PROJECT DESCRIPTION FOR TIST PROGRAM IN UGANDA VCS-001

The International Small Group & Tree Planting Program

Document Prepared By Clean Air Action Corporation

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1 PROJECT DETAILS

1.1 Summary Description of the Project

The International Small Group and Tree Planting Program (TIST) is a combined reforestation and sustainable development project, in Uganda, carried out by subsistence farmers. The farmers plant trees on their land and retain ownership of the trees and their products. They receive training from TIST and a share of the carbon revenues from CAAC.

TIST empowers Small Groups of 6-to-12 subsistence farmers in India, Kenya, Tanzania, and Uganda to combat the devastating effects of deforestation, poverty and drought. Combining sustainable development with carbon sequestration, TIST already supports the reforestation and biodiversity efforts of over 65,000 subsistence farmers. Carbon credit sales generate participant income and provide project funding to address agricultural, HIV/AIDS, nutritional and fuel challenges. As TIST expands to more groups and more areas, it ensures more trees, more biodiversity, more climate change benefit and more income for more people.

TIST provides an administrative backbone that supplies training in building nurseries, tree planting, conservation farming, building fuel-efficient stoves and malaria and HIV/AIDS prevention. Part of the backbone is a two-way communications network that includes newsletters, weekly meetings at the Small Group level, monthly meetings where groups of Small Groups receive training, periodic seminars at the national level and an award winning monitoring system based on hand-held computers and GPS. TIST is available to everyone and all are considered equal. The rotating leadership and the Small Group rules empower women and the undereducated. Those who are the most successful, regardless of education levels or gender, become mentors and leaders.

This project description (PD) is for a subset of the TIST project in Uganda and initially applies to 291 of the Small Groups, 1,662 members, 1,000 project areas and 777.1 ha. The main species planted are *Pinus patula*, Eucalyptus, and Cupressus spp.

1.2 Sectoral Scope and Project Type

This project is seeking registration under the Verified Carbon Standard (VCS 3.2) as an Afforestation, Reforestation and Revegetation (ARR) project and has been developed in compliance with the VCS Guidance for Agriculture, Forestry and Other Land Use Projects (VCS Version 3.2, 1 February 2012). It is a grouped project.

1.3 Project Proponent

Project Proponents	Point of contact	Roles/ Responsibility	Contact Details
Clean Air Action Corporation (CAAC)	Charles E. Williams, Vice President	Project developer, implementer, manager	Clean Air Action Corporation 7134 South Yale Ave, Suite 310 Tulsa, Oklahoma 74136 United States of America Phone: +1-918-747-8770

1.4 Other Entities Involved in the Project

Other Entities	Point of contact	Roles/ Responsibility	Contact Details
Institute for Environmental Innovation (I4EI)	Vannesa Henneke, Executive Director	Manages sustainable development components of TIST	Institute for Environmental Innovation 7134 South Yale Ave, Suite 310 Tulsa, Oklahoma 74136 United States of America Phone: +1-918-712-1866
Berkeley Reafforestation Trust	Rodney Portman, Trustee	Berkeley Reafforestation Trust provides funding for sustainable development components of TIST	The Berkeley Reafforestation Trust 3 Harley Gardens London SW10 9SW United Kingdom Phone: 020 7373 6801
Environmental Services, Inc (ESI)	Shawn McMahon	Validator/Verifier	Environmental Services, Inc. 3800 Clermont St., NW North Lawrence, OH 44666 United States of America Phone: +1-330-833-9941

1.5 Project Start Date

01-January-2003.

1.6 Project Crediting Period

30 years starting 01-January-2003 and ending to 31-December-2032

1.7 Project Scale and Estimated GHG Emission Reductions or Removals

Project	yes
Mega-project	no

Years	Estimated GHG emission reductions or removals (tCO2e)
Year 2003	1,245
Year 2004	3,624
Year 2005	7,258
Year 2006	12,208
Year 2007	18,489
Year 2008	24,554
Year 2009	30,289
Year 2010	31,994

Year 2011	31,337
Year 2012	30,862
Year 2013	29,181
Year 2014	29,101
Year 2015	26,827
Year 2016	25,244
Year 2017	26,880
Year 2018	28,197
Year 2019	25,815
Year 2020	27,614
Year 2021	27,674
Year 2022	28,588
Year 2023	29,223
Year 2024	29,223
Year 2025	29,223
Year 2026	28,567
Year 2027	28,574
Year 2028	27,064
Year 2029	24,102
Year 2030	24,005
Year 2031	21,483
Year 2032	22,004
Total estimated ERs	730,450
Total number of crediting years	30
Average annual ERs	24,348

1.8 Description of the Project Activity

1.8.1 Project Overview

Since its inception in 1999, over 65,000 participants organized into over 9,000 TIST Small Groups have planted over eleven million trees in Tanzania, India, Kenya, and Uganda - accomplishing GhG sequestration through tree planting, creating a potential long-term income stream, and developing sustainable environments and livelihoods. Replication of TIST in Uganda began in 2003.

Currently, over 5,800 TIST participants, in over 880 Small Groups, are registered in the TIST program in Uganda and are working to break their local cycle of deforestation, drought and famine. The trees planted in tens of thousands of discrete groves and land parcels are already beginning to reduce erosion, stabilize and enrich the soil, and will soon be providing shade. In the future, they will provide other benefits, including edible fruits and nuts, medicines, windbreaks, firewood and timber.

This PD is for a subset of the reforestation project in Uganda as described in Section 1.1.

As a grassroots initiative, Small Groups are provided a structural network of training and communications that allows them to build on their own internal strengths and develop best practices. Small Groups benefit from a new income source; the sale of carbon credits that result from the sequestration of carbon from the atmosphere, into the biomass of the trees and soil. These credits are expected to be approved under VCS and, because they are tied to tree growth, will be sustainable. The carbon credits create a new 'virtual' cash crop for the participants who gain all the direct benefits of growing trees and also receive quarterly cash stipends based on the GhG benefits created by their efforts. The maturing trees and conservation farming will provide additional sustainable benefits that far exceed the carbon payments. These include improved crop yield, improved environment, and marketable commodities such as fruits, nuts, and honey. TIST utilizes a high-tech approach to quantify the benefits and report the results in a method transparent to the whole world, which includes palm computers, GPS, and a dynamic "real time" internet-based database.

TIST contributes to the following indicators for sustainable development – Social well-being, Economic well-being, Technological well-being, and Environmental well-being:

Socio-economic well-being

- TIST generates employment of local Quantifiers and staff who travel to TIST tree groves and woodlots to quantify the number, location, circumference, and species of trees planted as a result of this project activity. The project also provides jobs for an office staff, who oversee the production of the TIST newsletter, the scheduling and coordination of Cluster meetings,[1] the synchronization of Palm data from the Quantifiers, and the establishment of the voucher payment system.

- TIST reinforces the removal of social disparities by encouraging participation among all members of society regardless of income, religion, or sex. TIST also removes social disparities by training participants to use the concept of rotating leadership within the Small Group format.

- TIST reinforces good practices for human health. TIST provides training on the use of UNFAO conservation farming practices, which, when adopted, have resulted in a doubling of crop output in many cases and helped to secure food, especially during periods of drought. In addition, TIST uses the Small Group Cluster meetings as a delivery mechanism to train participants in health matters, including HIV/AIDS awareness and prevention.

Technological well-being

- TIST provides the transfer of environmentally safe and sound technologies, including the use of Palm computers, laptop computers, GPS devices, Internet, and UNFAO conservation farming best practices. In addition, the TIST newsletter documents best practices, identified by the participants themselves, for sharing appropriate and adaptive technologies with one another.

Environmental well-being

- The TIST program improves resource sustainability and reduces resource degradation. Because TIST participants plant trees, and because not all trees survive, the deadfall alone will reduce the need for participants to continue to cut down trees outside TIST project boundaries after just a few years. Once enough trees are planted, they have the potential to provide a sustainable fuel wood supply.

[1] The Small Groups are all assigned to "Clusters," an administrative unit within walking distance of a central meeting point.

- Resource degradation exists when soils erode. TIST trees directly stabilize soils. They also provide shade that enables grasses to grow under the canopy, which further reduces soil degradation. They produce fruit, nuts, and traditional medicines, which lessen the pressure to obtain these from non-TIST tree stocks.

- By empowering Small Groups to select which tree species to plant and training on benefits of indigenous species, the project reinforces biodiversity friendliness.

- The impact of TIST is to reduce the levels of pollution in general. TIST provides an improvement in air quality through the sequestration of carbon. Soil stabilization that results from TIST also has the ability to improve water quality over the long-term. TIST does not own a fossil-fueled vehicle.

1.8.2 How the project will achieve GHG removals

The TIST Uganda project will achieve GHG removals through reforestation/revegetation and sequester atmospheric CO_2 in live aboveground and belowground biomass.

TIST project areas are located on lands owned or controlled by TIST small hold farmers and that have been used as cropland or grassland. Because the farmers also own the trees that they plant, the species are selected by the Small Groups, based on their needs and the benefits, which they desire to obtain. As a result, numerous species and varieties have been selected. Table 1.8 lists the species and indicates whether they are indigenous to the area. Additional species may be added over the 30-year life of the project, as additional planting takes place. The specific species for each project area are shown in the "Strata" worksheet.

Table 1.8 Tree Species Selected

Scientific Name	**Common name**	**Height (m)**	**Indigenous**
Acacia mearnsii	Australian Acacia	25	no
Annona spp.	Annona	6+	no
Artocarpus heterophyllus	Jackfruit	25	yes
Azadirachta indica	Neem	20	yes
Callistemon spp.	Bottlebrush	5+	no
Carica papaya	Papaya	10	no
Casuarina equisetifolia	Casuarina	30	yes
Citrus aurantifolia	Lime tree	6	no
Citrus sinensis	Orange	13	no
Cordia Africana	East African Cordia	15	no
Croton megalocarpus	Croton	35	no
Cupressus spp.	Cypress	5+	yes
Cyphomandra betacea	Tree Tomato, Cape Tomato	5	no
Entada abyssinica	Tree Entanda	15	no
Eriobotrya japonica	Loquat, Japanese Plum	10	no
Eucalyptus grandis	Flooded Gum	55	no
Grevillea robusta	Grevillea, River Oak, Silk Oak	25	no
Jacaranda mimosifolia	Jacaranda	20	no
Macadamia spp.	Macadamia Nut	18	no

Table 1.8 Tree Species Selected			
Scientific Name	**Common name**	**Height (m)**	**Indigenous**
Maesopsis eminii	Umbrella Tree	30	no
Mangifera indica	Mango	25	yes
Melia azedarach	Chinaberry, Bead Tree	7+	yes
Persea americana	Avocado	20	no
Pinus Patula	Patula pine	30	no
Podocarpus falcatus	East African Yellow Wood	46	no
Prunus africana	Iron Wood, Red Stinkwood	24	no
Psidium guajava	Guava	15	no
Solanum aculeastrum	Bitter Apple	5	no
Symphonia globulifera	Symphonia globulifera	30	no
Unknown	Unknown	na	na
Vangueria spp.	Wild Medlar	8	no
Vernonia amygdalina	Bitter Leaf	7	no
Zanthoxylum gilletii	East African Satinwood	35	no

Project technologies, products, services and activities

The technologies associated with tree planting have been developed through discussions with Uganda Forestry Department and use of existing literature. In addition, TIST works with the Small Groups and local experts to develop best practices that are recommended to the members for adoption. The following describes the technologies employed.

General: The project involves direct tree planting of species selected by the individual Small Groups, to meet their individual goals and needs. A list of suitable species is prepared based on input from local experts - Uganda Forestry Department and TIST members - and their benefits are discussed at TIST training meetings.

Nurseries: TIST best practices call for Small Groups to acquire seeds and develop their own nurseries using either seedbeds, or pots, made from plastic bags. Some Small Groups acquire seedlings from other groups, other individuals and local forest services.

Tree Planting: Tree planting is accomplished by manual methods using hand tools. TIST best practices call for farmers to dig individual holes that are 45 cm wide, 45 cm deep, spaced 2.5 m to 3.5 m apart for each seedling and fertilized using natural fertilizers. TIST does not own any fossil fuel vehicles or equipment to be used for tree planting.

Monitoring: TIST has deployed an innovative and award winning[2] data collection system that consists of battery-operated Palm computers, GPS receivers, data and image uploads through laptops or Internet access points to monitor project activities. The data collection is conducted by trained local representatives, called Quantifiers, who are often Small Group members. They travel to each specific project area by walking, bikes, and local buses. TIST does not own any vehicles.

[2] ComputerWorld Honors Program Laureate, 2007.

Internet: TIST uses Internet technology to make program results available transparently to a worldwide audience. It is also used to transfer field data collected with the Palm computers to the TIST database server located in the USA.

Pest Management: Small Groups are trained to use local natural techniques to manage pests. For example:

- Neem seeds are ground and added to boiling water. The mixture is left overnight and then applied to seedlings when cool.
- Neem leaves, washing soap, salt and red pepper (chili) are mixed together, then added to water and covered with the pan (this is a dangerous mixture!) and then boiled. The cooled mixture is applied to the seedlings.
- Ash is added to the area with seedlings.
- The area is well weeded to avoid encouraging pests.
- Neem leaves are boiled in water to make 'bitter water' and then applied to the seedlings.

Ongoing management: Long-term management of the trees rests with the Small Groups. However, due to the ongoing tree payment based on live tree counts and the long-term profit sharing arrangement with the Small Groups, there are ample incentives for the groups to maintain healthy long-term stands. All species will be maintained for the 30-year life of the project. Small Groups have contracted to replant trees that die in the first 20 years.

Management of the trees is dependent on the species. For example:

- *Pinus patula:* Initial spacing can be planted in rows, at a spacing of 2-2.5m. Selective harvesting will be ongoing, with a goal of achieving a 250 trees/ha, with stem density, with a mean dbh of 45 cm, at 45 years.

- *Eucalyptus* (spp): Branches are trimmed and used for fuel wood. Stands planted closer than 3m x 3m should be thinned to that spacing, within two to five years. Additional thinning will take place every year, to provide fuel wood and/or a cash crop to the Small Groups.

- *Cupressus* (spp): Cypress (common name) can be planted in wood lots, at an initial density of 1,100/ha, but should be thinned to 300 trees/ha, for saw wood production. Weeding is essential for the first two years, to produce maximum growth. Optimal spacing is 2-3m x 2-3m, where thinning inferior trees should occur after four to five years, and pole production can occur after ten years. Trees should be regularly pruned for maximum stem growth and to reduce risk of toppling over in strong wind or storms.

1.8.3 Schedule

The starting date of the proposed small-scale A/R CDM activity and the crediting period begins 1 January, 2003. The project is scheduled to last 30 years but may be extended if the carbon market is vibrant enough to support it.

Justification: TIST maintains a database record of each project area showing when it was first quantified by a TIST staff member and how old the trees were. These records appear at www.tist.org under "Project Areas" and under each region, group center, and Small Group where audits have taken place. The data collected by TIST indicates that the first trees planted by Small Groups, in project areas subject to this PD, were planted in 2003. See "Grove Summary" and "Strata" worksheets for age of trees.

Gantt Charts: The following Gantt charts show the timing of annual events for the project. The numbers along the top of each chart are years. Where "project" is indicated in the title, it is for the 30-year project life. Where "project area" is indicated, it is for events that might take place within a project area and the year one may be an event rather than the beginning project date. With all the different project areas, species, farmers and planting schedules, these charts are very general and subject to change.

Main planting schedule (project). Main planting has taken place, but additional planting may take place in individual project areas, over the next few years, where the original planting density is low.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30

Replacement planting schedule (project). As trees die, farmers are to replant for 20 years. Replanting can start as soon as the second year. Replanting is shown for 25 years because of the staggered start of individual project areas.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30

Monitoring (project). Monitoring is ongoing. The internal goal is to quantify each grove annually. Whether that is achieved or not, the Quantifiers are out in the field, all the time, visiting the multitude of project areas.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30

Validation and verification (project). Validation takes place around year six, when project areas have been established and trees are already in the ground and growing. It is expected that the initial verification will take place at the same time. While it is a cost trade off, because the monitoring is ongoing, it is possible that verification could take place as much as annually.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30

Thinning (project area). Thinning is allowed, because it improves tree growth. Because of the different species and their different growth rates, the different planting schedules, the different original spacing and different farmers, thinning can begin in as early as four years, where an early harvest for poles or firewood is made.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30

Fruit and nut harvest (project area). Most of the trees won't bear any fruits, nuts or other products for five or six years. After that, harvest will be annual.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30

Deadwood harvest (project areas). Farmers may harvest deadwood any time it exists. For those that lose trees in the first year, it will come in year one. However, it is expected that most deadwood harvest will take place in later years as larger trees are lost, or branches die.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30

1.9 Project Location

The individual project areas of this PD are located in Bushenyi, Kabale, Kanungu, Kisoro, Mbarara, Ntungamo, and Rukungiri Districts of Uganda. Most of the project activity is centered around Bushenyi and Kabale, generally around latitude 0.5 S, longitude 30 E. See Figure 1.9.

