



Verified Carbon Standard
Project Description Template

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Natural High Forest Rehabilitation Project on degraded land of Kibale National Park.



Table of Contents:

1	Description of Project:	4
1.1	Project title	4
1.2	Type/Category of the project	4
1.3	Estimated amount of emission reductions over the crediting period including project size:	4
1.4	A brief description of the project:	4
1.5	Project location including geographic and physical information allowing the unique identification and delineation of the specific extent of the project:	5
1.6	Duration of the project activity/crediting period:	11
1.7	Conditions prior to project initiation:	12
1.8	A description of how the project will achieve GHG emission reductions and/or removal enhancements:	14
1.9	Project technologies, products, services and the expected level of activity:	14
1.10	Compliance with relevant local laws and regulations related to the project:	23
1.11	Identification of risks that may substantially affect the project's GHG emission reductions or removal enhancements:	25
1.12	Demonstration to confirm that the project was not implemented to create GHG emissions primarily for the purpose of its subsequent removal or destruction:	25
1.13	Demonstration that the project has not created another form of environmental credit (for example renewable energy certificates):	25
1.14	Project rejected under other GHG programs (if applicable):	26
1.15	Project proponents roles and responsibilities, including contact information of the project proponent, other project participants:	26
1.16	Any information relevant for the eligibility of the project and quantification of emission reductions or removal enhancements, including legislative, technical, economic, sectoral, social, environmental, geographic, site-specific and temporal information.):	33
1.17	List of commercially sensitive information (if applicable):	33
2	VCS Methodology:	33
2.1	Title and reference of the VCS methodology applied to the project activity and explanation of methodology choices:	33
2.2	Justification of the choice of the methodology and why it is applicable to the project activity:	33
2.3	Identifying GHG sources, sinks and reservoirs for the baseline scenario and for the project:	35
2.4	Description of how the baseline scenario is identified and description of the identified baseline scenario:	36
2.5	Description of how the emissions of GHG by source in baseline scenario are reduced below those that would have occurred in the absence of the project activity (assessment and demonstration of additionality):	36
3	Monitoring:	43

3.1	Title and reference of the VCS methodology (which includes the monitoring requirements) applied to the project activity and explanation of methodology choices:	43
3.2	Monitoring, including estimation, modelling, measurement or calculation approaches:	43
3.3	Data and parameters monitored / Selecting relevant GHG sources, sinks and reservoirs for monitoring or estimating GHG emissions and removals:.....	44
3.4	Description of the monitoring plan	49
4	GHG Emission Reductions:	61
4.1	Explanation of methodological choice:	61
4.2	Quantifying GHG emissions and/or removals for the baseline scenario:	61
4.3	Quantifying GHG emissions and/or removals for the project:	64
4.4	Quantifying GHG emission reductions and removal enhancements for the GHG project:.....	67
5	Environmental Impact:	69
6	Stakeholders comments:.....	70
6.1	Brief description of how comments by local stakeholders have been invited and compiled:.....	70
6.2	Report on how due account was taken of any comments received:	71
7	Schedule:.....	73
8	Ownership:.....	73
8.1	Proof of Title.....	73
8.2	Projects that reduce GHG emissions from activities that participate in an emissions trading program (if applicable):	75
9	References:	75
10.	List of Annexes:.....	77

1 Description of Project:

1.1 Project title

Natural High Forest Rehabilitation Project on degraded land of Kibale National Park.

1.2 Type/Category of the project

The Natural High Forest Rehabilitation Project on degraded land of Kibale National Park falls under the scope of Agriculture Forestry and Other Land Use category (AFOLU) and is specifically a Reforestation (R) project type of the ARR category.

This is not a grouped project.

1.3 Estimated amount of emission reductions over the crediting period including project size:

The project is expected to sequester 4,450,862 of tCO₂-e during its 60 year crediting period.

1.4 A brief description of the project:

The Project activity in Kibale National Park (KNP) is located in western part of Uganda and is implemented by Uganda Wildlife Authority (UWA) in cooperation with Face the Future (FtF). Due to the high precipitation, complex landform and undulating valleys, as well as continual human disturbance (fire, grazing, charcoal production and cultivation) and poor land management, the area has been subjected to severe degradation of the surrounding vegetation as well as soil erosion. The project contributes to climate change mitigation by sequestering GHGs in sinks through tree planting and assisted natural regeneration activities.

The Kibale National Park is considered to contain some of the highest biological diversity in Uganda. There are at least 372 bird species, 4 species of wild cats and contains at least 351 tree species (Howard, 1996). This National Park also supports an exceptionally diverse and abundant primate fauna: 13 species of primates are found within the park, which is 67 % of the country's total species (IUCN, 1988). Kibale may contain the only viable population of red colobus monkey in Uganda. Furthermore, Kibale National Park is home to one of the largest chimpanzee populations in the world. The park is also home to a high number of butterfly and night moth species. Other prominent animal species are bushbucks and African elephants, as well as many reptile species such as the African rock python.

The purpose of the proposed ARR VCS project activity is to realize multiple socio-economic and environmental benefits (local community development, climate

change mitigation, biodiversity conservation and soil erosion control) through restoring forest vegetation on degraded lands.

Specific project objectives are to:

- Restore the integrity of the degraded forest ecosystems in the National Park and thereby enhance biodiversity conservation and control of soil erosion. This is achieved by replanting the degraded areas with locally occurring indigenous trees species.
- Transfer forestry knowledge and skills to the local communities with an aim to make them environmental ambassadors of the project.
- Provide employment opportunities to the communities adjacent to the park.
- Provide income generating opportunities by encouraging the establishment of locally owned and operated nurseries where seedlings are raised and later sold to the ARR VCS project.
- Promote regeneration of natural vegetation in the forest interior areas by creating a forested zone around the edge of the park which will act as a buffer to relieve the interior areas of pressure from agents of deforestation and degradation (i.e. anthropogenically caused fires).

To achieve these objectives, the following VCS ARR project activity is proposed:

Rehabilitation of 6,213 ha of degraded forest inside Kibale National Park through reforestation using model indigenous species such as *Albizia qummifera*, *Bridelia micrantha*, *Cordia africana*, *Cordia millenii*, *Croton macrostachyus*, *Croton megalocarpus*, *Erythrina abyssinica*, *Ficus natalensis*, *Mimusopsis bagshawei*, *Prunus africana*, *Spathodea campanulata*, *Sapium ellipticum*, and *Warburgia ugandensis*. These are fast growing species and have been proven to outgrow the grasses to avoid being suffocated and are resistant to grass root competition.

1.5 Project location including geographic and physical information allowing the unique identification and delineation of the specific extent of the project:

Location of the proposed ARR VCS project activity:

The project activity is located in western Uganda, near the base of the Rwenzori Mountains and about 200 km north of the equator (**Figure 1.5.1**). It falls into Kabarole district and is within half an hour's drive from Fort Portal town.



Figure 1.5.1 Location of the proposed ARR VCS project activity.

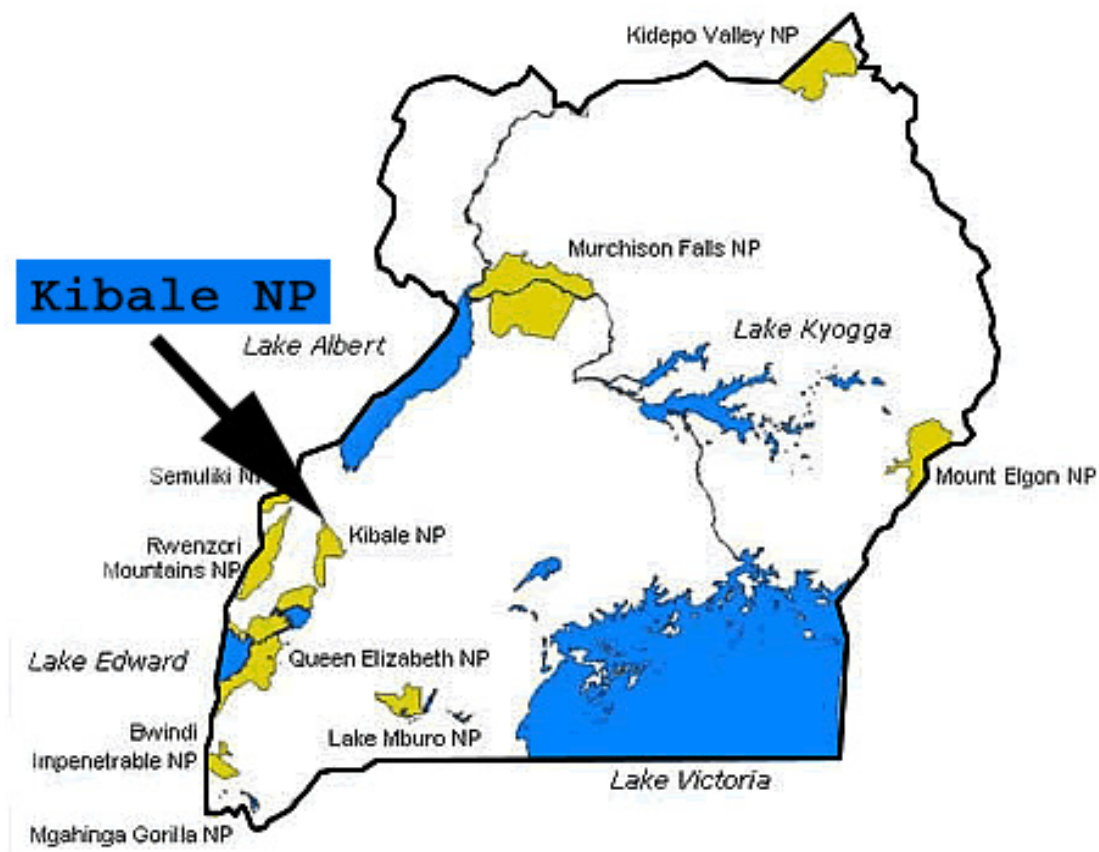


Figure 1.5.2 Location of the proposed ARR VCS project activity.

Host Party(ies): Republic of Uganda

Region/State/Province: Region: East Africa; State: Uganda; District: Kabarole District

City/Town/Community:

The location of the proposed ARR VCS activities can be described as follows:

1. The project participant's main Headquarters are in the city of Kampala, Kampala district.
2. Kibale National Park, is located in the south east of Fort Portal Town.
3. The surrounding communities in Kibale National Park include the native Batoro and migrant community of Bakiga.

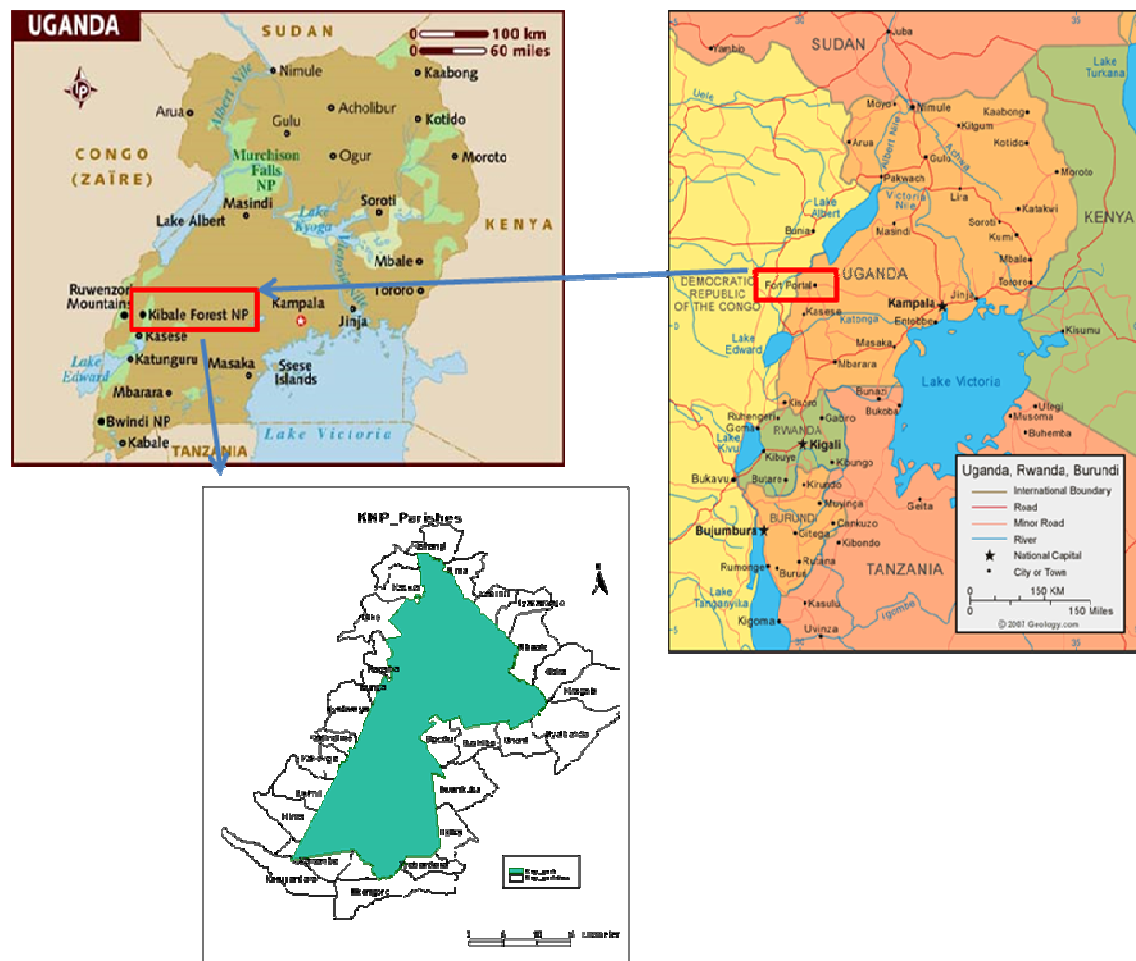


Figure 1.5.3 Location of Fort Portal town and communities surrounding proposed ARR VCS project activity.

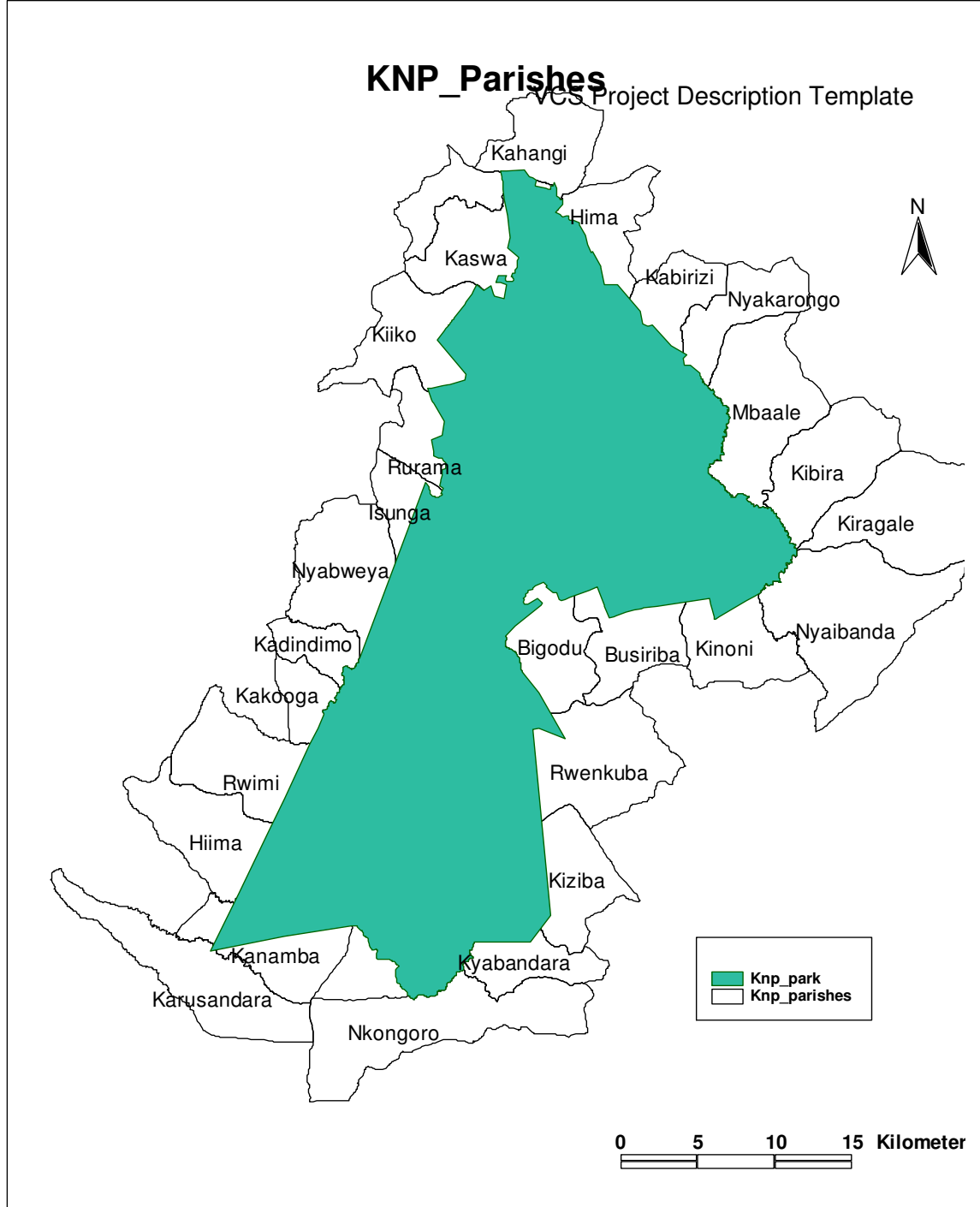


Figure 1.5.4 Detailed map of Kibale National Park and location of surrounding village communities.

Detailed geographic delineation of the project boundary, including information allowing the unique identification(s) of the proposed ARR VCS project activity:

The proposed ARR VCS project activity is located within the Kibale National Park. The project boundaries and geographical locations are indicated below. The specific geographical positions (longitude/latitude) have been determined from satellite images and actual planting area coordinates of the boundaries (polygons) established using GPS and stored in GIS (**Figure 1.5.5**)

Project Boundary: The project boundary in Kibale National Park is 10,000 ha within which more than 3,400 hectares have been replanted and almost 2,600 hectares have naturally regenerated. Kibale project area is located south east of Fort Portal Town with bearings $0^{\circ} 12'' - 0^{\circ} 40''$ North and $30^{\circ} 20'' - 30^{\circ} 35''$ East in

the counties of Burahya, Kibale and Mwenge. KNP is covered by Uganda Department of Lands and Surveys map sheets 56/IV, 57/III, 66/II and 67/I (series 732) at 1:50,000. The project boundary is outlined in **Figure 1.5.5** and the unique identifications of the polygons for each compartment (planted) area are provided in **Table 1.5** below.

Table 1.5. Unique identification of the polygons for the KNP project (coordinates in UTM ARC 1960 Zone 36N).

