CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM FOR SMALL-SCALE AFFORESTATION AND REFORESTATION PROJECT ACTIVITIES (CDM-SSC-AR-PDD)
(Version 02)

CONTENTS

Annexes

SECTION A. General description of the proposed small-scale A/R CDM project activity:

A.1. Title of the proposed small-scale A/R CDM project activity:

Uganda Nile Basin Reforestation Project No 2

History of the document:

Version	Date	Nature of Revisions
07	21 October 2010	Revised according to changes in implementation schedule

A.2. Description of the proposed small-scale A/R CDM project activity:

Uganda has to expand its wood resources substantially to meet the growing demand of wood products and to reduce the strong pressure on the remaining natural forests. According to FAO, Uganda has one of the highest deforestation rates in the World with 2.7% per year. Only a few thousand hectares of timber plantations remain but at least 65,000 ha of high yielding plantations are necessary to meet the domestic demand. Due to investment barriers tree planting for timber production is only viable if public incentives are provided. The EU-funded Sawlog Production Grant Scheme (SPGS), which supported the establishment of 2,500 ha in the last 2 years, has demonstrated this.

The small-scale CDM A/R project, implemented by the National Forestry Authority (NFA) in cooperation with communities, 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 370 ha within Rwoho Central Forest Reserve (NFA planting area: 334.1 ha (90 %), community planting area: 35.9 ha (10 %). 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 21,342.87 tCO_2-e by 2012. In section A.4.1.2 a map is showing the location of the project activities.

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.

In the project the NFA is the main investor being responsible for 90% of the investor shares and proportional area. The NFA is dominating this first project cluster considering that it is currently the only organization in Uganda able to provide confidence to international investors in this new investment concept and being able to provide the expected guarantees to replace the emission reductions in case the project activities may fail. The Co-investors are community groups, like the Rwoho Environmental Conservation and Protection Association (RECPA), with currently 250 members that are interested in tree planting. Many of the members already have a track record planting trees. Community groups will manage the remaining 10% of the project area. In subsequent project activities the investor share of communities and/or private enterprises will be gradually increased considering the learning curve and the available track record from the first project cluster.

Community groups will receive the payments for each tCO_2 sequestered at a price stipulated in the Emission Reductions Purchase Agreement between the buyer and the NFA. Detailed rights and responsibilities are regulated in Community Forest Management Agreements and a Tree Farming License (see attached documents). The NFA will provide seedlings and technical advice to community groups. In return they will be in charge to protect the plantations from fire and the remaining patches of natural forests.

NFA has all rights, titles and interest to the emission reductions produced by community groups. Community groups will be paid for the carbon sequestered by the NFA up-on delivery, but the NFA will maintain overall responsibility for the project implementation and delivery of the emission reductions.

A.3. Project participants:

Name of Party involved (*) ((host) indicates a host Party)	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)
Uganda (host country)	National Forestry Authority (NFA)	No
Government of Italy	International Bank for Reconstruction and Development as the trustee of the BioCarbon Fund	Yes
(*) At the time of making the CDM-SSC-AR-PDD public at the stage of validation, a Party involved may or may not have provided its approval. At the time of requesting registration, the approval by the Party(ies) involved is required.		

Rwoho Environmental Conservation and Protection Association (RECPA) and other community groups are participating in the Project in conjunction with low-income communities and individuals as determined by the host Party in compliance with the requirements for Decision 6/CMP.1 Annex section 15 (b).

A.4. Description of location and boundary of the small-scale A/R CDM project activity:

A.4.1. Location of the proposed small-scale A/R CDM project activity:

A.4.1.1. Host Party(ies):

Uganda

A.4.1.2. Region/State/Province etc.:

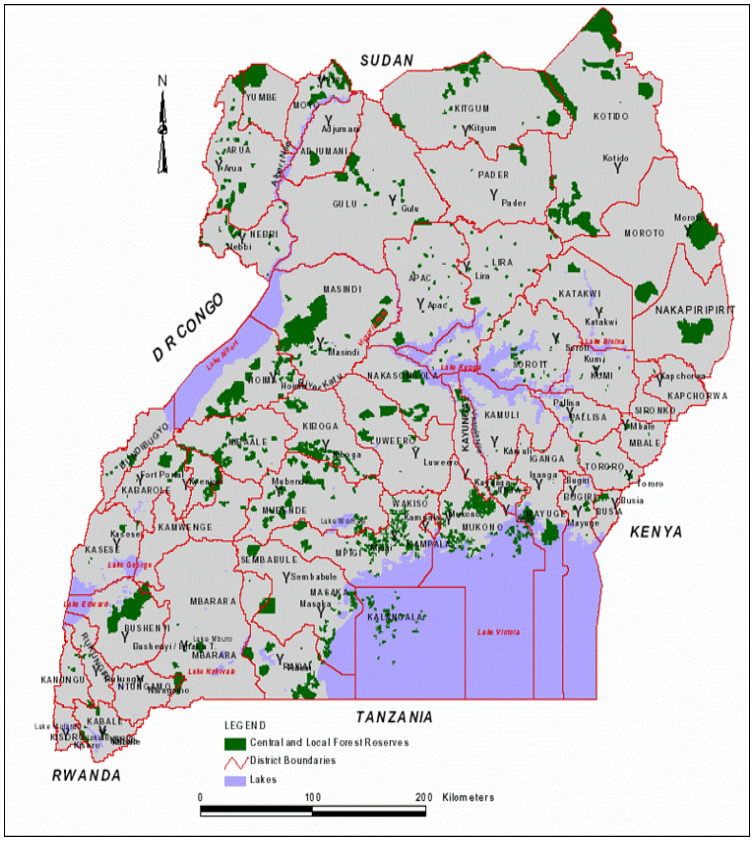


Fig. A-1 Map of Uganda with all Central Forest Reserves including Rwoho CFR.

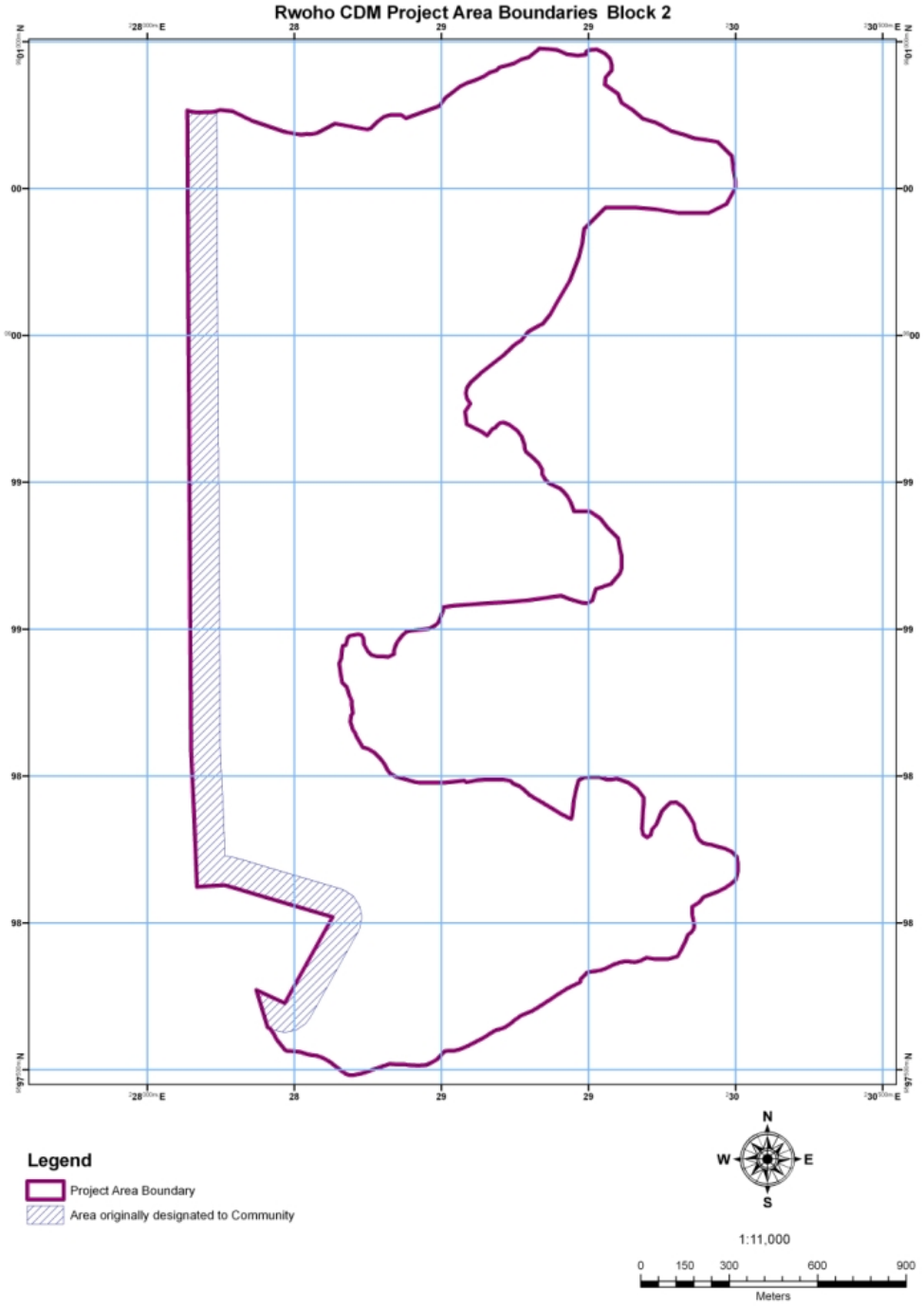
The project area is located in Mbarara, (Rwampara county) Isingiro, (Isingiro county) and Ntungamo (Ruhama county) districts and is covered by Uganda Department of Lands and Surveys map sheet 86/3 series Y732 at 1:50,000.

A.4.1.3. City/Town/Community etc:

Closest town is Mbarara (70 km away from the planting site).

A.4.2. Detail of geographical location and project boundary, including information allowing the unique identification(s) of the proposed small-scale A/R CDM project activity:

The project area is part of the Rwoho Central Forest Reserve, a gazetted woodland reserve. In total the reserve covers an area of 9,100 ha, of which 50 % is available for reforestation activities. Of the 50 km of external boundary about 9 km follows streams while 41 km is an artificial boundary maintained as a planted cutline with earth corner cairns and boundary-directional trenches. The reserve lies on top of a large flat-topped ridge running from North to South. The coordinates of the small-scale project are presented in the table and map below.