TIST has adopted a "grouped project" approach for this PD, because it is expanding throughout Uganda. As required by VCS, a KML file has been prepared that defines the extent of the geographic area of the expanded program. The KML file defines the districts listed above. See Appendix 06.

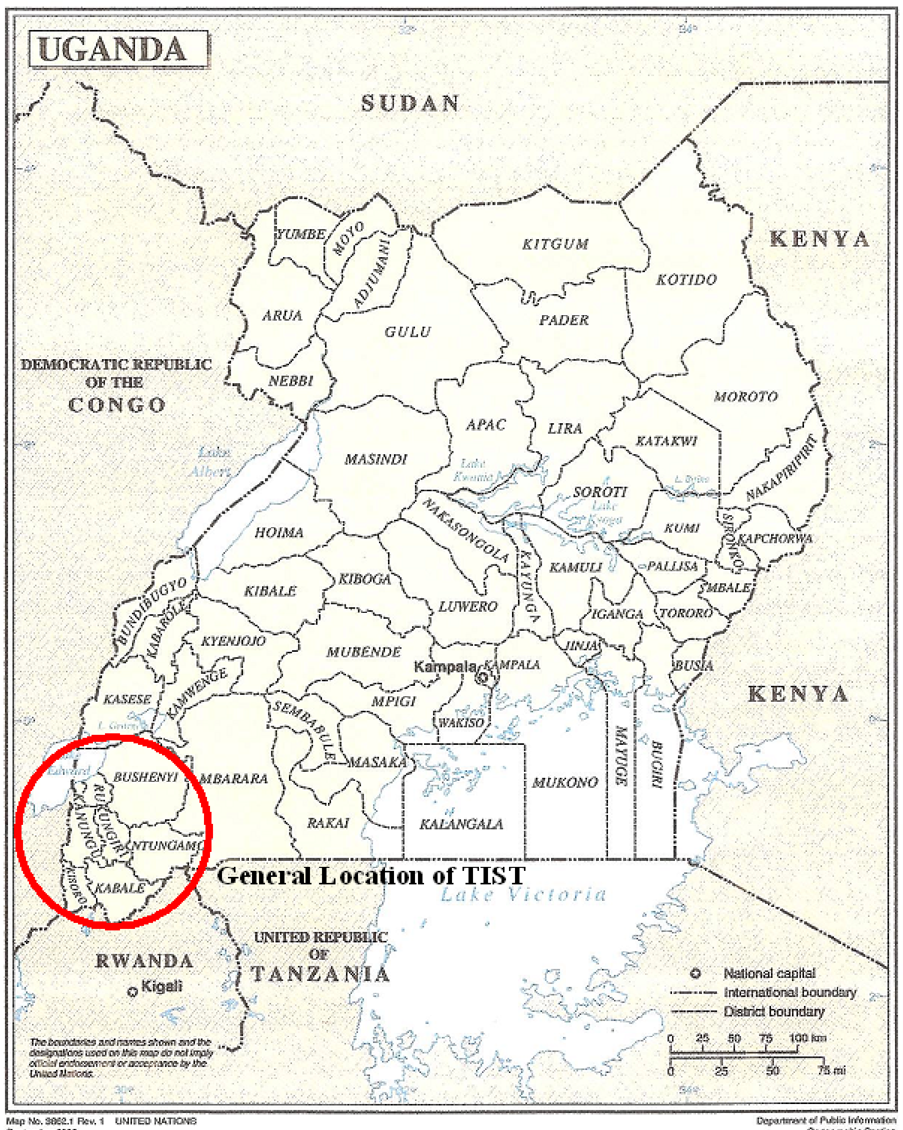

Figure 1.9: General area of the TIST project

The district and village of each project area are in Appendix 04, "Grove Summary" worksheet. The geographic locations and boundaries of each project area have been determined using a GPS and identified with a unique number and geographic coordinate. Appendix 01 shows the single point location of each project area on a 1990 Landsat 4/5 satellite image. Appendix 02 shows the single point location of each project area on a 2000 Landsat 7 satellite image. Appendix 03 is a KML file that can be loaded on Google Earth that identifies each project area and plots each boundary. In addition, TIST maintains all of this data in an interactive format on a website that is publicly available to anyone with Internet access. Included on the site are GPS tracks of the project areas on a geographic grid. It can be accessed as follows:

1. Go to tist.org
2. At top, select Project Area (example: Uganda). Note Country Profile information showing current tree count, Small Group count and predominate species information for all the TIST activities in the country. This information, as well as the rest of the information on the web site, is updated as much as several times a day, as field staff upload their data.
3. On the right, below map, select a Project Area (example: select Bushenyi). Note current Area Profile summaries at top showing current tree count, Small Group count and predominate species information for all the TIST activities in the Project Area.
4. Towards bottom, select a Group Center (example: Kyangyenyi). Note current Group Center Profile data at top showing current tree count, Small Group count and predominate species information for all the TIST activities in the Group Center.
5. Select link “Click Here to View the Quantified Tree Groves in this Group Center Displayed on a Satellite Map.” A Google Maps satellite image will appear with red dots showing the location of all the project areas assigned to this Group Center. Placing the cursor and clicking on a dot will display an information balloon about that project area.
6. Use the browser back button to return to the Group Center Profile page.
7. Note the table at bottom of page listing the Small Groups assigned to this Group Center, their tree and seedling counts and the Last Audit Date.
   a) The camera icon next to the group name is a link to pictures of the Small Group and their project areas. Digital photographs are taken with TIST’s data acquisition system and are automatically dated and mapped to the Small Group.
   b) The Adobe icon is a link to the Small Groups GhG contract with the Project Participant. It is password protected and not generally available to the public.
   c) Last Audit Date refers to the last time a TIST Quantifier (a staff member trained to collect project area data using TIST’s data acquisition system) collected data from this Small Group’s project area. It is a link to detailed quantification data.
8. Select one of the dates under Last Audit Date (example: date associated with MUTOJO DEV, AGENCY, 2005UG106).
9. On the Tree Audit page is a list of each project area belonging to the selected Small Group. Under Groves Present are the name, latitude and longitude of the project area.
10. Select a Name in the Groves Present section (example: Muda 01) that is a hot link and the GPS perimeter of that project area will appear showing the bounding latitude and longitude, identification and area.
11. On the same page, select the link at the top “Click here to view this grove perimeter plotted on a satellite image.” The perimeter of the project area is now displayed on a Google Maps satellite image. If there is a grey screen stating “we are sorry, but we don’t have imagery at this zoom level for this region” use the minus button (“-“) at the top left to zoom out until the satellite image comes into view. Additional clicking on the minus button will display the project area with a regional perspective.
12. On the satellite page, there are two other options. The first link, “Click Here to View Pictures of the TIST Small Group that has Planted Trees in this Grove” goes to the same set of pictures described in 7.a., above. The second link, “Click Here to View All the Quantified Tree Groves in this Group Center Displayed on a Satellite Map,” displays all of the project areas in the Group Center as described in 5., above.
13. Use the browsers back button to navigate back to the Tree Audit page to see more details about each project area including species, tree count and age.

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1.10 Conditions Prior to Project Initiation

Climate: The climate is tropical and shows little temperature variation throughout the year. In the low lands and Bushenyi plateau, the temperatures range between 25^{o} and 31^{o}C. In the highlands, such as in the Nsika and Kabale Mountains, the temperature ranges from 13^{o} to 26^{0}C. Rainfall is considered moderate, with most of the general area receiving around 1,400 mm per year.[3] The Mbarara plains are dryer, with only 1,000 mm per year of precipitation. The heaviest rains occur in April-May and September-November, with dry seasons between December and February and between June and August.

Soils: Soils are a function of the underlying rocks, topography, and climate. Above the rocks of the Buganda-Toro system, in the Nsika Mountains, are Acrisols, typical of old land surfaces with hilly terrain and a tropical climate.[4] The soils covering the Mbarara plains and smaller plains are Ferralsols. They are the result of highly weathered surfaces in the tropics, usually associated with forest cover. In this case, the forest cover has been removed by years of human occupancy.

Overlying the Karagwe-Ankolean terrain of the Kabale Mountains are Haplic Ferralsols. North of the Kabale Mountains and covering the Ankole Hills are Lithic Leptosols, indicative of rocky outcrops. The soil around Rukungiri and Rwashamaire is a Rhodic Nitosol, a red clay soil that is considered some of the better agricultural soil in the region. The volcanic rocks of the Queen Elizabeth National Park are Andosols. Rich organic Histosols can be found in the swampy areas associated with some of the river courses, such as the Koga tributary of the Ruizi River and the Munyere Swamp. Fluvisol cover the floor of the North Maramagambo Forest Reserve.

Topography/Hydrology: At the northwest edge of the general area is Lake George, at an elevation of 922 meters. It is connected to Lake Edward (west of the general area) by the south flowing Kazinga Channel. Straddling the channel and continuing along Lake Edward is a 15 to 20 kilometer wide lowland (1,000 meters) that is dominated by the Queen Elizabeth National Park and North Maramagambo Forest Reserve (termed herein, the QE lowland).

To the south of Lake George, rising to almost 2,200 meters are the mountains bearing the Kasyoha-Kitomi Forest Reserve and settled area adjacent to the east (termed herein, the Nsika Mountains). The west sides of the mountains drain to the channel via the Chamburo and Buhidagi Rivers, creating two large drainage basins in the Kasyoha-Kitomi Forest Reserve.

Rising up east of the QE lowland and situated south of the Nsika Mountains is a plateau (1,600 meters) defined by Bushenyi Town, Rukungiri, Ntungamo, and Kabwohe (herein termed the Bushenyi plateau). Draining the north side of the Bushenyi plateau are the upper reaches of the Chamburo River. The west portion of the plateau drains to the west and courses across the QE lowland via the Nyamweru, Rwenbuno, Koizi, Nchwera, or Rushaya Rivers. The first four flow directly to Lake Edward. The Rushaya flows into the Ntungu River and then to Lake Edward. The plateau also drains to the south and to the west flowing Minera River. The Minera becomes the Ntungu further down stream towards Lake Edward. Swamps along the slower moving streams characterize much of the plateau.

East and southeast of the Nsika Mountains, stretching beyond Mbarara, are plains (elevation about 1,370 meters, herein termed the Mbarara plains). The creeks and streams of the east portion on the Nsika Mountains and the southern Mbarara plains flow south, as tributaries of the Ruizi River. Also flowing to the Ruizi are the Koga, Buzhago, and Munyere swamps (elevation

[3] Exhibit 13: TIST UG PD-VCS-Ex 13 Dist Enviro Profile Bushenyi .doc. National Environment Management Authority (NEMA), District Environment Profiles: Bushenyi.
[4] Development Ecology Information Service (devecol), FAO Soil Maps, Alexandria VA USA. http://67.95.153.93/DevecolAfrica/GeoElinks/Africa/Africa_index_soils.htm. Accessed March 10, 2005.

approximately 1,350 meters). The Ruiza flows east through Mbarara, where it disappears into the swamps near Lake Mburo National Park.

The northern Mbarara plains drain to the north via the Oruyuba, Nyobisheke, Rutungu, Kabagore, and Kaginga Rivers. They ultimately feed the west flowing Katonga River, which feeds Lake George.

South of Mbarara are some minor mountains and a dissected plateau that reaches 1,890 meters (herein termed the Ankole hills). They drain to the north and to the west to the Ruizi River. Water shedding to the west and southwest flows to a major drainage, with as many as three names, the Rubingo, Chamwasha, or Kababo River. The river terminates at the Rwanda border, where it meets the east flowing Kagera River. Flowage on the southern portion of the Ankole Hills goes into the Chezho River, which feeds the Kagera River at the international border. The Kagera discharges into Lake Victoria (1,136 meters).

North of Kabale is a mountain range that reaches 2,640 meters, west of the general area of TIST (herein termed the Kabale Mountains). They drain to the north, across a plateau, to Lake Karangye, the Kakondo swamp, and the Ntungu/Minera River. They drain to the east to the Kakitumba River, which feeds the Kagera River. Southwest of Kabale is Lake Bunyoni.

Ecosystems: According to the FAO, the ecosystem of the general area is tropical mountains, with a finger of tropical rainforest along the Queen Elizabeth lowlands.[5] The World Wildlife Fund is more specific, calling the finger of tropical rainforest the Albertine Rift montane forests and the remainder Victoria Basin forest-savannah mosaic.

The Albertine Rift montane forests are rich in wildlife, including the mountain gorilla and chimpanzee. WWF reports the area as having “at least 14 species of butterflies and 37 species of birds which are found here and nowhere else in the world.” In addition, there are “a significant number of endemic amphibians, most notably the bamboo frog, copper-coloured tree frog, and the giant torrent frog.”[6]

The Victoria Basin forest-savannah mosaic is defined by WWF as “a unique landscape where species from west African forest ecosystems converge with those from east African forest-savannah mosaics.” WWF reports that the diversity of habitats support “more than 310 species of trees and shrubs, 280 species of birds, 220 species of butterflies, and 100 species of moths. Animals such as banded toads, red-faced barbets, and Mwanza rock agamas are among the many endemic species that can be found there.”[7]

Rare and Endangered Species: A list of rare and endangered species that were potentially present in the project areas was compiled through review of the literature and discussion with local experts. Field observations by TIST staff, discussions with forest department officials and Small Group Members indicate the absence of any endangered, or rare, species in the project areas.

[5] FAO Forestry Department, Country Profiles: Uganda, Global Forest Resources Assessment, Food and Agriculture Organization of the United Nations, 2000. http://www.fao.org/forestry/foris/webview/forestry2/index.jsp?siteId=5081&sitetreeId=18927&langId=1&geoId=0. Accessed March 10, 2005.

[6] World Wildlife Fund, Albertine Rift montane forests, http://www.nationalgeographic.com/wildworld/profiles/terrestrial/at/at0101.html. Accessed March 11, 2005.

[7] World Wildlife Fund, Victoria Basin forest-savanna mosaic, http://www.nationalgeographic.com/wildworld/profiles/terrestrial/at/at0721.html. Accessed March 11, 2005.

Uganda is widely known for its abundant and diverse wildlife, especially large mammals. While many of these animals were present in the projects areas in the past, the long history of human habitation and agriculture have pushed them to isolated pockets of protected areas, such as the Queen Elizabeth National Park and surrounding forest reserves. The project areas are lands under the control of subsistence farmers where wildlife has been long removed and replaced by domesticated animals and plants.

The IUCN Red List names 297 threatened species in Uganda, many of which roamed in the general area of the TIST project and quite possibly in the areas where the groves are situated. Some of the mammals reported in the Bushenyi District are the bushbuck, waterbuck, topi, elephants, chimpanzees, baboons, buffalos, lions (including tree climbing lions), hippopotami, black and white Colobus, red tail monkeys, and leopards.[8] There are over 500 species of birds that include black bee eaters, 11 different species of Kingfisher, flamingos, shoebills, fish eagles, and several types of falcon. The Rukungiri District reports mammals such as the mountain gorilla in the Bwindi Impenetrable Forest, vervette monkeys, bush-pigs, baboons, and leopards. They also report reptiles such as crocodiles in Lake Edward, and various turtles, snakes, lizards, geckos, and chameleons.[9]

Table 1.10 IUCN Red List of Threatened Species

Scientific Name	Common Name	Status
Mammals		
Dasymys montanus	Montane Shaggy Rat	EN
Delanymys brooksi	Delany's Mouse, Delany's Swamp Mouse	VU
Hippopotamus amphibius	Common Hippopotamus, Hippopotamus, Large Hippo	VU
Micropotamogale ruwenzorii	Rwenzori Otter Shrew, Ruwenzori Otter Shrew	NT
Ruwenzorisorex suncoides	Ruwenzori Shrew	VU
Amphibians		
Afrixalus orophilus	tree frog	VU
Hyperolius castaneus	Montane reed frog	VU
Hyperolius discodactylus	Albertine Rift reed frog	VU
Hyperolius frontalis	White-snouted reed frog	VU
Leptopelis karissimbensis	tree frog	EN
Leptopelis kivuensis	Kivu tree frog	NT
Petropedetes dutoiti	Du Toit's Torrent Frog	CR
Phrynobatrachus versicolor	Western Rift Puddle Frog	VU
Insects		
Agriocnemis palaeforma	damselfly	NT
Chlorocnemis pauli	Orange-tipped Threadtail	NT
Chlorocypha jacksoni	damselfly	VU
Chlorocypha molindica	damselfly	EN
Idomacromia jillianae	dragonfly	VU
Onychogomphus styx	dragonfly	NT
Pseudagrion bicoerulans	Afroalpine Sprite	VU
Tetrathemis denticauda	dragonfly	CR
Tetrathemis ruwensoriensis	dragonfly	CR

[8] National Environment Management Authority (NEMA), District Environment Profiles: Bushenyi http://www.nemaug.org/districtProfiles.htm. Accessed March 10, 2005.
[9] National Environment Management Authority (NEMA), District Environment Profiles: Rukungiri, 1998. http://www.nemaug.org/districtProfiles.htm. Accessed March 10, 2005.