Compartment ID	Grid Coordinates	
	Eastings	Northings
1	200707	44462
2	201537	44553
3	201445	45466
101	202919	39805
102	203380	39166
103	203196	40444
104	203103	38162
105	204763	39896
106	202458	39714
107	202365	38710
108	204026	40535
109	202365	37705
110	202826	37431
111	201719	35788
112	202364	35606
113	202088	35058
114	201719	34419
115	203194	36518
116	203102	35605
117	202548	33962
118	209927	40533
201	203286	34145
202	203101	33323
203	202271	32319

Compartment ID	Grid Coordinates	
	Eastings	Northings
204	204669	34418
205	201628	41997
206	200707	43275
207	210204	40533
301	199877	44554
403	200893	48114
404	201446	49027
405	201723	49026
406	202184	48935
407	202737	49026
408	202830	49848
409	200431	47566
401	201906	46014
410	200800	47475
501	201723	49848
502	201908	50122
503	202185	50944
504	202554	51035
602	203844	49482
603	204121	49939
701	202462	51765
702	203476	50395
1402	201445	45922
2402	200431	47201

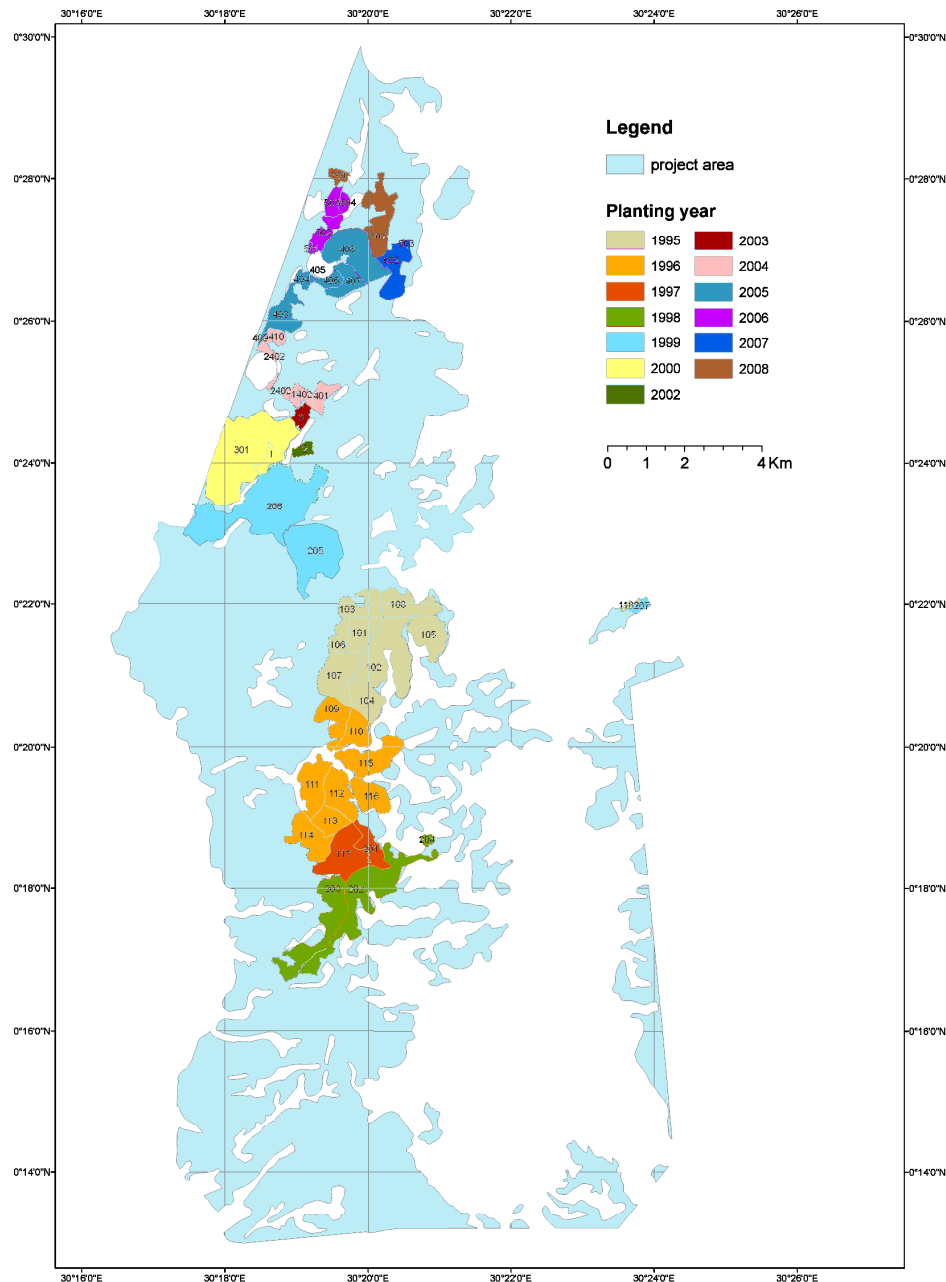


Figure 1.5.5 Map of the Kibale Project area showing eligible ARR VCS plantable and naturally regenerated areas.

1.6 Duration of the project activity/crediting period:

The project activity start date is 15th May 1994. The crediting period start date under VCS is 1st January 2009. The proposed project activity will use a fixed crediting period of 60 years.

Prior to 1 January 2002, the project applied an externally reviewed methodology (SGS, 2001) and engaged independent carbon monitoring experts to assess and quantify the project's baseline scenario (Anker and Jugerius, 1996; Meijer, 1995) and net emissions reductions or removals (IFER, 2002).

1.7 Conditions prior to project initiation:

Due to the high precipitation, complex landform and undulating valleys, as well as continual human disturbance (fire, grazing, charcoal production and cultivation) and poor land management, the area has been subjected to severe degradation of the surrounding vegetation as well as soil erosion.

Up until the 1960s, the project area was characterised by an intact natural high forest. However, due to changes in government (1970-1980s) and the consequential lack of implementation of policies, this forest was gradually deforested. The reserve has been subjected to continued degradation, especially over the last few decades where a significant increase in subsistence activities, such as cultivation and grazing activities, fuel-wood collection, and charcoal production have been witnessed, reducing a denser rainforest to a landscape with scarce pockets of trees. By 1980s, the proposed ARR VCS project area had become non-forest land. Furthermore, continued human activities such as frequent burning, grazing, shifting cultivation, fuel wood collection resulted in severe forest and soil degradation. This rendered the areas useless and were consequently abandoned.

To demonstrate that the land within the project boundary is eligible for an ARR VCS project activity, steps outlined in the ‘Procedures to define the eligibility of lands for forestation and reforestation CDM project activities, version 1’ were followed. The applicable step for the Kibale project was (a) (i) as follows:

(a) Demonstrate that the land at the moment the project starts does not contain forest:

- (i) Vegetation on the land is below the forest national thresholds (crown cover, tree height and minimum land area) for the forest definition under decisions 11/CP.7 and 19/CP.9 as communicated by the respective DNA.*

The Climate Change Secretariat (DNA) for Uganda has defined and communicated the national forest thresholds as land which has a:

- Minimum area of 1 hectare
- Minimum tree crown cover of 30 %; and
- A minimum height of 5 meters at maturity

Based on this definition by the Uganda DNA, the project area is eligible for ARR VCS activities because it consists of areas with grass and shrubs with a few scattered trees, and other areas with banana plantations (i.e. cropland). The plantable areas delineated on the basis of the above definitions are “formerly encroached areas with dominant elephant grass”, shown in Figure 1.7.1, which falls well below the national forest definition. Figure 1.7.1 was developed in 1995 during a land evaluation study by Ancker and Jungerius. This map includes categories showing other areas such as Park area, forest, quartzite ridges and inselbergs, non-forested riverine lands, and open spaces which are not part of the

VCS project activity. The VCS project activity takes place in the three areas labeled as formerly encroached areas with frequent banana plantations, formerly encroached areas with dominant elephant grass and grassland with Combretum. This map is chosen as a true representation of the land conditions before the start of project activities because even through the project start date is on 15 May, 1994, the actual planting activities only started in 1995.

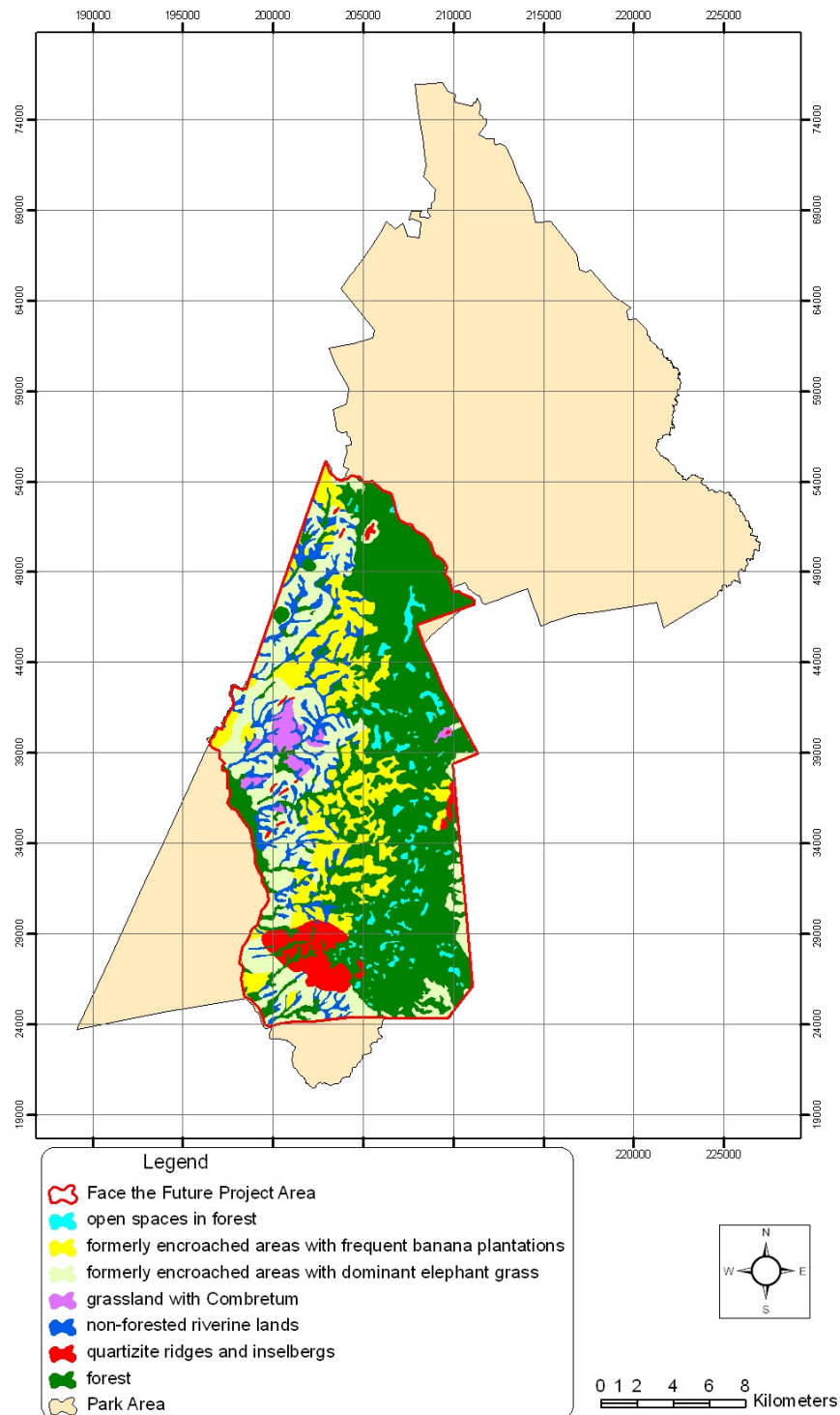


Figure 1.7.1. Land Evaluation Map by Ancker and Jungerius based on a 1995 Land-TM image.

1.8 A description of how the project will achieve GHG emission reductions and/or removal enhancements:

The project contributes to climate change mitigation by sequestering GHGs in sinks through assisted natural regeneration activities that aim to promote regeneration of natural vegetation in the forest interior areas by creating a forested zone around the edge of the park which will act as a buffer to relieve the interior areas of pressure from agents of deforestation and degradation (i.e. anthropogenically caused fires).

To achieve these objectives, the following VCS ARR project activity is proposed:

Rehabilitation of 6,212 ha of degraded forest inside Kibale National Park through reforestation using model indigenous species.

1.9 Project technologies, products, services and the expected level of activity:

1.9.1 Technology to be employed by the proposed ARR VCS project activity:

The technological practices currently implemented and to be implemented in the near future in the VCS ARR project are outlined below.

1. Identification of lands suitable for project

The project utilized remote sensing maps generated from 1989, 2003 and 2004 satellite images. In addition to this, a land evaluation for natural regeneration map 1996 by Jungerius, and a lands cover stratification map Sheet/2 1996 from the Uganda Department of Lands and Surveys were utilized to identify lands suitable for the project activity. The data was organized using a geographic information system database. Just before planting, an advanced survey through physical observation was carried out by UWA staff.

2. Nursery

The planting stock is derived from tree seedlings collected in the wild and nursery stock grown from seed. The wildlings are collected from within the park, potted out, and grown on in the project's nursery before being planted out. Wildlings collection is considered unlikely to have a serious long-term impact on the ecology and vegetation dynamics of the collection area. Mature forest trees vary in the amount and frequency of seed produced, but most will produce many hundreds of thousands of propagules spread over a period of several decades. See **Section 1.9.2** for tree species. Activities required for proper growth of seedlings are shown in **Table 1.9.1.1** Also seedlings raised in communities are purchased, as a way of promoting further income generation activities within the local communities.

Table 1.9.1.1 Overview of nursery activities.

Activity	Remarks
Seed collection	
Soil collection	Selection of sites with good quality soil nutrients; soil used for potting and seedbeds; only a thin layer of topsoil is collected
Construction of beds	
Sowing seeds	
Pot filling	
Wildling collection	Young seedlings from forest
Pricking out	
Watering	Manual sprinkling
Weeding	
Stacking pots	
Root pruning	
Sorting seedlings	Seedlings of > 30 cm are selected
Compound maintenance	
Bed shade repair	

Seed collection

The process involved the collection of seeds from or under mother trees for each species propagated by seed. Time of seed collection depended on the fruiting period of mother trees. High quality seeds were selected from the forest and/or plantations. The seeds were tested for their germination ability and growth in the nurseries.

Construction of nursery beds - Used to store both pricked out seedlings and pots filled with soil. This activity involved both the collection of materials for construction and the nursery bed construction itself.

Sowing seeds - Collected seeds were sown either in seedbeds or directly in pots after pre-treatment (if required for any particular species).

Pot filling - Soil collected was placed in polythene bags. This soil acted as media for the growth of seedlings.

Wildling collection - This activity involved the collection of young seedlings growing in the forest or under mother trees to be used as seedlings for planting. More experienced workers were involved in this activity to ensure that not only proper species but also seedlings in condition were collected.

Pricking out - Seedlings in a seedbed or wildlings collected from the forest were placed in the soil in polythene bags.

Watering – This was the most frequently performed activity involving manual sprinkling of water over the seedlings.

Weeding - Refers to the removal of weeds from pots and within the beds. Weeding in the pots was always done after a thorough watering of the seedlings.

Stacking pots – Involved the transferring of pots filled with soil from the site of pot filling and arranging them into beds.

Root pruning - As the seedlings grow, their root system develops and grows through the polythene pots. To avoid roots anchoring in the beds and to harden them off for eventual planting, exposed roots were cut off as often as they were noticed.

Sorting seedlings - This occurred when seedlings were being selected for planting. Only seedlings above 30 centimetres are used as planting stock. Seedlings shorter than 30cm were left longer in the nursery to allow them grow to the required size.

Nursery Compound maintenance - This activity involved the weeding of paths within the nursery, slashing of the nursery “compound”, staff / labour camp and carrying out any other activities geared at making the nursery compound tidy and hygienic.

Bed shade repair- This involved the repair of beds by replacing broken poles and re-thatching. The location of the nursery at Mainaro was selected due to its close proximity to water, which is a critical factor in the establishment of any nursery. When ready, seedlings were transported by tractor and/or truck to the planting site or "satellite nurseries", from which they were distributed to planting pits. Farmer's nurseries were located near the planting sites as much as possible to minimise transportation cost.

Nursery site clearing – This involved slashing and scrapping of the area where the beds were to be aligned.

3. Ground preparation

This is where the area to be rehabilitated by planting is opened up and made ready for planting. It involved preparatory measures and activities such as line slashing and pitting. These activities were carried out in each compartment in accordance to the vegetation types. The actual area to be planted was determined by the available funds in each given year. Patches in compartments that had regeneration areas (less than half ha), rocky soils, rocky outcrops and unsuitable thickets were not planted.

The following steps were carried out in suitable planting locations:

Line slashing: Line slashing was carried out in elephant grass and shrubby areas. The lines were of 2m in width at a grid of 5x5m.

Pitting: Pitting was done at 5x5m intervals. This depended on whether the spot or its surroundings were observed to lack any regenerating tree species. The recommended pits were of 60cm in radius in well-cultivated soils, with a central pit of 30cm depth by 45cm diameter for both half shaded and elephant grass areas respectively.

4. *Planting*

Planting activities are carried out during the wet season, between March-June and September–November every year. During planting species – site matching is of importance. Climax species are to be planted under favourable shade conditions such as banana, Vernonia and Acanthus shrubs. Intermediate species are planted only under shade while pioneer species should normally be in the open areas. Under elephant grass and other grasslands only pioneer and fast growing intermediate species should be planted. Selected seedlings were distributed to pits and planted. This involved hauling, distribution and planting of seedlings. The Forest clerks were expected to make independent decisions depending on adequate rain for maximum survival of the seedlings. During planting, regular workers would specifically carry out the activity to ensure site-matching of species, which is of uttermost importance. This and other recommendations outlined below were adhered to.

5. *Tending or maintenance*

Tending activities depended on the vegetation type of each area. Four types were considered here: (1) elephant grass, (2) spear grass/hyperphenia grass, banana plantations and (4) Vernonia/shrubby vegetation at outlined in **Table 1.9.1.2** Since in the majority of compartments, all four types occur, the method for tending within each type was discussed before each scheduled tend. In elephant grass, the selective spot slashing method was carried out in the old crop at intervals of not more than three months. Under Acanthus and other shrubs vegetation, tending was mainly carried out by spot slashing once every four to six months, depending on the growth of the vegetation and competition to the seedlings.

Table 1.9.1.2 Description of tending for different vegetation types.

Vegetation	Tending
Elephant grass	Clear cutting at 60 cm after every 3 months
Spear grass / hyperphenia grass	Line slashing coupled with spot weeding, once every 3 months
Banana plantations	Spot slashing once every 6 months
Vernonia and other shrubs	Line slashing once every 3-6 months

Clear cutting: Clear cutting was carried out below 30cm at monthly intervals for the first six months after planting. During the next six months, clear cutting was carried out on a monthly basis and for the last six month, once every month after which spot slashing was employed.

Spot slashing: In the second year after planting, spot slashing was carried out at intervals of three months in the second and third year. In the fourth and fifth year, spot slashing was carried at four month intervals to harden off planted crop and reduce maintenance costs.

Spot hoeing: this was only carried out in the new crop during the second rains after planting. This was done in order to allow easy penetration of water and reduce weed competition.