Tab A-1 Coordinates of the project boundaries (see map in Annex 6)

Small-scale CDM AR project No	Easting	Northing
2	228,135.67 230,006.88	9,897,481.48 9,900,976.89

Projection:

UTM Zone 36 S (central Meridian E 33)
Datum (Spheroid) = WGS84 (or ARC 1960)
Scale: 0.9996
False Easting = 500,000
False Northing= 0

A.5. Technical description of the small-scale A/R CDM project activity:

Within the project 370 ha of timber plantations would be established (for details see section A.5.4). Pine and mixed native tree species plantations will be established in a block design in degraded grassland areas. . It was anticipated that the plantation area would be stocked with 75 % *Pinus caribaea*, an already introduced and tested species in the area, 20 % *Maesopsis eminii* and 5 % *Prunus africana*. However, after an analysis of the project site growth conditions was conducted latter two species were dropped from the afforestation plan in favour of *Pinus carribaea.* .
Pinus carribaea will be managed on a 22 years rotation cycle (timber production) or until the target diameter is reached, i.e. 45 cm The plantation will be established in 19 blocks of an average of 25 ha each. Depending on the terrain and the road system block size will be between 20 and 30 ha. Around each block a fire line will be maintained.

The project area has been planted in the following sequence; 264.12 ha in the first year; 13.72 ha in the second year; and 92.16 ha in the third year.

A.5.1. Type(s) of small-scale A/R CDM project activity:

Reforestation of degraded grasslands (Grassland to forested land)

A.5.2. A concise description of present environmental conditions of the area, which include information on climate, soils, main watershed, ecosystems, and the possible presence of rare or endangered species and their habitats:

The area is characterized by a number of ridges dropping towards Kabobo valley in the west and descending to the Mishumba valley by a series of parallel ridges running out eastwards. It has an altitudinal range of 1,360-1,800 m with 56 % of the area exceeding a 15% slope (51 km²). The annual average rainfall is about 1,000 mm occurring mainly in two rainy seasons (March-May and September-December). Together with a relatively low mean annual temperature of 17.5°C this results in favorable tree growth conditions. Frosts were not recorded in the last 20 years and the area is not subject to flooding apart from small areas in the valley bottoms which will not be planted. The main watershed is the Kagera river which flows into Lake Victoria. The soil in most areas is sandy loam.

Grassland is the human induced fire-climax vegetation in the area. The grassland area is dominated by *Themeda-Chloris* savanna grass. The riverine vegetation, which will be protected in the framework of the project activities, includes *Papyrus* grass and semi-deciduous forests (Albizia-Markhamia).

Rwoho Central Forest Reserve is categorized as a secondary conservation forest in the National Forestry Nature Conservation Master Plan. There are no red-list species in the area. Of the 65 forests investigated in Uganda, Rwoho ranks 41st in overall biodiversity importance. Rwoho has one tree species unique to Uganda (*Terminalia laxiflora*) and one tree species endemic to the Albertine Rift (*Grewia pubescens*). Furthermore, there are a number of restricted range species that only occur in less than 5 forests in Uganda, but also in other forests in the East African region. In the area also two mammals and one butterfly which are regional endemics, and 5 trees/shrubs, one small mammal and 8 butterflies of

restricted range were found. In the table below the main results of the conservation value assessment are presented.

Tab. A-2 Summary of the inventory conducted in Rwoho CFR for the Uganda Forestry Nature Conservation Master Plan (2002).

CRITERION	TREE & SHRUBS	BIRDS	MAMMALS	BUTTERFLIES	OVERALL
Total No. of species	92	63	13	103	-
No. of restricted range species (< 5 forests)	5	0	1	8	
Species unique to forest	*Terminalia laxiflora*	None	None	*Colotis pallene, Henotesia ubenica, Spialia diomus*	4
Uganda endemics	None	None	*Crocidura selina*	*Euphaedra peculiaris*	2
Albertine Rift endemics	*Grewia pubescens*	None	None	None	1

A.5.3. Species and varieties selected:

For the reforestation activities the following tree species will be used:

- 100 % *Pinus caribaea var. hondurensis*
- 0% *Maesopsis eminii*
- 0% *Prunus africana*

Pinus caribaea is widely tested in Uganda and adaptable to a number of site conditions. *P. caribaea* was introduced to Uganda around 1960. Experiences with native tree species are limited in East Africa but the natural occurrence of *Maesopsis eminii* and *Prunus africana* in Rwoho is indicating that the prevailing site conditions are favorable for these tree species. However, due to limited information on tree growth performance and pest problems, in particular with *Prunus africana*, further increasing the proportion of native tree species would increase the project risk.

A.5.4. Technology to be employed by the proposed small-scale A/R CDM project activity:

Forest management techniques
Nursery technology, planting, tending and harvesting regimes will be in line with recently developed standards (see SPGS guidelines available at the NFA).

Site species matching and seed sources
All tree species used in the reforestation activities are proven in the area and not known to be invasive. Only high quality seed will be used. The potential negative impact of Pine plantations on the forest soil condition will be mitigated by modern silvicultural systems focusing on single tree performance, i.e. early thinning will focus the stand increment on the best performing trees and will result in a vigorous undergrowth vegetation to prevent soil erosion. The thinning regime applied is considered in the GHG sequestration calculation.

Pinus caribaea seed will be purchased from seed orchards in Queensland, Australia, Brazil or S. Africa. The orchards have been established as part of a scientific selection and breeding program. Seeds were originally from native stands in the Caribbean and/or Central American region and have undergone 2 or 3 generations of testing. Seed orchards in Kwa-Zulu Natal, South Africa have a similar history. In all cases, the number of mother trees will be large (>30) to ensure genetic variability.

Prunus africana seed will be collected from superior trees from Uganda's natural forests or wildlings. *Maesopsis eminii* seed will be also collected from plus trees planted in lines and blocks to enrich the forests in the 1960's and '70's. Efforts will always be made to maximize the number of mother trees per location (> 20).

Site preparation
Site preparation to enhance the early growth and development of the planted seedlings will be used, i.e. area around the planting spots will be weed free before planting. Site preparation will consider access for forest management and eventual forest harvesting activities. The existing road system will be only extended if necessary and low impact road construction techniques will be applied. Considering the low soil-carbon levels on this degraded land, site preparation will not significantly reduce soil carbon. Scattered mature trees on the project site will not be felled and staff and contractors will be trained accordingly as outlined in the forest management plan.

Planting
Most appropriate planting techniques for the local conditions will be adopted. The objective is to use the most cost-effective methods to achieve the objectives of high stocking and fast early growth. Planting distances will be such as to maximize stand development for timber production: the norm is 3.0 m x 3.0 m (1,111 plants per hectare), though this will be adopted according to specific site conditions. Accurate alignment of planting lines and spacing within the lines is important for subsequent tending operations. Planting holes shall be dug in advance of the rains so that the pits absorb moisture before planting. The limited soil disturbance will not significantly change the already low soil carbon levels.
When moisture build-up is sufficient all the planting shall be done as quickly as possible. If possible the plants shall be taken out to the planting site and kept watered and in the shade there. Within 2-3 weeks of planting, a stock checking shall be done to determine whether it is necessary to replace the failures ('beating up'). Where survival is less than 90%, beating up will be carried out – preferably within the same season. In case that pests or fire will disturb the project activities trees will be replanted and the reduced carbon sequestration rates will be considered and accounted for. The carbon sequestration rates were already risk reduced by 25 % to consider respective risks.

Tending and Weed Control
Tending and weed control are aimed at achieving the most cost-effective methods of establishing well adapted and high yielding tree plantations. Because long-term sustainability is crucial, techniques will be employed to improve both the ecological stability and the environmental protective functions of the project area.

Fire management
For the plantation a fire management plan will be developed and fire control will be a crucial element of the collaborative forest management agreement. An incentive system will be developed together with the communities to control fires within the plantation and conservation area and at a buffer zone surrounding the forest reserve. A sufficient budget to collect information on fire risks (monitoring of environmental parameter), to raise awareness and to provide fire control and firefighting equipment is considered in the financial plan.

Pest control and disease management
The project area will be routinely assessed for any pest and disease problems that may arise. Since pests and diseases usually occur in stressed crops, a key aim will be to minimize the stress in the planted areas through a variety of techniques that can be classed as 'good silviculture'. Every effort shall be carefully made to match species with prevailing site conditions and adopt cultural practices to ensure vigorous tree growth capable of resisting the pressures of pest and diseases. Chemical control methods will only be used as a last resort and after careful consideration of the environmental impact.

Thinning and pruning
Thinning and pruning of the plantations will be important to ensure that they maximize the proportion of large stems with clear timber. Thinning aims: i) to focus the stand increment on the best performing individuals and ii) to reach the targeted final product diameter as soon as possible. The impact of thinning on carbon sequestration is considered. The objects of pruning are to produce clear timber, to upgrade timber just outside the knotty core and in some cases, to prevent the spread of ground fires into the crowns. The impact of pruning on carbon sequestration rate is considered in the reduced biomass expansion factor (1.3 for Pine and 1.4 for all other tree species). Thinning and pruning regimes depend on the growth rates achieved in the project area. It is expected that three thinnings will take place - to be carried out at intervals dictated by the growth rate of the crops (approximately at an age of 5-6, 7-10 and 10-14 years). Similarly, pruning will be carried out in about 3 intervals depending on the growth of the trees.

Training
NFA staff and contractors will be trained to implement the forest management plan and the activities mentioned in this PDD (e.g. carbon monitoring). Details on the training program are outlined in the forest management plan and in the annual NFA plan of operation.

A.5.5. Transfer of technology/know-how, if applicable:

Technology transfer follows the training program of NFA according to SPGS guidelines which is supported by the EU and Norway.

A.5.6. Proposed measures to be implemented to minimize potential leakage as applicable:

not applicable

A.6. A description of legal title to the land, current land tenure and land use and rights to tCERs / lCERs issued:

The project area is located within the Rwoho CFR. Under Article 237 (2) (b) of the Constitution of the Republic of Uganda, Central Forest Reserves are regarded as trust property on behalf of the Uganda Land Commission. The NFA is a statutory manager for Central Forest Reserves of which Rwoho is amongst as laid down under the National Forestry and Tree Planting Act No. 8/2003. The land tenure is with the Government of Uganda, administered through the Uganda Land Commission. The Constitution of the Republic of Uganda 1995, Forest Reserves (Declaration) Order 1998, Land Act Cap 227 laws of Uganda as revised 2000 evidences the land title, i.e. that Forest Reserves are vested in the Uganda Land Commission.

The NFA can issue tree planting licenses to third parties; such licenses currently do not stipulate who is entitled to benefit from the carbon credits because the Ministry of Water and Environment is still in the process to develop a respective regulation. However, the current understanding of the Ministry is that the person/institution utilizing the land, i.e. the land user owns the carbon credits in Uganda. The Climate Change Secretariat will charge a small fee for their service to approve CDM projects and to monitor that the sustainable development benefits materialize as outlined in the Project Design Document. The only legal land-use in the Central Forest Reserve is forestry but due to fire and a lack of resources most of the area was not used for forestry for more than 40 years. Grasslands are the main land cover (see also section A.5.2).

There are people living in villages located outside the boundary of the Central Forest Reserve. They have used small-areas inside the Reserve for subsistence agriculture and occasionally for grazing. These communities will be entitled and supported to grow trees within the project boundary and to earn carbon credits in the framework of the project activities if they join RECPA, or form a community association.

A.7. Assessment of the eligibility of land:

In Uganda the Climate Change Secretariat (DNA) has defined forests as land which has a:

- Minimum area of 1 hectare
- Minimum tree crown cover of 30 %
- Considering trees that potentially reach a height of > 5 m.

