Project Implementation Report
for
TIST Program in Uganda
CCB-001

for validation under
The Climate, Community and Biodiversity Standard
Second Edition

12 December, 2011

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CCBA Project Implementation Plan
for
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Project Overview

The International Small Group and Tree Planting Program (TIST) empowers Small Groups of 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.

Since its inception in 1999, TIST participants organized into over 9,000 TIST Small Groups have planted over 11 million trees, on their own and community lands. GhG sequestration is creating a potential long-term income stream and developing sustainable environments and livelihoods. Replication of TIST in Uganda began in 2003 and has grown to over 5,700 TIST participants in over 800 Small Groups.

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 in the biomass of the trees and soil. These credits are expected to be approved under the Voluntary Carbon Standard and/or CDM 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.

This project description is for a subset of the TIST Uganda program and corresponds to TIST VCS project descriptions VCS-001, VCS-002, VCS-003 and VCS-004. It applies to 481 Small Groups 3,051 members, 1,782 project areas and 1,613.6 ha.

General Section

G1. Original Conditions in Project Area

G1.1 General Information: location of the project and basic physical parameters

TIST Uganda is comprised of about 8,000 individual project areas that are owned or controlled by the individual TIST members. The individual project areas of this PD are located in Bushenyi, Kabale, Kanungu, Mbarara, Ntungam, and Rukungiri Districts of Uganda. Most of the project activity is centered around Bushenyi, Kabale, and Kanungu, generally around latitude 0.5 S, longitude 30 E.

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.[1] 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.

[1] 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.

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 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.

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^oC. In the highlands, such as in the Nsika and Kabale Mountains, the temperature ranges from 13^o to 26^oC. Rainfall is considered moderate, with most of the general area receiving around 1,400 mm per year.[2] 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.

G1.2 General information: types and condition of vegetation within the project area

The individual project areas are generally cropland and grassland with a few scattered trees. The pre-project trees were counted and identified and are listed by project area in worksheet "Baseline Strata." [3] The rest of the ground cover was estimated as a percent of the total individual project area size. The stratification is present in worksheet "Grove Summary."

[2] Exhibit 13: TIST UG PD-VCS-Ex 13 Dist Enviro Profile Bushenyi.doc. National Environment Management Authority (NEMA), District Environment Profiles: Bushenyi.
[3] All worksheets are in Excel spreadsheet "TIST UG PD-CCB-001e App04 Data 111006.xls"

G1.3 General information: boundaries of the project area and the project zone

There are 1,782 individual project areas in the four associated Voluntary Carbon Standard (VCS) PDs and a total of over 4,300 TIST project areas currently in Uganda. The boundaries of each have been surveyed using a GPS and are presented four ways.

1) Appendix 01 is a Landsat 4/5 image of Uganda showing the location of each individual project area as a dot. This is to provide an overview of the project.
2) Appendix 02 is a Landsat 7 image of Uganda showing the location of the individual project areas as dot. This is to provide an overview of the project.
3) Appendix 03 is a KML file that displays the name, location and perimeter of each project area on Google Earth.
4) Each project area (including perimeter and current tree strata) is displayed under its TIST Small Group name on tist.org, a publicly accessible website).

Because of the dispersion and wide geographical area of TIST project areas, the Project Zone is the area of southwest Uganda centered around Bushenyi, Kabale, and Kanungu.

G1.4 Climate Information: baseline carbon stocks

The baseline carbon stocks were estimated based on the approved Clean Development Mechanism methodology 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*. Table G.1.4 shows the strata selected for the baseline calculation, the hectares and percent of area of each stratum and the appropriate factors needed to determine the baseline carbon stocks.