Fire Protection: Fires are a major factor preventing forest regeneration. Elephant grass and spear grass provide excellent combustible material especially during the dry seasons. Planted areas are completely surrounded by a 15 m external fire line or by non-combustible riverine vegetation. In the centre of each 15 m firebreak 4 m are scrapped clean of all vegetation. Furthermore, each compartment is divided into manageable blocks, which are separated by 10 m wide internal fire lines. Three meters of all internal fire lines is also scrapped clean. All fire lines are accessible by cars during the dry season. Training and retraining workers in fire fighting techniques is done. Another vital component of fire protection is fire awareness campaigns among the local populations neighbouring the park, including schools.

GIS technology:

Global Positioning System (GPS) has been extensively employed in the ARR VCS project's activities. Examples of GPS technology usage include, but are not limited to, the establishment of planted compartments, permanent sample plots, navigation to permanent plots and demarcation of park boundary. GIS has been used in the planning, carbon monitoring and verification of the project's activities.

1.9.2 Transfer of technology/know-how:

The Batoro and Bakiga communities are traditionally subsistence farmers who grow crops such as bananas, groundnuts, sweet potatoes and sugar cane. They did not have knowledge of reforestation and there was therefore a need to train them in forestry techniques; including seed collection, nursery management, planting, maintenance and protection. The knowledge that the local communities acquired helped them to raise tree seedlings which they plant in their own farmlands and sold to the project in order to improve their income levels. Since the beginning of the project, UWA has carried out on-the-job training for over 300 local community members who are employed on a perennial basis by the project to carry out rehabilitation programs.

Furthermore, UWA members of staff implementing the project activities are also trained to gain professional skills in different fields such as environmental management, finance and accounting and human resource management.

1.9.3 Species and varieties selected for the proposed ARR VCS Project Activity:

The selection of planting species was based on the preference of site conditions, carbon sequestration rates, biodiversity conservation and socio economic values:

1. Restoration forest with pioneer species: This type of forest system comprises of the pioneer species used for the restoration of the degraded forest. These species are normally planted in Elephant grass, shorter grass and in scattered *Acanthus* areas. The tree species under this category include: *Albizia qummiifera*, *Bridelia micrantha*, *Cordia africana*, *Cordia millenii*, *Croton macrostachyus*, *Erythrina abyssinica*, *Ficus natalensis*, *Prunus africana*, *Spathodea campanulata*, *Sapium ellipticum*, and *Warburgia ugandensis*. They are fast growing species and can soon outgrow the grasses to avoid being suffocated and are resistant to grass root competition.

2. Restoration forest with intermediate and climax species: This forest system involves mostly intermediate tree species and limited number of climax species. The vegetation in which these trees species area planted comprises shrubby areas of the mostly *Acanthus* canopy and scattered banana. Tree species planted in such areas include: *Albizia qummiifera*, *Cordia africana*, *Croton macrostachyus*, *Chrysophyllum albidum*, *Diospyros mespiliformis*, *Fantumia elastic*, *Lovoa brownii*, *Mimusops bagshawei*, *Prunus africana* and *Uvariopsis congensis*.

3. Characteristic features of major species

***Albizia qummiifera* (Mimosaceae family):** A large pioneer deciduous tree over 20 m high with ascending branches to a flat top of bipinnate leaves with 5-7 pairs of pinnate. It mainly occurs in mixed forests 1,000-2,300 masl.

Propagation: It is propagated from seedlings and wildlings

Uses: fuel, timber, fodder, nitrogen fixation.

***Bridelia micrantha* (Euphorbiaceae family):** This is an evergreen pioneer of medium size averaging 15m in height. Its spreading crown leaves are compound to simple alternative along the branches. The tree does well in a wide variety of climatic and ecological conditions ranging from wet to dry areas.

Propagation: It is propagated from seeds and wildlings.

Uses: fuel wood, timber, medicine and tool handles.

***Celtis durandii* (Ulmaceae family) :** A deciduous forest tree of about 35 m tall with a spreading crown. It is found in a wide range of habitats from dry rocky outcrops to moist evergreen lowland forests in all regions in Uganda (1,300-2,200 masl). The leaves are rough, 3-veined from the base, dull green above and with a toothed edge.

Propagation: It is propagated from wildlings and seeds

Uses: fuel wood, timber, tools, shade and fodder.

***Chrysophyllum albidum* (Sapotaceae family):** A tall and straight evergreen tree averaging 50 m in height with a dominant canopy; present in mixed parts of Kibale forest. The leaves are compound (oval-oblong shape) with an albidum (white or silvery - gray) under surface on mature leaves; the species is an intermediate requiring spacious shade when young.

Propagation: It is propagated from wildings and seeds.

Uses: fuel wood, timber and food.

***Cordia africana/abyssinica* (Boraginaceae family):** A deciduous tree averaging 15-25 m in height, often with a crooked trunk. It tolerates a variety of soil types and is common in moist forests, riverine galleries and wooded grasslands. Leaves are large (16 cm) and oval in shape, with a rounded base.

Propagation: It is propagated from wildlings and seeds.

Uses: fuel wood, timber, medicine, fodder, bee forage and soil mulch.

***Cordia mellenii/ugandensis* (Boraginaceae family):** A large tree measuring 30-45 m in height, with a wavy trunk rarely straight and a spreading crown. The leaves are large (16 x 13 cm) round, alternate with rounded tips and a heart shaped base.

Propagation: It is propagated from wildings and seeds.

Uses: timber, carving, fodder, bee forage and soil mulch.

***Croton macrostachys* (Euphorbiaceae family):** A deciduous tree with a rounded open crown formed by large spreading branches. The leaves are large, soft and heart-shaped. It is a fast growing species in areas with deep soils and high rainfall (1,100–2,500 masl).

Propagation: It is propagated from primarily seeds, and occasionally from wildlings.

Uses: timber, poles, medicine, folder, soil conservation. Use as a fuelwood is limited because of the unpleasant spicy odour released from the poisonous sap.

***Croton megalocarpus* (Euphorbiaceae family):** A semi - deciduous forest tree with an average height of 30 m and a light shade crown. It is widespread in Kibale forest mostly in semi - humid habitats of 100–2,500 masl. It is fast growing in areas with deep soils. Its leaves are of variable sizes, with a dull green upper surface and pale silvery underside.

Propagation: It is propagated through direct sowing of seeds in pots.

Uses: timber, medicine and fuel wood.

***Diospyros mespiliformis*:** A medium to large tree up to 25 m in height with a grey bark, which is rough and squared. Its leaves are a shiny dark green and alternate. Its flowers are fragrant: male flowers are clustered while female flowers are solitary. The resulting fruit is rounded in shape to 2-5 cm in a calyx cup, yellow and later purple. The pulp is soft and sweet with brown, hairy seeds. The wood is black and pale after felling.

Propagation: It is propagated from seedlings and wildlings.

Uses: Firewood, charcoal, timber, food (fruit; dry, fresh, fermented drink), medicine (bark, roots, fruits) bee forage shade and ornamental.

***Erythrina abyssinica* (Papilionaceae family):** A deciduous savannah woodland and grassland tree with a short trunk and thick spreading branches forming a rounded canopy at an average of 10m in height. Its round leaves are compound, with three leaflets, the largest being 15 cm in diameter,

Propagation: Propagation is from seeds, wildlings and cuttings taken during the rainy season. The tree is resistant to fire and termites.

Uses: carving, medicine, soil conservation, floats for fish nets, corks.

***Ficus natalensis* (Moraceae family):** An evergreen tree/shrub of up to 30 m in height with upright branches and a dense dropping crown. It grows in a wide range of climates, and in both wet and dry areas of 10-2,200 masl.

Propagation: Propagation is from cuttings which sprout/coppice vigorously.

Uses: medicine, fuel wood and bark cloth.

***Funtumia elastic*:** A forest tree which grows up to 40 cm in height with a straight cylindrical bole and no buttress. The bark is smooth and thin. It exudes abundant cream coloured latex which dries to a small ball if rubbed between the fingers. The leaves are broadly oval, opposite, dark green and leathery. Flowers are yellow-white, fragrant, and in dense shoot groups. Fruits develop as a pair of woody, flat follicles of 30cm. Seeds have long white hairs at one end.

Propagation: It is propagated from seeds and wildlings.

Uses: Unknown.

***Lovoa trichiliodes/L. brownii* : *Lovoa trichiliodes/L. brownii* :** An evergreen tree of 40m in height. The trunk is straight or wavy with a small or spreading dark crown. Buttresses usually absent, but the trunk may spread out at the base. The bark is thin and smooth, brown, and sometimes dark and fissured in older trees, strongly scented if cut. Leaves; even pinnate on stalks to 24cm, stalk flat or winged between leaflet pairs, 6-12 leaflets, the same size at the base, about 10cm long with about 20 closely spaced side veins each side. Small white flowers are abundant in large heads of 30cm. The fruit is present as a brown hanging capsule.

Propagation: It is propagated from seeds and wildlings.

Uses: Firewood, timber (furniture, doors, windows), charcoal and ornamental.

***Markhamia platycalyx* (Bignomaceae family):** Slender boled tree of 24m in height. Its stem is fluted towards the base; the crown is irregular, and the bark is grey/brown and flaking in irregular strips and patches. Leaves; compound pinnate with 7-11 leaflets, often in bunches, thin and wavy, each leaflets to 10 cm, wider at the tip. . Flowers; Bright yellow clusters, each trumpet shaped with orange red strips in the throat, buds furry, splitting in one side.. The fruit capsule grows up to 1.2 m long and 1.9 cm broad, with oblong seeds about 2.5 cm long including the yellow to white wood wings.

Propagation: It is propagated from seeds and wildlings.

Uses: Firewood, timber, poles, posts, tool handles, medicine (leaves), bee forage, shade, and soil conservation ornamental.

***Mimusops bagshawei* (Sapotaceae family):** A tall straight tree reaching 50m in height with a large spreading crown often fluted at the base. It is common in low and upland rain forests. The leaves are oval and often wide at the tip, and shiny dark green on the superior side, pale dull underneath.

Propagation: It is propagated from seeds and wildlings.

Uses: fuel wood, timber, medicine, fodder, bee forage.

***Prunus african/Pygeum africana* (Rosaceae family):** An evergreen tree of up to 40m in height occurring in moist mixed tropical rain forests, forest edges and gallery/valley forests of 1,100–2,000 masl. Its leaves are a leathery glossy dark green on branches dotted with breathing pores.

Propagation: It is propagated from seeds and wildlings. It is a very fast growing, pioneering species often present in secondary succession vegetation. It requires light and is often browsed by game.

Uses: fuel wood, timber and medicine.

***Sapium ellipticum*:** A small to medium sized deciduous tree occasionally reaching 20m in height. The bark is light brown/black and rough; often with drooping branches. Its leaves are long and oval in shape; dark green on the upper side, pale on the underside, turning dark red before falling. Flowers have no petals or sepals and are catkin-like with long spikes (5-10 cm) long, the upper part with tiny male flowers each with yellow stamens. Its fruit has a two-part red capsule about 1cm across, which opens up to set free seeds. The seeds are often eaten by insect larvae.

Propagation: It is propagated from seeds and wildlings

Uses: Firewood, farm tool handles, medicine (leaves & roots) and ornamental.

***Spathodea campanulata / similotica* (Bignoniaceae family):** A pioneer deciduous tree found at the forest fringes, growing up to 20m in height. It has compound leaves (40cm long) with 6 pairs of leaflets around the crown. The flowers form orange-red clusters. It has been grown in a variety of climates from sea level to 2,000 masl. It is a drought resistant species.

Propagation: It is propagated from seeds and is a fast growing species in deep soils.

Uses: fuel wood, carving, medicine and ornamentals.

***Trichilia drageana / splendida* (Moraceae) :** An evergreen tree growing 30-50m in height, with a dense spreading crown and fluted trunk. It has compound leaves of 4-6 pairs of leaflets.

Propagation: It is propagated from seeds and wildlings.

Uses: fuel wood and timber

***Uvariopsis congensis* (Annonaceae Family):** An under storey forest tree growing up to 13m in height. Its bole rarely exceeds 15cm diameters. Its bark is grey/yellow. Leaves are simple alternate, oblong- to lanceolate and about 5cm long. It grows well under the shade.

Propagation: It is propagated from seeds and wildlings.

Uses: fuel wood.

***Warbugia ugandensis* (Conellaceae family):** An evergreen tree of 30m high with a dense leafy crown. Its leaves are a shiny dark green on the upper side. It is found in to lower rainforest and drier highland forest at 1-2,000 masl. It is common in colonizing forests, forest edges, thickets and secondary succession vegetation. It is widely abundant in Kibale Forest.

Propagation: It is propagated from seeds and wildings. It is a fairly fast growing species found in a variety of habitats.

Uses: fuel wood, timber, food seasoning, medicine extra.

1.10 Compliance with relevant local laws and regulations related to the project:

The area now known as Kibale National Park (KNP) is situated in western Uganda, and has fallen under various protected area categories for over sixty years. Kibale Forest was originally managed by the British, and later by Ugandan authorities, as a Forest Reserve from 1932 to 1993 under the authority of the Forest Department. The total area (795 km²) of the Park and its boundary designations correspond to those of the 1932 Forest Reserve boundary combined with the former Kibale Forest Corridor Game Reserve. Kibale National Park was gazetted in 2003 under statutory Instrument No. 2003 No.46 cited as “The Uganda Wildlife (Declaration of Wildlife Conservation) (Kibale National Park) Instrument, 2003”. The Park is fully owned by the government of Uganda under the UWA Act and managed by Uganda Wildlife Authority on behalf of all Ugandans. Further descriptions are available in Sections 3, 4 and 5 of the Uganda Wildlife Act.

Current laws and/or regulations such as the constitution of the Republic of Uganda (1995) and the National Environmental Act (1996) allow the reforestation on the degraded lands. Below are a list of laws and regulations that are in favor of the project activities:

1. **The constitution of the Republic of Uganda of 1995**, which is the supreme law of the country, empowers Parliament to enact laws to protect and preserve the environment from abuse, pollution and degradation and also to promote measures intended to manage the environment for sustainable development and to promote environmental awareness. The constitution enjoins the state to protect important resources, including land, water, wetlands, oil, minerals, fauna and flora on behalf of the people of Uganda. The Constitution empowers the Government (or where appropriate local government) to hold in trust for the people and protect natural forest reserves and any land to be reserved for ecological and tourism purposes for the common good of all citizens.
2. **The National Environmental Act of 1996:** The main objective of the National Environment Act is to provide for the sustainable management of the environment. The Act establishes the National Environment Management Authority (NEMA) as a coordinating, monitoring and supervisory body. NEMA is the main institution responsible for the operation of the Environmental Impact Assessment (EIA) regime. Projects

which must undergo the EIA process include forestry related activities such as reforestation and afforestation. Under the Act, NEMA is required, in consultation with the lead agency which is the National Forestry Authority (NFA) to issue guidelines and prescribe measures for the management of all forests in Uganda. These guidelines have to take into account forests in protected areas, including forest reserves, national parks and game reserves; and forests on lands subject to interests held by private persons. NEMA, in consultation with the National Forestry Authority, is given powers to expressly exclude human activities in any forest area by declaring it a specially protected forest.

3. **The National Forestry and Tree Planting Act, 8/2003.** An Act to provide for the conservation, sustainable management and development of forests for the benefit of the people of Uganda; to provide for the declaration of forest reserves for purposes of protection and production of forests and forest produce; to provide for the sustainable use of forest resources and the enhancement of the productive capacity of forests; to provide for the promotion of tree planting; to consolidate the law relating to the forest sector and trade in forest produce; to establish a National Forestry Authority; to repeal the Forests Act, Cap. 147 and the Timber (Export) Act Cap. 151; and for related matters.
4. **The Uganda Wildlife Act, Cap. 200** aimed at:
 - a. the conservation of wildlife throughout Uganda so that the abundance and diversity of their species are maintained at optimum levels commensurate with other forms of land use, in order to support sustainable utilisation of wildlife for the benefit of the people of Uganda;
 - b. the sustainable management of wildlife conservation areas;
 - c. the conservation of selected examples of wildlife communities in Uganda;
 - d. the protection of rare, endangered and endemic species of wild plants and animals;
 - e. ecologically acceptable control of problem animals;
 - f. the enhancement of economic and social benefits from wildlife management by establishing wildlife use rights and the promoting of tourism;
 - g. the control of import, export and re-export of wildlife species and specimens;
 - h. the implementation of relevant international treaties conventions, agreements or other arrangement to which Uganda is a party; and
 - i. public participation in wildlife management.

There is no Ugandan Law explicitly stipulating carbon ownership rights. A contract is in place between UWA and Face the Future, which legally transfers ownership of the issued VCU to Face the Future. All VCUs from the ARR VCS project will therefore be issued to - and owned by - Face the Future.

1.11 Identification of risks that may substantially affect the project's GHG emission reductions or removal enhancements:

Non-permanence risk assessment was carried out using the VCS' "AFOLU Non-Permanence Risk Tool" version 3 of 8 March 2011. According to this tool, the project activity was rated at a low risk after yielding a 8.5% of buffer requirement. The project has a system in place to identify risks and established targets to reduce any non-permanent risks. Procedures have been developed and responsibilities are well assigned with internal auditing, reviews and training in place. The project also has a well qualified, experienced local management team in place to ensure that the project activities are implemented effectively. The land planned for the project activity is wholly contained within a national park. Based on the Sections 3,4 and 5 of the Uganda Wildlife Statute, the national park is fully owned by the government of Uganda under the UWA Act and mandated by Uganda Wildlife Authority on behalf of Uganda government and all Ugandans. Therefore, UWA has full control over the entire project lands. Additionally, the project will hold a 10% VCS buffer in reserve for use in case of any loss of permanence.

Reference is hereby made to the detailed VCS report called "*Non-Permanence Risk Report: Natural High Forest Rehabilitation Project on degraded land of Kibale National Park*" for more information.

1.12 Demonstration to confirm that the project was not implemented to create GHG emissions primarily for the purpose of its subsequent removal or destruction.

At the time the project started, in 1995, carbon credits were not a commodity and the concept was unheard of. Face became involved in 1994 and did not invest in forest destruction but in forest restoration. Instead, deforestation that took place in the UWA-Face project area was as a result of encroachment by local communities in the period between 1970 and 1985 (Okonya, 1993). For almost 30 years local communities were farming within the Forest Reserve, grazing cattle, growing maize and bananas. There was no productively managed forest in the area. In 1993 all inhabitants and encroachers within the boundaries of the National Park were re-settled in Kibaale District, approximately 100 km from Kibale National Park (FSC, 2010; General Management Plan of Kibale National Park, 2003-2013). These statements are further substantiated by the Figures 1.7.1 and 1.7.2 presented earlier in the PD.

The purpose of the project is to reforest degraded lands and to promote natural regeneration. The project was not implemented to create GHG emissions hence no clearing of forest for creation of VCU's took place.

1.13 Demonstration that the project has not created another form of environmental credit (for example renewable energy certificates).

NOT APPLICABLE.

1.14 Project rejected under other GHG programs (if applicable):

NOT APPLICABLE.