Notes:

EW = Extinct in the Wild
CR = Critically Endangered
EN = Endangered
VU = Vulnerable
NT = Near Threatened

Project was not implemented for subsequent GhG removal

The Project Proponent declares this project was not implemented to create GHG emissions for the purpose of its subsequent reduction, removal or destruction. The "Carbon Credit Sale Agreement" among the Project Proponent and the Small Groups members is long term and does not allow for the harvesting of trees, except for thinning to enhance growth. Trees that die are to be replanted. The project does not create any other products and the long term funding of the project is totally dependent on the revenue stream provided by a long-term tree growth.

1.11 Compliance with Laws, Statutes and Other Regulatory Frameworks

As a tree planting program that takes place voluntarily on existing farm land, there are few laws that are relevant to TIST. A review of the potentially applicable laws and regulations was made by CAAC's US staff, the Uganda staff, and local Ugandan counsel. They include:

- The Constitution of the Republic of Uganda of 1995. It empowers Parliament to enact laws to protect, preserve and manage the environment. It does not contain any language that would have a specific impact on the project.
- The National Environmental Act of 1996. It establishes the National Environment Management Authority (NEMA). In accordance with the Act, TIST submitted an Environmental Screening to NEMA.[10] Because of the multiple benefits of the project for forests and people, NEMA waived the requirement for an environmental impact assessment for the TIST tree planting activities in Uganda.[11]
- The National Forestry and Tree Planting Act, 8/2003. The Act provides for the conservation, sustainable management and development of forests for the benefit of the people of Uganda. While it promotes tree planting, it specifically states that the national and/or local government have "no ownership over trees or forest produce situated on private land."
- The employment laws are listed below. CAAC uses Kenya counsel to advise on issues relating to employment. CAAC is not in violation of these laws.
    - The Employment Act, 2006
    - National Social Security Fund Act, Cap 222
- Companies Act, Cap. 110). CAAC is registered as a branch and is in good standing to operate in Uganda.

[10] See Exhibit 01: TIST UG PD-VCS-Ex 01 Environmental Screening 060803.pdf
[11] See Exhibit 02: TIST UG PD-VCS-Ex 02 NEMA EA Approval 070515.pdf

1.12 Ownership and Other Programs

1.12.1 Evidence of Right to Use

Each project area is a tree grove planted by a Small Group. It is named using a unique combination of the TIST number for that Small Group and the grove name.

- The landowner is a small hold farmer who is one of the TIST Small Group members. Uganda is going through a transition from customary tenure to land registry. The ownership of TIST project areas is both through customary tenure and registered land deeds.
- The Project Participants do not own any of the land. TIST is a project name, not a legal entity, and does not own, control or have any rights to any of the land.
- The landowner covenants together with other farmers to form a Small Group. The Small Groups own the trees that they plant and determine how tree products and carbon revenues are divided among themselves.
- Host Country land law is silent as to the ownership of carbon and carbon pools. However, the Small Groups own the trees that they plant together and grant the rights to all carbon associated with TIST to Clean Air Action Corporation (CAAC) under a "Carbon Credit Sale Agreement."
- Under Paragraph 4 of the "Carbon Credit Sale Agreement," the members affirm their ownership or rights to the land designated as project areas.[12]
- CAAC is registered as a branch in Uganda under the Companies Act and is a legal entity in Uganda.
- Under this PD, VERs shall be issued to CAAC.
- The current land use is agricultural.

The status of the contractual relationship between the land owner and TIST will be monitored. This will include changes in ownership of the land and changes in Small Group membership.

1.12.2 Emissions Trading Programs and Other Binding Limits

The Project Proponent declares that net GHG emission reductions or removals generated by the project will not be used for compliance with an emissions trading program, or to meet binding limits on GHG emissions.

1.12.3 Participation under Other GHG Programs

The Project Proponent declares the project has not been registered, nor is seeking registration under any other GHG programs.

[12] See Exhibit 03: TIST UG PD-VCS-Ex 03 GhG Contract UG 051014.doc and Exhibit 04: TIST UG PD-VCS-Ex 04 GhG Contract UG 080319.doc

1.12.4 Other Forms of Environmental Credit

The Project Proponent declares this project does not create another form of GHG-related environmental credit for GHG emission reductions or removals claimed under the VCS Program, or that any such credit has been, or will be, cancelled from the relevant program.

1.12.5 Projects Rejected by Other GHG Programs

The Project Proponent declares this project has not be rejected by any other GhG program, has not been submitted to any other GhG project for crediting and is not claiming credits associated with the trees planted and maintained by this project under any other program.

1.13 Additional Information Relevant to the Project

1.13.1 Eligibility Criteria

Eligibility of this project is assessed at two levels. The first is based on the CDM methodology used and the second as a VCS grouped project.

CDM Methodology Eligibility Requirements. Regarding the former, the eligibility for a small-scale A/R CDM reforestation project is assessed using CDM Executive Board Report 35, Annex 18, “Procedures to define the eligibility of lands for afforestation and reforestation project activities.”[13] To qualify as a CDM reforestation project, the project must meet the host country definition of a forest. Uganda defines the minimum area of a “forest” as 1.0 hectare with a minimum tree crown cover of 30%, with trees having the potential to reach a minimum height of five meters at maturity in situ. As a VCS project, however, this aspect of eligibility does not apply. VCS allows the use of smaller project areas and captures them as afforestation, reforestation and revegetation projects. This PD includes discrete project areas that are less than the minimum area to allow the inclusion of even the smallest small-hold farmer. It also deviates from the 30% crown cover requirement to allow continued subsistence farming in the project areas.

The additional demonstrations required by Annex 18 are based on the results of TIST’s baseline monitoring of each project area and are presented on the "Grove Summary" worksheet. The information is collected on-site, through direct observation and measurement and through direct discussion with the landowner and members of his/her Small Group. Additional evidence is based on information discussed below and demonstrates adherence to these requirements.

a) *Demonstrate that the land at the moment the project starts does not contain forest by providing transparent information that:*

   (i) *Vegetation on the land is below the forest thresholds (tree crown cover or equivalent stocking level, tree height at maturity in situ, minimum land area).*

The physical survey of each parcel taken during the baseline monitoring indicates the lands were barren, cropland and/or covered with grass, shrub or litter and therefore did not meet the requirements for crown cover or height. Existing trees were identified by species and counted. As shown in the Section 3.1, the average stem density is well below the forest threshold.

   (ii) All young natural stands and all plantations on the land are not expected to reach the minimum crown cover and minimum height chosen by the host country to define forest.

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[13] UNFCCC, "Procedures to Demonstrate the Eligibility of Lands for Afforestation and Reforestation CDM Project Activities”, CDM Executive Board Meeting 35, Annex 18, 2007. Accessed November 17, 2010 at http://cdm.unfccc.int/EB/035/eb35_repan18.pdf.

As shown in Section 3.1, there were relatively few existing trees when project activities began and most were found as isolated trees along the border of individual parcels. Given the history of continued deforestation, as indicated by the maps and satellite images and described in Section 2.4, and continued use of the land by the project members, it is not expected that this area will revert to natural forest without intervention.

(iii) The land is not temporarily unstocked, as a result of human intervention such as harvesting or natural causes.

The baseline monitoring indicates these areas have a history of cultivation ("Grove Summary" worksheet).

b) *Demonstrate that the activity is a reforestation or afforestation project activity:*

(i) *For reforestation project activities, demonstrate that the land was not forest by demonstrating that the conditions outlined under (a) above also applied to the land on 31 December 1989.*

The project areas did not contain a forest on 31 December 1989. This is demonstrated by the "Grove Summary" worksheet. As part of collecting the baseline information, the landowners are questioned about whether their project area was forested in 1990. 100% of them responded that it was not forested. In addition, baseline monitoring was conducted on each individual project area to confirm that there had not been deforestation of a parcel since that time. This generally included looking for stumps or evidence of recent harvest activity and looking at the surrounding lands to see of there were indications that the project areas were cleared of native ecosystems within the ten-year period prior to the proposed Project Start Date. Nothing was observed to indicate there had been deforestation activity.

Historical imagery from 1990[14] and 2000[15] was also looked at. Because the discrete project areas tend to be very small, the resolution is too coarse on both images to conduct a detailed analysis of each project area. However, both images confirm that the project areas are situated on lands that have a history of human occupancy and farming. The protected forests can be seen on both images, to contrast with the areas where the project areas are located. These observations support the statements by the landowners and field observations by TIST personnel that the project areas were not deforested since 31 December 1989, or that project areas were cleared of native ecosystems within the ten-year period prior to the proposed Project Start Date.

Grouped Project Eligibility Criteria. Each instance, present and future, will meet the CDM requirements. This includes eligibility (Section 1.13.1), applicability (Section 2.2), additionality thresholds (Section 2.5), the technologies and measures used (Section 1.8), baseline scenario and determination (Section 2.4), boundary determination (Section 2.3) and monitoring (Section 4.0), all as described, herein.

In addition to the above, there are two other eligibility criteria for inclusion of new instances of each project activity. The first is that it must be in the geographic area defined in Section 1.9 (i.e. be in Uganda).

The second is that the ex ante carbon estimates for each project area (i.e. instance) must be below the pertinent capacity limits. In this case, the CDM small scale AR methodology has a 16,000 tonne per year average limit on a project. This equates to 480,000 tonnes CO_2e for a 30-year project life. VCS places a one percent limit on each instance and requires instances that exceed this limit to be divided into clusters. To be eligible for this PD, each project area shall

[14] See Appendix 01: Landsat 4 and 5 composite circa 1990, 30 meters per pixel resolution.
[15] See Appendix 02: Landsat 7 composite circa 2000, 15 meters per pixel resolution.

either be at or below the one percent level (4,800 tonnes CO_2e), or will meet the requirements for inclusion as a cluster.

For the subset of TIST project areas that are in this PD, all of the instances are less than the one percent threshold. This is documented in the "Proj Life Ex ante CO2e" column of the "Grove Summary" worksheet. The calculations are based on the ex ante estimates for each strata in the "Strata" worksheet. The results were further modified to adjust for project areas that, because of the area (ha), exceeded the ex ante estimates, but, because of the stem density, does not. All of the documentation is presented in a transparent and verifiable manner in the worksheets.

1.13.2 Leakage Management

Leakage will be minimized as follows:

Fossil fuel emission: TIST owns no fossil fuel vehicles or equipment. Quantifiers and staff use public transport, walking and bicycles to go to various project areas. Use of Palm computers and the Internet allows Quantifiers to upload their data at local Internet cafés or by using mobile phone technology, reducing travel and use of public transportation back to TIST offices.

Displacement of people: TIST member's plant trees, on their own lands. The Greenhouse Gas Agreement among the Small Group members and the Project Participant does not give the Project Participant any right to the Small Group's land, or require that they leave. TIST does not displace any people.

Displacement of farming activities: TIST small hold farmers only plant trees to the extent that they can afford to, given their reliance on the remainder of their land for subsistence agriculture. The value of their crops far exceeds the GhG revenues that are available. In addition, where Small Groups have adopted conservation farming, the applicable crops have yielded over twice that of traditional farming.

Displacement of primary fuel supply: TIST tree growing activities do not cause leakage in the form of harvesting wood outside the project area. First, a large numbers of the residents in the subject districts already use wood as their primary source of fuel, an activity that has resulted in regional deforestation. Second, TIST best practices call for the planting and management of sustainable woodlots, that allows for the continuing growth of carbon stocks and the use of deadfall, or tree wood, available through managed thinning. TIST will not cause leakage from this activity; it helps mitigate it.

1.13.3 Commercially Sensitive Information

Commercially sensitive information that has been made available to the Validator but is being excluded from the public is:

- The International Small Group and Tree Planting Program, Carbon Credit Sale Agreement, Exhibit 03: TIST UG PD-VCS-Ex 03 GhG Contract UG 051014.doc.
- The International Small Group and Tree Planting Program, Carbon Credit Sale Agreement, Exhibit 04: TIST UG PD-VCS-Ex 04 GhG Contract UG 080319.doc.
- CAAC's proprietary financial model, Exhibit 09: TIST UG PD-VCS-Risk Ex09 Financial Plan.xls (referenced in Non-Permanence Risk Report).

1.13.4 Further Information

Not applicable.

2 APPLICATION OF METHODOLOGY

2.1 Title and Reference of Methodology

The approved baseline and monitoring methodology applied to the proposed VCS project activity is CDM AR-AMS0001 Version 06: Simplified baseline and monitoring methodologies for small-scale A/R CDM project activities implemented on grasslands or croplands with limited displacement of pre-project activities.[16] Also used were the following tools:

- Procedures for the demonstration of land eligibility, AR-AMS0001, Appendix A.
- Procedures for the assessment of additionality, AR-AMS0001, Appendix B.

2.2 Applicability of Methodology

The proposed project activity fulfills all of the applicability conditions stated by AR-AMS0001:

- The simplified baseline and monitoring methodologies are applicable if the conditions (a) - (d) mentioned below are met.

  a) *Project activities are implemented on grasslands or croplands*. As indicated on "Grove Summary" worksheet,[17] project activities are implemented on grasslands and croplands. See Table 3.1.A for a summary.
  b) *Project activities are implemented on lands where the area of the cropland, within the project boundary, displaced due to the project activity is less than 50 per cent of the total project area*. This condition was deemed met through a survey of the individual members that farm the land and through field observations. Landsat imagery was also reviewed, but the resolution was too coarse to provide any meaningful data (see imagery in Appendix 01 and Appendix 02). In the surveys, 100% of the farmers indicated there was no displacement of cropland. Field observation shows that some of the farmers have chosen to plant trees along property lines, to plant their trees widely spaced in their fields and practice agro forestry and/or plant trees on steep hillside less suitable for agriculture. There were no observations that indicate that this condition was not met. In addition, all of this is supported by the overriding fact that TIST members are subsistence farmers that rely on their land for household food production. Carbon has little value compared to food, so they only plant in areas that will not cause them to displace higher value activities such as farming. Also see Section 4.3.3, "C. Ex post estimation of leakage."
  c) *Project activities are implemented on lands where the number of displaced grazing animals is less than 50 percent of the average grazing capacity of the project area*. This condition was deemed met through a survey of the individual members that farm the land and through field observations. Landsat imagery was also reviewed, but the resolution was too coarse to provide any meaningful data (see imagery in Appendix 01 and Appendix 02). In the surveys, 74.1% of the farmers said they rarely or never grazed their land and 100% of the farmers indicated there was no displacement. Field observation showed no evidence that grazing is significant in the project areas, or in the entire area, in which the project areas are located. Some farmers do keep a few head of cattle, but they are typically confined to pens and fed fodder. There were no observations that indicate that this condition was not met. See "Misc Calc" worksheet for survey calculations.

[16] UNFCCC, "AR-AMS0001, Version 6: Simplified baseline and monitoring methodologies for small-scale A/R CDM project activities implemented on grasslands or croplands with limited displacement of pre-project activities," CDM Executive Board Meeting 56, 2010. ("AR-AMS0001"). Accessed 20 October 2011 at http://cdm.unfccc.int/methodologies/DB/91OLF4XK2MEDIRIWUQ22X3ZQAOPBWY.
[17] All worksheets referenced in PD are in Appendix 04, Excel spreadsheet.

d) *Project activities are implemented on lands where 10 percent of the total surface project area is disturbed as result of soil preparation for planting*. The minimum spacing recommended for the trees is two meters x two meters, or four square meters. The recommended size of the holes is 0.3 meters in diameter, or 0.07 square meters. The calculated area disturbed, as a result of soil preparation for planting, is less than 2%. See "Misc Calc" worksheet. Plowing does take place for intercropping, as part of the baseline activity and is not considered by the CDM AR Working Group to be part of the project activity.

- Carbon pools are above- and below-ground tree and woody perennials biomass. See Section 2.3.2, this document.
- Project emissions are considered insignificant and therefore neglected. See Section 3.2.5, this document, for ex ante estimates.
- The project areas are eligible for the A/R project activity, using procedures for the demonstration of land eligibility contained in Appendix A of AR-AMS0001. See Section 1.13.1, this document.
- The project activity is additional, using the procedures for the assessment of additionality contained in Appendix B of AR-AMS0001. See Section 2.5, this document.

2.3 Project Boundary

2.3.1 Project Boundaries

The project area is a complex area of thousands of discrete individual project areas spread out over thousands of square kilometers (see Section 1.1 for a summary). As such, the project boundaries are presented in Appendix 03, project area boundaries in a Google Earth KML file.