Based on satellite images (see table below) the area that was non-forested since 31/12/1989 and hence being eligible for the proposed A/R CDM project activity has been delineated. In the Annex the closest available images to the reference year are presented (August 1992).

Tab-3 Available satellite images to demonstrate that the project site was non-forested since 31/12/1989.

Year	Sensor	Forest classification
1984	Landsat	Non-forest
1992	SPOT XS	Non-forest
2004	Landsat	Non-forest

Areas currently forested or which have been forest after the 31.12.1989 are excluded from the A/R CDM project activity (see Annex 5). In the following documents there is further evidence that the area was grassland even before 1964:

- Working Plan for Bugamba and Rwoho CFRs. Ankole Kingdom. Period 1964 to 1973 prepared by J. Lang-Brown and published by the Ugnada Forest Department
- Working Plan for Bugamba and Rwoho Central Forest Reserves; July 1985 to June 1990 prepared by R.A Owen, H.L Blackett, P. Drichi, D. Elungat and J. Mbony-Bahane and published by the forest Department in 1985" there is already a written testimony that the area was grasssland.

Subsequently, 5 small-scale CDM A/R projects have been distributed across the eligible land area considering that the project boundaries of any two small-scale CDM A/R project activities will be more than 1 km apart from each other. The project area of the project activity is presented in the table below. The project will include a certain proportion for community project activities. The map in Annex 6 is showing the respective areas.

Interviews with local communities conducted during the project validation confirm continuous land degradation of land.

Tab. A-4 Project area, a map is provided in Annex 5.

Small-scale CDM AR project No 2	Area in ha
NFA planting area	334.1
Community planting area	35.9
Total	370

A.8. Approach for addressing non-permanence:

tCERs will be used for the net anthropogenic GHG removals by sinks. The project is designed that harvesting and subsequent replanting occurs at different times for smoothing the carbon stock changes curves. Some sequestered carbon may be released due to catastrophic events. In this case an equivalent quantity of tCERs will be replaced based on modalities and procedures of CDM A/R project activities.

A.9. Duration of the proposed small-scale A/R CDM project activity / Crediting period:

20 (twenty) year and 0 (zero) month crediting period, which may be renewed twice, adding up to a total maximum crediting period of 60 (sixty) years.

A.9.1. Starting date of the proposed small-scale A/R CDM project activity and of the (first) crediting period, including a justification:

The project started on 1April 2008 (1/04/2008).

A.9.2. Expected operational lifetime of the proposed small-scale A/R CDM project activity:

60 years

A.9.3. Choice of crediting period and related information:

20 years, renewable crediting period

A.9.3.1. Duration of the first crediting period (in years and months), if a renewable crediting period is selected:

20 years

A.9.3.2. Duration of the fixed crediting period (in years and months), if selected:

Not applicable

A.10. Estimated amount of net anthropogenic GHG removals by sinks over the chosen crediting period:

Tab A-5 Net anthropogenic GHG removals by sinks over the chosen crediting period

	Annual net a. GHG removals by sinks	Cumulative net a. GHG removals by sinks

Year	tCO2e	tCO2e
2008	*2,646.60	2,646.60
2009	1,814.00	4,460.60
2010	3,288.85	7,749.45
2011	8,509.40	16,258.85
2012	5,084.02	21,342.87
2013	2,865.82	24,208.69
2014	7,303.07	31,511.76
2015	6,588.34	38,100.10
2016	10,747.48	48,847.58
2017	-4,374.98	44,472.60
2018	8,484.89	52,957.49
2019	4,063.78	57,021.27
2020	8,594.09	65,615.36
2021	-4,524.67	61,090.69
2022	6,114.27	67,204.96
2023	2,766.31	69,971.27
2024	6,753.09	76,724.36
2025	6,853.49	83,577.85
2026	6,846.49	90,424.34
2027	6,799.44	97,223.78
Total estimated net a. GHG removals by sinks	**97,223.78**	
Total crediting years	**20**	
Annual average over the crediting period	**4,861.19**	

*[GHG removals by project year 2008] – [Baseline biomass] = 3775.1 – 1128.5 = 2646.6

Net anthropogenic GHG removals in the project area:
By the year 2012: 21,342.87 tCO_2-e
By the year 2017: 44,472.60 tCO_2-e

A.11. Public funding of the proposed small-scale A/R CDM project activity:

The reforestation activities will be financed by NFA. RECPA and other community groups will provide mainly in-kind contributions. The NFA will use their revenues from sales of forest produce and services to cover the investment costs. The main source of income for the NFA is the sale of harvesting licenses for about 120.000 m³ a year in mature plantations. Others are eco-tourism revenues, land license fees and revenues from the sale of seeds and seedlings. There is no available funding that will result in a diversion of official development assistance and financial obligations of any Parties under the UNFCCC.

A.12. Confirmation that the small-scale A/R CDM project activity is not a debundled component of a larger project activity:

The NFA has decided to develop a portfolio of small-scale CDM A/R project activities together with private and community based investors. Considering the land-use patterns in Uganda and the available

investment capital, small scale A/R CDM project activities clustered in a number of Central Forest Reserves and regions appear to be the only feasible option for Ugandan based investors, particularly when aiming at including communities and small-scale private entrepreneurs. In each small-scale CDM A/R project activity the COP10 decision regarding bundling will be considered, i.e. each project activity will not produce more than 16,000t CO2e per year considering the average projected net anthropogenic GHG removals by sinks. The project boundaries of any two small-scale CDM A/R project activities will be more than 1 km apart from each other.

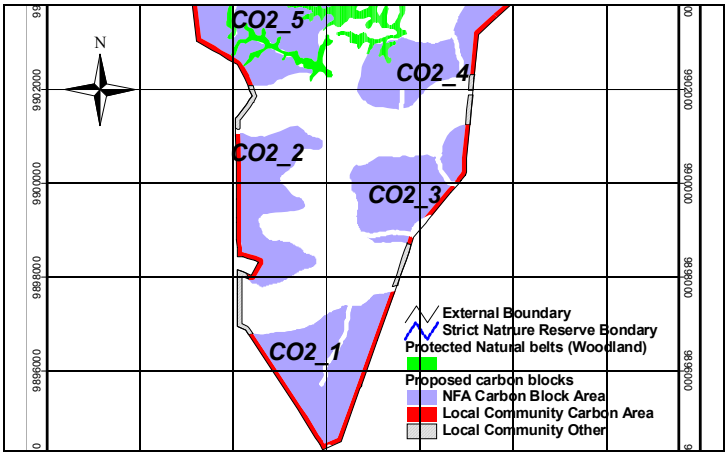


Fig. A-1 Location of the SCCAR Projects

Tab. A-6 Closest points of adjacent projects 1, 3, 4 and 5 to project 2 demonstrating a minimum of 1 km between projects.

Project A to Project B	Project A Point		Project B Point		DeltaY	DeltaX	Distance (Metres)	Bearing
A Closest Point to B	East	North	East	North				
CO2_2 to CO2_1	228,699.90	9,897,481.48	228,801.3	9,896,793.5	990.50	182.62	1,007.5	***169.6***
CO2_2 to CO2_3	229,612.04	9,899,232.49	230,634.21	9,899,209.93	22.56	1022.17	1,002.4	***82.6***
CO2_2 to CO2_5	229,082.9	9,900,844.0	228,694.0	9,902,086.4	939.90	388.90	1,017.2	***337.5***

SECTION B. Application of a baseline and monitoring methodology:

B.1. Title and reference of the approved baseline and monitoring methodology applied to the proposed small-scale A/R CDM project activity:

Simplified baseline and monitoring methodologies for small-scale afforestation and reforestation project activities under the clean development mechanism implemented on grasslands or croplands.
AR-AMS0001 / Version 05.

B. 2. Justification of the applicability of the baseline and monitoring methodology to the proposed small-scale A/R CDM project activity:

The choice of methodology is justified because:

1. The proposed project activity is "grasslands to forested lands"; as shown in LANDSAT, ground truthing during site selection and baseline
2. There has been no ploughing of lands during plantation establishment; as NFA uses 25 cm pits for planting
3. The displacement of activities due to the implementation of the project activity is less than 50%; as shown in section C.3 of this document and
4. Significant changes in the carbon stocks, in particular the living biomass pool of woody perennials and the below-ground biomass of grasslands, are not expected to occur in the absence of the project activity as current land use would be continuing according to observations made during site selection

B.3. Specification of the greenhouse gases (GHG) whose emissions will be part of the proposed small-scale A/R CDM project activity:

As per the simplified baseline and monitoring methodologies for selected small-scale afforestation and reforestation project activities under the clean development mechanism, CO_2 is the only GHG included as part of the proposed small-scale A/R CDM project activity.

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B.4. Carbon pools selected:

As per the Simplified baseline and monitoring methodologies for selected small-scale afforestation and reforestation project activities under the clean development mechanism only above ground and below ground tree and woody perennials biomass and below ground biomass of grasslands are selected.

Tab. B-1 Carbon pools to be considered

CARBON POOL	SELECTED
Above ground, tree and woody perennials	Yes, main carbon pool increased through project activity
Below ground, tree, woody and grass	Yes
Dead wood	No, pool likely to increase compared with the baseline but excluded (conservative)
Litter	No
Soil organic carbon	No

B.5. Description of strata applied for ex ante estimations:

Land-use stratification in Rwoho CFR based on satellite images

The Rwoho CFR was stratified according to land-use types based on SPOT XS satellite images from August 1992. The project sites are all degraded grasslands, other land-use types in the area are not considered in the project. The project activity will take place within one stratum which is grassland. Changes in the carbon stocks in the living biomass pool in the grassland is not expected to exceed 10% of ex ante net GHG removals by sink therefore a multiplier of a part of the project area is not applicable.

The project area is treated as paragraph 7 b) of the methodology suggests. Ex ante stratification will be based on three criteria, i.e the species planted, planting year, the season and ownership.

B.6. Application of baseline methodology to the proposed small-scale A/R CDM project activity:

The historical baseline approach is used for the proposed small-scale A/R CDM project activity. In the absence of the reforestation project no significant positive changes in the carbon stocks within the project boundary would occur considering that reforestation is facing the barriers outlined below.
Data used to determine the baseline scenario:

- Satellite imagery
- Biomass survey with cluster plot design, measured parameters were: number of trees, respective species, dbh and tree height (see table B.8.1.1.1).

Given this information, we have assumed that

Significant changes in the carbon stocks, in particular the living biomass pool of woody perennials and the below-ground biomass of grasslands, are not expected to occur in the absence of the project activity.

As such following the paragraph 6 (a) of the **AR-AMS0001 / Version 05** methodology:

Changes in carbon stocks shall be assumed to be zero.