1.15 Project proponents roles and responsibilities, including contact information of the project proponent, other project participants:

Face the Future is a company that was set up with the mission to mitigate climate change by rehabilitating and conserving forests and other ecosystems. Its predecessor is Face Foundation (FACE: Forests Absorbing Carbon-dioxide Emissions), a Dutch Foundation that was established with the objective to develop afforestation and reforestation projects in order to combat climate change. The projects that Face Foundation had established are located in Malaysia, Ecuador, Uganda, the Czech Republic and the Netherlands. In 2009 Face Foundation transferred her projects to Face the Future. This document refers to Face the Future's project activity in the Kibale National Park in Uganda. The Uganda Wildlife Authority (UWA) is one of the governing bodies that regulates wildlife conservation in Uganda. UWA was established in 1996 by the Uganda Wildlife Statute, which merged the Uganda National Parks and the Game Department. It is governed by a Board of Trustees appointed by minister responsible for wildlife. UWA is in charge of management of 10 National Parks, 12 Wildlife Reserves, 14 Wildlife Sanctuaries and provides guidance for 5 Community Wildlife Areas. UWA's mission is to conserve, economically develop and sustainably manage the wildlife and Protected Areas of Uganda in partnership with neighboring communities and stakeholders for the benefit of the people of Uganda and the global community.

Table 1.15.1 Outline of the project proponents and participants for the Kibale ARR project activity.

Private and/or public entity(ies) project participants (*) (as applicable)	Indicate if the Party involved wishes to be considered as a project participant (Yes/No)
Public entity: Uganda Wildlife Authority (UWA)	No
Private entity: Face the Future. A Dutch company with offices in Rotterdam, Netherlands.	Yes

Table 1.15.2 Contact information on participants in the proposed ARR VCS project activity.

Organization:	Uganda Wildlife Authority
Street/P.O.Box:	Plot 7 Kira Road, Kammwokya/P.O. Box 3530
Building:	
City:	Kampala

State/Region:	
Postfix/ZIP:	
Country:	Uganda
Telephone:	+256 414 355 000
FAX:	+256 414 346 291
E-Mail:	Andrew.seguya@ugandawildlife.org
Website URL:	www.ugandawildlife.org
Represented by:	Andre Seguya
Title:	Ag. Executive Director
Salutation:	Dr.
Last Name:	Seguya
Middle Name:	
First Name:	Andrew
Department:	
Mobile phone:	+256 772 722 210
Direct FAX:	
Direct tel:	
Personal e-Mail:	seguya@gmail.com

Organization:	Face the Future
Street/P.O.Box:	Pieter de Hoochweg 108,
Building:	
City:	Rotterdam
State/Region:	Rotterdam
Postfix/ZIP:	3024 BH
Country:	The Netherlands
Telephone:	+31 10754 2050
FAX:	+31 10478 1473
E-Mail:	denis.slieker@face-thefuture.com
Website URL:	www.face-thefuture.com
Represented by:	Denis Slieker
Title:	Managing Director
Salutation:	Mr.
Last Name:	Slieker
Middle Name:	
First Name:	Denis
Department:	
Mobile phone:	+31 652455639
Direct FAX:	
Direct tel:	+31 1075 42051
Personal e-Mail:	

The roles and responsibilities for Face and UWA are twofold:

Carbon development project carried out by Face:

The project proponent Face the Future holds responsibility for the carbon development aspect of the project and is entitled to the carbon sequestration rights of the project. As such Face the Future is responsible for the following activities:

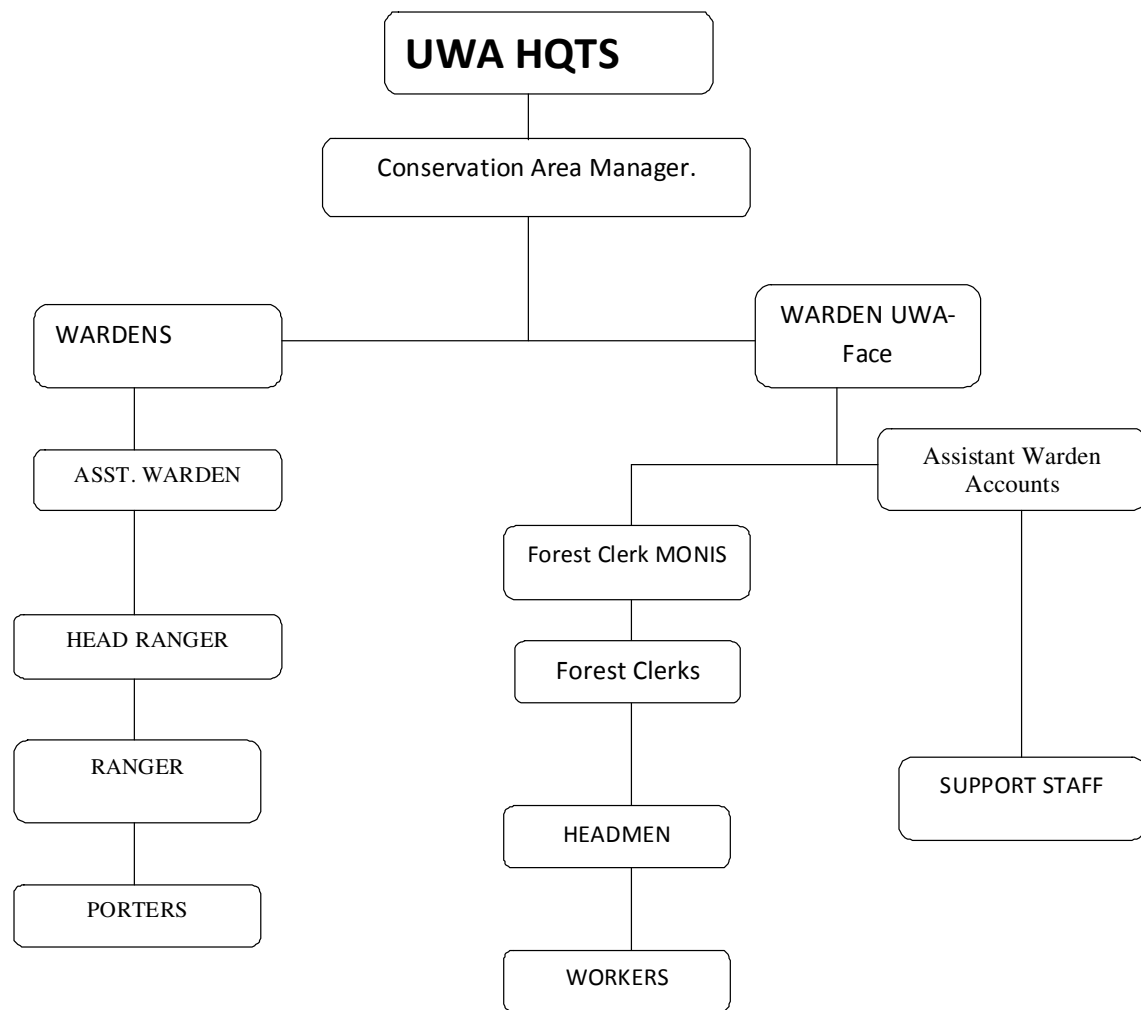
- Project funding
- Carbon development (PDD, monitoring plan, validation, verification and registration)
- Overall project management

Field project implementation by UWA:

The project will be managed on-site by the UWA-Face Warden, the Assistant warden for accounts, several forest clerks, Headmen, general workers and support staff. The project has implementation strategy and monitoring guidelines outlined in the Forest Management Plan for each year.

The carbon monitoring (biomass assessment) every 5 years will be conducted by the UWA staff who are well trained in carbon monitoring campaign and GIS inventory capacity. The forest clerk for monitoring is in charge of storing the data in the UWA-Face database.

Below are detailed descriptions of the operational and management structure for the ARR VCS project in Kibale.



WARDEN - Face

The Warden- Face is the overall in-charge of UWA-Face Project activities in Kibale National Park under the Uganda Wildlife Authority. He reports directly to the Conservation Area Manager and Face the Future in the Netherlands. He/she is the technical link between Face the Future and Management of Uganda Wildlife Authority.

He shall be responsible for:

- (i) Ensuring that UWA-Face Project objectives of reforestation of degraded areas is successfully done in accordance with the basic requirements of Face the Future and Uganda Wildlife Authority.
- (ii) Drawing up a Plan of Operation for the project area and ensuring its successful implementation after approval by both Face and UWA.
- (iii) Revising the Plan of Operation to accommodate changed situations according to the general conditions of Face the Future.
- (iv) Ensuring that funds are made available promptly for project execution and proper administration and accountability is affected.

- (v) Supervising all support staff in the project area and ensuring good quality work output including taking disciplinary action as necessary.
- (vi) Acquisition and proper handling of all project equipment and stores including vehicles.
- (vii) Administration of training programmes under the project.
- (viii) Co-ordinating of research programmes under UWA-Face reforestation activities.
- (ix) Working in close consultation with the Conservation Area Manager to ensure that UWA-Face project activities are executed in an environmentally friendly way and enhance the overall conservation strategy of Uganda Wildlife Authority.
- (x) Representing Face interests in Uganda Wildlife Authority.

FOREST CLERK -MONIS

The MONIS Assistant, answerable to the Warden- Face, is in-charge of planning and monitoring within the project. He/She is responsible for:

- (i) Ensuring that forest plans are prepared within the agreed time.
- (ii) Ensuring that the forest plans are adhered to as far as applicable and that targets are being met as far as prevailing conditions allow.
- (iii) Advising the Warden-Face on the priority species and sites for planting.
- (iv) Collect and enter data on project activities as is required in MONIS.
- (v) Ensuring that all planted areas are properly mapped and entered into the project's database.
- (vi) Ensuring that all equipment/software's in the MONIS department are in good running condition.
- (vii) Coordinating research activities within the project area.
- (viii) Running the Monitoring Information System within the project.
- (ix) Sending data to appropriate persons in Face and UWA.

ASSISTANT WARDEN ACCOUNTS

(a) Principle Functions

- Liaising with UWA, Co-ordination of all reporting including fiscal, purchasing, technical etc.
- Financial record keeping and cost accounting.
- Supervision of day-to-day management of project office including finances and support staff.

(b) Major duties and responsibilities

- **Management of project Office:**
 - (i) Ensure a smooth operating office including establishing and operating an efficient filing system. Supervise staff; manage inventory and safe storage of all project equipment.
 - (ii) Issuing of equipment/stores and stationery to staff after consultation with management.

- (iii) With guidance/assistance of the Warden- Face ensure up to date administration of project vehicles.
- **Financial Accounting Reporting:**
 - (i) Initiates and develop an appropriate accounting system for entire project set up. He/she will be responsible for: -
 - (ii) Day to day accounting for all project finances and subsequent compilation of monthly, quarterly and annual financial statements on STRICT deadlines.
 - (iii) Keeping a monthly staff workers pay roll observing all statutory deductions.
 - (iv) Carry out bank reconciliation.
 - (v) Co-ordinate with the Director Financial Services UWA to ensure appropriate and timely disbursement of funds from UWA headquarters and be responsible for its proper administration.
 - (vi) Ensure accurate work in a timely manner to produce the required reports on time.
- **Manage procurement and Inventory**
 - (i) Manage local procurement of supplies both office and field.
 - (ii) Maintain up-to date equipment and supply inventory for both consumable and non-consumable stores.
- (c) ***Perform any other duties that may be assigned to him/her by the Warden-Face to whom he/she is directly responsible.***

FOREST CLERK

He/she is in charge of fieldwork activities (FFW) works directly under Warden-Face and makes sure that:

- (i) A priority list of planting sites is produced to determine species site matching and species mixing.
- (ii) Restoration work in accordance with the Approved Annual work Programmes (AWPs).
- (iii) The right species or species characteristic of the undisturbed high forest are planted in degraded areas.
- (iv) Labour is well handled; motivated and maximum output realised in order to achieve project targets. Labour force and the staff under him/her produce and sustain good quality work especially on Nursery & Seed, Planting and Maintenance activities.
- (v) Requisition of stores or equipment and to ensure that these are well kept and Accounted for.
- (vi) Workers committees are functional and effective.
- (vii) Workers food rations are well planned and effectively administered.
- (viii) He/she is responsible for timely production of reports/returns.
- (ix) Determines the training needs of the workers to ensure that these are handled adequately.
- (x) Pays the worker wages.

- (xi) Ensures that adequate fire protection measures are put in place in the project area.
- (xii) Ensures that established research plots are not tampered with.
- (xiii) Ensures good public relations with the local communities around the project area are cultivated and maintained.

HEADMEN/WOMEN

Working directly under Project Assistants he/she is responsible for a team of twenty-five men and women during field work. He/she makes sure that:-

- (i) Labour is effectively allocated; work done inspected and recorded in the relevant labour/work register.
- (ii) Work of the highest quality is produced and tasks completed before payment is effected.
- (iii) Handles labour problems on spot before calling for emergency workers committee meetings.
- (iv) Ensures discipline among workers during field operations and that there is harmony between workers within and between teams.

WORKERS

They are responsible for achievement of project objectives. They work under the direct supervision of the Headmen and be organised in workers committees to enhance effective representation on management matters. Workers can only qualify for project remuneration and fringe benefits if they accomplish set targets and are of good character and discipline.

SUPPORT STAFF

OFFICE ATTENDANT/GUEST HOUSE KEEPER

He / She is responsible for the following:

- (i) Ensure that the office, its furniture and equipments are kept in a tidy state.
- (ii) Ensure safe custody of all equipment in the office.
- (iii) Prepare office tea.
- (iv) Attend to the guesthouse work as required.
- (v) Receive and attend to visitors.
- (vi) Carry out any other duties as assigned by superior staff.

DRIVER

Is under the direct supervision of the Project Administrator and duties include:

- (i) Maintenance of project vehicles in sound mechanical condition.
- (ii) Keep up to date daily vehicle log sheet entries.
- (iii) Attend to all safari programmes as scheduled by superior officers.
- (iv) Carry out any other duties as may be advised by his/her superiors

TURN MAN

- (i) Makes sure that his vehicle is in good mechanical condition at all times.
- (ii) Assists drive the vehicle in emergency situations.
- (iii) Responsible for the safe custody of project stores while in transit.

- (iv) Carry out any other duties assigned by superior staff.
- (v) Attend to the water pump.
- (vi) Ensure that all project vehicles are kept tidy.

RADIO OPERATOR / STORE KEEPER

Duties will include the following:

- (i) He/She is responsible for radio operations of the project and also take care of project store.
- (ii) Training personnel in radio communication.
- (iii) Service /maintenance of both HVF and Short wave radio network.
- (iv) Receive all purchases of goods and equipment made by the project and ascertains that they are in good condition.
- (v) Makes issues of such stores upon authorization of project management.
- (vi) Keep a record of receipt, issues and stocks and their condition for management planning.
- (vii) Under the supervision of the administrator carry out physical stock counts or as directed by management. Should produce a monthly stores report.
- (viii) Ensures safe custody of goods under his care.
- (ix) Executes other duties as will be assigned to him/her by superior Officers.

1.16 Any information relevant for the eligibility of the project and quantification of emission reductions or removal enhancements, including legislative, technical, economic, sectoral, social, environmental, geographic, site-specific and temporal information.):

NOT APPLICABLE.

1.17 List of commercially sensitive information (if applicable):

NOT APPLICABLE.

2 VCS Methodology:

2.1 Title and reference of the VCS methodology applied to the project activity and explanation of methodology choices:

This project activity uses the CDM A/R “Approved consolidated afforestation and reforestation baseline and monitoring methodology AR-ACM0001: Afforestation and reforestation of degraded land”, Version 05.0.0.

2.2 Justification of the choice of the methodology and why it is applicable to the project activity:

The proposed ARR VCS project activity complies with the conditions of the selected methodology in the following ways:

- a) *The A/R CDM activity is implemented on degraded lands, which are expected to remain degraded or to continue to degrade in the absence of the project; hence the land cannot be expected to revert to a non-degraded state without human intervention.*

Using stage 1 of the “Tool for the identification of degraded or degrading lands for consideration in implementing CDM A/R project activities”, this land has been classified as “degraded” by FAO in its National Soil degradation maps of 2008. **Figure 2.2.1**, shows that the majority of Uganda’s soils are either in moderate or severe degradation state. The entire Kibale National Park falls wholly within the area of severe soil degradation.

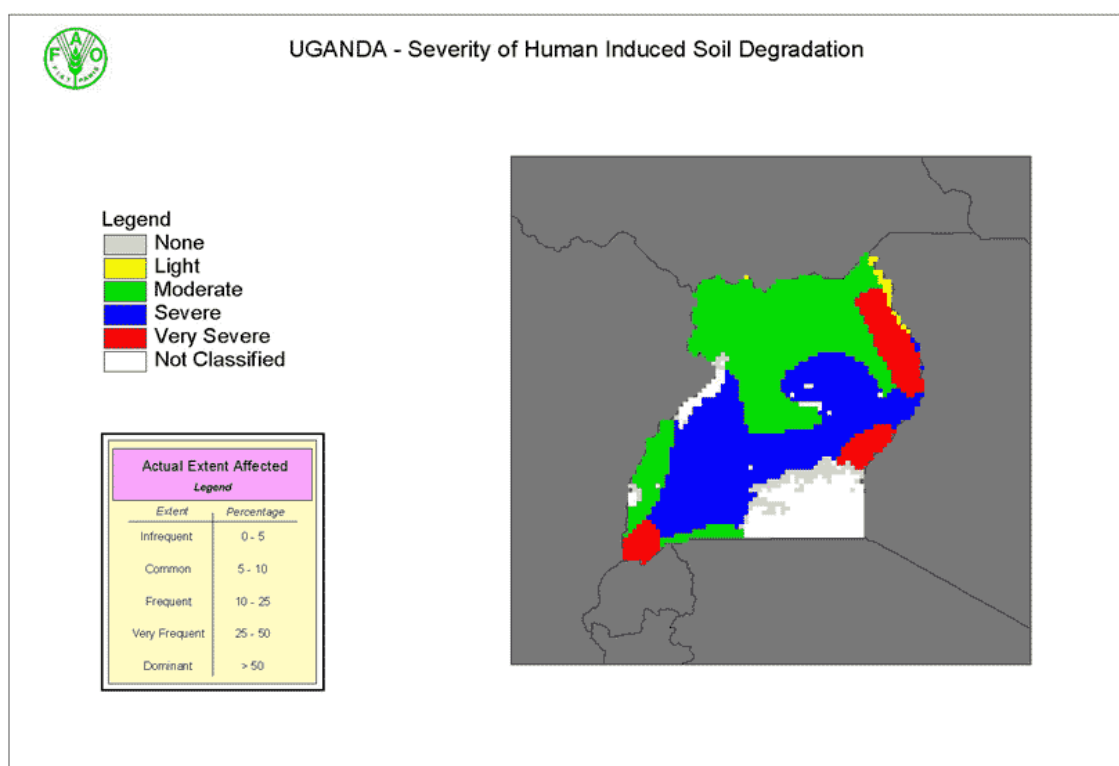


Figure 2.2.1 Soil degradation map of Uganda.

Furthermore, due to frequent fires, agricultural cultivation, soil erosion, grazing and fuel wood collection the lands to be reforested are severely degraded and are still degrading and these remain in a low carbon steady state. The proposed project areas have been denuded and anthropogenic pressures prohibit natural regeneration. Most lands are currently covered by herbaceous plants (including Elephant grass and banana trees), shrubs and a scarce number of growing trees (see **Section 2.4** and **Meijer, 1999** for details). Unavailability of natural seed sources and poor site conditions in the absence of direct human intervention do not allow the natural recruitment of tree vegetation cover. This lack of regeneration has failed to lead to the establishment of forests according to the national definition of forest for CDM purposes in Uganda.