2.3.2 Project and Baseline GhG Sources

Source		Gas	Included?	Justification/Explanation
Baseline	Baseline tree growth	CO_2	n/a	Not required by methodology, see Section 3.1
		CH_4	n/a	Not required by methodology, see above
		N_2O	n/a	Not required by methodology, see above
		Other	n/a	
Baseline	Baseline non-woody growth	CO_2	n/a	Not required by methodology, see Section 3.1
		CH_4	n/a	Not required by methodology, see above
		N_2O	n/a	Not required by methodology, see above
		Other	n/a	
Project	Trees	CO_2	Yes	Above and below ground biomass, see Section 3.2
		CH_4	n/a	Not required by methodology, see above
		N_2O	n/a	Not required by methodology, see above
		Other	n/a	

2.4 Baseline Scenario

Most Likely Scenario. The methodology requires justification that “the most likely baseline scenario of the small-scale A/R CDM project activity is considered to be the land-use prior to the implementation of the project activity, either grasslands or croplands.”[18] The baseline field observation as detailed in the "Grove Summary" worksheet indicates the project areas are grassland and cropland prior to implementation of the project activity. That this is also the most likely use of the project areas, without the project activity, is supported by:

- The project areas are private lands owned by subsistence farmers conducting the project activity. They have a history of farming and use of the land, other than natural forest or long-term forestry.
- These lands are located in an area populated by subsistence farmers, who use wood for their primary fuel. As supported by the references below, wood use, agriculture and increasing population have been key factors in deforestation.
- These factors lead to the conclusion that there is little reason to believe that the project areas will revert to forest without intervention.
- There are no alternative uses of this land that can be reasonably expected.

Literature Regarding Changes in Baseline Carbon Stocks. There is a clear pattern of rural firewood use and forest degradation in Uganda that supports the case that carbon stocks on each individual project area would be expected to decline or, at best, are increasing at a rate of less than 10% compared to the expected removal by sinks. The lands of and surrounding the project areas have been degrading for decades, due to human intervention. Despite a series of forest policies that began in 1929,[19] forests in the TIST areas are in an extremely precarious position.

The Uganda Forest Policy[20] cites a decline in forest resources:

> (T)he trend in Uganda is one of loss of forest cover and degradation of the remaining forest resource base:
>
> - in tropical high forest, about 280,000 hectares are now degraded, representing at least a third of the country's valuable high forest;
> - in woodlands, the degradation and clearance is more marked, as most of the current loss of forest cover is in woodland areas;
> - in the government Forest Reserves, which cover over 1.1 million hectares, there is less than 740,000 hectares of forest cover, a loss of 35% of forest cover. Of the 20,000 hectares of timber plantations planted on this government land, as little as 6,000 hectares of well-stocked softwood plantations currently remain standing.

According to the FAO[21] Uganda has lost 86,000 ha of forest per year between 1990 to 2005, falling from 4,924,000 hectares to 3,627,000 hectares. That is 1,297,000 total ha, equal to over a 25% loss. It was estimated that 46.4 million m^3 (over bark) of wood products was removed in 2005, which was equal to 29.8% of the country’s growing stock. Of this, 42,0416,000 m^3 (over bark) was removed or fuel wood.

[18] AR-AMS0001, Section II.5.
[19] The Uganda Forest Policy, Ministry of Water, Lands and Environment, Republic of Uganda, 2001. Accessed January 7, 2010. http://www.sawlog.ug/downloads/The%20Uganda%20Forestry%20policy.pdf
[20] Ibid, p. 2
[21] Global Forest Resources Assessment, 2005 (FAO). http://www.fao.org/forestry/fra/fra2005/en/

The specific project areas are part of this environment. They are lands owned and used by the rural residents and are subject to constant pressure to provide fuel wood, food and livelihood for these subsistence-level farmers.

2.5 Additionality

Additionality of the proposed project activity is proven, using the “Assessment of Additionality” contained in Appendix B of AR-AMS0001, which demonstrates that the project activity would not have occurred in the absence of the proposed project activity.

From the Project Participant’s perspective, TIST has numerous investment barriers. TIST does not create or sell any products, other than GhG credits, associated with carbon sequestration. The trees and their products are owned by the Small Groups. Any revenue generated by the tree products belongs to the Small Groups. The TIST GhG “business” has been funded by Clean Air Action Corporation (CAAC), as an investor, based solely on future GhG revenues. There is no business or business case without carbon revenues. There is no payback or ROI, without carbon revenues. But for the expectation of a carbon market and the expectation of the sale of GhG credits from the project activity, CAAC would not have invested in TIST. Without carbon revenues, TIST is not viable or sustainable.

From the Small Groups or member’s perspectives, there are barriers that have prevented reforestation of these lands:

Investment barrier. Tree plantations require investment to obtain seedlings and, in the case of TIST farmers, to take land out of current revenue production activities, such as cropland, for long-term gain. Investment requires access to credit. However, due to their low income, the farmers participating in TIST have little opportunity for investment loans or capital. Banks tend to be reluctant to lend to those living at the subsistence level, because they have few assets for collateral and little disposable income available for debt service. According to The International Fund for Agricultural Development (IFAD), “more than one billion people – 90 percent of the world’s self-employed poor – lack access to basic financial services, depriving them of the means to improve their incomes, secure their existence, and cope with emergencies.”[22]

Referring to the Southwest Region23 of Uganda, IFAD reports income of “about USD 100 per [capita], which is less than half the national average” and states, “a lack of credit has constrained farmers' ability to acquire inputs or adopt improved practices.[24] Muwanga (2001) reinforces this and, referring to rural Uganda, concludes “lack of credit contribute[s] to community and household poverty.”[25]

TIST members are the people described above. They are subsistence farmers with little access to the credit required for a plantation. Table 2.5.A is from Bushenyi District Planner based on discussion about the Small Group income.

[22] Accessed 22 September 2010 at http://www.ifad.org/media/press/2004/38.htm.
[23] Defined as the areas in Uganda, which borders Tanzania, Rwanda and Zaire. This is the area where TIST farmers are located.
[24] Uganda: Southwest Region Agricultural Rehabilitation Project, Mid-term evaluation, International Fund for Agricultural Development (IFAD) http://www.ifad.org/evaluation/public_html/eksyst/doc/prj/region/pf/uganda/s010ugae.htm
[25] Nansozi K. Muwanga, “The Differences In Perceptions Of Poverty,” Structural Adjustment Participatory Review Initiative (Sapri), Uganda National NGO Forum, June 2001. http://www.saprin.org/uganda/research/uga_poverty.pdf

Table 2.5.A. Annual Income Brackets				
Income Level (Ush)		Income Level US$		Pct of Groups
Min	Max	Min	Max	
720,000	2,400,000	$257	$857	82%
2,400,000	4,800,000	$857	$1,714	11%
4,800,000	9,600,000	$1,714	$3,429	5%
9,600,000	12,000,000	$3,429	$4,286	2%
12,000,000	and up	$4,286	and up	0.3%

While the trees can have a long-term financial benefit without the carbon component, day-to-day household expenses prevent these farmers from spending their minuscule income on reforestation projects. For example, seedlings cost Ush 100 to Ush 1,000 per seedling. Since each farmer is expected to plant a minimum of 500 trees, the total up front cost is Ush 50,000 to Ush 500,000 per farmer, which is a significant portion of their annual income.

The following table provides an example of the initial costs, to the farmers, to start a plantation. Without TIST, the farmer must buy the seedlings and incur labor costs. Without TIST, an investment is required, but there is no credit available to fund it. TIST overcomes the investment barrier two ways. First, it provides training that reduces the capital required to develop a tree plantation. The training teaches TIST members how to obtain seeds and build nurseries at zero cost, thereby, reducing the need for credit. Second, under the terms of the Project Participant's contracts with the TIST Small Groups, the farmers receive an annual advance on their potential carbon revenues, which eliminates the need for credit.[26] These payments are paid at least annually based on the number of live trees counted each year. The payments are $0.02, per tree, per year, and are initially of greater value than the value of the carbon. Ultimately, the Small Groups will receive 70% of the net carbon revenues.

Table 2.5.B Start-up Cost Comparison: 1 ha Plantation[27]		
	Without TIST	With TIST
Live Trees	500	500
Income	$ -	$ 10
Cost of a 500 Tree Plantation		
Seedlings	$ 98	$ -
Labor	$ 46	$ -
Total Yearly Cost	$ 145	$ -
Income/(Loss)	$ (145)	$ 10

Barriers due to social conditions, lack of organization. Planting large plantations requires more than a single individual. The local communities lack the organizational structure to put together a volunteer effort to plant trees. This statement is supported by the fact that Uganda has had Forestry Policies since 1929 but is still seeing annual losses in forest cover (see Section 2.4). TIST and the Small Group approach provide the organizational structure necessary to overcome this barrier. TIST provides the training and the member's Small Group provides the necessary manpower and support.

[26] See Exhibits 03 and 04.
[27] See Appendix 04, "Plantation Costs" worksheet for assumptions and references.

Laws and regulations requiring tree planting. The trees are planted on private lands and there are no laws or regulations that require the TIST farmers to plant them.

Common Practice. There are cases in the area where farmers have planted fast rotation trees without the carbon incentive. These farmers have no incentive to maintain the trees; indeed, their incentive is to harvest them as soon as possible to get the revenue. In contrast, TIST is using the annual tree payment to encourage and promote long-term, managed tree stands. The TIST GhG Agreement requires the members to "plant a minimum of 1,000 trees and raise them to maturity", "replant trees that die, for any reason, each year for the next" 20 to 30 years;[28] and to "not cut down trees, except when implementing best practices for agroforestry developed by TIST." This is only possible because of the potential carbon revenues.

Conclusion. The extension activities implemented by TIST that allow the project participants to overcome these barriers, and the incentive payments TIST provides that support their decision to participate, are entirely dependent on the carbon market. These kinds of activities are not possible, without external financing of some kind. TIST's operational budget for the project is funded through an investment from CAAC, which is contingent on returns of future GhG revenues. Without carbon revenues, on which its funding solely depends, the TIST project is neither viable, nor sustainable.

2.6 Methodology Deviations

The project and project monitoring plan meet all of the requirements of the methodology and does not deviate from the baseline scenario, additionality determination, or inclusion of project GhG sources, sinks and reservoirs.

As noted in Section 1.13, TIST has many project areas that do not meet the host country definition of a forest. However, since VCS allows for afforestation, reforestation and revegetation, this is not an issue for this project or PD. Therefore, there are no applicable deviations to the methodology.

3 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

3.1 Baseline Emissions

The methodology allows the change in baseline carbon stocks to be deemed zero, in the absence of the project activity. Therefore, this section will 1) calculate the baseline carbon stocks and 2) demonstrate that the project meets the requirements that allow the change to be considered zero.

3.1.1 Equations to calculate estimated baseline carbon stocks

The methodology is applied in the context of the project activity, using the following formula:

$$B_{(t)} = \sum_{i=1}^{I} (B_{A(t)i} + B_{B(t)i})*A_I \qquad \textbf{Eq. 3.1.a}$$

Where:

$B_{(t)}$ = carbon stocks in the living biomass 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 of stratum i in the absence of the project activity (t C/ha)

[28] The contract in Exhibit 03 is for 20 years and the contract in Exhibit 04 is for 30 years.

$B_{B(t)\,i}$ = carbon stocks in below-ground biomass at time t of stratum i in the absence of the project activity (t C/ha)
A_i = project area of stratum i (ha)
i = stratum i (I = total number of strata)

The above-ground biomass ($B_{A(t)}$) is calculated per stratum i as follows:

$$B_{A(t)} = M_{(t)} * 0.5 \qquad \textbf{Eq. 3.1.b}$$

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 d.m./ha)
0.5 = carbon fraction of dry matter (t C/t d.m.)

The below-ground biomass ($B_{B(t)}$) is calculated per stratum i as follows:

$$B_{B(t)} = 0.5 * (M_{grass} * R_{grass} + M_{woody\,(t=0)} * R_{woody}) \qquad \textbf{Eq. 3.1.c}$$

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 C/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 d.m./ha)
$M_{woody\,(t=0)}$ = above-ground biomass of woody perennials at t=0 that would have occurred in the absence of the project activity (t d.m./ha)
R_{woody} = root to shoot ratio of woody perennials (t d.m./t d.m.)
R_{grass} = root to shoot ratio for grassland (t d.m./t d.m.)

The baseline net GhG removals by sinks is calculated using:

$$\Delta_{CBSL,t} = (B_{(t)} - B_{(t-1)})*(44/12) \qquad \textbf{Eq. 3.1.d}$$

Where:

$\Delta_{CBSL,t}$ = baseline net GHG removals by sinks (t CO_2-e)
$B_{(t)}$ = carbon stocks in the living biomass pools within the project boundary at time t in the absence of the project activity (t C)

As allowed by the methodology, the change in carbon stocks that would be expected in the absence of the project activity is zero, meaning $B_{(t)}$ and $B_{(t-1)}$ are equal. Therefore:

$$\Delta C_{BSL,t} = (B_{(t)} - B_{(t-1)})*(44/12)$$
$$\Delta C_{BSL,t} = (0)*(44/12)$$
$$\Delta C_{BSL,t} = 0$$

3.1.2 Baseline Strata

Table 3.1.A shows the strata selected for the baseline calculations. It includes the hectares and percent of area of each strata and the appropriate factors needed to determine whether the changes in baseline carbon stocks is expected to exceed 10% or not.

Table 3.1.A Baseline Strata					
			AG and BG Biomass t CO_2e/ha[29]		
Baseline Strata	**Hectare**	**Area**	**Non-woody**	**Trees**	**Total**
Cropland, annual crops	11.7	1.5%	18.3	2.8	21.2
Grassland as grassland	765.5	98.5%	16.0	2.8	18.8
Total	777.1	100.0%			

Assumptions:

- Hectares of cropland are based on field estimates made for each individual project area as listed in "Grove Summary" worksheet. Where active farming was identified (a "Y" in the "cultivated" column), the area for that project area was multiplied by the "% Barren" plus annual crop columns. The remainder of the project areas was determined to be grassland.
- Annual cropland non-woody stocks = 5 t C/ha above and below ground = 18.3 t CO_2e/ha.[30]
- Tropical dry grassland non-woody stocks = 8.7 t d.m./ha above and below ground = 16.0 t CO_2e/ha.[31]
- Woody biomass stocks represented by trees at a density of 1.2 stems per ha (919 trees over 777.1 ha). The numbers of baseline trees was determined by a physical count of each tree.[32]
- Average DBH of pre-existing trees = 44.0 cm from inventory of pre-existing trees.[33]
- Aboveground tree biomass calculated applying equation from for dry forest, where Kg dry mass = exp(-1.996+2.32*ln(DBH cm)).[34]
- Root:shoot ratio of 0.48.[35]
- Carbon fraction of dry biomass = 0.5

3.1.3 Change in Carbon Stocks without the Project Activity

The methodology requires documentation to justify whether, in the absence of the project activity, the change, in carbon stocks, in the living biomass, of woody perennials and the below ground biomass of grasslands, are expected to:

- increase by less than 10% of the ex ante actual GhG removals by sinks (methodology case 6.(a)),
- decrease (case 6.(b)), or
- increase by more than 10% of the ex ante actual GhG removals by sinks (case 6.(c)).

[29] AG = Above Ground, BG = Below Ground.
[30] International Panel on Climate Change, "2006 Guidelines for National Greenhouse Gas Inventories, Volume 4, Agriculture and other Land Use," Chapter 5, "Cropland", Section 5.3.1.2, Table 5.9, 2006. ("IPCC 2006 AOLU")
[31] IPCC 2006 AOLU, Chapter 6, "Grassland", Section 6.3.1.2, Table 6.4, 2006.
[32] Appendix 04, "Baseline Strata" worksheet.
[33] Ibid.
[34] Brown, S. 1997. "Estimating biomass and biomass change of tropical forests: a primer." FAO Forestry Paper 134, Rome, Italy. Section 3, "Methods for Estimating Biomass Density from Existing Data." Citing Brown et al. (1989). Accessed 22 September 2010 at http://www.fao.org/docrep/W4095E/W4095E00.htm. Also See of AR-AMS0001, Appendix C
[35] GPG-LULUCF, Annex 3A.1 Biomass Default Tables for Section 3.2 Forest Land, Table 3A.1.8, Woodland/savannah

As croplands and grassland under active human intervention, the carbon stock in the living biomass pool of woody perennials and below ground biomass of grassland is not expected to exceed 10% of the ex ante actual net GhG removals by sinks (case 6.(a)) and would quite possibly decrease in the absence of the project activity (case 6.(b)). In either case, the methodology allows the change in baseline carbon stocks to be deemed zero, in the absence of the project activity.

To determine if the change in baseline carbon stocks could exceed 10% of the net GhG removals from the project activity, Table 3.1.B was prepared. As shown, the combined area of cropland or the area of grassland, with generous assumptions concerning growth in the woody biomass carbon stocks, is not expected to exceed 10% of the ex ante actual net GhG removals.