Baseline carbon stocks are determined using equation 1:

$$B_{(t)} = \sum_{i=1}^{I} \left(B_{A(t)i} + B_{B(t)i} \right) * A_i \qquad (1)$$

Where:
$B_{(t)}$ = carbon stocks in the living biomass pools within the project boundary at time *t* in the absence of the project activity (t C);
$B_{A(t)i}$ = carbon stocks in above-ground biomass at time *t* in the absence of the project activity (t C/ha)
$B_{B(t)i}$ = carbon stocks in below-ground biomass at time *t* in the absence of the project activity (t C/ha)
A_i = project activity area of stratum *i* (ha)
i = stratum *i* (*I* = total number of strata)

Above-ground biomass

For above-ground biomass $B_{A(t)}$ is determined for the one stratum as follows:
Living biomass carbon pools are expected to be constant

$$B_{A(t)} = M_{(t)} * 0.5 \qquad (2)$$

Where:
$B_{A(t)}$ = carbon stocks in above-ground biomass at time *t* in the absence of the project activity (t C/ha)

$M_{(t)}$ = above-ground biomass at time *t* that would have occurred in the absence of the project activity (t dm/ha)[1]
0.5 = carbon fraction of dry matter (t C/t dm)

According to the methodology $M_{(t)}$ consists of above-ground tree and woody perennials biomass M_{woody}. It has been measured during preliminary baseline surveys. The results of these surveys are shown in Table B.3. The survey methodology was identical to the monitoring methodology described below with the exception that the plot radii were 20 m due to the sparseness of the trees.

Below-ground biomass

For below ground-biomass $B_{B(t)}$ is determined for the one stratum as follows:
Living biomass carbon pools are expected to be constant

$$B_{B(t=0)} = B_{B(t)} = 0.5 * (M_{grass} * R_{grass} + M_{woody\ (t=0)} * R_{woody}) \quad (6)$$

Where:
$B_{B(t)}$ = carbon stocks in below-ground biomass at time *t* that would have occurred in the absence of the project activity (t dm/ha)
M_{grass} = above-ground biomass in grass on grassland at time *t* that would have occurred in the absence of the project activity (t dm/ha)
$M_{woody\ (t)}$ = above-ground woody biomass at time *t* that would have occurred in the absence of the project activity (t dm/ha)
R_{woody} = root to shoot ratio of woody perennials (t dm/t dm)
R_{grass} = root to shoot ratio for grassland (t dm/t dm)

Documented local values for R_{grass} and R_{woody} are not available in Uganda. Due to the absence of such values we used:

R_{grass} 1.6 (IPCC GPG Table 3.4.3 value for tropical grasslands)

R_{woody} 0.42 (Table 3A.1.8 from the GPG LULUCF we will use the root-shoot ratio for "secondary tropical/subtropical forests").

The estimated baseline GHG removals by sink are the sum of the carbon stock change in above and below ground biomass. As described in chapter C.1. stock changes in the baseline scenario are set to zero due to ongoing land degradation. Therefore formula (10) is not applicable.

Data was collected with a sampling intensity of 1%, the allocation of the sampling plots is presented in (Annex 7). The first point was randomly selected and subsequently between 2-3 cluster points where located in the main directions, with a distance of 300m.
The baseline revealed an average current above and below ground biomass of 3.05 tCO2 per ha which was considered in the carbon sequestration calculation in table C5. In the table below the biomass distribution across the sampling plots is presented. A comparison with sample plots measured for the

[1] dm = dry matter

National Biomass Study in 2000 and 2004 indicate that the biomass stocks are relatively stable but with a tendency to decrease. The National Biomass Study was carried out to assess the existing biomass in Uganda. Plots have been measured at national scale at grid intervals of 5 km by 10 km.

Tab. B-3 Biomass distribution of the small-scale CDM AR project area in Rwoho CFR.

CARBON POOLS	DRY MATTER t/ha	ABOVE GROUND BIOMASS IN tC/ha	BELOW GROUND BIOMASS IN tC/ha	TOTAL tC /ha	CO_2e/ha
Grass	0.84	0.00*	0.67	0.67	2.46
Woody Perrenial	0.23	0.11	0.05	0.16	0.59
Total	1.07	0.11	0.72	0.83	3.05

* According to the methodology (AR-AMS0001 / Version 05) above-ground biomass of grasslands were not considered for baseline calculation

In the table below statistical information of the biomass distribution is provided.

Tab. B-4 Statistical analysis of the baseline biomass assessment using Excel functions.

Parameter	Value for grass	Value for woody perennials
N	177	177
Minimum value in t dry matter per ha	0	0
Maximum value in t dry matter per ha	1.0	4.5
Average value in t dry matter per ha	0.59	0.23
Significance level	0.05	0.05
Confidence	0.1	0.04
CV %	3.1	0.4

Tab.B-5 Grass biomass distribution (t dry matter)

Above ground	Below ground	No plots
0.5	0.14	48
0.5-0.7	0.14-0.1981	54
0.7-1	0.198-0.283	67
>1	>0.283	8

Tab.B-6 Woody perennials biomass distribution (t dry matter)

Above ground	Below ground	No plots
0.75	0.21	48
0.75-1.5	0.21-0.4245	54
>1.5	>0.4245	67

B.7. Description of how the actual net GHG removals by sinks are increased above those that would have occurred in the absence of the registered small-scale A/R CDM project activity:

The demonstration of additionality follows the AR-AMS0001 / Version 05. The project activity would not have occurred without the CDM component due to the following barriers:

Investment barriers, other then the economic/financial barriers, inter alia:

The NFA and community groups do not have access to the EU Sawlog Production Grant Scheme, because they are not eligible and the fund is used-up already. In addition, government agencies are not eligible to apply for this grant and community members interested in tree planting do not reach the minimum planting area to be eligible, i.e. 25 ha. There is currently no other fund to support tree planting at this scale. Other debt funding is currently not available and international capital markets are reluctant to

support forestry projects in Uganda, e.g. the dfcu Group Managing Director in Uganda mentioned that projects without a positive cash-flow after 3-4 years will not be considered for a loan. In addition, guarantees/securities of forestry projects are difficult to sell due to limited market and tradability experiences with this asset class. Finally, the high country specific risk enables the project developer to get financing (OECD country risk classification valid as of 27/01/2006).

Institutional barriers, *inter alia*:
Legally the project area can be used only for forestry; no alternative land-use is permitted. However, the financial situation of the NFA prevents that Central Forest Reserve are reforested, considering the financial situation of the NFA and the scale of this task. Approximately 500,000 ha of Central Forest Reserves do not have an actual forest cover. The NFA has only the capacity to reforest recently harvested plantations. This is more cost efficient because land preparation costs are lower and the revenue from the timber sales can be used to cover the investment costs. Therefore, without the CDM component the project activity would have not occurred.

Technological barriers, *inter alia*:
There is limited tree planting know-how in the area after the forestry operations collapsed in the 1970ties. From nursery operations to silvicultural expertise - the knowledge had to be renewed through collaboration with the ENCOFOR project of the EU.
>>

Barriers due to prevailing practice, *inter alia:*
The small-scale CDM AR project activity is the "first of its kind". No project activity of this type is currently operational in East Africa. This means the initial learning curve is steep and transaction costs to get the project on the ground will be very high. This pilot project activity will leverage the playing field for other investors to establish CDM forestry projects.

Barriers due to local ecological conditions, *inter alia*:
The area is a human induced fire climax with more or less annual fires outside the natural forest conservation areas in the moist valleys. Natural regeneration is not possible under these conditions and without the CDM component the project activity would not be feasible and the soil degradation would continue and the conservation areas with natural vegetation would most likely disappear.

Barriers due to social conditions, *inter alia*:
There are hardly any income generation opportunities in the area after the forestry operations collapsed in the 1970ties. The communities are relatively far away from the main markets in Mbarara and Ntungamo and therefore can not sell agricultural crops at competitive prices. Accordingly, only with the CDM component forestry skills can be developed and people can find skilled and unskilled employment. RECPA is the main community based environmental association in the area. They are committed to plant quality trees but without the carbon component they have no access to land, quality seedlings and technical advice.

B.8. Application of monitoring methodology and monitoring plan to the small-scale A/R CDM project activity:

Below details on planting and tree survival monitoring, carbon stock monitoring and the design of a permanent plot sampling design are presented. The inventory and GIS unit of NFA will be in charge of supervision of monitoring of the project carbon.

Step 1: Planting progress and tree survival monitoring
The area planted will be assessed for replanting one-months after planting if less than 90% of the trees have not recovered from the planting shock (see section A 4.8). For carbon monitoring purposes planting monitoring will be conducted with a GPS to determine the planting area and analysed in a Geographic Information System. In addition, 20% of the planting rows will be visited in the field and gaps will be recorded. The rows to be visited will be randomly selected. If more than 20% of the rows in a given planting block of 25 ha have gaps bigger than 100 m² due to fire and pests a full sampling will be conducted.

Step 2: Carbon stock monitoring
Carbon stocks will be estimated through stratified random sampling procedures and the following equations:

$$P(t) = \sum_{i} (PA(t)\ i + PB(t)\ i) * Ai$$

where:
P(t) = carbon stocks within the project boundary at time *t* achieved by the project activity (t C)
PA(t) i = carbon stocks in above-ground biomass at time *t* of stratum *i* achieved by the project activity during the monitoring interval (t C/ha)
PB(t) i = carbon stocks in below-ground biomass at time *t* of stratum *i* achieved by the project activity during the monitoring interval (t C/ha)
Ai = project activity area of stratum *i* (ha)
i = stratum *i*

Stratification for sampling will be the same as the stratification for the ex ante estimation of the actual net GHG removals by sinks. The calculations shown below will be performed for each stratum.

For above-ground biomass
PA(t) is calculated per stratum *i* as follows:

$$PA(t) = E(t) * 0.5$$

where:
PA(t) = carbon stocks in above-ground biomass at time *t* achieved by the project activity during the monitoring interval (t C/ha)
E(t) = estimate of above-ground biomass at time *t* achieved by the project activity (t dm/ha)
0.5 = carbon fraction of dry matter (t C/t dm)

E(t) will be estimated through the following steps:

Step 3: The diameter at breast height (DBH) or DBH and tree height will be measured

Step 4: Estimate the above-ground biomass (AGB) using Biomass expansion factors and stem volume as follows:

$$E(t) = SV * BEF * WD$$

where:
E (t) = estimate of above-ground biomass at time *t* achieved by the project activity (t dm/ha)

SV = stem volume (m3/ha)
WD = basic wood density (t dm/m3)
BEF = biomass expansion factor (over bark) from stem volume to total volume (dimensionless)
Biomass expansion factor (over bark) from stem volume to total volume (dimensionless), default value of 1.4 used for Maesopsis and Prunus and 1.32 for Pine.

SV will be estimated from on-site measurements using DBH and height. Consistent application of BEF will be secured on the definition of stem volume (e.g. total stem volume or thick wood stem volume requires different BEFs).

Documented local values for *WD* will be used. In the absence of such values, national default values should be used. If national values are also not available, the values should be obtained from table 3A.1.9 of the IPCC good practice guidance for LULUCF.

For below-ground biomass
PB(t) will be estimated for each stratum *i* as follows:
$PB(t) = E(t) * R * 0.5$

where:
PB(t) = carbon stocks in below-ground biomass at time *t* achieved by the project activity during the monitoring interval (t C/ha)
R = root to shoot ratio (dimensionless)
0.5 = carbon fraction of dry matter (t C/t dm)

Documented national values for *R* will be used. If national values are not available, the values will be obtained from table 3A.1.8 of the IPCC good practice guidance for LULUCF.