- b) *If at least a part of the project activity is implemented on organic soils, drainage of these soils is not allowed and not more than 10% of their area may be disturbed as a result of soil preparation for planting.*

Project activities are not implemented on organic soils. About 90% of the Park is overlain by red ferralitic soils of which 70% are sandy clay loams in the north and 30% are clay loams in the South. These soils are deeply weathered, show little differentiation in horizon and are of very low to moderate fertility. The remaining 10% is where fertile eutrophic soil occurs on a base of volcanic ash limited to Mpokya and Isunga areas on the Western edge of the Park.

c) The land does not fall into wetland category.

None of the ARR project activity areas fall into the wetland category. There are however three small rivers called Mpanga, Dura and Nsonge that pass through the project area. Project activities are excluded from the banks of these rivers.

d) Litter shall remain on site and not be removed into the A/R CDM project activity.

ARR project activities do not include litter removal. Additionally, project activities are carried out entirely within the boundaries of the National Park and no litter removal activities are allowed.

e) Ploughing/ripping/scarification attributable to the A/R CDM project activity if any, is

(i) Done in accordance with appropriate soil conservation practices, e.g. follows the land contour.

(ii) Limited to the first five years from the year of initial site preparation; and

(iii) Not repeated, if at all, within a period of 20 years.

There has not been and will not be any ploughing/ripping/scarification of land due to ARR project activities. Land preparation in the project area involves slashing of 2m wide areas in grass dominated planting areas. In the non-grass dominated areas, pits of 60cm radius are dug at 5x5m intervals.

The selection of this methodology can be justified on the basis of the fact that it provides clear tools, procedures and guidelines on the following:

1. demonstration of the eligibility of lands for afforestation and reforestation project activities.
2. definition of the project boundary to ARR project activities.
3. identification of the degraded or degrading lands for consideration in implementing ARR project activities.
4. identification of the baseline scenario and demonstration of additionality in ARR project activities.
5. Calculation of the number of plots required for measurements within ARR project activities.
6. testing of significance of GHG emissions in ARR project activities.

2.3 Identifying GHG sources, sinks and reservoirs for the baseline scenario and for the project:

The carbon pool selected for the project activity are described in the **Table 2.3.1** below, while the emission sources and GHGs included and excluded are presented in **Table 2.3.2**.

Table 2.3.1 Selected carbon pools in the baseline and project.

Carbon Pools	Selected	Explanation
Above-ground biomass	Yes	Major carbon pool subjected to project activity
Below-ground biomass	Yes	Carbon pool expected to increase as a result of the project
Dead wood	No	The dead wood carbon pool increases less in the baseline than in the project scenario, and is therefore conservatively omitted from carbon accounting
Litter	No	The litter carbon pool increases less in the baseline than in the project scenario, and is therefore conservatively omitted from carbon accounting.
Soil Organic Carbon	No	It conservatively decided not to account for SOC.

Table 2.3.2 Emission sources and GHGs included in or excluded from accounting.

Sources	Gas	Included / Excluded	Explanation
Burning of woody biomass	CO ₂	Excluded	No burning of biomass takes place in the project
	CH ₄	Excluded	
	N ₂ O	Excluded	

2.4 Description of how the baseline scenario is identified and description of the identified baseline scenario:

The “Combined tool to identify the baseline scenario and demonstrate additionality in ARR CDM project activities” is used to both identify the baseline scenario. As will be demonstrated in **Section 2.5**, the most likely baseline scenario in the project area is scenario 2: less encroachment. This scenario assumes that UWA would have limited success in keeping encroachers at bay. This would mean that fires continue to roam the formerly encroached land and the carbon stock would be the result of a mix between agricultural activities, fire and partial regeneration of pioneer vegetation (grass and shrubs). The carbon stock in this case would be for the mix of shrub, forest and banana plantations.

2.5 Description of how the emissions of GHG by source in baseline scenario are reduced below those that would have occurred in the

absence of the project activity (assessment and demonstration of additionality):

The “Combined tool to identify the baseline scenario and demonstrate additionality in ARR CDM project activities” is used to both identify the baseline scenario and to demonstrate additionally:

STEP 0: Preliminary screening based on the starting date of the ARR project activity

The proposed ARR VCS project was started in 1995 and since then, it has applied an externally reviewed methodology and engaged independent carbon monitoring experts to assess and quantify the project’s baseline scenario and net emissions reductions or removals resulting in carbon crediting under the SGS standard. In 2003 Face contracted the certification Société Générale de Surveillance (SGS) to validate and verify Kibale, based on SGS’ GHG Validation and Verification program. In the absence of an international standard defined or accepted by the UNFCCC Secretariat, SGS had prepared a set of criteria based on Decision 17/C.P.7 of the Marrakech accords. These criteria act as a standard and the Kibale project was validated against it twice: in 2003 and 2008 respectively. Reports of these assessments were published in 2004 and 2009. Since then, project activity has been geared towards future crediting under VCS. The incentive of planned sale of GHG emission allowances is evidenced in the steps further below of the additionality test. Without the GHG allowance sales, the project would not be economically attractive, and would face significant barriers.

STEP 1: Identification of alternative land use scenarios to the proposed ARR VCS project activity

Sub-step 1a: Identification of credible alternative land use scenarios to the project activity

Since the lands to be planted are restricted to forestry purposes by government, other land uses are practically impossible, therefore the identified alternative land uses include three that were historically possible and one that relates to afforestation as recommended by the tool.

1. **Continued encroachment** at a scale and rate of before project activities started 1993 This alternative comprises of a mix of grassland, shrub land and banana plantations.
2. **Continued but less intensive encroachment**, assuming that UWA would have limited success in keeping encroachers at bay. This would mean that fires continue to roam the formerly encroached land and the carbon stock would be the result of a mix between agricultural activities, fire and partial regeneration of pioneer vegetation (grass, shrubs and bananas).
3. **No human encroachment**, assuming that the park would have some success in protecting the area, but no investment in forest rehabilitation, while widespread and frequent perturbation by fire continues. The resulting fire regime would favour elephant grass which would in turn suppress natural regeneration of trees.

4. **Afforestation** of the lands within the project area performed without being registered as ARR VCS project activity.

Sub-step 1b. Consistency of credible alternative land use scenarios with enforced mandatory applicable laws and regulations

The continued encroachment of any form as outlined in land use scenarios 1-2 are not permitted under Uganda law; however, UWA does not have the capacity to enforce the applicable laws and regulations as demonstrated in the many years that led to mass encroachment and consequent degradation of areas in Kibale National Park.

Current laws and/or regulations such as the constitution of the Republic of Uganda (1995) and the National Environmental Act (1996) allow the reforestation on the degraded lands. Below are a list of laws and regulations that are in favor of landuse scenario 4:

1. **The constitution of the Republic of Uganda of 1995**, which is the supreme law of the country, empowers Parliament to enact laws to protect and preserve the environment from abuse, pollution and degradation and also to promote measures intended to manage the environment for sustainable development and to promote environmental awareness. The constitution enjoins the state to protect important resources, including land, water, wetlands, oil, minerals, fauna and flora on behalf of the people of Uganda. The Constitution empowers the Government (or where appropriate local government) to hold in trust for the people and protect natural forest reserves and any land to be reserved for ecological and tourism purposes for the common good of all citizens.
2. **The National Environmental Act of 1996**: The main objective of the National Environment Act is to provide for the sustainable management of the environment. The Act establishes the National Environment Management Authority (NEMA) as a coordinating, monitoring and supervisory body. NEMA is the main institution responsible for the operation of the Environmental Impact Assessment (EIA) regime. Projects which must undergo the EIA process include forestry related activities such as reforestation and afforestation. Under the Act, NEMA is required, in consultation with the lead agency which is the National Forestry Authority (NFA) to issue guidelines and prescribe measures for the management of all forests in Uganda. These guidelines have to take into account forests in protected areas, including forest reserves, national parks and game reserves; and forests on lands subject to interests held by private persons. NEMA, in consultation with the National Forestry Authority, is given powers to expressly exclude human activities in any forest area by declaring it a specially protected forest.
3. **The National Forestry and Tree Planting Act, 8/2003**. An Act to provide for the conservation, sustainable management and development of forests for the benefit of the people of Uganda; to provide for the declaration of forest reserves for purposes of protection and production of forests and forest produce; to provide for the sustainable use of forest resources and

the enhancement of the productive capacity of forests; to provide for the promotion of tree planting; to consolidate the law relating to the forest sector and trade in forest produce; to establish a National Forestry Authority; to repeal the Forests Act, Cap. 147 and the Timber (Export) Act Cap. 151; and for related matters.

4. **The Uganda Wildlife Act, Cap. 200** aimed at:
 - a. the conservation of wildlife throughout Uganda so that the abundance and diversity of their species are maintained at optimum levels commensurate with other forms of land use, in order to support sustainable utilisation of wildlife for the benefit of the people of Uganda;
 - b. the sustainable management of wildlife conservation areas;
 - c. the conservation of selected examples of wildlife communities in Uganda;
 - d. the protection of rare, endangered and endemic species of wild plants and animals;
 - e. ecologically acceptable control of problem animals;
 - f. the enhancement of economic and social benefits from wildlife management by establishing wildlife use rights and the promoting of tourism;
 - g. the control of import, export and re-export of wildlife species and specimens;
 - h. the implementation of relevant international treaties conventions, agreements or other arrangement to which Uganda is a party; and
 - i. public participation in wildlife management.

STEP 2: Barrier analysis

Sub-step 2a: Identification of barriers that would prevent the implementation of at least one alternative land use scenarios:

There are no barriers related to continuation of land use scenarios 1-3 because there is no investment, institutional or technological barriers related to continuation of encroachment. However, alternative land use 4 faces the following barriers, which prohibit it from getting implemented in the absence of income derived from the sale of carbon credits derived from the Project Activity. These barriers include:

a) Investment barriers:

This project faces investment barriers, which prohibit its implementation without income derived from the sale of carbon credits or external donors. The main source of income for the Kibale National Park is derived from tourism activities while that of neighboring communities comes from subsistence agriculture, with poor access to improved agricultural implements and limited market access. Hence, neither UWA nor the local communities have the ability to invest in ARR project activities since VCUs are obtained after several years of investment and project implementation. The costs of nursery establishment and tending of planted seedlings are beyond what UWA and or the local communities can afford.

For example, initial reforestation activities for the Kibale project were funded by NORAD (IUCN and Ministry of Environment Protection, 1990) and IUCN (Ministry of Environment Protection, 1990) because UWA could not afford it. By 1993, IUCN invited Face to help them with investment into ARR activities and the initial cost for the first year alone was €13,138 which by the year 2010 has turned into a €3 million investment by Face - understandably unaffordable for both UWA and local communities.

b) Institutional barriers

Despite the environmental needs, there has been no institution with requisite capacity to implement a program of forest restoration on the proposed project sites. Restoration of these degraded areas could not occur in the absence of human resource capacity of UWA to enforce the protection laws on the National Park. Infrastructure is another barrier for afforestation project of this magnitude. The project activities in Kibale for example has had to build offices and staff houses, purchase big items such as project vehicles, motorcycles, water pump, electricity generator and road maintenance (>€75,00.00 investment) all of which were not in place before the start of project activities. Infrastructures such as these and roads are not only necessary but critical for a successful remote-based project like Kibale.

c) Technological barriers

Both technical and technological barriers represent a complete array of shortcomings in the successful establishment of either small or large scale ARR project activities. Interviews with the project team of UWA, District officials and local communities indicate that there is usually limited access to required inputs and management. Lack of knowledge on the quality seed sources and lack of skills for producing high quality seedlings at a large scale are a major setback. For successful tree planting as well as for preventing planted trees from being subject to fire, severe competition with grasses, etc, the project team would have to overcome a wide array of technical and technological barriers for a successful reforestation project.

d) First of a kind project barrier

Implementing an ARR project at a date earlier than the Kyoto Protocol, at a large scale and in operational partnership with UWA would make it a first of its kind. There are no records of such a project in Uganda. And even those that exist, none of them have been implemented with the objective of establishing a highly degraded natural forest through direct plantation of native species. As a consequence, such a project would have to overcome significant barriers in the establishment, implementation and monitoring phases as its project staff would have no experience and no other existing projects to learn from.

Sub-step 2b: Elimination of land use scenarios that are prevented by the identified barriers:

The fourth land use scenario regarding afforestation of the lands within the project area performed without being registered as an ARR VCS project activity is

eliminated from consideration because it is prevented by all the barriers outlined in sub-step 2a. On the other hand, continuation of pre-project scenarios 1-3 are not prevented by any of the barriers listed above in sub-step 2a.

Sub-step 2c: Determination of baseline scenarios allowed by the barrier analysis:

As stated in sub-step 2b above, continuation of the pre-project land use scenarios 1-3 which includes different levels of encroachment and seasonal fires is not prevented by any of the barriers listed above in sub-step 2a. The qualitative analysis to assess the removals by sinks for each of these baseline scenarios is described as follows:

1. **Continued encroachment** at a scale and rate of before project activities started 1993 resulting in a mix of grassland, shrubland and banana plantations. This would mean that the carbon stock stays more or less constant at 3.6 Mg/ha as presented in the baseline determination report of Meijer (1999).
2. **Continued but less intense encroachment** assuming that UWA would have limited success in keeping encroachers at bay. This would mean that fires continue to roam the formerly encroached land and the carbon stock would be the result of a mix between agricultural activities, fire and partial regeneration of pioneer vegetation (grass and shrubs). The carbon stock in this case would be for the mix of shrub, forest and banana and round 4.4 Mg/ha (Meijer, 1999).
3. **No human encroachment**, assuming that the park would have some success in protecting the area, but no investment in forest rehabilitation, while widespread and frequent perturbation by fire continues. The resulting fire regime would favour elephant grass which would in turn suppress natural regeneration of trees. The carbon stock in this scenario would be about 1.1 Mg/ha (Meijer, 1999).

Land use scenario 2 is considered to be most likely conservative baseline scenario, i.e. giving the smallest difference with the project scenario 4.4 Mg/ha (**Table 2.5.1**). However, the more conservative figure of 5.2 Mg/ha, belonging to the stratum 'banana plantation', is adopted as the baseline carbon stock to be more conservative.

Table 2.5.1 Vegetation types in the encroached area before the project started (adjusted from Meijer, 1999).

Vegetation type	Area [ha]	C content, no fire and not managed [Mg/ha]
Forest	193	208.1
Shrubland	340	20.3
Mix of shrub, forest and banana	1,053	4.4
Mix of grassland, shrubland and banana	860	3.6
Banana plantation	163	5.2
Tall grassland with limited regeneration	267	1.1
Medium-height grassland with stunted trees	68	2.5
Total area (only areas shaded)	2,411 ^{***}	

*) Small sample size.

**) Corrected value of that reported by Meijer.

***) The part of the Development Area studied by Meijer exceeded the area implemented; the types listed by Meijer also includes riverine vegetation, and other vegetation outside the compartment area.

STEP 3. Investment analysis

Was not carried out for this ARR project activity because the baseline scenario identified in sub-step 2c above allows for the highest baseline GHG removals by sinks.

STEP 4. Common practice analysis

There are a couple of projects being implemented in other regions of Uganda. The first is a small scale reforestation project in Rwoho Central Forest Reserve of the Nile Basin. The Rwoho project was the first ever Ugandan project to be registered under CDM. It is part of a project cluster of 5 similar projects aiming to provide a new financing mechanism to overcome the current barriers to establish timber plantations in Uganda and to allow communities to benefit from the CDM. In total the project activities cover an area of 347.1 ha within Rwoho Central Forest Reserve (NFA planting area: 324.9 ha (94 %), community planting area: 22.2 ha (6 %)). The Reserve covers in total an area of 9,100 ha. Based on conservative estimates, with a 22 years rotation cycle for all tree species, the project will produce 24,421 tCO₂-e by 2012. The project allows the involvement of private and community-based tree planting initiatives with different investor shares. Due diligence, monitoring, validation and verification costs will be shared among the project cluster. Based on a successful implementation of the first pilot cluster it is planned to extend the portfolio across the country clustered in a number of deforested public forest reserves and target regions. Hence, a project design that can be easily replicated was developed and the concept will consider options for a programmatic approach.

The other reforestation activity is the Community Reforestation Project in the Albertine Rift valley region which is currently working with established groups of farmers in the Albertine Rift region of Uganda to plant agroforestry and small

scale plantations. Additional activities include the planting of mixed native woodlot for timber - including mahogany, cedar, African cherry, laurel, and silk trees - along with boundary planting for fuel wood and fruit. This region has been classified as a biological hotspot according to Conservation International and is also the home to the Rwenzori Mountains which are a UNESCO World Heritage site. Furthermore, approximately 50,000 metric tons of CO₂ are reduced each year, and the Project has been registered with the voluntary carbon standard called Plan Vivo. The project, which was established in 2003, is now looking to expand into new communities and local field officers are currently setting up training for newly recruited farmers in these new regions. With this in mind, all the community forestry management 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."

Project activities similar to Kibale's magnitude and approach not been implemented in the region. The project objective is to establish degraded area of natural high forest inside the Kibale National Park. Natural forest rehabilitation is not common in Uganda as many plantations are of exotic species. Therefore, no projects of this type have been reported, and therefore this can be recognized as a **first of its kind project**.

3 Monitoring:

3.1 Title and reference of the VCS methodology (which includes the monitoring requirements) applied to the project activity and explanation of methodology choices:

The project applies the CDM A/R "Approved consolidated afforestation and reforestation baseline and monitoring methodology AR-ACM0001: Afforestation and reforestation of degraded land", Version 05.0.0. See **Section 2.2** for how the methodology applies to the project activity.

3.2 Monitoring, including estimation, modelling, measurement or calculation approaches:

The purpose of monitoring is to provide management information and transparency on the implementation of the project activity and to quantify the actual net GHG emission reductions resulting from the implementation of the project activity. Management information on project implementation allows the checking of the achievement of project goals and quality of the work.

The type and origin of data and information to be reported is described in the Sections 3.3 and 3.4 below. Section 3.4 deals with monitoring frequency, roles and responsibilities and management of data quality.

3.3 Data and parameters monitored / Selecting relevant GHG sources, sinks and reservoirs for monitoring or estimating GHG emissions and removals:

Data / Parameter:	A_i
Data unit:	ha
Description:	Total area monitored for GHG sinks
Source of data to be used:	GPS coordinates
Value of data applied for the purpose of calculating expected emission reductions	3619 and 2593
Description of measurement methods and procedures to be applied:	Monitoring is carried out using GIS integrated with GPS and Remote Sensing data
QA/QC procedures to be applied:	See Annex II.
Any comment:	Project activity area

Data / Parameter:	$a_{i,p}$
Data unit:	m ²
Description:	Area of sampling frame for plot p in stratum i
Source of data to be used:	GPS coordinates
Value of data applied for the purpose of calculating expected emission reductions	Various
Description of measurement methods and procedures to be applied:	Monitoring is carried out using GIS integrated with GPS and field surveys
QA/QC procedures to be applied:	Once selected, the size of the sampling frame shall be fixed until the end of the last crediting period
Any comment:	Planting year stratum whose size depended on availability of funds available during the planting year

Data / Parameter:	$A_{p,i}$
Data unit:	ha
Description:	Total area of all sample plots in stratum i
Source of data to be used:	Calculated based on the strata
Value of data applied for the purpose of calculating expected emission reductions	
Description of measurement methods and procedures to be applied:	
QA/QC procedures to be applied:	See Annex II.