Table 3.1.B Change in Baseline Carbon Stocks

Year	Woody Biomass Stocks (AG and BG)[36] t CO2e/ha (1)		Woody Biomass Stocks (AG and BG) t CO2e (2)		Cumulative Baseline Removals t CO2e	% of Net GHG Removals from Project Activity (3)
	cropland	grassland	cropland	grassland		
2003	2.8	2.8	33.1	2,174.9		
2004	2.9	2.9	34.0	2,232.7	58.6	0.0%
2005	3.0	3.0	34.9	2,291.2	118.1	0.0%
2006	3.1	3.1	35.8	2,350.7	178.4	0.0%
2007	3.1	3.1	36.7	2,411.0	239.7	0.0%
2008	3.2	3.2	37.7	2,472.2	301.8	0.0%
2009	3.3	3.3	38.6	2,534.3	364.8	0.0%
2010	3.4	3.4	39.6	2,597.2	428.7	0.1%
2011	3.5	3.5	40.5	2,661.0	493.5	0.1%
2012	3.6	3.6	41.5	2,725.7	559.2	0.1%
2013	3.6	3.6	42.5	2,791.3	625.7	0.1%
2014	3.7	3.7	43.5	2,857.8	693.2	0.1%
2015	3.8	3.8	44.6	2,925.1	761.6	0.1%
2016	3.9	3.9	45.6	2,993.4	830.9	0.1%
2017	4.0	4.0	46.6	3,062.6	901.1	0.1%
2018	4.1	4.1	47.7	3,132.6	972.3	0.1%
2019	4.2	4.2	48.8	3,203.6	1,044.3	0.1%
2020	4.3	4.3	49.9	3,275.4	1,117.3	0.2%
2021	4.4	4.4	51.0	3,348.2	1,191.2	0.2%
2022	4.5	4.5	52.1	3,421.9	1,266.0	0.2%
2023	4.6	4.6	53.3	3,496.5	1,341.7	0.2%
2024	4.7	4.7	54.4	3,572.0	1,418.4	0.2%
2025	4.8	4.8	55.6	3,648.5	1,496.0	0.2%
2026	4.9	4.9	56.7	3,725.8	1,574.5	0.2%
2027	5.0	5.0	57.9	3,804.1	1,654.0	0.2%
2028	5.1	5.1	59.1	3,883.3	1,734.4	0.2%
2029	5.2	5.2	60.4	3,963.5	1,815.8	0.2%

[36] Appendix 03, "Baseline Trees" worksheet.

Table 3.1.B Change in Baseline Carbon Stocks						
	Woody Biomass Stocks (AG and BG) t CO2e/ha (1)[36]		Woody Biomass Stocks (AG and BG) t CO2e (2)		Cumulative Baseline Removals t CO2e	% of Net GHG Removals from Project Activity (3)
Year	cropland	grassland	cropland	grassland		
2030	5.3	5.3	61.6	4,044.5	1,898.1	0.3%
2031	5.4	5.4	62.8	4,126.6	1,981.3	0.3%
2032	5.5	5.5	64.1	4,209.5	2,065.5	0.3%
Notes:						
(1) AG = Above Ground, BG = Below Ground						
(2) Biomass for all project areas						
(3) Project ex ante tonnes =			730,450			

Assumptions:

- Carbon stocks in non-woody vegetation are constant.
- Woody biomass stocks are based on the number of baseline trees, as determined by a physical count of each tree. See "Baseline Strata" worksheet.
- Average DBH of pre-existing trees was determined during the baseline evaluation. See "Baseline Strata" worksheet.
- The biomass of the baseline trees was grown at a diameter increment of 0.5 cm. See "Baseline Trees" worksheet.
- Aboveground tree biomass calculated applying equation for dry forest in India, where Kg dry mass = exp(-1.996+2.32*ln(DBH cm))[37]
- Root:shoot ratio of 0.48.[38]
- Carbon fraction of dry biomass = 0.5
- Project ex ante tonnes are from Table 3.2.C.

Application of methodology to support Cases 6.(a) and 6.(b). While there may be ample evidence to support a case of decreasing baseline carbon stocks absent the project activity (see Section 2.4), a conservative case was demonstrated above. As shown in Table 3.1.B, if the baseline carbon stocks are assumed to increase absent the project activity, the increase is less than 10% of the ex ante project tons and meets the conditions of Case 6.(a). As such, the change in baseline carbon stocks shall be assumed to be zero.

3.2 Project Emissions

3.2.1 Equations for ex ante project removals

The ex ante net greenhouse gas removals by sinks is calculated using the following equation:

$$N_{(t)} = \sum_{i=1}^{I} (N_{A(t)i} + N_{B(t)i}) * A_i \qquad \textbf{Eq. 3.2.a}$$

Where:

[37] Brown, S. 1997.
[38] GPG-LULUCF, Annex 3A.1 Biomass Default Tables for Section 3.2 Forest Land, Table 3A.1.8, Woodland/savannah.

$N_{(t)}$ = total carbon stocks in biomass at time t under the project scenario (t C)
$N_{A(t)\,i}$ = carbon stocks in above-ground biomass at time t of stratum i under the project scenario (t C/ha)
$N_{B(t)\,i}$ = carbon stocks in below-ground biomass at time t of stratum i under the project scenario (t C/ha)
A_i = project activity area of stratum i (ha)
i = stratum i (I = total number of strata)

For above-ground carbon stocks, $N_{A(t)\,i}$ is calculated per stratum i as follows:

$$N_{A(t)\,i} = T_{(t)i} * 0.5 \qquad \textbf{Eq. 3.2.b}$$

Where:

$N_{A(t)\,i}$ = carbon stocks in above-ground biomass at time t under the project scenario (t C/ha)
$T_{(t)i}$ = above-ground biomass at time t under the project scenario (t d.m./ha)
0.5 = carbon fraction of dry matter (t C/t d.m.)

Where volume tables are used to calculate the aboveground biomass, the following equation is used:

$$T_{(t)i} = SV_{(t)i} * BEF * WD \qquad \textbf{Eq. 3.2.c}$$

Where:

$T_{(t)i}$ = above-ground biomass at time t under the project scenario (t d.m./ha)
$SV_{(t)i}$ = stem volume at time t for the project scenario (m3 /ha)
BEF = biomass expansion factor (over bark) from stem to total above-ground biomass (dimensionless)
WD = basic wood density (t d.m./m3)

For below-ground biomass, $N_{B(t)}$ is calculated per stratum i as follows:

$$N_{B(t)\,i} = T_{(t)} * R * 0.5 \qquad \textbf{Eq. 3.2.d}$$

Where:

$N_{B(t)\,i}$ = carbon stocks in below-ground biomass at time t under the project scenario (t C/ha)
$T_{(t)}$ = above-ground biomass at time t under the project scenario (t d.m./ha)
R = root to shoot ratio (t d.m./t d.m.)
0.5 = carbon fraction of dry matter (t C/t d.m.)

3.2.2 Strata for ex ante project removals

For the purpose of calculating ex ante actual net GhG removals, the area of project activity has been stratified by major species and age class.[39] The primary species are stratified separately, and the minor species are aggregated into one species class.

[39] Appendix 04, "Strata" worksheet and "Misc Calc" worksheet.

Table 3.2.A Ex Ante Strata			
Scientific Name	**Age Class**	**Hectare**	**Area %**
Eucalyptus grandis	2003	10.1	1.3%
Eucalyptus grandis	2004	26.7	3.4%
Eucalyptus grandis	2005	26.9	3.5%
Eucalyptus grandis	2006	20.3	2.6%
Eucalyptus grandis	2007	45.6	5.9%
Eucalyptus grandis	2008	21.9	2.8%
Eucalyptus grandis	2009	19.5	2.5%
Eucalyptus grandis	2010	7.7	1.0%
Eucalyptus grandis	2011	0.0	0.0%
Eucalyptus grandis	2012	0.0	0.0%
Pinus patula	2003	12.8	1.6%
Pinus patula	2004	10.8	1.4%
Pinus patula	2005	40.2	5.2%
Pinus patula	2006	92.6	11.9%
Pinus patula	2007	92.8	11.9%
Pinus patula	2008	139.9	18.0%
Pinus patula	2009	123.9	15.9%
Pinus patula	2010	38.3	4.9%
Pinus patula	2011	0.0	0.0%
Pinus patula	2012	0.0	0.0%
Cupressus spp	2003	1.3	0.2%
Cupressus spp	2004	0.9	0.1%
Cupressus spp	2005	4.4	0.6%
Cupressus spp	2006	2.1	0.3%
Cupressus spp	2007	0.2	0.0%
Cupressus spp	2008	0.2	0.0%
Cupressus spp	2009	1.3	0.2%
Cupressus spp	2010	0.2	0.0%
Cupressus spp	2011	0.0	0.0%
Cupressus spp	2012	0.0	0.0%
Other Africa, Dry Tropical	2003	2.8	0.4%
Other Africa, Dry Tropical	2004	5.0	0.6%
Other Africa, Dry Tropical	2005	7.1	0.9%
Other Africa, Dry Tropical	2006	6.1	0.8%
Other Africa, Dry Tropical	2007	5.0	0.6%
Other Africa, Dry Tropical	2008	2.9	0.4%
Other Africa, Dry Tropical	2009	5.6	0.7%
Other Africa, Dry Tropical	2010	2.1	0.3%
Other Africa, Dry Tropical	2011	0.0	0.0%
Other Africa, Dry Tropical	2012	0.0	0.0%

Table 3.2.A Ex Ante Strata			
Scientific Name	**Age Class**	**Hectare**	**Area %**
Total ha		**777.1**	**100.0%**

3.2.3 Factors for ex ante project removals

The factors used for estimating the actual net GhG removals, for the four tree classes, are shown below.

Pinus patula

I_v = 24 m^3/ha/yr.[40]
Where:
I_v = annual increment in volume based on over the bark log volumes.
BEF = 1.3.[41]
WD = 0.45 t.d.m/m^3.[42]
R = 0.46 when AGB <50 t/ha, 0.32 when AGB range is 50 to 150 t/ha, 0.23 when AGB >150 t/ha.[43]

Eucalyptus spp.

Iv = 32.5 m3/ha/yr.[44]
Where:
I_v = annual increment in volume based on over the bark log volumes.
BEF = 1.5.[45]
WD = 0.51 t.d.m/m^3.[46]
R = 0.45 when AGB <50 t/ha, 0.35 when AGB range is 50 to 150 t/ha, 0.20 when AGB >150 t/ha.[47]

Cupressus spp.

I_v = 24 m^3/ha/yr.[48]
Where:
I_v = annual increment in volume based on over the bark log volumes.

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40 GPG-LULUCF, Table 3A.1.7. Average Annual Above Ground Net Increment in Volume in Plantations By Species, referencing L Ugalde & O Pérez, "Mean annual volume increment of selected industrial forest plantation species," Forest Plantation Thematic Papers, Working Paper 1. Forest Resources Development Service, Forest Resources Division. FAO, Rome (unpublished), Accessed 22 September 2010 at http://www.fao.org/DOCREP/004/AC121E/ac121e03.htm.
41 GPG-LULUCF, Table 3A.1.10, Default Values Of Biomass Expansion Factors (BEF), Tropical, pines.
42 GPG-LULUCF, Table 3A.1.9-2, Basic Wood Densities (D) of Stemwood (Tonnes Dry Matter/M3 Fresh Volume) for Tropical Tree Species, Tropical America, Pinus patula.
43 GPG-LULUCF, Table 3A.1.8, Tropical/Sub-tropical dry forest.
44 GPG-LULUCF, Table 3A.1.7.
45 GPG-LULUCF, Table 3A.1.10, Default Values Of Biomass Expansion Factors (BEF), Tropical, broadleaf.
46 GPG-LULUCF, Table 3A.1.9-2, Basic Wood Densities (D) of Stemwood (Tonnes Dry Matter/M3 Fresh Volume) for Tropical Tree Species, Tropical America, Eucalyptus robusta.
47 GPG-LULUCF, Table 3A.1.8, Temperate broadleaf forest/plantation, Eucalyptus Plantation. AGB means aboveground biomass.
48 GPG-LULUCF, Table 3A.1.7, Average Annual Above Ground Net Increment in Volume in Plantations By Species.

BEF = 1.2.[49]
WD = 0.43 t.d.m/m^3.[50]
R = 0.46 when AGB <50 t/ha, 0.32 when AGB range is 50 to 150 t/ha, 0.23 when AGB >150 t/ha.[51]

Other Africa, Dry Tropical

N_A = 15 t.d.m/ha/yr.[52]
Where:
N_A = annual increment of above ground biomass, t.d.m/ha/yr
BEF = 1.5.[53]
WD = 0.61 t.d.m/m^3.[54]
R = 0.27.[55]

Table 3.2.B Other Tree Density Estimate

Species	Count	Density (D)	Count*D	Reference Code[56]
Acacia mearnsii	2	0.78	1.6	4
Annona spp.	410	0.64	262.4	4
Artocarpus heterophyllus	590	0.53	312.7	3
Azadirachta indica	9	0.69	6.2	5
Callistemon spp.	210	0.64	134.4	4
Casuarina equisetifolia	321	0.83	266.4	1

[49] GPG-LULUCF, Table 3A.1.10, Default Values Of Biomass Expansion Factors (BEF), Tropical, Pines.
[50] GPG-LULUCF, Table 3A.1.9-2, Basic Wood Densities (D) of Stemwood (Tonnes Dry Matter/M3 Fresh Volume) for Tropical Tree Species, Tropical America, Cupressus lusitanica.
[51] GPG-LULUCF, Table 3A.1.8, Conifer forest/plantation. AGB means aboveground biomass.
[52] GPG-LULUCF, Table 3A.1.6, Annual Average Above Ground Biomass Increment in Plantations By Broad Category, Africa, Other Species, Dry.
[53] GPG-LULUCF, Table 3A.1.10, Default Values Of Biomass Expansion Factors (BEF), Tropical, Broadleaf.
[54] A sample set of tree counts by species planted by TIST farmers in Uganda was obtained from the TIST database. The wood densities were obtained and a weighted average was calculated. See Table 3.2.B.
[55] GPG-LULUCF, Table 3A.1.8, Tropical/Sub-tropical dry forest.
[56] Table 3.2.B References:

1. IPCC-GPG, 2003. Table 3A.1.9-2, Basic Wood Densities (D) of Stemwood (Tonnes Dry Matter/M3 Fresh Volume) for Tropical Tree Species.
2. IPCC-GPG, 2003. Table 3A.1.9-1, Basic Wood Densities (D) of Stemwood (Tonnes Dry Matter/M3 Fresh Volume) for Boreal and Temperate Species.
3. Zanne, A.E., Lopez-Gonzalez, G.*, Coomes, D.A., Ilic, J., Jansen, S., Lewis, S.L., Miller, R.B., Swenson, N.G., Wiemann, M.C., and Chave, J. 2009. Global wood density database. Dryad. Accessed October 24, 2011 http://datadryad.org/bitstream/handle/10255/dryad.235/GlobalWoodDensityDatabase.xls
4. Ministry of Water, Lands and Environment, Forest Department, National Biomass Study, 2002, Local data for wood density, Reference No. 16a. Accessed October 24, 2011 http://cdm.unfccc.int/UserManagement/FileStorage/B7Y5L3VPMSJN0ODWU2HARC41Z9XG8I
5. Browne, Sandra. Estimating biomass and biomass change in tropical forests, FAO Forestry Paper 134, Appendix 1 - List of wood densities for tree species from tropical America, Africa, and Asia, 1997. Accessed October 24, 2011 at http://www.fao.org/docrep/W4095E/W4095E00.htm
6. World Agroforestry Centre, Wood Density Data Base. Accessed October 24, 2011 at http://www.worldagroforestrycentre.org/Sea/Products/AFDbases/wd/index.htm

Table 3.2.B Other Tree Density Estimate				
Species	Count	Density (D)	Count*D	Reference Code[56]
Citrus aurantifolia	1	0.72	0.7	6
Citrus sinensis	795	0.74	588.3	4
Cordia Africana	25	0.48	12.0	4
Croton megalocarpus	39	0.57	22.2	1
Eriobotrya japonica	122	0.88	107.4	3
Grevillea robusta	7,297	0.62	4,524.1	6
Jacaranda mimosifolia	183	0.55	100.7	1
Macadamia spp.	6	0.72	4.3	6
Maesopsis eminii	105	0.41	43.1	5
Mangifera indica	560	0.55	308.0	1
Melia azedarach	1	0.82	0.8	6
Persea americana	1,832	0.47	861.0	1
Podocarpus falcatus	805	0.43	346.2	5
Prunus africana	857	0.72	617.0	4
Psidium guajava	152	0.75	114.0	6
Solanum aculeastrum	7	0.44	3.1	6
Symphonia globulifera	1,039	0.58	602.6	5
Vangueria spp.	1,281	0.69	882.4	3
Vernonia amygdalina	1	0.43	0.4	6
Zanthoxylum gilletii	12	0.78	9.4	6
Grand Total	16,662	**0.61**	10,131.4	

3.2.4 Ex ante project removals

Table 3.2.C provides the cumulative and annual ex ante actual net GhG removals by sink as carbon and as CO_2 equivalent. The table is based on the calculations shown in "Ex Ante Carbon Est" worksheet and "Ex Ante Strata Est" worksheet derived using the equations, strata and factors, above.