Root to shoot ratios for the species concerned are not available, allometric equation developed by Cairns et al. (1997) or a more representative equation taken from the IPCC good practice guidance for LULUCF, Table 4.A.4 will be used:

$PB(t) = exp(-1.085 + 0.9256 * \ln E(t)) * 0.5$

where:
PB(t) = carbon stocks in below-ground biomass at time *t* achieved by the project activity during the monitoring interval (t C/ha)

E(t) = estimate of above-ground biomass at time *t* achieved by the project activity (t dm/ha)
0.5 = carbon fraction of dry matter (t C/t dm)

The same BEF, WD, and R will be used in the ex-post calculation.

B.8.1. Data to be monitored: Monitoring of the actual net GHG removals by sinks and leakage.

All the parameters on data to be monitored fall under Actual net Green House gas removals by sinks in the project area.

B.8.1.1. Actual net GHG removals by sinks data:

The parameters for estimating the Actual net GHG removals by sinks are as represented in table B 8.1.1.1

B.8.1.1.1. Data to be collected or used in order to monitor the verifiable changes in carbon stock in the carbon pools within the project boundary resulting from the proposed small-scale A/R CDM project activity, and how this data will be archived:

Tab. B-7 data to be collected or used in order to monitor carbon stock changes

Data variable	Source of data	Data unit	Measured (m), calculated (c) or estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic / paper)	Comment
Location of the area where the project activity will be implemented	GIS system based on field surveys and satellite imagery	UTM coordinate, X,Y,Z	(m)	5 years	100%	Electronic	GPS is used
Ai – size of the areas where the project activity has been implemented for each type of strata	GIS system based on field surveys and satellite imagery	UTM coordinate, X,Y,Z	(m)	5 years	100%	Electronic	GPS is used
Location of the permanent sampling plots	Project maps and project design	UTM coordinate, X,Y,Z	defined	5 years	100%	Electronic	GPS is used
Diameter at breast height (1.3 m)	Permanent plot	cm	(m)	5 years	Each tree in the sample plot	Electronic	Measure diameter at breast height (DBH) for each tree that falls within the sample plot and applies the size limit
Height	Permanent plot	m	(m)	5 years	Each tree in the sample plot	Electronic	Measure height (H) for each tree that falls within the sample plot and applies the size limit
Basic wood density	National Biomass Study 2002:	Tonnes of dry matter per m^3 fresh volume	(e)	once			
Total CO_2	Project activity	Metric tonnes	(c)	5 years	All project data	Electronic	Based on data collected from all plots&carbon pools

B.8.1.2. Data for monitoring of leakage (if applicable)

Not applicable

B.8.1.2.1. If applicable, please describe the data and information that will be collected in order to monitor leakage of the proposed small-scale A/R CDM project activity

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Data variable	Source of data	Data unit	Measured (m), calculated (c) or estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic / paper)	Comment

B.8.2. Describe briefly the proposed quality control (QC) and quality assurance (QA) procedures that will be applied to monitor actual GHG removals by sinks:

As stated in the IPCC GPG for LULUCF (page 4.111) monitoring requires provisions for quality assurance (QA) and quality control (QC) to be implemented via a QA/QC plan. The plan will be part of project documentation and cover procedures as described below for:
a) Collecting reliable field measurements;
b) Verifying methods used to collect field data;
c) Verifying data entry and analysis techniques; and
d) Data maintenance and archiving. Especially this point is important, also for small-scale A/R CDM project activities, as time scales of project activities are much longer than technological improvements of electronic data archiving. Each point of importance for small-scale A/R CDM project activities are treated in the following section.

Procedures to ensure reliable field measurements
Collecting reliable field measurement data is an important step in the quality assurance plan. Those responsible for the measurement work are trained in all aspects of the field data collection and data analyses. It is good practice to develop Standard Operating Procedures (SOPs) for each step of the field measurements, which should be adhered to at all times. These SOPs describe in detail all steps to be taken of the field measurements and contain provisions for documentation for verification purposes so that future field personnel can check past results and repeat the measurements in a consistent fashion. To ensure the collection and maintenance of reliable field data:
a) Field-team members are fully aware of all procedures and the importance of collecting data as accurately as possible;
b) Field teams install test plots if needed in the field and measure all pertinent components using the SOPs to estimate measurement errors;
c) The document will list all names of the field team and the project leader will certify that the team is trained;
d) New staff adequately trained.

Procedures to verify field data collection
To verify that plots have been installed and the measurements taken correctly, it is good practice to re-measure independently every 10 plots and to compare the measurements. The following quality targets should be achieved for the re-measurements, compared to the original measurements:

- Missed or extra trees no error within the plot
- Tree species or groups no error
- D.B.H. < ± 0.5 cm or 3 % whichever is greater
- Height < ± 10/ and -20%
- Circular plot radius/sides of rectangular plot < ± 1% of horizontal (angle-adjusted)

At the end of the field work independently 10-20% of the plots will be checked. Field data collected at this stage will be compared with the original data. Any errors found will be corrected and recorded. Any errors discovered will be expressed as a percentage of all plots that have been re-checked to provide an estimate of the measurement error.

Reliable carbon estimates require proper entry of data into the data analyses spreadsheets. Possible errors in this process can be minimized if the entry of both field data and laboratory data are cross-checked and, where necessary, internal tests incorporated into the spreadsheets to ensure that the data are realistic. Communication between all personnel involved in measuring and analyzing data should be used to

resolve any apparent anomalies before the final analysis of the monitoring data is completed. If there are any problems with the monitoring plot data that cannot be resolved, the plot should not be used in the analysis.

Data maintenance and storage
Because of the relatively long-term nature of these project activities, data archiving (maintenance and storage) will be an important component of the work. Data archiving should take several forms and copies of all data should be provided to each project participant.
Copies (electronic and/or paper) of all field data, data analyses, and models; estimates of the changes in carbon stocks and corresponding calculations and models used; any GIS products; and copies of the measuring and monitoring reports should all be stored in a dedicated and safe place, preferably offsite. Given the time frame over which the project activity will take place and the pace of production of updated versions of software and new hardware for storing data, it is recommended that the electronic copies of the data and report be updated periodically or converted to a format that could be accessed by any future software application.

Training
Training on how to monitor quality control (QC) and quality assurance (QA) will be provided by NFA experts.

B.8.3. Please describe briefly the operational and management structure(s) that the project operator will implement in order to monitor actual GHG removals by sinks by the proposed small-scale A/R CDM project activity:

The project will be managed on-site by the Mbarara Plantation Manager, Bugamba Sector manager and and 2 Field Forestry Supervisors in charge of the area. They will manage the NFA plantations and will provide implementation support to the Community plantings. The NFA has implementation monitoring guidelines laid out in the Forest Management Plan to be followed and will support community groups to have simple monitoring guidelines for the community based planting activities.
The carbon monitoring will be conducted by the NFA Inventory and GIS Units with biomass monitoring and GIS inventory capacity. The latter will also be in charge of data storage in the NFA database.

B.9. Date of completion of the baseline study and the name of person(s)/entity (ies) determining the baseline and the monitoring methodology:

The date of completion of the baseline study: 16 March 2006.

The monitoring methodology was applied by NFA and the ENCOFOR project to this specific case: http://www.joanneum.at/encofor

Monitoring study performed by:	Xavier Mugumya National Forestry Authority 10/20 Spring Road P.O. Box 70863, Kampala, Uganda Tel. +256 (31) 264 35 /6 Email: nfa@nfa.org.ug	Dr. Timm Tennigkeit UNIQUE forestry consultants GmbH Schnewlinstr. 10, D-79098 Freiburg Tel. +49 761 20 85 34 0 Fax +49 761 20 85 34 10 Email: unique@unique-forst.de

SECTION C. Estimation of ex ante net anthropogenic GHG removals by sinks:

C. 1. Estimated baseline net GHG removals by sinks:

Changes in the carbon stocks in the living biomass of woody perennials and the below-ground biomass of grasslands are expected not to exceed actual net GHG removals by sinks, the changes in carbon stocks are assumed to be zero in the absence of the project activity. Hence no formula/calculations were used to estimate the baseline net GHG removals by sinks.

C. 2. Estimate of the actual net GHG removals by sinks:

Project planting area after 20 years: **97,223.78 tCO2e.**

Accounting methodology is provided in the TARAM tool and the related manual. Final calculation referred to under C.4

C. 3. Estimated leakage:

The possibility of leakage from the displacement of activities or people was considered using the following indicators:

Enumeration of cattle kraals near the reserve was done and recorded at the project site, at village, parish and sub-county level. Although the grasslands extend beyond the reserve, it was assumed that all these animals feed outside as well as in the reserve (to be conservative). In the reserve animals generally spend 2 thirds of their daily feeding time (i.e. 14 hours/day). But they only spent a fraction of their total yearly feeding time in the reserve. Rwoho, being a relatively dry area, average grazing capacity of 0.5 (head/ha) is assumed. Time-average number of grazing animals per hectare displaced due to the project activity divided by the average grazing capacity of land for the area, expressed as percentage is less than 10%. It is taken to be representative of all project sites. Thus no leakage due to cattle grazing is accounted for.

Tab. C-1: Average grazing assessment for Project No.2

Total Animals (Close to site)	Available Grazing Area in + outside Reserve(ha)	Animal /ha	Avg time of day in reserve in %	AvgTime Animal/ha	Avg Time_Animal_ha/ Avg Grazing Capacity
100	5700	0.0175	58	0.0102	2%

The assessment demonstrates that the average grazing is below 10% of the potential and therefore **no leakage** due to grazing was considered. In addition, the planting activities will force commercial grazers to invest in improved grazing land or zero-grazing systems.

In the project area no people will be displaced (a) and no agricultural production activities (b).

Furthermore, considering that the surrounding area contains no significant biomass no leakage monitoring is required. In the surrounding area the biomass is comparable to the project area (see table B-3 and B-5 above). The plots of the National Biomass Survey 2000 and 2004 located in the surrounding area of the project and expert opinion verified this information.

C. 4. The sum of C. 2. minus C.1. minus C.3. representing the net anthropogenic GHG removals by sinks of the proposed small-scale A/R CDM project activity:

The net anthropogenic GHG removals by sinks for each year during the first crediting period are calculated as,

$ER_{AR\ CDM,\ t} = \Delta C_{PROJ,\ t} - \Delta C_{BSL,\ t} - GHG_{PROJ,\ t} - L_t$ (21)

where:

$ER_{AR\ CDM,\ t}$	Net anthropogenic GHG removals by sinks (t CO2-e/year)
$\Delta C_{PROJ,\ t}$	Project GHG removals by sinks at time t (t CO2-e/year)
$\Delta C_{BSL,t}$	Baseline net GHG removals by sinks (t CO2-e/year)
$GHG_{PROJ,\ t}$	Project emissions (t CO2-e/year)
L_t	Leakage attributable to the project activity at time t (t CO2-e / year)

For this and subsequent crediting periods Lt=0 see C.3

$ER_{AR\ CDM,\ 20}$ GHG removals in project planting area after 20 years: **97,223.78 tCO2e.**

C. 5. Table providing values obtained when applying equations from the approved methodology:

Tab C-2 Project planting area: Net anthropogenic GHG removals by sinks of the proposed A/R CDM project activity.