Any comment:	A total of all permanent sample plots

Data / Parameter:	DBH
Data unit:	m
Description:	Diameter at breast height of tree - measured at 1.3m height
Source of data to be used:	Field measurements in sample plots.
Value of data applied for the purpose of calculating expected emission reductions	
Description of measurement methods and procedures to be applied:	Diameter measured at 1.3m height
QA/QC procedures to be applied:	See Annex II.
Any comment:	Electronic

Data / Parameter:	H
Data unit:	m
Description:	Height of tree
Source of data to be used:	Measured in the field
Value of data applied for the purpose of calculating expected emission reductions	
Description of measurement methods and procedures to be applied:	Triangulation using impulse or criterion
QA/QC procedures to be applied:	
Any comment:	Electronic measurement.

Data / Parameter:	T
Data unit:	years
Description:	Time period elapsed between two successive estimations of carbon stock in a carbon pool/ Year
Source of data to be used:	
Value of data applied for the purpose of calculating expected emission reductions	3
Description of measurement methods and procedures to be applied:	N/A
QA/QC procedures to be applied:	N/A
Any comment:	T_2 is 2011 and T_1 is 2008

Data / Parameter:	Plot position
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VCS Project Description Template

Data unit:	GPS coordinates
Description:	Plot position, GPS coordinates
Source of data to be used:	Field measurement
Value of data applied for the purpose of calculating expected emission reductions	
Description of measurement methods and procedures to be applied:	Only trees > 5mm.
QA/QC procedures to be applied:	See Annex II.
Any comment:	All plots. Electronic.

Data / Parameter:	<i>Tree Crown</i>
Data unit:	m
Description:	The size of tree crown
Source of data to be used:	Field measurement
Value of data applied for the purpose of calculating expected emission reductions	
Description of measurement methods and procedures to be applied:	
QA/QC procedures to be applied:	See Annex II.
Any comment:	Width. Electronic

Data / Parameter:	<i>Name tree species</i>
Data unit:	The name of the tree species, Identified at both genus and species level. Electronic.
Description:	The name of the tree species, Identified at both genus and species level. Electronic.
Source of data to be used:	Field measurement
Value of data applied for the purpose of calculating expected emission reductions	
Description of measurement methods and procedures to be applied:	
QA/QC procedures to be applied:	
Any comment:	Identification at both genus and species level. Electronic.

Data / Parameter:	<i>Tree status</i>
Data unit:	See comment section below
Description:	The observed and recorded status of trees measured in the field
Source of data to be used:	Field measurement
Value of data applied for the purpose of calculating expected emission reductions	

VCS Project Description Template

Description of measurement methods and procedures to be applied:	
QA/QC procedures to be applied:	
Any comment:	Three options: 1) Living tree, 2) recently dead tree, 3) Dead tree. Electronic.

Data / Parameter:	W_{wet}
Data unit:	kg
Description:	Weight of wet (or fresh) woody biomass
Source of data to be used:	Calculated
Value of data applied for the purpose of calculating expected emission reductions	
Description of measurement methods and procedures to be applied:	
QA/QC procedures to be applied:	
Any comment:	Calculated for all trees measured in the field. Electronic.

Data / Parameter:	$W_{air\ dry}$
Data unit:	kg
Description:	Weight of woody biomass which has been air-dried
Source of data to be used:	Calculated
Value of data applied for the purpose of calculating expected emission reductions	
Description of measurement methods and procedures to be applied:	
QA/QC procedures to be applied:	
Any comment:	Calculated for all trees measured in the field. Electronic.

Data / Parameter:	$W_{oven\ dry}$
Data unit:	kg
Description:	Weight of woody biomass which has been oven-dried
Source of data to be used:	Calculated
Value of data applied for the purpose of calculating expected emission reductions	
Description of measurement methods and procedures to be applied:	
QA/QC procedures to be applied:	

Any comment:	Calculated for all trees measured in the field. Electronic.

Data / Parameter:	<i>a,b,c,d</i>
Data unit:	Dimensionless
Description:	Parameters used in formula for calculation of W_{wet} established for tree size classes based on data obtained in Uganda.
Source of data to be used:	Literature
Value of data applied for the purpose of calculating expected emission reductions	See Table 3.4.4.9
Description of measurement methods and procedures to be applied:	Parameters used in formula for calculation of W_{wet} . i.e. To calculate the fresh weight of carbon stock held in woody biomass
QA/QC procedures to be applied:	
Any comment:	Varies according to diameter

Data / Parameter:	CF_a
Data unit:	N/A
Description:	Carbon fraction conversion factor for $W_{air\ dry}$
Source of data to be used:	National Biomass Study, Uganda
Value of data applied for the purpose of calculating expected emission reductions	
Description of measurement methods and procedures to be applied:	Conversion factor for $W_{air\ dry}$
QA/QC procedures to be applied:	
Any comment:	Species-specific and range from 0.05-1.28. Mean for Uganda is 0.56

Data / Parameter:	CF_b
Data unit:	N/A
Description:	Carbon Fraction Conversion factor for $W_{oven-dry}$. Or oven-dried woody biomass.
Source of data to be used:	National Biomass Study, Uganda.
Value of data applied for the purpose of calculating expected emission reductions	0.853
Description of measurement methods and procedures to be applied:	Conversion factor for $W_{oven-dry}$
QA/QC procedures to be applied:	
Any comment:	Corresponds to moisture content of 14.7% for Ugandan experiments.

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Data / Parameter:	CF_c
Data unit:	N/A
Description:	Conversion factor for tree biomass for species or group of species j.
Source of data to be used:	IPCC 1995
Value of data applied for the purpose of calculating expected emission reductions	0.50
Description of measurement methods and procedures to be applied:	Conversion factor for calculating carbon content.
QA/QC procedures to be applied:	
Any comment:	

Data / Parameter:	CF_r
Data unit:	N/A
Description:	Conversion Factor for calculating root biomass
Source of data to be used:	Literature
Value of data applied for the purpose of calculating expected emission reductions	
Description of measurement methods and procedures to be applied:	Calculation of below ground biomass
QA/QC procedures to be applied:	
Any comment:	Root factor for calculating root biomass. Ranges from 0.32 for smallest trees, up to 0.08 for large trees.

Data / Parameter:	CS_{TAG}
Data unit:	Mg/ha
Description:	Carbon stock in above ground biomass of trees.
Source of data to be used:	Calculated
Value of data applied for the purpose of calculating expected emission reductions	
Description of measurement methods and procedures to be applied:	
QA/QC procedures to be applied:	
Any comment:	Carbon stock in above ground biomass of trees.

3.4 Description of the monitoring plan

3.4.1 Information on how geographic coordinates of the project boundary are established, recorded and archived:

The project boundary is used to delineate the project area. The location of each node of the project boundary will be measured during fieldwork and archived in the database. The project boundary is monitored at during events such as site preparation, planting, permanent sampling operations, fire monitoring events, carbon monitoring campaign, etc., during which compartment IDs and compartment areas are required to be entered.

Two major activities are implemented with regards to the monitoring of the project boundary.

One of the major activities for monitoring utilizes a computer program called **MONIS** (Monitoring and Information System) which was developed with the specific aim to monitor the progress of the project over the lifetime of the contract. The program makes use of satellite images, ground photographs and topographic maps of the region. In addition to this program, Geographic Positioning System (GPS) is utilized in order to locate the specific boundaries of the project area and the National Park at large. An in-house training program was developed and implemented for relevant staff members and they were trained on the use of GPS technology. In order to store basic data in a logical order, data entry into MONIS is carried out on a monthly basis after the monthly reports have been submitted from the field.

The second major activity that is carried out is mapping of project and planted compartment boundaries using a hand-held GPS. Coordinates at each turning point on the compartment boundary are recorded in order to show proper boundaries of planted areas and to determine the actual planted areas. Mapping is carried out every year after planting targets have been achieved. The end product of the mapping exercises are maps of the rehabilitated areas.

All spatial data are archived at the UWA-Face office in Kibale and at the Face the Future office in the Netherlands.

Table 3.4.1 Data to be used for monitoring project boundary.

Data variable	Data unit	Measured (m), calculated (c) estimated (e) or default (d)	Recording frequency	Number of data points / Other measure of number of collected data.	Comment
Project ID	Alpha numeric	d	Before the start of the project	100%	Named before the project start.
Project location	Alpha numeric	m	Before the start of the project	100%	Using GPS to locate geographical coordinates of the project boundary before start of the project
Compartment ID	Alpha numeric	d	Annually	100%	Each compartment has a particular combination of tree species and year planted. Numeric series ID will be assigned to each compartment
Compartment Area	Alpha numeric	c	5 years	100%	Spatial extent of actual area of compartment (spatial size) determined by the use of GPS

3.4.2 Stratification and sampling design:

3.4.2.1 Ex-Ante stratification

Stratification for *ex-ante* estimations was based on the ARR VCS project planting and management strategy. All planting stands comprised of mixed species planted at the same time and same density of 5x5m resulting in 400 trees per hectare across the project area. The same tending and weeding regime was applied in all planting stands of the same age for the respective species. As such, for the *ex-ante* actual net GHG removals by sinks, the planted areas were stratified into planting age cohorts. In addition to these strata, there exists a natural regeneration area stratum resulting from the planting of a buffer zone strategy of 1995 on the western part of the project area. As a result of full protection from fires due to project activities, the inner portion (eastern part) of the project area has started to regenerate naturally and forms a stratum of its own. Therefore, the management strategy, temporal and spatial information on the forest establishment will be adopted as stratification criteria. The geographical locations of the naturally regenerated area, planting sites, planting dates and the actual areas planted per year have been identified and are represented as polygons in the stratification map shown in **Figure 3.4.2.1** below.

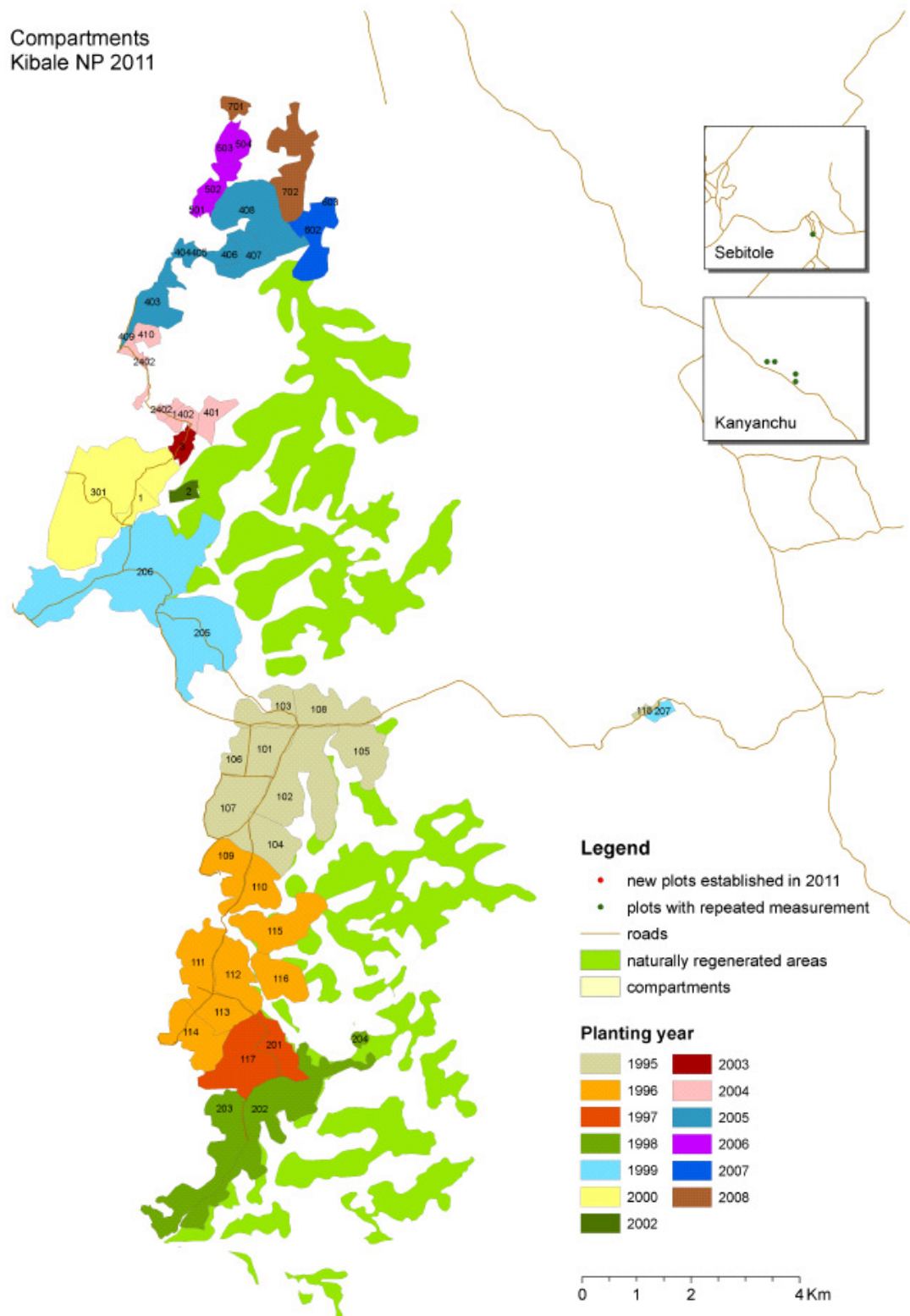


Figure 3.4.2.1 Showing an outline of planted and natural regeneration areas within the greater National Park boundary.

3.4.2.2 Ex-Post stratification

Ex-post stratification is conducted after all the planting compartments have been completed to address the possible changes of planting activity in the buffer zone.

Potential anthropogenic and natural influences shall be taken into account in ex-post stratification for the purpose of evaluating variables influencing the actual GHG removals by sinks. In Kibale, the stratification for ex post estimations shall be based on the actual implementation of the project planting plan and the natural regeneration area. Since the project takes place in a well protected National Park area with low risks to fire and uniform climatic, topography and geological conditions which will not affect the variability to the growth pattern of the biomass in the project area, no revisions of current *ex ante* stratification are expected to take place during ex post stratification.

3.4.2.3 Sampling design

A regular sampling grid was used on the compartment areas; applying plot clusters (groups of three and four permanent sampling plots in the natural regeneration and planted areas respectively) in a spacing of 500 x 500 meters (**Figure 3.4.2.3**). In total, there were 349 inventory plots established or re-measured in compartment and natural regeneration area.

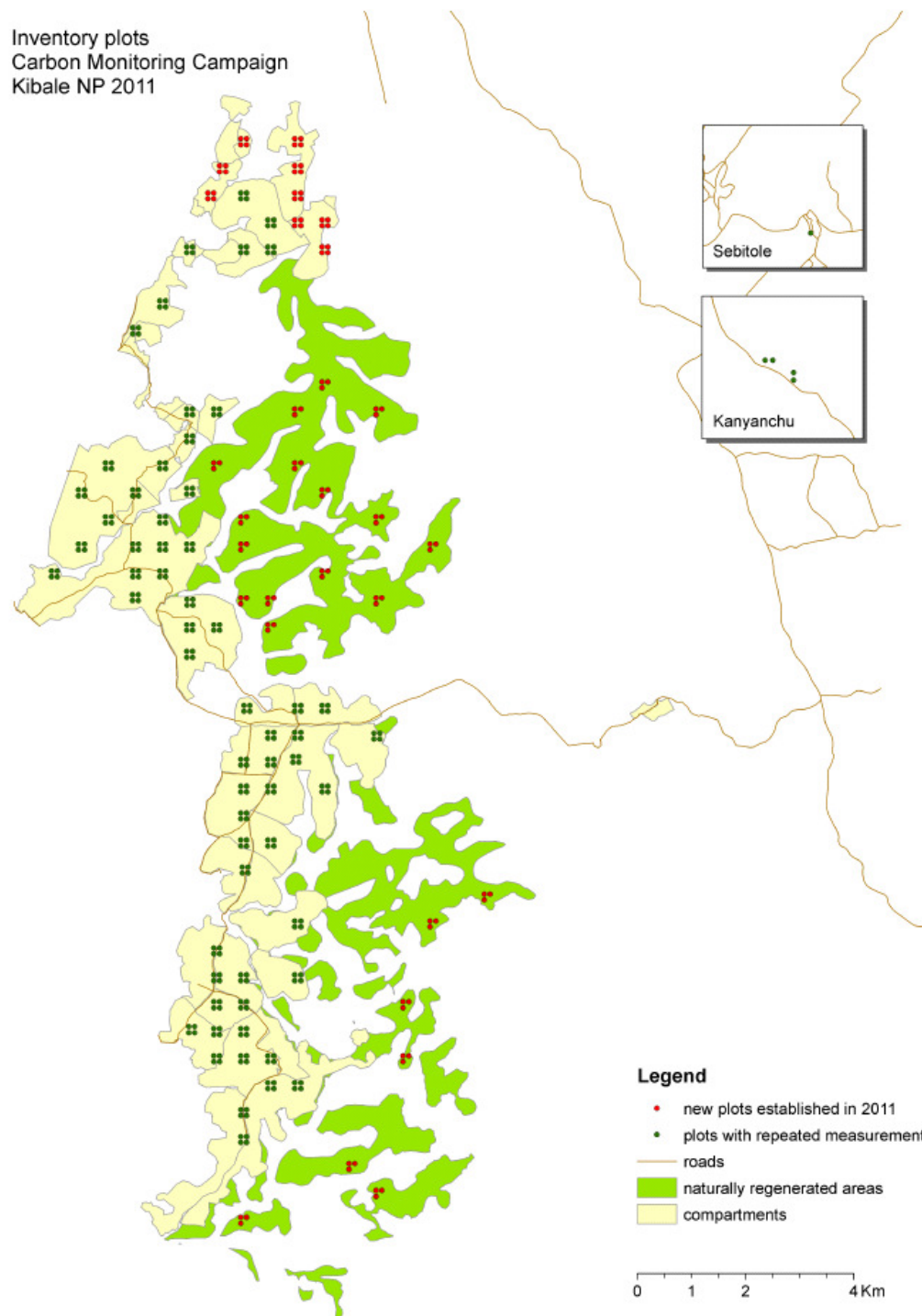


Figure 3.4.2.3 Overview of sampling grid in Kibale compartment and natural regeneration areas.