Table 3.2.C Ex Ante Project Removals			
Year	Ex Ante Carbon	Ex Ante CO_2	Ex Ante CO_2
Planted	t (cum)	t (cum)	Yearly t
2003	340	1,245	1,245
2004	1,328	4,869	3,624
2005	3,308	12,128	7,258
2006	6,637	24,336	12,208
2007	11,680	42,825	18,489
2008	18,376	67,380	24,554
2009	26,637	97,668	30,289
2010	35,362	129,662	31,994
2011	43,909	160,999	31,337

Table 3.2.C Ex Ante Project Removals			
Year	Ex Ante Carbon	Ex Ante CO_2	Ex Ante CO_2
Planted	t (cum)	t (cum)	Yearly t
2012	52,326	191,861	30,862
2013	60,284	221,042	29,181
2014	68,221	250,143	29,101
2015	75,537	276,970	26,827
2016	82,422	302,215	25,244
2017	89,753	329,094	26,880
2018	97,443	357,291	28,197
2019	104,483	383,106	25,815
2020	112,015	410,720	27,614
2021	119,562	438,394	27,674
2022	127,359	466,982	28,588
2023	135,329	496,205	29,223
2024	143,298	525,428	29,223
2025	151,268	554,650	29,223
2026	159,059	583,218	28,567
2027	166,852	611,791	28,574
2028	174,233	638,856	27,064
2029	180,807	662,957	24,102
2030	187,353	686,963	24,005
2031	193,213	708,446	21,483
2032	199,214	730,450	22,004

3.2.5 Project emissions

In accordance with the conditions of the approved baseline and monitoring methodology AR-AMS0001, "project emissions are considered insignificant and therefore neglected."[57] While no test or analysis of project emissions are required, the following comments are provided:

- **Fertilizers.** The policy of TIST is for the farmers to refrain from using chemical fertilizers and instead to rely on dung and plant material. Neither of these are the result of project activity and need not be considered. However, if considered, the nitrogen emissions from natural fertilizers are estimated to be less than 0.1% of the actual net greenhouse gas removal by sink and may be considered de minimis. See "Misc Calc" worksheet.

- **Nitrogen-fixing species.** Emissions from nitrogen fixing species are also insignificant. Though present, the nitrogen-fixing trees are a minor component of the overall tree inventory. Because any deadwood will be used for domestic fuel, the trees will not be left to rot or decay. The lands where the trees are being planted are degraded and likely have a nitrogen deficit.

- **Fossils Fuels.** There will be no burning of fossil fuels or biomass for site preparation, monitoring, tree harvesting, or wood transportation; nor does TIST involve any industrial processes, as all labor is manual. Thus, no other GHGs are expected to be emitted as a result of the implementation of the proposed project.

[57] AR-AMS0001, Section I.3, Section II.26 and Section VI.47.

3.3 Leakage (ex ante)

Methodology defines leakage. The methodology provides that if project participants demonstrate that the project does not result in displacement of activities, or people, or does not trigger activities outside the project boundary that would increase GhG emissions, an ex ante leakage estimate is not required.[58] It also states that, if evidence can be provided that, if displacement of pre-project activities does not cause deforestation, leakage can be considered zero.[59] Furthermore, the CDM Executive Board has determined that, if moving to ones own existing farm plot “does not trigger activities outside the project boundary that would be attributed to the small-scale afforestation or reforestation project activity under the CDM, such that the increase in greenhouse gas emissions by a source occurs, a leakage estimation is not required."[60]

As discussed in Section 1.13.2, Leakage Management, the project does not have fossil fuel emissions and does not displace people. As discussed in Section 3.2.5, Project Boundary, project emissions that could cause leakage are de minimis and "therefore neglected."[61]

Leakage relating to displacement of farming activities. As discussed in Section 1.13.2, Leakage Management, TIST farmers are small hold farmers that rely on their land for subsistence agriculture. Since they need most of their land to grow foods and because the value of their crops and livestock far exceeds the GhG revenues that are available, displacement of farming activities is limited. As part of the data collection for the baseline activity, Small Groups are asked, "Will any activities be displaced?" This question is asked in the context of the CDM Executive Board's interpretation that, if moving to ones own existing farm plots “does not trigger activities outside the project boundary that would be attributed to the small-scale afforestation or reforestation project activity under the CDM, such that the increase in greenhouse gas emissions by a source occurs, a leakage estimation is not required."[62] A survey of TIST members controlling the project areas indicated that activities were displaced on 0.0 hectares.

Based on the above, an ex ante leakage calculation is not necessary.

3.4 Summary of GHG Emission Reductions and Removals

The procedure for quantifying net GhG removals is to:

1. determine the GhG removals per Section 3.2;
2. subtract the net baseline removals which per Section 3.1 are zero;
3. subtract the project emission which per Section 3.2.5 are zero; and
4. subtract the project leakage, which per Section 3.3 are zero.

The required formula is:

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

Where:

$ER_{AR\ CDM,\ t}$ = net anthropogenic GHG removals by sinks (t CO_2e/year)

58 AR-AMS0001, Section IV. Leakage (ex ante)
59 Ibid.
60 UNFCCC, "Simplified Baseline And Monitoring Methodologies For Selected A/R Small-Scale CDM Project Activity Categories," CDM AR Working Group Meeting 5, Page 5. Accessed 22 September 2010 at http://cdm.unfccc.int/Panels/ar/ARWG05_repan1_simplified%20AR_SSC_meths.pdf.
61 AR-AMS0001, Section I.3, Section II.26 and Section VI.47.
62 Ibid.

$\Delta C_{PROJ,t}$ = project GhG removals by sinks at time t (t CO_2e/year)
$\Delta C_{BSL,t}$ = baseline net GhG removals by sinks (t CO_2e/year)
$GHG_{proj,t}$ = project emissions (t CO_2e/year)
L_t = leakage from project (t CO_2e/year)

The following was used to make the CDM formula fit the table format required by VCS.

$ER_{AR\ CDM,\ t}$ = "Estimated net GHG emission reductions or removals (tCO2e)"
$\Delta C_{PROJ,t}$ = "Estimated project emissions or removals (tCO2e)"
$\Delta C_{BSL,t}$ = "Estimated baseline emissions or removals (tCO2e)"
$GHG_{proj,t}$ = not included in table
L_t = "Estimated leakage emissions (tCO2e)"

Table 3.4. Estimated Net GhG Removals

Years	Estimated baseline emissions or removals (tCO2e)	Estimated project emissions or removals (tCO2e)	Estimated leakage emissions (tCO2e)	Estimated net GHG emission reductions or removals (tCO2e)
Year 2003	0	1,245	0	1,245
Year 2004	0	3,624	0	3,624
Year 2005	0	7,258	0	7,258
Year 2006	0	12,208	0	12,208
Year 2007	0	18,489	0	18,489
Year 2008	0	24,554	0	24,554
Year 2009	0	30,289	0	30,289
Year 2010	0	31,994	0	31,994
Year 2011	0	31,337	0	31,337
Year 2012	0	30,862	0	30,862
Year 2013	0	29,181	0	29,181
Year 2014	0	29,101	0	29,101
Year 2015	0	26,827	0	26,827
Year 2016	0	25,244	0	25,244
Year 2017	0	26,880	0	26,880
Year 2018	0	28,197	0	28,197
Year 2019	0	25,815	0	25,815
Year 2020	0	27,614	0	27,614
Year 2021	0	27,674	0	27,674
Year 2022	0	28,588	0	28,588
Year 2023	0	29,223	0	29,223
Year 2024	0	29,223	0	29,223
Year 2025	0	29,223	0	29,223

Table 3.4. Estimated Net GhG Removals				
Years	Estimated baseline emissions or removals (tCO2e)	Estimated project emissions or removals (tCO2e)	Estimated leakage emissions (tCO2e)	Estimated net GHG emission reductions or removals (tCO2e)
Year 2026	0	28,567	0	28,567
Year 2027	0	28,574	0	28,574
Year 2028	0	27,064	0	27,064
Year 2029	0	24,102	0	24,102
Year 2030	0	24,005	0	24,005
Year 2031	0	21,483	0	21,483
Year 2032	0	22,004	0	22,004
Total t CO2e	0	730,450	0	730,450

4 MONITORING

4.1 Data and Parameters Available at Validation

Data Unit / Parameter:	**Location of project area**
Data unit:	Latitude and longitude
Description:	Single point location of a discrete project area.
Source of data:	GPS
Value applied:	See "Grove Summary" worksheet, Appendix 4, for each result.
Justification of choice of data or description of measurement methods and procedures applied:	Direct measurement of latitude and longitude of a point within a project area using a GPS. Used to provide a simple location of a discrete project area.
Any comment:	None

Data Unit / Parameter:	**Boundary of project area**
Data unit:	Latitude and longitude
Description:	Multiple points of latitude and longitude that describe the boundary of a discrete project area.
Source of data:	GPS
Value applied:	See KML file, Appendix 3, for all results.
Justification of choice of data or	Direct measurement of points of latitude and

description of measurement methods and procedures applied:	longitude along the boundary of each discrete project area. The points are collected with a GPS while walking the perimeter of the project area.
Any comment:	None

Data Unit / Parameter:	**Area of project area**
Data unit:	Hectares
Description:	Size of the area where the project activity has been implemented
Source of data:	GPS
Value applied:	See "Grove Summary" worksheet, Appendix 4, for each result.
Justification of choice of data or description of measurement methods and procedures applied:	A calculated quantity based on the latitude and longitude values collected with the GPS to determine each project area boundary.
Any comment:	None

Data Unit / Parameter:	**Ownership of project area**
Data unit:	Name
Description:	Ownership of land of project area
Source of data:	“Carbon Credit Sale Agreement”
Value applied:	Not applicable
Justification of choice of data or description of measurement methods and procedures applied:	Each Small Group member is a signatory to a “Carbon Credit Sale Agreement.”
Any comment:	None

Data Unit / Parameter:	**Baseline trees**
Data unit:	Count of baseline trees
Description:	The number of trees existing in a project area, before the planting of project trees, is counted.
Source of data:	Trees are physically counted in the field.
Value applied:	See "Baseline Strata" worksheet, Appendix 4, for each result.
Justification of choice of data or description of measurement methods and procedures applied:	Each baseline tree is counted by strata. The count is used to calculate average stem density to determine if the change in baseline carbon stocks is expected to exceed 10% of the project removals. See Section 3.1.

Any comment:	None

Data Unit / Parameter:	**Baseline tree circumference**
Data unit:	Centimeters
Description:	The circumference of trees existing in a project area, before the planting of project trees, is counted.
Source of data:	Trees are physically measured in the field.
Value applied:	See "Baseline Strata" worksheet, Appendix 4, for each result.
Justification of choice of data or description of measurement methods and procedures applied:	The circumference of each tree in each strata are measured and averaged and placed in a 50 cm bin. The average diameter of all baseline trees is calculated. The average is used as part of the procedure to determine if the change in baseline carbon stocks is expected to exceed 10% of the project removals. See Section 3.1.
Any comment:	None

Data Unit / Parameter:	**Baseline strata**
Data unit:	Hectares
Description:	The area of cropland or grassland at baseline.
Source of data:	Estimate based on visual field observations.
Value applied:	See "Grove Summary" worksheet, Appendix 4, for each result.
Justification of choice of data or description of measurement methods and procedures applied:	The percent of cropland and grassland are estimated for each individual project area. The percent is multiplied by the area of the project area. The product is used as part of the procedure to determine if the change in baseline carbon stocks is expected to exceed 10% of the project removals. See Section 3.1.
Any comment:	None

Data Unit / Parameter:	**Project trees**
Data unit:	Count of tree
Description:	The number of trees per age and species strata in each project area.
Source of data:	Trees are physically counted in the field.
Value applied:	See "Grove Summary" and "Strata" worksheets,

	Appendix 4, for each result.
Justification of choice of data or description of measurement methods and procedures applied:	The tree count by strata is used to extrapolate the ex ante GhG removals. See Section 3.2.
Any comment:	None

4.2 Data and Parameters Monitored

Data Unit / Parameter:	**Number of trees**
Data unit:	Trees
Description:	Number of trees in a project area by strata
Source of data:	Physical counts
Description of measurement methods and procedures to be applied:	Physical count of the trees in each stratum by Quantifiers with each visit
Frequency of monitoring/recording:	Ongoing measurement taken by Quantifiers as they visit project areas. Each project area could be visited as much as once per year.
Value monitored:	Tree count by strata
Monitoring equipment:	Customized handheld computer
QA/QC procedures to be applied:	Part of overall QA/QC procedures discussed in Section 4.3.
Calculation method:	Not applicable
Any comment:	None

Data Unit / Parameter:	**DBH**
Data unit:	cm
Description:	Diameter of tree at breast height (1.30 m)
Source of data:	Physical measurements
Description of measurement methods and procedures to be applied:	TIST measures DBH of up to 20 representative trees of each age/species stratum in different project area.
Frequency of monitoring/recording:	Ongoing measurement taken by Quantifiers as they visit project areas.
Value monitored:	Representative circumference of trees in a strata.
Monitoring equipment:	Measuring tape and customized handheld computer.
QA/QC procedures to be applied:	Part of overall QA/QC procedures discussed in Section 4.3.
Calculation method:	Not applicable

Any comment:	None

Data Unit / Parameter:	**Total CO_2**
Data unit:	Tonnes
Description:	Total CO_2e sequestered by the trees
Source of data:	Calculation
Description of measurement methods and procedures to be applied:	Allometric equations are assigned to each stratum. DBH values are applied to the allometric. Average biomass of a tree in each stratum is calculated and multiplied by number of trees in each stratum. Biomass is converted to CO_2e and the CO_2e of the stratum are totaled.
Frequency of monitoring/recording:	Calculation takes place with each monitoring report
Value monitored:	Above and below ground biomass
Monitoring equipment:	Computer and database
QA/QC procedures to be applied:	Part of overall QA/QC procedures discussed in Section 4.3.
Calculation method:	Not applicable
Any comment:	None

4.3 Description of the Monitoring Plan

4.3.1 Monitoring roles and responsibilities

The Small Groups manage themselves based on a covenant among the members of each Small Group. They manage and oversee their own trees. They contract with Clean Air Action Corporation (CAAC) to sell their carbon, receive payments, and receive training. The GhG component of TIST is managed by CAAC, who developed the database, web site and procedures for monitoring the GhG. CAAC is responsible for this project description and for selling any GhGs that become available.

The operational processes for monitoring the actual GhG removal by the sinks are for TIST Quantifiers to visit each grove once per year and, at minimum, once every five years to count trees and collect circumference, GPS and other data. Quantifiers transmit the monitoring data via the Internet to the TIST website, where it is managed by CAAC. CAAC oversees the data and conducts QA/QC reviews. Feedback is provided to the TIST Quantifiers and office staff. CAAC is responsible for tabulating carbon stocks.

The Uganda staff has oversight of the Quantifiers. They also conduct internal audits of Quantifier performance.

The TIST Data System stores all of the current and archived data. CAAC managers use customized reports to analyze the data and look for trends, missing data or obvious errors. TIST managers visit selected project areas and observe quantifications and audits.

Allometric equations will come from literature research. Leakage monitoring will come from surveys of the TIST members in charge of an individual project area.

4.3.2 TIST Data System

Each project area is owned and managed by a different group of people that TIST calls a Small Group. The areas are discrete parcels of land spread out over many districts and villages. The Small Groups select the species of trees, the number of trees to plant and the planting schedule. They also maintain the trees. While TIST works with the groups to develop best practices that can be shared and adopted by everyone in the organization, the fact remains that each project area is different. The difference is such that the monitoring system required is different than typical forest monitoring protocols.

TIST has met the challenge of obtaining accurate information from a multitude of small discrete project areas, in remote areas, where roads are poor and infrastructure is minimal, by combining high-tech equipment and low-tech transportation within its administrative structure. The TIST Data System is an integrated monitoring and evaluation system currently deployed in Uganda and three other countries. On the front end, is a handheld computer-based platform supported by GPS technology that is utilized by field personnel (Quantifiers, auditors, trainers and host country staff) to collect most project information. This includes data relating to registration, accounting, tree planting, baseline data, conservation farming, stoves, GPS plots and photographs. The data is transferred to TIST's main database server via the Internet and a synchronization process, where it is incorporated with historical project data. The server provides information about each tree grove on a publicly available website, www.tist.org. In addition, the other data is available to TIST staff through a password-protected portal.

The handheld computers have been programmed with a series of custom databases that can temporarily store GPS data, photographs, and project data. The interface is designed to be a simple to use, checklist format, that ensures collection of all of the necessary data. It is simple enough for those unskilled in computers and high-tech equipment to be able to operate, after a short period of training. The interface can also be programmed for data collection not specific to the project. The handhelds are "off the shelf," keeping their costs relatively low.

The synchronization process takes place using a computer Internet connection. While office computers are used where available, field personnel commonly use cyber cafes, reducing travel time and improving data flow. Where available, cell phones using GPRS technology are now allowing synchronization from remote tree groves and project areas, providing near real-time data.