	Estimation of baseline net. GHG removals by sinks	Estimation of actual net GHG removals by sinks	Estimation of leakage	Estimation of net anthropogenic GHG removals by sinks
Year	tCO2e	tCO2e	tCO2e	tCO2e
2008	0	2,646.60	0	2,646.60
2009	0	1,814.00	0	1,814.00
2010	0	3,288.85	0	3,288.85
2011	0	8,509.40	0	8,509.40
2012	0	5,084.02	0	5,084.02
2013	0	2,865.82	0	2,865.82
2014	0	7,303.07	0	7,303.07
2015	0	6,588.34	0	6,588.34
2016	0	10,747.48	0	10,747.48
2017	0	-4,374.98	0	-4,374.98
2018	0	8,484.89	0	8,484.89
2019	0	4,063.78	0	4,063.78
2020	0	8,594.09	0	8,594.09
2021	0	-4,524.67	0	-4,524.67
2022	0	6,114.27	0	6,114.27
2023	0	2,766.31	0	2,766.31
2024	0	6,753.09	0	6,753.09
2025	0	6,853.49	0	6,853.49
2026	0	6,846.49	0	6,846.49
2027	0	6,799.44	0	6,799.44
Total	0	**97,223.78**	0	**97,223.78**

SECTION D. Environmental impacts of the proposed small-scale A/R CDM project activity:

D.1. Provide analysis of the environmental impacts, including transboundary impacts (if any):

The NFA has contracted Environmental Assessment Consult Limited to conduct an Environmental Impact Assessment in line with the regulations stipulated by the National Environment Management Authority (NEMA). The main conclusion of the assessment is presented below:

The forest plantation establishment and management will cause some impacts on the forest ecosystem in the short run but these are recoverable through tree planting. Mitigation measures are proposed, if implemented will reduce and eventually eliminate the likely adverse impacts on the environment. It is recommended in this report that mitigation measures identified will be mainstreamed into the FMP and annual operational plans. Generally, besides the fact that the project absorbs considerable amount of carbon from the atmosphere every year, it will further reduce soil erosion, thereby improving the quality of downstream water supplies and may ameliorate local climate to some limited extent, commensurate with the relatively small areas to be reforested at the different sites.

NEMA formally approved the project on July 31st 2006. The full report is available upon request from the project developer (see Annex 4).

D.2. If any negative impact is considered significant by the project participants or the host Party, a statement that project participants have undertaken an environmental impact assessment, in accordance with the procedures required by the host Party, including conclusions and all references to support documentation:

The implication is not that there may be a negative impact per se, as water quality will be greatly improved, but that the positive impacts are not as great as anticipated.
For example, trees are known to use more water than grass and scientific evidence from equivalent sites suggests there may be a reduction in total flows of water from the watershed, but in severely compacted sites, better infiltration resulting from tree roots breaking up the compaction, may improve the recharging of ground water.
And, through the establishment of forest plantations, the abundance and variety of species may fall in areas planned for forest plantations.

D.3. Description of planned monitoring and remedial measures to address significant impacts referred to in section D.2. above:

Implementation of the proposed mitigation measures and activities under the mitigation monitoring plan will help reduce the predicted impacts of the Forest Management Plan on the biophysical and social-economic environment.

SECTION E. Socio-economic impacts of the proposed small-scale A/R CDM project activity:

E.1. Provide analysis of the socio-economic impacts, including transboundary impacts (if any):

The host party has no specific procedures for socioeconomic impact assessment. However, the project was successfully assessed against the sustainable development criteria developed by the Climate Change Secretariat in Uganda (DNA). Furthermore, a socio-economic assessment was carried out by the NFA in the framework of the feasibility study. Some key findings are presented below (see section F)

E.2. If any negative impact is considered significant by the project participants or the host Party, a statement that project participants have undertaken a socio-economic impact assessment, in accordance with the procedures required by the host Party, including conclusions and all references to support documentation:

See Section F.

E.3. Description of planned monitoring and remedial measures to address significant impacts referred to in section E.2. above:

SECTION F. Stakeholders' comments:

F. 1. Brief description of how comments by local stakeholders have been invited and compiled:

In March 2005 (22nd to 26th) a socio-economic baseline assessment was conducted in the proposed project area. Meetings have been conducted in different villages (Rwoho, Kinhanga and Kirungu parish) with village leaders, selected members and in particular woman groups to explain the purpose of the planned project activities and to receive information on the prevailing livelihood framework (see field report from Xavier Mugumya 2005). Follow-up stakeholder meetings have been conducted on June 30th 2005, July 11th 2005, and March 1st 2006 with all communities living near the 5 small-scale project sites. The latter have been organized by RECPA, but the information below represents all Community Associations and not only RECPA. In addition, RECPA conducted awareness raising meetings in all parishes close to the 5 small-scale projects to inform farmers about the project and to invite them to participate in the CDM reforestation project. NFA field staff on the ground collaborated with community members during project preparation activities.

F. 2. Summary of the comments received:

Population density and family structure
The CFR is situated in a region with a medium population density of 160 people per km² based on the 1991 census. Most of the people interviewed were resident in the district. Immigration to the area began roughly in 1945. Most of the immigrants came from Kabale (then Kigezi) district (SW-Uganda). The most recent migrants settled in the area in 2000. The educational level is low, illiteracy is especially common among adults above 40 and older people. Access to schools in the area is reasonable with the distances rarely exceeding 3km. Family size in average is 8-9 people.

Livelihood system
Most of the farmers are involved in subsistence farming and have small land holdings, the majority (80 %) own below one hectare, the biggest areas mentioned was 10 ha. The crops grown are bananas (matooke), beans, sorghum, cassava, groundnuts, millet, Irish and sweet potatoes. Coffee is grown occasionally. About 50 % or the people do have as of yet planted trees on their farms with an average of about 100 trees (one individual planted as much as 1,500 others only 10). Trees are planted for fuel wood, timber and poles. The dominating ethnic group in the region, the Bashiga, is known to have a cultural inclination to tree growing. Some of the produce is sold on the local markets. In addition to agriculture, most farmers do have some livestock (mainly chicken, goats or cows, in some cases sheep). However, there are a few larger herds (>25 animals) passing irregularly through the area which are owned by non-resident pastoralists who use hired herdsmen. These actually can afford to sleep over night in the forest and let the animals graze. Alternative sources of income are very limited: 20 % were working as casual labourers another 20 % were running a small trading business in the village. The only skilled professions were 1 teacher, 1 builder and 1 contractor.

There is no running water in most villages; people collect water from the valley bottoms in the CFR. A few of the residents own small collection tanks to collect rain water.

Potential social benefits from the project activities

a) Income
Apart from selling produce at the local markets, the project region is almost completely lacking income generation opportunities. Therefore, the re-vitalization of the forestry sector creates employment opportunities and is highly beneficial for the integrity of the local communities in the area. The local communities further benefit from the provision of fuel-wood. The employment plan for the project indicates a need for approx. 500 people in the establishment phase of the project. The number of people is estimated based on previous planting experience from the NFA and the private sector. Particularly women find new employment opportunities in nursery work and weeding.

After the establishment phase about 200 people will be needed for fire protection, thinning and pruning (until year 14). The necessary labour will be employed locally involving the local councils and opinion leaders. If sufficient labour can not be found locally not more than 40 % labour from outside will be contracted. For the period between last thinning and harvest about 50 permanent workers are needed which will all be employed locally. Wages will be in the range of US$ 2 per day which reflects the local labour prices. In addition to the direct employment, the support to private woodlot owners will provide further employment. The NFA will monitor respective activities.

b) Capacity building
Tree growing skills already exist, in particular among the 150 RECPA members. They have established more than 10 ha already. However, since there was no access to improved seeds the quality of the plantation is not very impressive. In addition, since forestry was a main source of income in the past people still have basic skills but they have to be up-graded.

c) Access to markets
The revitalization of the plantation sector in the area will contribute to improved infrastructure facilitating market access. The distance to the next town (Mbarara) is between 70 km and 100 km making it difficult to access for the local communities. The sale of timber will allow for the development of small businesses in the timber sector, local value-adding activities will be encouraged. Local timber from private woodlots will gain from the marketing structures of the NFA.

d) Access to financial resources
The communities currently have no access to credit facilities because they can not demonstrate that they have an income. With the project they are able to receive an income and subsequently will be eligible to apply for a microfinance loan.

Potential Social Risks
Since the most significant direct benefits are the employment opportunities and since labour needs will exceed local capacities at least for the first 7 years of the project severe conflicts from people or social groups excluded from actively participating in project activities are not to be expected.
Nevertheless, there are some possible negative social impacts or areas of potential conflict:

- Reduced land for mostly wealthy people who graze their herds illegally in the reserve. Because the project is going to ensure the reserve's integrity illegal grazers will loose 'free' grazing land. Considering the increasing enforcement of the law this will not result in significant leakage outside the project area. Livestock businesses will adopt zero grazing techniques or establish improved grazing land-use system. Zero grazing means livestock is kept in paddocks and food is provided.
- Local usage rights like domestic firewood, water drinking points for animals and local medicinal herbs will remain unchanged.

- The NFA is legally required to community forest management plans. These plans are consultative and minutes are appendixes to any planning activities that take place. Possible mitigation of the negative social impacts will include:
    - The collaborative forest management agreement stipulating rights and responsibilities is the main instrument to mitigate the potential negative impacts.
    - NFA has a unit responsible for legal community interests which are negotiated mutually.
    - Involvement of local leaders in the general forest activities and speaking to the local council meetings helps to lower existing resistance or uncertainty.
    - NFA will avail two employees to particularly include community interests in plantation-development.

During the stakeholder consultations on July 11th 2006 the 38 participating community members expressed their strong interest in reforestation for environmental protection. The following objectives of the community members were reported in the minutes of this meeting:

- To protect the environment
- To strengthen community relationship with the responsible body (NFA)
- To participate in reforestation, soil and erosion control
- To enhance climatic stability
- Expect to enter into a contractual agreement with the NFA that ensures their right to harvest the trees and to benefit from the revenue of emission reductions. In return they are prepared to plant trees and to replant after harvesting
- Depending on the performance community members would like to have additional land for tree planting in a subsequent project
- Highly interested to work within the plantations (salary expectations range from US$ 0.9 – US$ 3.4/day).
- Women in particular were interested to benefit from job opportunities (nursery work and weeding). It is expected that all NFA jobs will be contracted to the local communities.