3.4.2.4 Cluster design

The inventory plots were aggregated in clusters. It was planned that one field group would manage one cluster per day on average. The cluster design is described in **Figure 3.4.2.4** below:

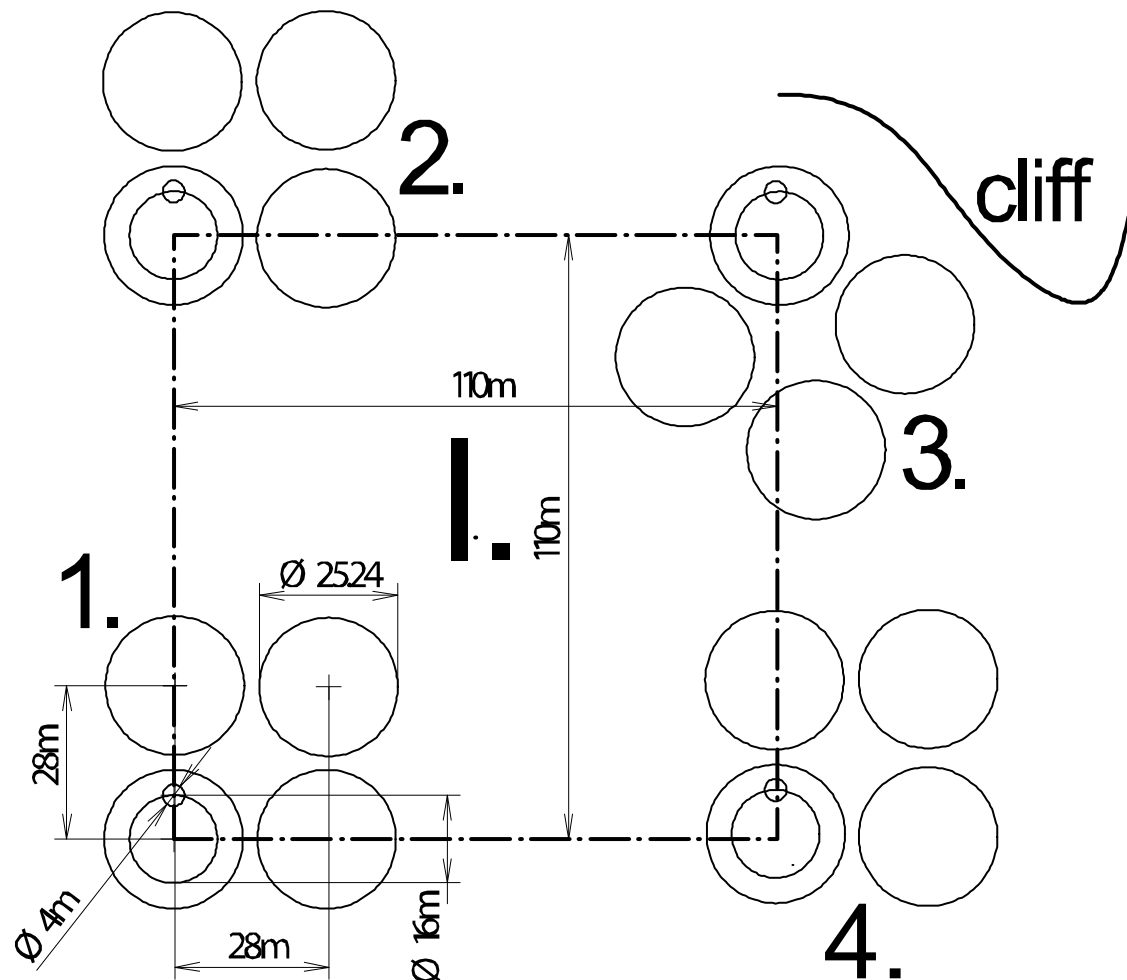


Figure 3.4.2.4 The monitoring cluster (1.) consists of four plots. Each sampling plot is composed of four circles 500 m² each. Plot 3 was rotated because of the obstacle. The obstacle can be road, cliff, river, etc.

3.4.2.5 Plot design

Each inventory plot (**Figure 3.4.2.5**) was composed of four circles with an area of 500 m² each (i.e. 2 000 m² altogether). Amongst these circles, one circle acts as a key circle which contains an additional concentric subplot to measure smaller trees and another small circle to assess the amount of tree regeneration. The applied limits for sub-circles and tree size specified for the carbon monitoring project in Uganda are shown in **Table 3.4.2.5**.

Table 3.4.2.5 Applied limits for trees given by diameter at breast height (DBH) for particular sub-plots within an inventory plot.

Circle radius	Tree DBH limit
Eccentric 2 m “regeneration circle”	Bellow 50 mm
Up to 8 m of the key plot centre	50 mm and more
Up to 12,62 m of the key plot centre (its entire area)	150 mm and more
Remaining three large circles of the plot	300 mm and more

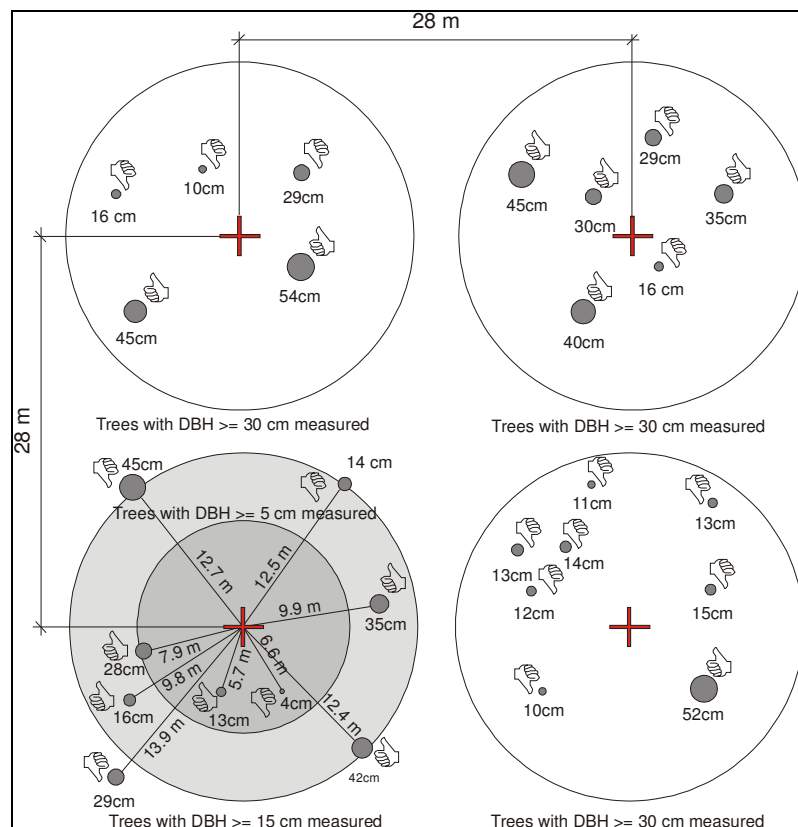


Figure 3.4.2.5 Trees equal or greater than 30 cm of DBH are measured in the entire plot. Trees equal or greater than 15 cm of DBH are measured in the light gray circle. Trees equal or greater than 5 cm of DBH are measured in the inner dark gray circle.

Natural regeneration within the plots was surveyed only in the regeneration circle (2 m radius), located 8 m to the North from plot centre. If regeneration is present, height and species were described. A tree is classified as regeneration only if its DBH is less than 50 mm and has a height greater than 10 cm.

3.4.2.6 Plot Monumentation

In order to comply with the requirement of the methodology (AR-ACM0001-Version 05.0.0) for permanent sampling plots, all inventory plots are measured in a local Cartesian co-ordinate system with the center in the middle of inventory plot. The project utilizes both the Laser and GPS technologies to locate plot centers. The GPS is used in Global Coordinate System (i.e. on the navigation plot) where as the Laser is utilized on both the local and global coordinate systems. The Laser is reliable for navigation under canopy, provides a precise navigation to the plot center and is utilized for all measurements carried out within the inventory plot.

From the center of an inventory plot, a position of marked tree is measured. This marked tree is then painted and if necessary some more descriptive comments are entered into the database. Selection of the tree to be painted is based on the size and type of the tree. For example, a tree of 20cm DBH, belonging to the climax species group and not edible to wildlife, is preferably selected because it is more likely to still be alive during the next carbon monitoring campaign, 5 years later. Therefore, during the repeated measurements the geo-reference is taken from the painted tree. This means that upon reaching the inventory plot, the Field Team immediately searches around for painted tree and uses the positioning routine to get a reference from it.

In order to improve the permanent visibility of the plots and especially the plot centres, concrete markers will be placed in the plot centres by the end of 2011.

3.4.2.7 Precision requirements

The number of permanent sampling plots and the targeted precision level for the biomass estimation is $\pm 10\%$ of the mean at a 90% confidence level and was determined using the approved CDM tool for “*Calculation of the number of sample plots for measurements within A/R CDM project activities*” version 02.1.0 as required by the CDM methodology AR-ACM0001, version 05.0.0.

3.4.2.8 Monitoring of the baseline net GHG removals by sinks, if required by the selected approved methodology

The carbon pools in the baseline scenario are in a steady state. Therefore no monitoring of baseline net GHG removals is carried out.

3.4.2.9 Monitoring of the actual net GHG removals by sinks

Monitoring of the actual net GHG removals by sinks in the planted compartments takes place every five years. In Kibale, these were carried out in 2003 and 2008, with an exception of 2011 which took only 3 years between 2008 and 2011. This exception to the 5-year interval is as a result of the transition from SGS

certification to VCS whereby VCS requires all old projects to be verified before September 8, 2011. After 2011, all future carbon monitoring campaigns will be based on the 5-year interval again. Carbon monitoring campaigns are carried out following monitoring steps in the Standard Operating Procedures (SOP) and Standard of Quality Control and Quality Assurance developed specifically for Kibale (Annex I and II) by the Czech Republic based Institute of Forest Ecosystem Research (IFER). The SOP contains rules for how DBH measurements and heights are carried out in normal terrain as well as under special circumstances such as on steep slopes, for slanted trees, etc. The procedures are described using a step-wise approach, where steps are accompanied with specific pictures and screenshots. The content of the SOP is complementary with the content of the monitoring training sessions given to inventory teams.

The monitoring of actual net GHG removals by sinks will be monitored in accordance with the selected CDM methodology (AR-ACM0001, version 05.0.0) associated with the carbon stock changes in above- ground and below-ground biomass of native species described in earlier sections of the PDD. Carbon stocks in litter and soil pools are not monitored. The changes in carbon stocks in tree biomass are estimated on the basis of field measurements carried out in permanent plots in 2008 and in 2011. The rate of change of carbon stock in trees is calculated as:

$$dC_{TREE,i,(t_1,t_2)} = \frac{C_{TREE,i,t_2} - C_{TREE,i,t_1}}{T}$$

where:

$dC_{TREE,i,(t_1,t_2)}$ Rate of change in carbon stock in above-ground and below-ground biomass of trees in stratum i , for the period between year t_1 and year t_2 ; t C yr⁻¹

C_{TREE,i,t_2} Carbon stock in trees in stratum i , at a point of time in year t_2 ; t C

C_{TREE,i,t_1} Carbon stock in trees in stratum i , at a point of time in year t_1 ; t C

T Time elapsed between two successive estimations ($T=t_2 - t_1$); yr

i 1, 2, 3, ... M_{PS} strata in the project scenario

Carbon stock in the above- and below-ground tree biomass ($C_{TREE,i,t}$) is estimated using the allometric equation method as recommended in the methodology (AR-ACM0001, version 05.0.0.). The allometric equations are developed as follows:

$$\ln(W_{wet}) = a + b * \ln(D) + c * \ln(HT) + d * \ln(CR) \quad (1)$$

Where

W_{wet} the calculated tree fresh weight (all aboveground components).

a, b, c, d	parameters established for three tree size classes (Table 3.4.4.9).
D	tree breast height diameter in cm.
HT	tree height in m.
CR	crown width in m.

The parameters a, b, c were established for three tree size classes based on a wealth of destructively obtained data in Uganda (Velle, 1997, Begumana 2000, IFER, 2002). The parameters a, b, c and d applied in the calculation of W_{wet} are shown in **Table 3.4.2.9**. The allometric equations grouped by tree dimensions are particularly useful for mixed stand conditions and for larger forested areas.

Table 3.4.4.9 The set of parameters estimated by NBS, Kampala, Uganda.

Diameter range	Parameters			
	a	b	C	d
DBH<20 cm	-0.85989	1.54456	0.50663	0.33335
DBH 20-60 cm	-1.75089	1.94391	0.47373	0.24578
DBH>60 cm	-2.16650	2.03293	0.31292	0.43634

Calculation of air-dry weight:

$$W_{air-dry} = W_{wet} * CF_a \quad (2)$$

Where

$W_{air-dry}$	air-dry weight;
CF_a	conversion factor.

The conversion factors are locally available at National Biomass Study (Kampala, Uganda). They are species-specific and range between 0.05 and 0.75. If a factor for particular species is unknown, a default value of 0.56 is applied. This corresponds to a mean value of the available factors for common tree species in Uganda.

$$W_{oven-dry} = W_{air-dry} * CF_b \quad (3)$$

Where

$W_{oven-dry}$	oven-dry weight;
CF_b	conversion factor (0.853).

The value of the additional conversion factor CF_b (0.853) corresponds to a moisture content of 14.7 % in air-dry matter. This is the average value found in the local experiments (NBS, unpublished material). Oven-dry matter is converted to carbon stock (CS_{TAG}) using conversion factor (CF_c) of 0.50, which is commonly used elsewhere (Matthews 1993, Schelhaas 2002, Kort 1999) and also recommended by the IPCC (1995 a, b).

Calculating the carbon content in belowground biomass of tree roots:

$$CS_{TBG} = CS_{TAG} * CF_r \quad (4)$$

Where

CS_{TBG} carbon stock in below ground biomass in tree roots;
 CF_r root factor applicable on the level of individual trees.

CF_r is derived from the CO2fix model (Mohren et al. 1999) estimation using a default parameter set for tropical evergreen forest ecosystems (Nabuurs and Mohren, 1993). The model gives a root ratio in relation to mean stem volume and stand age. The volumetric information is used to derive a size-dependent root factor that is attributed to each measured tree stored in the database. The root fraction ranges from 0.32 for the smallest trees up to 0.08 for the largest trees. The applied root ratio is a rather conservative value to comply with a rigorously “safe” assessment strategy involved in the assessment.

4 GHG Emission Reductions:

4.1 Explanation of methodological choice:

The project applies the CDM A/R methodology AR-ACM0001, version 05.0.0, titled ‘Afforestation and reforestation of degraded land’. See **Section 2.2** for how the methodology applies to the project activity.

4.2 Quantifying GHG emissions and/or removals for the baseline scenario:

The baseline net removals by sinks are the sum of the carbon stock changes in carbon pools in the absence of the proposed ARR VCS project activity. As demonstrated above in **Section 2.5**, the baseline scenario is the one involving limited encroachment maintenance at a steady state. This baseline scenario represents the carbon stocks in living trees at the start of the project activity calculated according to the methodology with the formula:

$$C_{TREE_BSL} = \frac{44}{12} * B_{TREE_BSL} * CF_{TREE_BSL}$$

where

C_{TREE_BSL} Carbon stock in living trees in the baseline at the start of the project activity; t CO₂-e
 $\frac{44}{12}$ Ratio of molecular weights of CO₂ and carbon; dimensionless
 B_{TREE_BSL} Biomass of living trees in the baseline at the start of the project; t d.m.
 CF_{TREE_BSL} Carbon fraction of dry matter for tree biomass in baseline; t C t⁻¹ d.m.

For this ARR project activity, Face in 1999 commissioned Meijer to carry out a baseline study whose results show that changes in the carbon stocks for both above and below ground biomass are expected not to exceed actual net GHG removals by sinks and are therefore assumed to be zero in the absence of the project activity. Hence the formula above is only applied to multiply the 5.2 tonnes of carbon per hectare (adjusted from Meijer, 1999), which is the conservative value of the carbon stock in the stratum 'banana plantation', with the combined area A_i of stratum 'Planted Area' and 'Regenerating Area'. The total area to be planted during the crediting period is presented in **Table 7.2** and has a size of 6,000 hectares. In addition, the Regenerating Area is 2,593 hectares. The combined area is therefore 8,593 hectares. As the baseline is in a steady state, there is no increases in GHG removals. See **Annex III** for details on the estimation, and the spreadsheet 'Kibale Baseline Recalculation_082711', which details the calculation of the mean tree carbon stock in the baseline, based on inventory data by Meijer in 1999. In addition, the carbon stock changes in dead wood, litter and soil organic matter are conservatively assumed to be zero based on the methodology applied.

Table 4.2.1 Estimation of the ex ante baseline net GHG removals by sinks.	
Year	Annual estimation of cumulative baseline net anthropogenic GHG removals by sinks; in t CO₂ - e
1995	164.175
1996	164.175
1997	164.175
1998	164.175
1999	164.175
2000	164.175
2001	164.175
2002	164.175
2003	164.175
2004	164.175
2005	164.175
2006	164.175
2007	164.175
2008	164.175
2009	164.175
2010	164.175
2011	164.175
2012	164.175
2013	164.175
2014	164.175
2015	164.175

VCS Project Description Template

2016	164.175
2017	164.175
2018	164.175
2019	164.175
2020	164.175
2021	164.175
2022	164.175
2023	164.175
2024	164.175
2025	164.175
2026	164.175
2027	164.175
2028	164.175
2029	164.175
2030	164.175
2031	164.175
2032	164.175
2033	164.175
2034	164.175
2035	164.175
2036	164.175
2037	164.175
2038	164.175
2039	164.175
2040	164.175
2041	164.175
2042	164.175
2043	164.175
2044	164.175
2045	164.175
2046	164.175
2047	164.175
2048	164.175
2049	164.175
2050	164.175
2051	164.175
2052	164.175
2053	164.175
2054	164.175
2055	164.175
2056	164.175

2057	164.175
2058	164.175
2059	164.175
2060	164.175
2061	164.175
2062	164.175
2063	164.175
2064	164.175
2065	164.175
2066	164.175
2067	164.175
2068	164.175
Total estimated baseline net GHG removals by sinks (tonnes of CO₂ e)	164.175
Total number of crediting years	60

4.3 Quantifying GHG emissions and/or removals for the project:

The actual net greenhouse gas removals by sinks were estimated using the equations described in section 5 of the CDM methodology AR-ACM0001/Version 05.0.0 as follows:

$$\Delta C_{ACTUAL} = \Delta C_P - GHG_E$$

Where:

ΔC_{ACTUAL} :	Actual net GHG removals by sinks; tCO ₂ -e
ΔC_P :	Sum of the changes the carbon stock in the selected carbon pools with the project boundary; tCO ₂ -e
GHG_E :	Increase in non-CO ₂ GHG emissions within the project boundary as a result of the implementation of the A/R VCS project activity; tCO ₂ -e

Under the applicability conditions of this methodology, changes in carbon stock of above-ground and below-ground biomass of non-tree vegetation may be conservatively assumed to be zero for all strata in the project scenario.

Furthermore, the ex-ante estimation, the increase in GHG emissions as a result of the implementation of the proposed ARR VCS project activity within the project boundary is assumed as zero.

The change in carbon stock in tree biomass is estimated on the basis of field measurements in permanent sample plots in 2003, 2008 and 2011.