The TIST Data Server consists of a public side, accessible by anyone over the Internet and a private side only accessible through a password-protected portal. On the public side, a dynamic database is used to constantly update the displayed data. Changes can be seen daily as new synchronizations come in. By mapping the project data with photos and GPS data, the results of each Small Group can be seen on a single page. The GPS data has been programmed with Google Maps to locate project activities anywhere in the world on satellite imagery. See Section 1.9 for detailed instructions on accessing grove data.

On the private side, confidential accounting data, archive data and data not currently displayed is available. This is the source data for the custom reports and tables necessary for project managers.

The TIST database is off-site and has an off-site backup. The information collected and used for this monitoring program will be archived for at least two years following the last crediting period.

4.3.3 Method for Calculating Carbon Stocks

A. Ex post estimation of the baseline net greenhouse gas removals by sinks

No monitoring of the baseline is required. As demonstrated in Section 4.2, the change in baseline carbons stocks is below the threshold that would require monitoring. Because only the trees planted as part of the project are counted in the estimation of project removals, the baseline carbon stocks are fixed at zero.

B. Ex post estimation of the actual net greenhouse gas removals by sinks

Step 1. Because of the difference in species and age of the trees and location, ownership and management of the project areas, each project area shall be monitored. They are documented in "Grove Summary" and "Strata" worksheets, Appendix 04. The boundary of the project area has been obtained with a GPS (Appendix 03), the area calculated and displayed in the "Grove Summary" worksheet.

Step 2. The strata for the ex post estimation of the actual net greenhouse gas removals will be by species and year, similar to the ex ante estimate, as described in Section 3.2. Stratification is done within each individual project area. The area of a stratum in a project area ("area of a stratum (ha)") is determined by multiplying the area of project area (see Step 1) by the percentage of trees of that stratum in the respective project area.

Step 3. Where a tree species exceeds 10% of the total tree inventory, it will be assigned to a Major Strata. All other tree species will be assigned to an "Other" strata.

Step 4. Allometric equations will be used to convert DBH values to biomass. An allometric equation for each Major Stratum will be identified. If a species specific equation for a Major Strata is unavailable, it will use the "Other" equation as a default. Based on research, the following are examples of the Major Strata and the allometric equations that may be used. The list will be updated as new, or more appropriate ones, become available.

Pinus[63].Y = $0.887+[(10486 \times (DBH)^{2.84})/((DBH^{2.84})+376,907)]$
Eucalyptus[64]: *$\text{Log } Y = -2.43 + 2.58 \text{ Log } C$*
Grevillea: no species specific equations, will use "Other" equation
Cupressus: no species specific equations, will use "Other" equation
Other (default)[65]: *$Y = (0.2035 \times DBH^{2.3196}) \times 1.2$*

Where:

Y= aboveground dry matter, kg (tree)-1
DBH = diameter at breast height, cm
C = circumference at breast height, cm
ln = natural logarithm
exp = e raised to the power of
1.2 = expansion factor to go from bole biomass to tree biomass

63 IPCC 2006 AOLU, Annex 4A.2, Table 4.A.1. Temperate/Tropical Pines.
64 DH Ashton, "The Development of Even-aged Stands in Eucalyptus regnans F. Muell. in Central Victoria," Australian Journal of Botany, 24 (1976): 397-414, cited by Tim Pearson, Sandra Brown and David Shoch, in "Assessment of Methods and Background for Carbon Sequestration in the TIST Project in Tanzania," Report to Clean Air Action Corporation, (December 2004).
65 Tim Pearson, Sandra Brown and David Shoch, in "Assessment of Methods and Background for Carbon Sequestration in the TIST Project in Tanzania," Report to Clean Air Action Corporation, (December 2004). See Exhibit 05: TIST UG PD-VCS-Ex 05 Winrock Report 021215.doc.

Step 5. The DBH of up to 20 trees per stratum, per project area, will be measured. Height will not be measured, or used, in the allometric equations. Each DBH value, for each tree measured, will be applied to the appropriate allometric equation and the biomass of each, per tree, in the stratum, will be obtained and averaged to determine the "average above ground biomass per tree (kg)" of a stratum.

Step 6. For each stratum, in each project area, the average above ground biomass, per tree, will be multiplied times the number of trees, to yield the "above ground biomass in stratum (kg)." The results will be divided by 1,000, to obtain "above ground biomass in stratum (t)."

Step 7. The methodology requires the use of tons of biomass, per hectare, in a subsequent step. It is determined by dividing the "above ground biomass in stratum (t)" from Step 6, by the "area of the stratum" from Step 2.

$$\text{above ground biomass (t/ha)} = \frac{\text{above ground biomass in stratum (t)}}{\text{area of the stratum (ha)}}$$

Step 8. The above ground biomass of each stratum will be multiplied by 0.5, to convert biomass to carbon. The result is "above ground carbon" (t/ha).

Step 9. The carbon stocks of the below ground biomass of each stratum (t/ha) are calculated by multiplying the above ground biomass of each stratum (t/ha), by the appropriate roots to shoot ratio and by 0.5, the carbon fraction of the biomass. A root to shoot factor of 0.27 will be used.[66] The result is "below ground carbon" (t/ha).

Step 10. The total carbon stocks (CO_2e) are determined by adding the above and below ground carbon (C) of each stratum in each project areas, multiplying each sum by the respective area of that stratum, converting the result to CO2e and summing the products. The following is the general equation required by the methodology.

$$P(t) = \sum_{i-I}^{I} (PA(t)\ i + PB(t)\ i) * Ai*(44/12)$$

Where:

$P_{(t)}$ = carbon stocks within the project boundary at time *t* achieved by the project activity (t CO_2e)
$PA_{(t)}$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) from Step 8.
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) from Step 9.
Ai = project activity area of stratum *i* (ha) from Step 2.
I = stratum *i* (*I* = total number of strata)

C. Ex post estimation of leakage

In accordance with the methodology, ex ante leakage is assumed to be zero. For ex post leakage, the methodology requires the monitoring of cropland, domesticated grazing animals and domesticated roaming animals displaced by the project activity during the first crediting period. If the indicators are less than 10%, leakage is set to zero.[67] The CDM Executive Board also

[66] GPG-LULUCF, Table 3.A.1.8
[67] AR-AMS0001, Section VI, 48.

provided additional guidance regarding grazing which, among other things, established a 50 hectare threshold on the monitoring of grazing.[68] It stated:

> The approach in this document can be used to determine whether the increase in emissions of greenhouse gases due to displacement of pre-project grazing activities attributable to the A/R CDM project activity is insignificant and may be accounted as zero.

The required monitoring was conducted through the use of a survey of the TIST members during baseline monitoring, the results of which are presented in the "Grove Summary" worksheet. The pertinent column titles are:

- Cultivated: A "Y" in this column indicates this was cropland and subject to the leakage monitoring.
- Activity Displaced: The farmers were asked if any activity was displaced which includes farming and grazing. A "Y" indicates they responded an activity was displaced.
- Grazing: Farmers were also asked specifically if grazing was displaced.

The procedures used to collect this data are part of the overall TIST program. Quantifiers go to the Small Groups and interview them about the specific circumstances regarding each individual project area. They also look around and collect the required information. The Quantifiers have been trained that this is critical information and that it must be accurate and is subject to audit both internally and during validation and verifications. In addition, as evidenced by the GhG contracts, the Small Groups are bound by the TIST values of accuracy and honesty.

An analysis for the croplands displaced was conducted in the "Misc Calc" worksheet. Using the DSUM spreadsheet function, the "Grove Summary" worksheet was queried to find the sum of the project areas that was both cultivated, and is therefore cropland, and where displacement was indicated. The results are that there were 0.0 hectares of cropland displaced.

An analysis of grazing displacement was conducted and it was shown to be below the 10% threshold.

- This is not an area where domesticated roaming animals are present, so any incidental roaming animals are included in the domesticated grazing animals category.
- As discussed in Section 2.2, these project areas are not primarily used for domesticated grazing animals.
- The farmers indicated there was no displacement. Since grazing tends to be restricted to a few cows and goats, adding new trees to an active farming area would not necessarily result in "displacement" of grazing activities.

In spite of the above, an analysis was conducted to quantify the displacement that might be associated with grazing (see "Grove Summary" worksheet). The area of grazing land for each project area was determined by multiplying the area of the project area by the percent grassland determined for the baseline (see "Grazing Land (ha)" column). The following conservative numerical values were assigned to weight the intensity of grazing described in the "Grazing" column.

Never = zero
Rarely = 10%
Sometimes = 25%
Often = 50%

[68] UNFCCC, "Guidelines On Conditions Under Which Increase In GhG Emissions Related To Displacement Of Pre-Project Grazing Activities In A/R CDM Project Activity Is Insignificant," CDM Executive Board Report 51, Annex 13, December 2009.

The results for each project areas are in the "Grazing Displaced" column and total 0.7% of the project.

The monitoring results indicate cropland and grazing leakage is below the thresholds that require further monitoring and that the ex post leakage can be set at zero.

Beneficial "leakage" from project activities: The program is designed to allow sustainable thinning within the project boundary by the members, which will reduce the need for fuel wood from external sources. The trees are owned by the Small Group members and as the trees die, either naturally or through thinning, they can be used as fuel wood by the members.[69] This is in addition to the biomass maintained for the calculation of actual net GhG removals by sinks (since ex post carbon calculations are based on current tree counts, any trees lost to harvest, etc., are automatically excluded from the calculation). The project activity will have a beneficial effect on area deforestation; instead of causing it, it will ameliorate it.

4.3.4 Data to be monitored

The data to be monitored for monitoring actual net GhG removals by sinks are the number of trees in each project area and representative circumference. Because of the potential difference among project areas, the tree count of each project area is monitored. TIST has a staff of trained Quantifiers that visit each and every project area periodically. When quantifying a project area, they:

- Identify or confirm identification of the project area by its unique name combination of Small Group name and grove name (grove is the vernacular used by the project for a project area).
- Determine the latitude and longitude of the approximate center point of the project area with a GPS. It is automatically logged into the hand-held computer database for temporary storage.
- Map the boundaries of the project area by walking the perimeter using a GPS. The data is stored in the hand-held computer database for temporary storage.
- Count each tree in the project area by age and species strata. This data is entered by the operator directly into the handheld computer database for temporary storage.
- Measure the circumference of up to 20 trees in the age and species strata of a project area. Data will not be collected at all locations. The operator enters it into the handheld computer database for temporary storage.
- The data on the handheld computer database is uploaded to the TIST server, through the Internet, for additional processing and permanent storage.

4.3.5 Managing data quality

TIST will use the following QA/QC procedures:

- **Quantifier Training:** Quantifiers receive explicit training in regard to TIST's Standard Operating Procedures, so that quantifications are performed in a standard and regular fashion. The Quantifier field manual/handbook is available online at www.tist.org under "Documents to Download" and is updated to reflect changes in internal procedures. Quantifiers meet monthly to discuss questions or problems that they may have and receive

[69] Thinning will be used to give surviving trees more opportunity to grow. While thinning will result in a dip in the carbon stocks below that present prior to thinning, the carbon stocks of the project area will not go below baseline levels. In addition, because of the different species, different growth rates and different planting schedules it is expected that the carbon stocks of the entire project will always be increasing.

training and software updates when necessary. Quantifiers are not dedicated to a grove for the life of that grove and may be rotated to other groves.

- **Staff Audits:** TIST staff members are trained to quantify groves and have handheld devices that are programmed to conduct audits. A requirement of their job is to periodically audit Quantifiers, including an independent sampling of tree counts and circumference measurement.

- **Multiple Quantifications:** TIST's internal goal is to quantify each project area once per year. Inaccurate data and errors are self-correcting with the subsequent visits. If trees have died or have been removed, a new count will reflect the current population. The growth of the trees, as indicated by increased DBH, is monitored with these subsequent visits. If a species is mislabeled, it will arise as a conflict when different Quantifiers attempt to perform tree counts for that grove that do not match the previous one. Comparisons are made over time, to determine whether a particular quantification or tree count appears unrealistic.

- **Multiple Tracks:** In order to ensure that the location and perimeter of each discrete project area is accurate, each GPS track of the parcel is measured at least twice, or until two tracks that reliably define the project area are obtained. Quantifiers will be required to re-trace the tract with each quantification, to verify that they are at the correct project area and that they are counting the correct trees.

- **Double Counting:** To ensure that the same project area is not counted more than once, an overlap script is used that compares the outline of all project areas. If an overlap is detected, the project areas are visually compared. If an overlap is determined, the overlapping project area is removed from the PD.

- **Data Quality:** TIST Quantifiers count every tree in each discrete project area. Counting each tree is 100% sampling and provides greater than 1% precision, at the 95% confidence level. Up to 20 circumference readings, for each strata, in a project area, will be taken and archived to develop a localized database of growth data by strata. This data will provide the circumference data for each stratum. This sampling will exceed the 10% precision at the 95% confidence level required by the methodology. The confidence and precision levels will be assessed in future monitoring.

- **TIST Data System:** The data system is an integral part of TIST's quality assurance and quality control plan. The handheld devices are programmed in a manner that requires the data to be collected in a step-by-step manner, increasing the likelihood that all the data will be collected. Data field characteristics are defined to force the use of numbers, text or special formats. Drop down menus are used to restrict answers to certain subsets (e.g. a TIST Small Group name comes from a drop down menu). Some data fields are restricted to a range of data (e.g. negative numbers are not allowed). The data is uploaded within a few days to the main database, providing timely reporting and secure storage of the data.

- **Desk Audit:** TIST has developed analytical tools for reviewing data, as it comes in from the field, to look at track data, tree counts, and completeness of data.

- **Transparency:** By providing the quantification data online and available to anyone with an Internet connection, TIST is open to audit by anyone, at any time. By providing the location, boundaries, tree count by species and circumference, any interested party can field check TIST data. This transparency and the actual visits that have already taken place provide a further motive to make sure the field data is correct.

- **Data Storage:** The data will be stored in an electronic format on the TIST server. Currently, the server hardware is operated by a third party company that specializes in web and data hosting. They are in Dallas, Texas, USA. However, CAAC could, in the future, change hosts or choose to host the server at its offices.

5 ENVIRONMENTAL IMPACT

5.1 Environmental assessment

The environmental screening was conducted and submitted to the National Environmental Management Authority (NEMA) of Uganda on 03 August 2006.[70] On 15 May 2007, NEMA provided a letter to Clean Air Action Corporation stating that "there are no anticipated adverse environmental impacts and therefore, there is no need for further environmental assessment at this stage."[71]

The A/R CDM project activity does not have any negative environmental impact because the project activity is highly environmental friendly. A short summary from the third party environmental assessment conducted in Kenya is given below. [72]

Table 5.1.A Existing Positive Impacts	
Project Component	**Existing Positive Impacts**
-Promotion of tree planting through carbon credit programs and conservation farming -Promotion of compost manure	Increased tree cover
	Improved incomes at the household level, through cash remuneration, to groups and individual households, based on the number of trees in farms
	Reduction of global warming through increased sink for Greenhouse Gases (GHG), hence a mitigation against sudden climate change
	High potential for the program activities to attract further/future carbon credit markets, hence income generation
	Improved farming methods that prevent carbon dioxide (CO_2) from escaping into the atmosphere, while trees act as carbon sinks
	Increased tree variety, hence wood based products
	Enhanced biodiversity, hence increased ecosystem services such as pollination for food
	Improved opportunity to get rid of unsuitable trees for Agroforestry such as Eucalyptus spp through appropriate awareness creation activities
	Increased availability and access to tree products such as firewood and timber products
	Improved soil fertility, hence improved crop production through planting of nitrogen fixing shrubs and trees
	Improved food security and nutritional status through increased crop production and growth of fruit trees, as well as adoption of improved conservation farming (some farmers reported an increase of production from two to three bags to eight, from a quarter of farm after adopting conservation farming
	Diversification of livelihood sources, i.e. training in beekeeping
	Possible replication of the project activities in other areas, following successful implementation
	Management of water catchment areas through promotion of tree planting
	Increase in groundwater recharge, as a result of increase in

[70] See Exhibit 01
[71] See Exhibit 02
[72] NAREDA Consultants, Environmental Audit Report For TIST Project Activities, Final Report, April 2010. Page 16-20. ("NAREDA"). See Exhibit 06: TIST UG PD-VCS-Ex 06 KE EIA Report NAREDA 100506.doc

Table 5.1.A Existing Positive Impacts	
Project Component	**Existing Positive Impacts**
	vegetation cover that minimizes surface runoff and improves infiltration.
	Increased tree-based environmental services such as moderation of local climate, reduced soil erosion and aesthetic values associated with trees

Table 5.1.B Potential Positive Impacts	
Project Component	**Potential Positive Impacts**
Promotion of tree planting through carbon credit programs	High potential of program activities to attract carbon markets
	Improved farming methods prevent carbon dioxide (CO_2) from escaping into the atmosphere, while trees act as carbon sinks
	Possible replication of the project activities in other areas
	Increase in groundwater recharge, as a result of increase in vegetation, that minimizes surface runoff and improves nutrition
	Possible introduction of other nature based activities, like bee keeping, due to increased foliage material, thus contributing to maintenance and enhancement of the biodiversity through pollination by bees
	Increased population of native species through TIST training
Conservation farming	Possible increased incomes as a result of improved farm productivity
	Possible improved food security
	Possible replication and adoption of conservation farming both within the project area (those farmers that are not group members) and outside the project area
	Improved farm productivity and environmental improvement through appropriate farming practices
	Possible reduced soil erosion as farmers increasingly adopt organic farming