F. 3. Report on how due account was taken of any comments received:

The comments received had a strong influence on the framework for collaboration with communities in the context of the project activities, reflected in the collaborative forest management agreement and the tree planning license.
It is envisioned that 310 ha will be reforested by RECPA members and other community groups. The consultations indicated that this is a feasible size to be managed by the communities. However, land will be distributed based on tree planting performance. Taking account of the most frequently mentioned barriers to establish community woodlots, the NFA will provide seedlings and technical advice to the communities and will cover the carbon monitoring costs for the area. The NFA will offer the respective carbon credits within the framework of the Emission Reductions Purchase Agreement to the prospective buyer and will handle the payments. The Communities will receive the full revenue achieved from the produced VERs. The buyer of the emission reductions is legally entitled to comment and approve the terms of any license or agreement with community groups. The stakeholder comments will be also considered in the Collaborative Forest Management Plan that will be developed by RECPA and other community groups with support from the NFA.

Fig. F-1 Project area of the Nile Basin Reforestation Project

Fig. F-2 RECPA stakeholder meeting with representatives of NFA and ENCOFOR at Rwoho to prepare CDM A/R project activities in July 2005.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROPOSED SMALL-SCALE A/R CDM PROJECT ACTIVITY

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Middle Name:	
First Name:	Hudson
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Middle Name:	
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Represented by:	Ms. Joelle Chassard
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First Name:	Joelle
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Mobile:	
Direct FAX:	202-522-7432
Direct tel:	202-458-1873
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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

The NFA will use revenues from licensing to finance the 5 small-scale A/R CDM projects. Therefore, the projects do not result in a diversion of official development assistance and is separate from and is not counted towards the financial obligations of those Parties.

The NFA is in charge of all Central Forest Reserves on behalf of the Government of Uganda as defined by the Uganda Forestry and Tree Planting Act. Its financial viability is fundamental to meet the obligations of sustainable management and conservation of the Reserves. According to the initial plan the NFA should be financially self sustaining by the fourth year of operations. Current financial projections find this realistic with regards to funding the core operations, but there will be need for external funding to continue investing in new plantations after the support is phasing out, and until the new timber plantations provide revenue.

For the NFA 2004-05 was the first year of operations and the institution received activity-specific funding from two donor arrangements:

1) Under the Forest Resource Management and Conservation Project from the EC/European Development Fund the NFA receives €2.6 million, ending 2006. 2006 is the last year of the programme, with an estimated funding of €1.6 million.

2) UK Department for International Development and Norway provided € 3.3 million as a Start-Up Fund to co-fund infrastructure development and to provide working capital for the establishment phase of the NFA. The programme ends 2007, and € 2.5 million remains for 2006 and 2007.

Annex 3

DECLARATION ON LOW-INCOME COMMUNITIES

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NFA
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NFA/N/08/08

March 25, 2008

STATEMENT OF DECLARATION OF LOW INCOME COMMUNITIES AND INDIVIDUALS

The National Forestry Authority as the participant of the "Uganda Nile Basin Reforestation Project No 1, 2, 3, 4, and 5" (the "project") wishes to declare **that the proposed CDM small-scale AR project activity is developed and implemented in conjunction with low-income communities and individuals as determined by the host Party** in compliance with the requirements for **Decision 6/ CMP.1 ANNEX section 15 (b)**

26/3/08

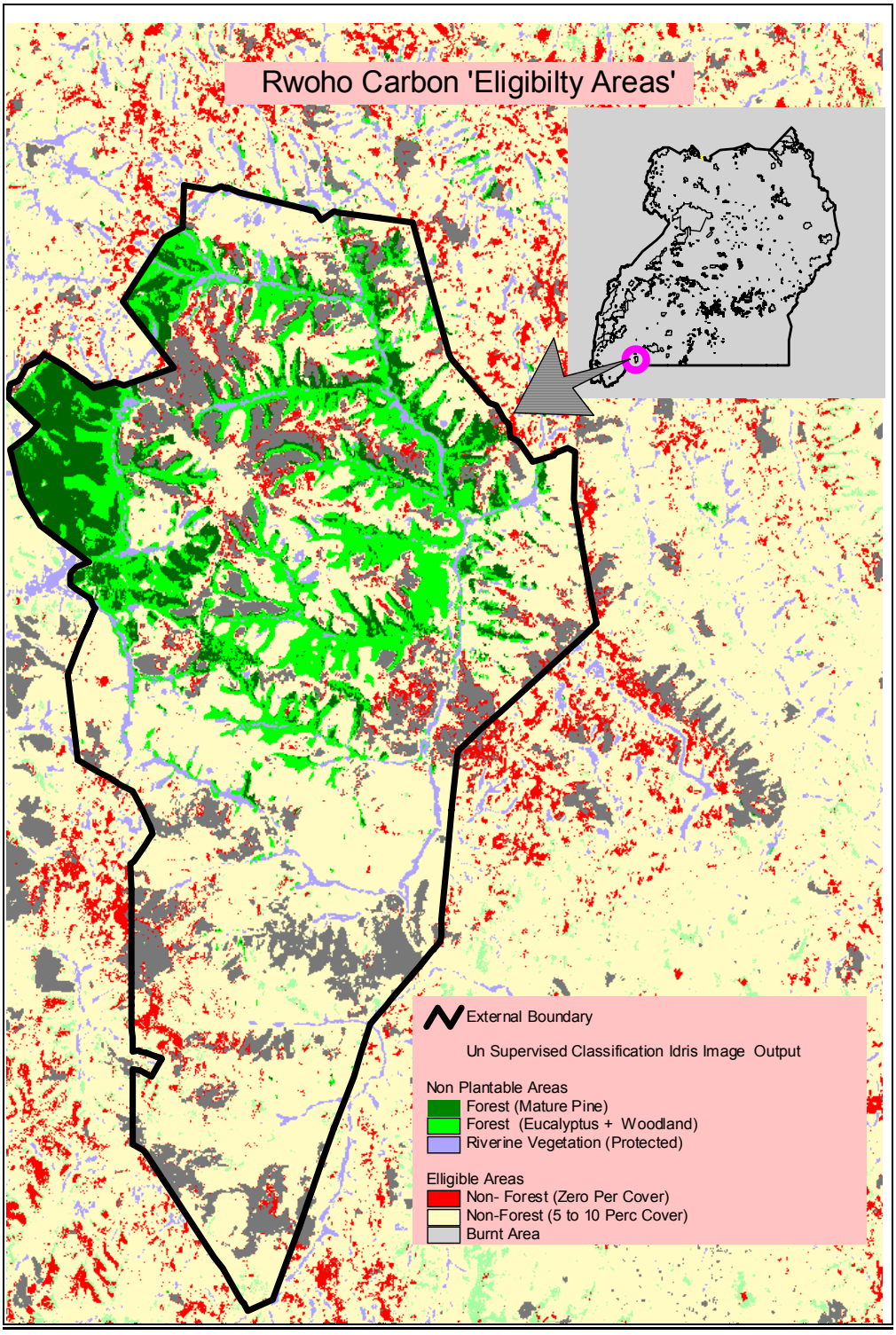
Damian B. Akankwasa
Executive Director,

Annex 4
List of accompanying documents (available upon request from the project developer)

DOCUMENT	STATUS	AUTHOR
NFA Forest Management Plan Rwoho/Bugamba CFR	Draft document	NFA
Environmental Impact assessment Rwoho/Bugamba CFR	Public report	Environmental Assessment Consult Limited
Collaborative Forest Management agreement	Draft document approved by NFA ready to be signed by community groups	NFA
Tree Farming License for community groups	Draft document approved by NFA ready to be signed by community groups	NFA
Baseline data assessment sheet	Document	NFA
Standard Operating Procedures for Carbon Monitoring in Plantations	To be prepared	NFA
Project description for the Climate Change Secretariat to assess the project against the CDM sustainable development criteria	Document	NFA

Annex 5

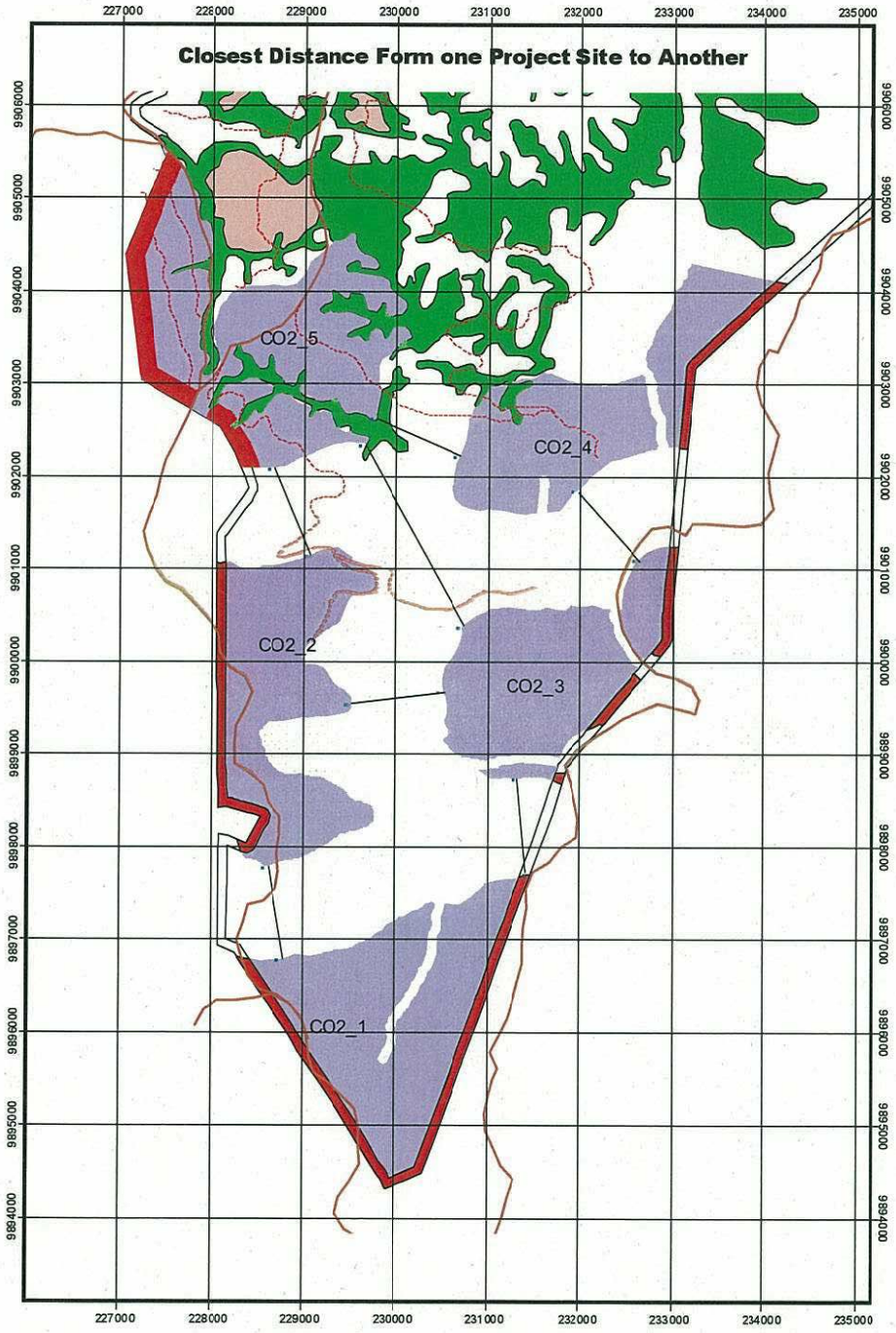
Rwoho CDM land eligibility map based on SPOT XS images from 08/1992