Following the methodology, carbon stock in above-ground and below-ground tree biomass ($C_{TREE,i,t}$) is estimated by the allometric equations method as applied in 2011 for both the *ex-ante* and *ex-post* estimation in a two step process. Because of the availability of monitoring data from within the project boundary at the time of the *ex-ante* calculation, these data have been used to model the growth in the project area. This is in line with the methodology ACM0001, version 5.0.0, which requires under step 1 (a)(ii) of the *ex-ante* calculation using the allometric method, that a tree growth model is used from existing data or literature. Tree inventory data from the project area itself are used, because they represent the most accurate estimation of biomass stocks available. Carbon stock changes in the with-project scenario are modelled in CO2Fix software, based on the inventory results. A time series of carbon stocks as a function of plantation age are created based on the inventory data from 2003, 2008 and 2011: e.g. the carbon stock measured in 2011 in planting year 1996, provides the carbon stock at the plantation age of 15 years (this is step 1 (a) (iii) of the *ex-ante* allometric method in the methodology). In addition to measurements within the project boundary, extra inventory plots have been located in Kanyanchu (representing carbon stocks in primary forest – i.e. the climax phase of the ecosystem) and Sebitole (planted in 1942 – 1943), both site being within Kibale National Park and representative for the forest type occurring within the project boundary. The time series covers the whole crediting period and longer, and is used to calibrate the model in CO2Fix. The inventory carbon stocks are calculated with the same allometric equations as in the *ex-post* estimation, see the Monitoring Plan in **Section 3.4**, and this way follows step 1 (a) (i) and (iv) of the *ex-ante* calculation using the allometric method in the methodology.

The results of the *ex-ante* estimations are presented in **Table 4.3.1**.

Table 4.3.1 Ex-ante estimation of actual net GHG removals by sinks.				
Year	Cumulative GHG removals by afforestation and reforestation (tonnes of CO₂ e)	GHG sources from biomass burn (tonnes of CO₂ e)	GHG sources from biomass loss (tonnes of CO₂ e)	Cumulative Actual net GHG removals (tonnes of CO₂ e)
2009	932.951	0	0	932.951
2010	1.001.186	0	0	1.001.186
2011	1.071.241	0	0	1.071.241
2012	1.145.800	0	0	1.145.800
2013	1.225.432	0	0	1.225.432
2014	1.310.079	0	0	1.310.079
2015	1.399.868	0	0	1.399.868
2016	1.494.065	0	0	1.494.065
2017	1.592.376	0	0	1.592.376

VCS Project Description Template

2018	1.690.455	0	0	1.690.455
2019	1.787.920	0	0	1.787.920
2020	1.884.323	0	0	1.884.323
2021	1.979.275	0	0	1.979.275
2022	2.072.593	0	0	2.072.593
2023	2.164.561	0	0	2.164.561
2024	2.255.187	0	0	2.255.187
2025	2.344.716	0	0	2.344.716
2026	2.433.222	0	0	2.433.222
2027	2.520.760	0	0	2.520.760
2028	2.607.350	0	0	2.607.350
2029	2.693.017	0	0	2.693.017
2030	2.777.678	0	0	2.777.678
2031	2.861.360	0	0	2.861.360
2032	2.943.859	0	0	2.943.859
2033	3.025.093	0	0	3.025.093
2034	3.104.883	0	0	3.104.883
2035	3.183.145	0	0	3.183.145
2036	3.259.491	0	0	3.259.491
2037	3.333.618	0	0	3.333.618
2038	3.405.616	0	0	3.405.616
2039	3.475.383	0	0	3.475.383
2040	3.543.046	0	0	3.543.046
2041	3.608.444	0	0	3.608.444
2042	3.671.442	0	0	3.671.442
2043	3.732.251	0	0	3.732.251
2044	3.790.810	0	0	3.790.810
2045	3.847.135	0	0	3.847.135
2046	3.901.280	0	0	3.901.280
2047	3.953.144	0	0	3.953.144
2048	4.002.760	0	0	4.002.760
2049	4.050.190	0	0	4.050.190
2050	4.095.476	0	0	4.095.476
2051	4.138.612	0	0	4.138.612
2052	4.179.456	0	0	4.179.456
2053	4.218.087	0	0	4.218.087
2054	4.254.541	0	0	4.254.541
2055	4.288.845	0	0	4.288.845
2056	4.321.378	0	0	4.321.378

2057	4.352.348	0	0	4.352.348
2058	4.381.856	0	0	4.381.856
2059	4.409.895	0	0	4.409.895
2060	4.436.608	0	0	4.436.608
2061	4.462.391	0	0	4.462.391
2062	4.487.052	0	0	4.487.052
2063	4.510.711	0	0	4.510.711
2064	4.533.431	0	0	4.533.431
2065	4.555.145	0	0	4.555.145
2066	4.575.929	0	0	4.575.929
2067	4.595.864	0	0	4.595.864
2068	4.615.038	0	0	4.615.038
Total for crediting period				4.615.038

4.4 Quantifying GHG emission reductions and removal enhancements for the GHG project:

Based on the methodology AR-ACM0001, version 05.0.0, the net anthropogenic GHG removals by sinks is calculated with equation (8):

$$C_{AR-CDM} = \Delta C_{ACTUAL} - \Delta C_{BSL} - LK$$

Leakage (LK) is not applicable to the project. The parameter ΔC_{BSL} is quantified in **Section 4.2** of the PD and ΔC_{ACTUAL} is quantified in **Section 4.3** of the PD. The **Table 4.4.1** below presents the calculation of the parameter C_{AR-CDM} .

Table 4.4.1 Summary of results obtained in Sections 4.2 and 4.3.				
Year	Estimation of baseline net GHG removals by sinks (tonnes of CO ₂ e)	Estimation of actual net GHG removals by sinks (tonnes of CO ₂ e)	Estimation of leakage (tonnes of CO ₂ e)	Estimation of net anthropogenic GHG removals by sinks (tonnes of CO ₂ e)
2009	164.175	932.951	0	768.776
2010	164.175	1.001.186	0	837.011
2011	164.175	1.071.241	0	907.066
2012	164.175	1.145.800	0	981.625
2013	164.175	1.225.432	0	1.061.257
2014	164.175	1.310.079	0	1.145.904
2015	164.175	1.399.868	0	1.235.693
2016	164.175	1.494.065	0	1.329.890
2017	164.175	1.592.376	0	1.428.201

VCS Project Description Template

2018	164.175	1.690.455	0	1.526.280
2019	164.175	1.787.920	0	1.623.745
2020	164.175	1.884.323	0	1.720.148
2021	164.175	1.979.275	0	1.815.100
2022	164.175	2.072.593	0	1.908.418
2023	164.175	2.164.561	0	2.000.386
2024	164.175	2.255.187	0	2.091.012
2025	164.175	2.344.716	0	2.180.541
2026	164.175	2.433.222	0	2.269.047
2027	164.175	2.520.760	0	2.356.585
2028	164.175	2.607.350	0	2.443.175
2029	164.175	2.693.017	0	2.528.841
2030	164.175	2.777.678	0	2.613.503
2031	164.175	2.861.360	0	2.697.185
2032	164.175	2.943.859	0	2.779.684
2033	164.175	3.025.093	0	2.860.918
2034	164.175	3.104.883	0	2.940.707
2035	164.175	3.183.145	0	3.018.969
2036	164.175	3.259.491	0	3.095.316
2037	164.175	3.333.618	0	3.169.442
2038	164.175	3.405.616	0	3.241.441
2039	164.175	3.475.383	0	3.311.207
2040	164.175	3.543.046	0	3.378.871
2041	164.175	3.608.444	0	3.444.269
2042	164.175	3.671.442	0	3.507.267
2043	164.175	3.732.251	0	3.568.076
2044	164.175	3.790.810	0	3.626.635
2045	164.175	3.847.135	0	3.682.960
2046	164.175	3.901.280	0	3.737.104
2047	164.175	3.953.144	0	3.788.969
2048	164.175	4.002.760	0	3.838.585
2049	164.175	4.050.190	0	3.886.015
2050	164.175	4.095.476	0	3.931.301
2051	164.175	4.138.612	0	3.974.437
2052	164.175	4.179.456	0	4.015.281
2053	164.175	4.218.087	0	4.053.912
2054	164.175	4.254.541	0	4.090.365
2055	164.175	4.288.845	0	4.124.670
2056	164.175	4.321.378	0	4.157.203
2057	164.175	4.352.348	0	4.188.173
2058	164.175	4.381.856	0	4.217.681

2059	164.175	4.409.895	0	4.245.720
2060	164.175	4.436.608	0	4.272.433
2061	164.175	4.462.391	0	4.298.216
2062	164.175	4.487.052	0	4.322.877
2063	164.175	4.510.711	0	4.346.536
2064	164.175	4.533.431	0	4.369.256
2065	164.175	4.555.145	0	4.390.969
2066	164.175	4.575.929	0	4.411.753
2067	164.175	4.595.864	0	4.431.688
2068	164.175	4.615.038	0	4.450.862
Total				4.450.862
(tonnes of CO2 e)				

The ARR project activity started in 1995, and carbon monitoring programs took place in 2003 and 2008 with eventual issuance of credits under the SGS standards. From 2009 onwards, project activities have been geared towards the transfer from SGS to VCS. Therefore the crediting period under VCS will start from the year 2009 as shown in the **Table 4.4.1** above showing an estimated amount of net anthropogenic GHG removals by sinks.

5 Environmental Impact:

There are some low level environmental impacts of the project activity:

- collection of soil for nursery activities
- disposal of plastic pots from seedlings
- collection of wildlings from the forest

However, from 2001 onwards seedlings raised in the communities are purchased, as a way of promoting further income generation activities within the local communities. The nursery farmers raise seedlings adjacent to the project nurseries not only for easy supervision by Project staff, but also for proper rehabilitation of areas where nursery soil is collected. Plastic pots are generally re-used by local communities and the pots are bio-degradable. Collection of wildlings is not considered to be on such a scale that it would have a significant impact. There is no road construction or harvesting activities and no chemicals or exotic species are being utilised. The re-establishment of natural forest is seen as a positive impact, enlarging the habitat for native species, protecting the park's biodiversity and enhancing its tourism value. Native grasslands located in the project area need to be protected; they are not reforested.

Detailed documentation on the analysis of environmental impacts are contained in the "Environmental Impact Study (EIS) report for the future operations of the UWA-Face Project" prepared by Environmental Monitoring Associates (EMA) Ltd in 1999.

6 Stakeholders comments:

6.1 Brief description of how comments by local stakeholders have been invited and compiled:

The 2006 SGS' FSC report states that "Community consultation was carried out at Kibale and all groups/individuals interviewed (e.g. the Nyabweya Parish Community, the Bigodi Women's Group, the Mugume Clinic Nurse, Nursery workers) were well aware of the benefits of the forest, and how they could access these benefits. In addition, there was evidence of good communication between UWA and the community. Records of liaison (e.g. minutes of meetings, letters etc) were kept by the Assistant Warden for Community Conservation (Olivia Biira), who was appointed to operate in the 28 parishes, which are on the boundary of the park. UWA also supports the CPI (Community Protected area Institution), which comprises of people nominated by the communities, to represent the different Parishes and have the responsibility of overseeing issues in the communities, including environmental issues."

6.1.1 Summary of the comments received

Since the start of the project activities, there have been several meetings held with local stakeholders. The following are only a small sample of comments received over the years by the UWA members of staff during community consultations. UWA's Isunga office in Kibale National Park contains several folders where meeting minutes are filed.

6.1.2 Minutes of the meeting held Mbale Parish on 17th July 1996

The meeting objective was to address the community's needs to access wild coffee in the National Park. To ensure long-term sustainable harvest of wild coffee, community members suggested that UWA should limit the number of people accessing the park for coffee using distance of the village settlement from the park boundary and also to include those whose gardens are raided by wildlife. The community members further suggested that they could form community groups which would limit the number of people going into the park to harvest wild coffee. They also wanted to know if their views would be integrated into the coffee resource management plan.

6.1.3 Workshop on management of problem animals held on July 28th 2000 at St. Joseph's Inn in Virika

Crop raiding by problem animals was a major issue of concern and communities felt that they it required joint efforts from all relevant stakeholders such as UWA and the Local Government to live up to their responsibilities. The major threats to crop damage included baboons, elephants, wild pigs, red-tailed monkeys and to a certain extent, birds.

6.1.4 Meeting with the LCS and community of Beseri, Nkongoro Parish, Kamwenge sub-county, Kamwenge District on 27th November 2007

The chairman of Beseri LCI spoke on behalf of his community members on two matters:

1. Problem animals such as elephants, wild pigs and baboons caused a lot of havoc in their community. They disrupted life activities such as schooling for children who as a result of problem animals were required to watch over the gardens instead of going to school.
2. Their community only had an old school which was collapsing due to lack of funds. They were appealing to the local government officials to work with LCS and communities to raise the education standards in their community.

6.1.5 Translated from “Orukurato RWA PARK Katebe” which means meeting with the community of Katebe on 21-11-2008

The following two items were addressed during this meeting:

1. There was wildlife conflict and the community members wanted to find out if they could build camps along the park boundary.
2. Years back communities were involved in wild coffee harvesting inside the Park. This program was not well respected by communities and it was halted by UWA. At this meeting the community members wanted to find out if they could resume coffee harvesting.

6.1.6 Sensitization meeting held on February 20, 2009 at Munobwa Village

This community group was interested in having their questions (below) answered:

1. Local communities wanted to know how they could access resources. Would it be as individuals or in groups?
2. Is there compensation in case of crop damage?
3. What measures are put in place to control vermin and elephants?

6.2 Report on how due account was taken of any comments received:

The following is an account of how each of the above outlined comments and questions from local stakeholders were addressed:

6.2.1 Minutes of the meeting held Mbale Parish on 17th July 1996

The WFMR emphasized that the views of the people were very important because they are the ones who have long-term experience with the resources and have knowledge on how best to manage them. It was therefore important to consult with them at all levels when deciding on issues which concern the communities.

6.2.2 Workshop on management of problem animals held on July 28th 2000 at St. Joseph's Inn in Virika

Comments from the local stakeholders at the St. Joseph's Inn where taken into account by proposing training of target groups including the task force members of Kibale National Park, formation of vermin control units and units at the district level to help address the problem.

6.2.3 Meeting with the LCS and community of Beseri, Nkongoro Parish, Kamwenge sub-county, Kamwenge Distrtict on 27th November 2007

The Warden for Community Conservation Mr. Muhabwe appealed to all community members to work together in order to access better programs from the government. He also highlighted some of the important benefits from Protected Areas such as access to select resources under agreements, employment, education, and support for infrastructure among others.

6.2.4 Translated from Orukurato RWA PARK Katebe which means meeting with the community of Katebe on 21-11-2008

1. The response from the UWA CCR was that local communities were not allowed to set up camps along the boundary for vermin control because only the Government had the mandate to do so. The communities however, could build camps within their own gardens.
2. The response from UWA CCR was that communities where no longer allowed to access wild coffee trees from this area, however, CCR would alert the park management on their wishes and get back to them at a later stage.

6.2.5 Sensitization meeting held on February 20, 2009 at Munobwa Village

The following are answers from the CCR in her address of the community group questions:

1. Local communities wanted to know how they could access resources. Would it be as individuals or in groups? Park management works with groups to avoid complications with regards to individual interests which may be in conflict with group wishes.
2. Is there compensation in case of crop damage? The CCR made it clear that the Wildlife Act of Uganda of 2000 does not cover crop damage.
3. What measures are put in place to control vermin and elephants? The CCR indicated that vermin are specifically taken care of in the Local Government Act in which three species are declared as vermin namely; baboons, velvet monkeys and wild pigs. Communities have the right over vermin once they are outside the park boundary. With regards to elephants however, measures such as chilli pepper usage have been tried, deemed effective and were therefore recommended.

7 Schedule:

Chronological order of the GHG project cycle and the implementation of forest planting activities are outlined in **Tables 7.1 and 7.2** below.

Table 7.1 Schedule of the GHG project cycle.

GHG project cycle element	Year / Period / Interval
Project Start date	May 15, 1994
Crediting period start date	January 1, 2009
Project crediting period	60 years
Monitoring and reporting frequency	Every 5 years
Project termination date	December 31, 2068

The size of the area to be rehabilitated is determined in contracts between Face the Future and Uganda Wildlife Authority, describing the planting efforts for that specific year. Contract covers a planting period of about 1 year and a tending period of 5 years. **Table 7.2** shows the areas that have already been planted and the areas that are planned for planting.

Table 7.2 Implementation of forest planting.

Period	Area (ha)
1995 – 1997	1.400
1997 – 1999	974
2000	339
2001	0
2002	16
2003	21
2004	98
2005	285
2006	80
2007	90
2008	116
2009	105
2010	97
2011	370
2012	400
2013	400
2014	400
2015	400
2016	409
total	6.000

8 Ownership:

8.1 Proof of Title

The area now known as Kibale National Park (KNP) is situated in western Uganda and has fallen under various protected area categories for over sixty years. Kibale Forest was originally managed by the British, and later by Ugandan authorities, as a Forest Reserve from 1932 to 1993 under the authority of the Forest Department. The total area (795 km²) of the Park and its boundary designations correspond to those of the 1932 Forest Reserve boundary combined with the former Kibale Forest Corridor Game Reserve. Kibale National Park was gazetted in 2003 under statutory Instrument No. 2003 No.46 cited as “The Uganda Wildlife (Declaration of Wildlife Conservation) (Kibale National Park) Instrument, 2003”. The Park is fully owned by the government of Uganda under the UWA Act and managed by Uganda Wildlife Authority on behalf of all Ugandans. The purpose of the Wildlife Act under Section 18(2) are:

1. to preserve selected examples of the biotic communities of Uganda and their physical environments.
2. to protect areas of aesthetic beauty and of special interest
3. to preserve populations of rare, endemic and endangered species of wild plants and animals.
4. to assist in water catchment conservation.

Further descriptions are available in Sections 3, 4 and 5 of the Uganda Wildlife Act. What this means for Kibale which contains the largest population of Chimpanzees and the only national park which is a forest park, is that there is full protection these animal and plant species which would be jeopardized should any mineral extraction take place.

Additionally, below is a statement from Uganda Wildlife Authority’s Chief Conservation Area Manager:

“This Instrument is a Parliamentary Resolution to indicate that the government has set aside this piece of land (Kibale National Park) as a protected area for wildlife conservation only. All other activities not compatible with wildlife conservation are therefore not allowed inside Kibale National Park. The Statutory Instrument is derived from the provisions of the Wildlife Act (Formerly Uganda Wildlife Statute). By providing this Statutory Instrument, we as Uganda Wildlife Authority attest to the fact that there are no overlapping land (both surface and sub-surface rights) in the Face Project area of Kibale National Park that might affect the Face Project now and/or in the future. The area is secured by the Parliamentary declaration as a wildlife protected area.”

Since the land is owned by the Ugandan Government, there are no overlapping claims. All resources, below or above the surface belong to the government, except for those which have been agreed otherwise, for example the carbon ownership by Face the Future in the following signed agreements:

1. The MoU between Face and the Government of Uganda (1994), see article 2.e.
2. Form of Agreement contract example, the contract of the first area, 1994. This contract refers to the General conditions of Contract .

3. The General conditions of Contract (1992), see article 33.

8.2 Projects that reduce GHG emissions from activities that participate in an emissions trading program (if applicable):

NOT APPLICABLE.

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10. List of Annexes:

All annexes are provided as separate documents as listed below:

- i. Annex I: Standard of Operating Procedures.
 - ii. Annex II: Standard of Quality Control and Assurance.
 - iii. Annex III: Baseline study.
 - iv. Annex IV: Monitoring Report.
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