The tables below present the existing and potential negative impacts of program activities

Table 5.1.C Existing Negative Impacts and their Mitigation Measures		
Project Component	**Existing Negative Impacts**	**Proposed Mitigation Measures**
Promotion of tree planting through the carbon credit program	High expectations from farmers which TIST may not be able to meet or are outside its scope of coverage	-TIST to continue and improve awareness creation on TIST policies of support to specific activities through increasing seminars/ training aimed at developing best practices with and empowerment of TIST farmers -Conduct participatory techniques to identify farmers concerns and use these forums for feedback

Table 5.1.C Existing Negative Impacts and their Mitigation Measures		
Project Component	**Existing Negative Impacts**	**Proposed Mitigation Measures**
	Farmers' dissatisfaction due to delayed payment	-Improve review of group payments, and target paying each group at least twice per year -Improve awareness creation of TIST policies, such as the 500 trees rules among group members and the fact that payment is made based on available man hours -Improve awareness on TIST's policy/value of "low budget big results" -Educate farmers that payments will increase once the GHG credit is initialized, when farmers will receive 70% of the income after in-country costs
	Inadequate information dissemination of information between TIST staff and group members	-Streamline the information dissemination mechanisms between TIST staff at the project area level and those at the grassroots -Ensure regular trainings of TIST grassroots staff to update them on the latest TIST policies -Ensure regular and consistent meetings at the groups level -Ensure adequate awareness creation among TIST grassroots staff and group members on TIST's institutional structure
	Poor awareness among farmers on how to join TIST activities leads them to believe that they have been excluded from TIST activities	-Improve awareness creation on TIST policies in the registration of members -Conduct participatory techniques to identify farmers concerns and use these forums as feedback forums

Table 5.1.D Potential Negative Impacts and their Mitigation Measures		
Project Component	**Potential Negative Impacts**	**Proposed Mitigation Measures**
Promotion of tree planting	Possible negative changes in soil properties as litter becomes dominated by one or a few tree species and decomposition dynamics are altered.	-Encourage farm crop rotations that incorporate use of indigenous tree species -Interplant exotic with native tree species -Continue with the TIST campaign of encouraging the planting of more indigenous tree species
Promotion of conservation farming	Farmers resistant to retain chemical fertilizers and pesticides utilization for perceived high yields	-TIST promotes awareness on usefulness and benefits derived from organic fertilizers and pesticides

The report concludes "drawing from the positive and negative impacts as highlighted above, the former outweighs the latter by far, an observation clearly pinpointed by community, especially during the focused group discussions."

TIST has reviewed the mitigation measures and finds that they are part of the existing program. Most refer to constant outreach to the member to increase awareness. TIST provides regular training in the abovementioned activities through seminars, cluster meetings, Small Group meetings and the newsletter. In addition, TIST Quantifiers are trained in most aspects of the program and they try to visit each Small Group once a year. While their primary purpose is quantification, they can also provide answers to some questions while on site.

5.2 Socio-economic impacts

An analysis of the socio-economic impacts is provided:

Administration. TIST requires a Host Country staff to operate. There are currently 19 staff employees. TIST personnel travel by public transportation and buy food and supplies from local merchants, bolstering the local economy. TIST uses Host Country professionals, such as accountants and lawyers. TIST staff is trained to use the handheld computers and GPS and how to collect data. They synchronize their devices in cyber cafés, requiring the use of personal computers.

Direct Effects to Small Groups. TIST benefits thousands of Small Group members by providing a new source of income. Small Group members are paid for each tree they plant and maintain. When the project becomes self-funding from the sale of carbon credits, they will receive 70% of the net carbon revenues.

Small Group Structure. Empowerment of Small Groups and creation of “best practices” improves farm production, health, and farmer life. Small Groups use “rotating leadership” which supports gender equality and develops the capacities of each member. The visible success of the TIST groups and the availability of wood, shade, lumber, fruit, and improved crop yields provides the entire community with positive examples.

Additional benefits for Small Group members and their families:

- Fruits and nuts from tree plantings
- Wood products and limited timber from trees
- Natural medicines and insecticides from trees
- Capacity building on agricultural improvements, business skills, nursery development, and reforestation
- Animal fodder
- Small Groups organize to deal with other social and economic problems such as famine, AIDS, inadequate water supply
- Improved beauty of the landscape
- Surpass “sustainability” in that people meet their needs today in ways that improve the next generation’s ability to meet its needs in the future

The project will create a positive socio-economic impact.

6 STAKEHOLDER COMMENTS

6.1 Description of how comments are obtained

Membership in TIST is completely voluntarily. The actions that members take are on their own land. They maintain ownership of the land, the trees planted for sequestration and all the products that the trees yield. TIST exists for the local farmers and only grows if the local farmers support it. The rapid growth of TIST is a reflection of the positive reaction that the farmers and other stakeholders have had about TIST.

When TIST begins in an area, they contact community leaders, village heads/village leaders, local NGOs and local government officials to determine if there is an interest in the program. If there is an interest, TIST holds a public seminar to present the program, answer questions, address concerns and receive comments. Regular and on-going meetings the public is invited to attend follow this. TIST representatives have met with numerous State, District and Village officials seeking comments and showing them the project. Since TIST is organic in its growth, this process continues as it expands to new villages. In addition to the meetings, information about TIST is disseminated by word of mouth; using “The Tree,” a multi-lingual newsletter published by TIST Uganda; and direct contact with community leaders and government officials.

The original TIST program was started in Tanzania, in late 1999, to meet local needs in a sustainable way, while at the same time addressing climate change. Uganda sent their first representatives to a TIST seminar in Tanzania in July 2003. The representatives went back to Uganda and introduced TIST by word of mouth and Small Group meetings. Interested individuals formed Small Groups and began planting trees.

Two formal public meetings were held, one at the Katungu Mothers Union in Bushenyi on 12 February 2009 and one at the Kirigime Guest House in Kabale on 16 February, 2009. Notice was given in two Uganda newspapers, the New Vision and Orumuri. Announcements were made on the radio in Bushenyi on 2, 3 and 6 February 2009. Announcements were made on the radio in Kabale on 3, 4 and 5 February 2009. Letters of invitation were also sent to selected stakeholders and interested parties.

At the Small Group level, member farmers meet with TIST representatives regularly, where they have an opportunity to ask more questions and make more comments. Since one of TIST’s main focuses is adopting best practices, these are forums to review what is working about the program and how it can be improved. Changes to the program are announced in the newsletter.

The result of this stakeholder process has led to numerous invitations for TIST to come to new villages and numerous positive comments about TIST. The following section will summarize written comments. TIST has not received any negative comments.

6.2 Summary of the comments received

Mbabazi Annet, 0777840023/0751364891	10 homes neighboring form TIST – Other 10 do not. As a trainer, what can I do to have them all join TIST?
Ngikabakunzi F., 0782-239393	Have you reached Kigoro District? If not, when are you going there?
Mbwenu Ukoreki	I planted Eucalyptus trees, they have drained all the water, what should I do?
Ngarame – Kankiriho, 0782363336	Eucalyptus exhibits allelopathy and creates conflict between neighbors. Is it possible for plant breeders to breed a Eucalyptus variety that does not exhibit that phenomenon? I have observed some varieties that are fairly compatible.

Mwesigwa Trichard, DPDO, West Angola Diocese, 0712202254	What strategies have you put in place to ensure youth movement and continuity of TIST program? Are you in liaison and partnership with other organizations at the grassroots, so as to avoid duplication of services?
Ngarame – Kankiriho, 0782363336	America signs most Conventions but does not ratify them, yet they are one of the bigger producers of carbon dioxide leading to global warming. What can be done to convince the US to ratify those Conventions?
Namara Gad, 0782449744	Are the western countries changing their way of industrial production to reduce carbon emissions? What should be the immediate remedy to reduce carbon dioxide as far as the world is concerned?
Katringi K. Asaph, 0772473190	We signed the agreement that we should be paid twice a year, why are we now paid once?
Mr. Ndyabawe Carlpeters, Ababaliisa Tree Planting Group No 200595, 077529544 (Trainer)	Clean Air Action Corporation collects money from Greenhouse Gas sales every year. For accountabilities sake, how will farmers know how much money has been collected, how much money has been given to farmers, and what balance remains, so that by year 2022 we are able to know how much money there is to give out to farmers as the 75% top up?
Ndyabawe Carlpeters, 0775294544	Article 6 of the Agreement has been contravened with because many groups are not paid their due despite their trees having been quantified. What is the explanation? CAAC has not complied with her pledges, Sec. 8. (i) CAAC has never helped any group to open account, (ii) Why not pay individuals through individual bank accounts in individual banks? Why doesn't Kabale have a full time functional office since Mr. Beshobelio's office is always locked?
Rev. Sunday Jotham, 0782-584759	As churches, we have grown trees on our land. Do we, also, need to join other farmers to form a group? As churches, are we included in the TIST program?
Biraali Yasin of Kanyinya Small Group, 0702903720	I have an Arboretum that has been left to grow for the last 16 years. It has many young trees brought by migrating birds. What TIST benefits should I receive from the big trees of 16 years and more? What about the young trees now coming up as a result of migrating birds?
Besigye Agguly, 078174536, Kigatatukore	Last payment was 2007, so we request we should be paid on time.
Generous Kachetero, 0772520472	Can we the farmers who are registered with TIST get Certificates of Insurance from TIST organization for security of our children's inheritance?
Green Earth Movement Group, Bugembe Levi N, 0752275443	Request for increase on the price given per tree because – cost of living has gone up, - cost/labor for planting and maintaining trees has gone up, - land appreciates every day.
John Fisher Ivanmremye, 0782822904, Kashenshero – Ruhinda – Bushenyi, Kashambya Tweyambe Group	Groups should be monitored. TIST should teach groups on soil fertilization and conservation. Amount of money paid to farmers should be more than the current payment.
Hamurwa Bahingi Kwebeisaho, Kokole, PO Box 262	Not paid for 3 years. Have registered. Have counted. A group of 6 farmers along Kigoro road – 15 km
Turyatunga Javira Nyamunoza, Agriculturist man as profession from Muko sub county where we don't have any representatives of TIST, 0773461381 or 0703212252	Which type of trees would you need for us to plant? Suppose we were involved in planting trees, would you provide us with fertilizers since some of our soils are hilly and are not fertile to support this activity?

Rwenjeru United Asso Group, 0781521422	Eucalyptus drains our swampy water. Groups need loans. More training is needed. Where is the market for medicinal plants?
Koyelhyenga Milton, 0772476529	I recently learned of TIST and I'm interested in it. I have already planted over six hundred trees. I come from Kabwabe area and I don't know any group. What is the processing of joining any group?
Nuwagaba K Fredrick, 0774364441, Twehamizidize Tree Planting Group	We should be paid more money to maintain our tree plantations.
Green Earth Movement	Reduce the cost of administration, increase price paid to farmers to make the project sustainable.
Ainamani, Emmanuel, Makerere University, ainemmyx@yahoo.com	Of the youth who have land, we don't have money to invest, so can we be partnered and plant?
Miyuwi Joseph from Vyambura Valley Tree Planting Group	In our area we have a problem transporting at the time of rain and transporting our products from conservation farming to the market. What method can be done to help those farmers to transport their products?
Baguma Gerald, an environmentalist by profession, aged 25 year, 0782017753	Can you help us and employ at least one quantifier in Kitumba sub county? Am willing to do that job if given opportunity.
Tumwize Elly, 0752587113	Involving Youth in TIST: Parents should encourage the youth to plant trees by giving them land. I personally gave my daughter land and she has 500 pine trees.
Group No 195, Karukana Tukwatanise Group	Pur group was quantified on 12/09/07; but we have not received our payment.
I'm one of the farmers of TIST, Kyangabo Group, Ashmwe T Christopher, 0782252709	The problem that we're facing, we have fire hazards in the area, so can you get us any means of insurance, so that we can insure the trees in our areas. This is a very serious problem we face.
Hamurwa Sub County, TIST IS GOOD, Miyuni Faustine, Trainer	I thanked God who put mind to TIST to help poor people through the International Small Group and Tree Planting Program, especially in Kabale, which is suitable for trees, grow out, like these species of trees - pinus patula, cupressus lusitanica, eucalyptus kalitunsi. When we received TIST we planted more and more trees with a hope of receiving an incentive for each alive tree. People thanked TIST very much for their environmental conditions to be protected. Concepts from farmers to visitors: 1. We need more quantifiers because our groups are not counted for their trees, if possible each sub-county should have one quantifier. People are complaining for their trees to be counted. 2. Some people who are not in TIST want to sell their land and pinus trees. Would you buy it for TIST? Challenges: 1. Payments do not come in time, 2. Our trees are not counted, 3. 35 % is little money for alive tree.

6.3 How due account was taken of comments received

1) *There were six farmers who voiced concerned about TIST not paying farmers on time, wanting to be paid more per tree, wondering when they would start seeing the 75% carbon offset money the GHG contracts talks of, or wanting to see the overhead reduced so that farmers get paid more money.*

In the meetings, we also explained how the payments were devised, how much we sell offsets for, and how the basic economics of the program work out. We told the farmers that as the price of carbon increases, and as we expand in Uganda and keep expenses down, they would get paid more.

We reminded the farmers that certain criteria must be met in order to trigger a payment. They include having more than 500 trees in a Small Group, having been quantified and having a signed GHG contract. We told all the farmers who had not been paid recently and thought they met all the criteria, to meet with us after the meeting to see if we could resolve the problem.

2) *Five farmers asked questions or made comments about the kinds of trees we are planting, the dangers of Eucalyptus trees, the benefits of Eucalyptus trees, and wanted to know if TIST could provide insurance for trees*.

We explained to the farmers that Eucalyptus trees were causing many serious environmental problems in Kenya, and monoculture tree planting was a practice that many farmers in Kenya were beginning to reverse. We encouraged the farmers in Uganda to begin starting nurseries of their own and growing indigenous trees. We told some of the farmers who seemed not to know about Eucalyptus trees, that they could cause erosion of land, and that the presence of Eucalyptus trees on farms limited food crops that could be grown. Lastly, we told the farmers that crop insurance for trees was something that we did not have any experience with, and therefore it was something that we did not think we would be able to provide.

3) *Three people wanted to request that we involve the youth more in our efforts, or make suggestions about how children of TIST participants could take part in our work.*

We told the group that were very interested in getting the youth more active in TIST and in tree planting, but we thought that this was something that would probably have to be done by parents or grandparents

4) *Criticism from three farmers was directed at Western nations and the US for polluting so much and not doing more to solve the problem, for not ratifying the Kyoto Protocol, and for not curbing their industrial emissions.*

The people in the audience were told that they were correct about America not ratifying the Kyoto Protocol and America being a large polluter. They also were told that some Western nations were probably not doing enough, and some were doing a lot to improve the environment and reduce their emissions.

We gave them the address of President Obama, and encouraged them to write him about their concerns with America being a polluter and not signing any climate pact. We explained that while Ugandans do not have a representative in the US government, many many letters from villages in Uganda to the President would be a powerful and meaningful gesture, and it also might be the best thing to do in order to convince the US to ratify the Kyoto Protocol.

5) *Two participants of the community asked that TIST provide more training on a variety of subjects.*

Conservation farming and how to build and manage a nursery were two main areas where we saw large needs for training in Uganda. We told them that these two areas were places where training could help farmers grow more food with Conservation Farming and save money by having their own homegrown seedlings instead of having to buy seedlings. Regarding better training, we are committed to improve the quality.

6) *One person wanted to know if TIST could help farmers open bank accounts.*

We told the farmers that since we are not a bank, we couldn’t directly help them with this. We also told them that we learned that the bank fees were too high and costly for a dedicated account for the tree stipends. We are looking into other options but, until one is found that is advantageous to the farmers, we would continue to make cash disbursements. We encouraged them to tell us if they had any new ideas.

7) *One person asked TIST to help groups of farmers transport goods to market in the rain when the roads get bad.*

We told the farmers that we do not have a vehicle of our own, so we would not be able to help them move goods to market in our own vehicle.

6.4 Ongoing communication with stakeholders

TIST will maintain communications with stakeholders several ways.

- As a community-based project, the thousands of members represent a cross section of the population. These are stakeholders, both because they are members, and because they represent the community.
- TIST's aforementioned communication structure (seminars, Cluster meeting, Small Group meetings, regular visits by Quantifiers, trainers and newsletter) will provide avenues for ongoing dialogue.
- TIST has a full time staff of Ugandans that are part of the community. They liaise with the community, government officials and other NGOs.
- TIST membership includes government officials, church leaders and members of other NGOs.
- The TIST website allows direct communication with the US office. The US office answers questions, addresses concerns and can direct the Uganda staff to issues that have been raised.