process puts into consideration the potential for displacement of agricultural activities by assisting the farmer to ensure that adequate land has been set aside for food production. This is expected to minimize the risk of leakage due to displacement for agricultural activity.

For the leakage as a result of project management, it is anticipated that ECOTRUST staff will be visiting the project area at least four times a year (twice a year for training and twice a year for monitoring). It is expected therefore that a total of 500lts (8km per liter of fuel for 1,000km four times a year) will be consumed for the four trips. This amount multiplied by the IPCC emission coefficient of diesel (0.934kgCO₂ per litre) comes to 0.467tCO₂ annually. This amount has been included in the calculation of the risk buffer.

Able D.2.	
Leakage Risks	Management Measures
Displacement of agricultural activity	Code of conduct for producers, which limits involvement in deforestation Technical support in the development of farm plan to ensure that the farmers have sufficient land for agriculture productivity over and above tree planting. Regular socio-economic assessments to monitor land use changes within the project area
Carbon emissions due to Project management and monitoring Travel	Minimizing travel through working with organized groups Estimation included in the risk buffer

SECTION E. Monitoring and Technical Support Plan:

E.1. Monitoring of carbon indicators

ECOTRUST programme and project officers are responsible for the monitoring of the carbon indicators. This activity is conducted in collaboration with the community group coordinators and project technicians. The group members are also involved in the monitoring activities. A guidance document will be developed to guide the project technicians.

E.2. Verification of monitoring

Plan Vivo Foundation through the annual report review as well as occasional field visits will be reviewing the monitoring. The project has been subjected to a third party verification starting year five. Currently, the third party verification is being provided by Rainforest Alliance . SmartWood.

E.3. Technical support and review

Technical Specifications

The project received initial technical support from the World Agroforestry Centre ICRAF and National Forestry Resources Research Institute (NaFORRI). These provided support in the development of technical specifications, baseline establishment and project management. The subsequent technical specifications will be developed by ECOTRUST working with local experts. The assumptions and calculations used in each project technical specification will be independently reviewed and the Plan Vivo Foundation and will confirm that the methodology for the land-use system is robust and compatible with Plan Vivo Standards.

The actions required to develop them will include baseline studies, biomass surveys, carbon modeling, training workshops and community meetings, and biodiversity and socioeconomic impact assessments.

Tree Nursery and Woodlot Management.

In order to enhance farmers skills in tree nursery management and tree planting, all the tree nurseries will be managed by the farmers themselves. A group nursery or

individual nurseries may be established depending on the farmers' interest. However, the bottom line is production of high quality seedlings in their required amounts. Production of seedlings by farmers themselves has several advantages including promotion of sustainability in the long-term. ECOTRUST and its partners will provide all the technical backstopping to the groups/individuals and build their capacity in the process. This is in line with the trend of having farmers being in control of their production systems leaving the service providers to provide technical guidance. This could even enable farmers to access resources from other sources to fund some nursery operations.

E.4. Administrative support:

Farmer Selection

This is a cooperative offset scheme targeting farmers in organized groups, whose group formation is motivated by participation in collaborative natural resource management. Communities are engaged through the Plan Vivo process of community consultation and participatory meetings with farmer coordinators and Collaborative Forest Management (CFM) Groups. All the CFM groups have signed agreements with the National Forest Authority to participate in the management of Forest Reserves

It is important to work with farmers who belong to an organised group for ease in administration and communication. However, each individual farmer will join the programme voluntarily and will have an individual agreement with ECOTRUST the project coordinator.

Database management

ECOTRUST will designate a programme officer responsible for the administration of *plan vivos* including recruitment and training of farmers, supervising project technicians as well as monitoring of the performance. All selected farmers will apply through the field coordinator who then reports to the ECOTRUST programme officers. The programme officer will be responsible for the database management and preparation of annual reports.

SECTION F. Environmental impacts of the proposed activities:

F.1. Expected environmental impacts of the proposed activities

The carbon sequestration project is targeting those areas that were formerly forested but have been transformed into farmland over the decades. The project seeks to promote the growing of Uganda's indigenous tree species, contributing to their conservation. Special attention will be given to those species, whose populations and genetic variety has been greatly reduced by the overexploitation of forest resources in this area. The project will be promoted in areas neighboring protected areas, to provide an alternative source of wood and thus reducing pressure from the protected areas.

In addition, there are several other environmental benefits associated with the growing of indigenous tree species in this area.

The targeted districts have several protected areas in the form of forest reserves (e.g Kasyoha . Kitomi, Kalinzu, and Maramagambo in Bushenyi, Bugoma in Hoima and Budongo in Masindi) as well as communal forests, which are the main source of hard wood timber in Uganda. These forests are being degraded due to the over exploitation of their resources. It is therefore hoped that payment for carbon sequestration in this area will further contribute to the conservation of the forests and maintenance of their several ecological functions (e.g carbon sequestration, biodiversity, watershed etc.).

As a result of their position in the landscape, riverine forests play a critical role in the ecosystem, disproportionately large for their sizes in buffering potential impacts on water quality of rivers from disturbance in upland ecosystems and as wildlife corridors that enhance sustenance of species.

The targeted forests offer protection to many local streams, rivers, and lakes (including Lake George a Ramsar site) and reduce siltation of major water ways (which in turn protects important lake fisheries).

Tree planting contributes to soil conservation, and the intended emphasis on native tree planting will contribute to habitat restoration and protection in rural Uganda. Furthermore, by increasing tree cover in this area, the project will contribute to the improvement of the watershed functions. Specifically, the following biodiversity benefits are envisaged:

- Promotion of indigenous tree species and expansion of native islands and corridors
- Restoration, protection and management of degraded and threatened ecosystems
- Improved protection of protected areas through provision of alternative sources of wood
- Regulation of micro-climates
- Water purification
- Soil stabilisation and improved moisture retention on slopes

SECTION G. Socio-economic impacts of the proposed activities:

G.1. Expected socio-economic impacts of the proposed activities

Initiating a Plan Vivo system in Uganda will result in significant ancillary benefits beyond offsetting CO₂ emissions. The focus will be on agroforestry systems and small scale plantations to improve incomes; provide increased access to fuel wood and building materials, and reduce deforestation pressures.

Revenue generated through initial sales of carbon will largely offset start up costs for small-scale forestry activities in Uganda, thus enabling rural communities to invest in sustainable resource management using income from environmental services. Furthermore, participants will gain access to local and national markets for timber, pole wood and fuel wood, fruit and fodder. Nursery establishment and production of seedlings will also provide additional income to rural communities.

The project will build local and regional capacity and develop generic carbon management systems that may be replicated in other communities throughout the country. Furthermore, small-scale production of fuel wood and timber will alleviate pressure on nearby forest reserve and national park resources.