Annex 6

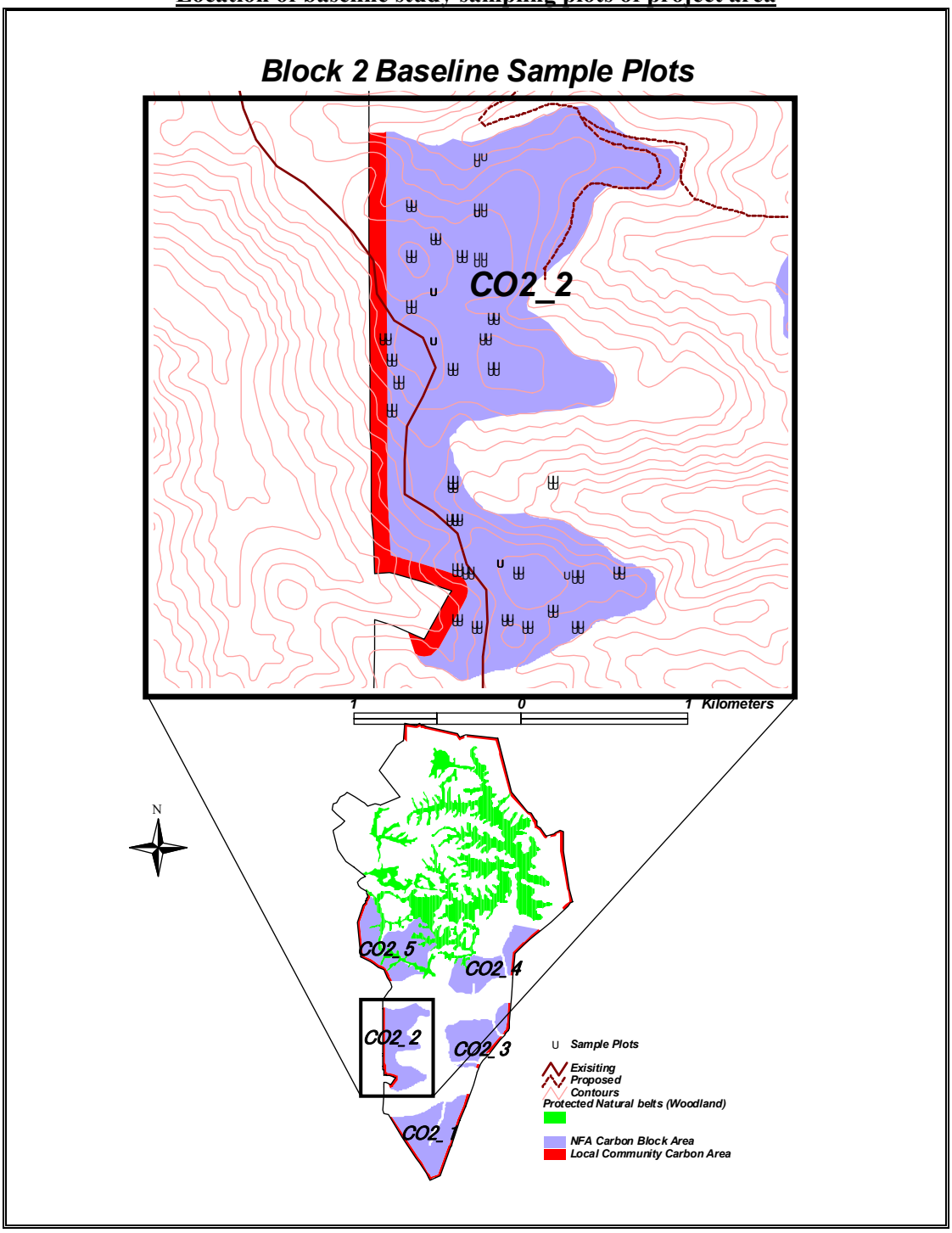
Location of small-scale CDM A/R projects

The closest distance between projects is 1 km as presented below (project areas are depicted in blue, the buffers in between project areas are presented in white and the conservation areas in green



Annex 7

Location of baseline study sampling plots of project area



Annex 8

Carbon Monitoring plan
→ adopted from the approved methodology of the China AR-ADM 001 methodology

1. Monitoring of the baseline net GHG removals

The baseline scenario of the proposed small-scale CDM A/R project activity is established using the simplified baseline and monitoring methodologies for selected small-scale A/R CDM project categories. The carbon stock changes in the baseline scenario are set to zero for lands without growing trees and the projected carbon stock changes in above- and below-ground biomass of existing trees for lands with growing trees). Therefore the carbon stock change in the baseline scenario not needs to be monitored.

2. Monitoring the overall performance of the proposed A/R CDM project activity

a) Monitoring actual project boundary that occurs actually

b) Monitoring of the forest establishment to ensure the planting quality and confirm the practice described in section A is well-implemented

c) Monitoring of the forest management

d) Internal GHG monitoring audit

The specific indicators to be monitored listed in section B-6 will be applied.

3. Monitoring the actual net GHG removals by sinks

a) Stratification

Each small-scale CDM A/R project activity is considered to be strata and has been further divided into sub-strata to consider the different tree species planted.

However, post stratification will be conducted after the first monitoring event to address the possible changes of project boundary and planting year in comparison to the project design, and to address the change in carbon stocks more or less variable then that is expected, taking into account data from the monitoring of the over all performance of the proposed A/R CDM project activity and the variation in carbon stock change for each stratum and substratum after the first monitoring event. Substrata will be grouped if they have similar carbon stock, carbon stock changes and spatial variation.

b) Sampling Frame

- **Determining sample size**

The NFA is using a sampling intensity of 0.16 % to monitor its plantation activities, this relates to one sampling plot of 400 m² for every 25 ha. With this sampling intensity the minimum precision target of +/- 10%, at a 95% confidence level (t-value) for the mean standard deviation should be reached. In case the required accuracy is not sufficient the sampling intensity will be increased. The number of plots for each species was allocated based on the proportion of area. However, it might be reasonable to modify the sample size after the first monitoring event based on the variation of the carbon stock changes.

Table: Number of monitoring plots for the small-scale project activity and for each tree species

Small-scale CDM AR project No 2	Area in ha	Number of plots in areas planted with		
		Pine	Maesopsis	Prunus
NFA planting area	334.1	10	3	0
Community planting area	35.9	1	0	1

- **Locating sampling plots**

The permanent sample plots will be located systematically with a random start, using GPS. The size of plots is 400 m² (20m X 20m).

c) Monitoring frequency

The planting activity will be conducted from 2008 to 2010. First monitoring will be conducted in 2012 with subsequent monitoring interval of 5 years, i.e., in 2017, 2022, 2027, 2032, and 2035 respectively.

d) Measuring and estimating carbon stock changes over time

Carbon stock changes over time will be measured according to the procedures in section B.4. and section C

e) Monitoring GHG emissions by sources as the results of the A/R CDM project activity

see above

4. Monitoring the leakage

Not required

5. Quality Assurance and Quality Control (QA/QC)

To ensure the net anthropogenic GHG removals by sinks to be measured and monitored precisely, credibly, verifiably and transparently, a quality assurance and quality control (QA/QC) procedure will be implemented,

a) Reliable field measurements

To ensure the reliable field measurements,

- Standard Operating Procedures (SOPs) for each step of the field measurements, including all detail phases of the field measurements and provisions for documentation for verification purposes, will be developed and adhered to over times.

- Training courses on the field data collection and data analyses will be held for persons involving in the field measurement works. The training courses should ensure that each field-team members have been fully aware of all procedures and the importance of collecting data as accurately as possible. To achieve this, both classroom examination and field examination will be conducted, and only those that have passed the examination can join the team. Test plots will be established and used for the field examination in which all measurement of pertinent components and procedures will be examined.

- A document that shows that these steps have been followed will be presented as a part of the project documents. The document will list all names of the field team and the project leader will certify that the team is trained;
- Any new staff will be adequately trained.

b) Verification of field data collection

To verify that plots have been installed and the measurements taken correctly,

- 10% of randomly selected plots will be re-measured by independent qualified team.
- Key re-measurement elements include the location of plots, DBH and tree height.
- The re-measurement data will be compared with the original measurement data. Any errors found will be corrected and recorded. Any errors discovered will be expressed as a percentage of all plots that have been rechecked to provide an estimate of the measurement error. If the difference between the re-measurement and original measurement is higher than 5%, the sample plot will be eliminated.

c) Verification of data entry and analysis

To minimize the possible errors in the process of data entry, the entry of both field data and laboratory data will be reviewed by an independent expert team and compared with independent data to ensure that the data are realistic. Communication between all personnel involved in measuring and analysing data will be used to resolve any apparent anomalies before the final analysis of the monitoring data is completed. If there are any problems with the monitoring plot data that cannot be resolved, the plot should be re-measured or not be used in the analysis.

d) Data maintenance and archiving

Data archiving will take both electronic and paper forms, and copies of all data will be provided to each project participant. All electronic data and reports will also be copied on durable media such as CDs and copies of the CDs are stored in multiple locations. The archives include:

- Copies of all original field measurement data, laboratory data, data analysis spreadsheet;
- Estimates of the carbon stock changes in all pools and non-CO2 GHG and corresponding calculation spreadsheets;
- GIS products;
- Copies of the measuring and monitoring reports.

6. Uncertainty assessment

The uncertainty in each species in each stratum can be estimated from re-measurement of randomly selected plots and/or from the measurement of replicate plots. Uncertainties will be estimated and expressed as half the 95% confidence interval width divided by the estimated value:

$$U_s(\%) = \frac{\frac{1}{2}(95\%ConfidenceIntervalWith)}{\mu} \cdot 100$$
$$= \frac{\frac{1}{2}(4\sigma)}{\mu} \cdot 100$$

Where

Us = percentage uncertainty of each species within sub-stratum, %

μ = mean value

σ = standard deviation

The uncertainty of each sub-stratum is then combined using following error propagation equations

$$U_c = \frac{\sqrt{(U_{s1} \cdot C_{s1})^2 + (U_{s2} \cdot C_{s2})^2 + \cdots + (U_{sn} \cdot C_{sn})^2}}{\left|C_{s1} + C_{s2} + \cdots + C_{sn}\right|}$$

Where

Uc = combined percentage uncertainty of sub-stratum, %

Usi = percentage uncertainty of species i in the sub-stratum, %

Csi = mean carbon stock of species i in the sub-stratum

The stratum and total percentage uncertainties are further combined in the same way as above.

7. Monitoring the environmental and social-economic impacts

The activities mentioned in the Environmental Impact Assessment plan chapter 6 will be monitored. The impact of the project on the well being of the population in the area will be monitored by the NFA staff on the ground, a respective report will be prepared within the framework of the Community Forest Management plan.