Table G1.4

			AG and BG Biomass t CO2e/ha		
Baseline Strata	**Hectare**	**Area**	**Non-woody**	**Trees**	**Total**
Cropland, annual crops	23.2	1.4%	18.3	3.0	21.3
Grassland as grassland	1,590.4	98.6%	16.0	3.0	18.9
Total	1,613.6	100.0%			

*AG = Above Ground, BG = Below Ground

Assumptions:

- Hectares of cropland are based on field estimates made for each individual project area as listed in worksheet "Grove Summary."
- Annual cropland non-woody stocks = 5 t C/ha above and below ground (IPCC 2006GL, Section 5.3.1.2) = 18.3 t CO2e/ha
- Tropical dry grassland non-woody stocks = 8.7 t d.m./ha above and below ground (IPCC 2006GL, Table 6.4) = 16.0 t CO2e/ha

- Woody biomass stocks represented by trees at a density of 1.2 stems per ha (1,900 trees over 1,613.6 ha). The numbers of baseline trees were determined by a physical count of each tree.[4]
- Average DBH of pre-existing trees = 45.2 cm from inventory of pre-existing trees.[5]
- Above ground tree biomass calculated applying equation for dry forest, where Kg dry mass = exp(-1.996+2.32*ln(DBH cm)).[6]
- Root:shoot ratio of 0.48.[7]
- Carbon fraction of dry biomass = 0.5

G1.5 Community information: description of communities in project zone

Uganda's population is primarily rural, with highest population density in the southern regions. The area is ethnically diverse. The dominant ethnic group of the Bushenyi District is the Banyankole/Bahima, which constitute about 82.6%. The second largest is composed of the Bakiga with 10.7%. The Bahororo are about 2.9%.[8]

Table G1.5 is the estimated annual income of the Bushenyi District and is from the district planner.

Table G1.5.A. Annual Income Brackets

Income Level (Ush)		Income Level US$		Pct of Groups
Min	Max	Min	Max	
720,000	2,400,000	$360	$1,200	82%
2,400,000	4,800,000	$1,200	$2,400	11%
4,800,000	9,600,000	$2,400	$4,800	5%
9,600,000	12,000,000	$4,800	$6,000	2%
12,000,000	24,000,000	$6,000	$12,000	0.3%

The literacy level is low. According to the 1991 census, in Bushenyi, only 53.7% of the people aged from 10 years and above are able to read and write. The predominant occupation of the working people is agriculture, where almost 80% were subsistence farmers.[9]

G1.6 Community Information: current land use and property rights

[4] Appendix 04, "Baseline Strata" worksheet.
[5] Ibid.
[6] 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 AR-AMS0001, Appendix C
[7] GPG-LULUCF, Annex 3A.1 Biomass Default Tables for Section 3.2 Forest Land, Table 3A.1.8, Woodland/savannah
[8] Exhibit 13
[9] Exhibit 13

The pre-project land use was agriculture. The current land use is tree planting and agriculture.

There are four main types of land tenure in Bushenyi District:[10]

- Customary tenure: This is the most widespread and oldest tenure known in the area. Under this system, the owner of land has rights to use and may dispose of it at will, including passing it on to his sons and daughters. This type of ownership was legally recognized in the Constitution (1995).
- Leasehold tenure: A leasehold is a contract for use of a parcel of land and has a maximum term of 99 years.
- Freehold tenure: Freehold is the absolute private ownership of interest in land, which can be transferred, without restriction, and is free of obligation to the state.
- Mailo land: This is a system where people were given land by traditional kings. Farmers living on Mailo land are considered tenants and do not have land ownerships rights. They pay a fixed annual rent set by the Ugandan Government.

G1.7 Biodiversity Information: current biodiversity within the project zone

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.[11] 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." [12]

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." [13]

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[10] Ibid.
[11] 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.
[12] World Wildlife Fund, Albertine Rift montane forests, http://www.nationalgeographic.com/wildworld/profiles/terrestrial/at/at0101.html. Accessed March 11, 2005.
[13] World Wildlife Fund, Victoria Basin forest-savanna mosaic, http://www.nationalgeographic.com/wildworld/profiles/terrestrial/at/at0721.html. Accessed March 11, 2005.

G1.8 Biodiversity Information: High Conservation Values and attributes

Queen Elizabeth National Forest, Bwindi Impenetrable National Park and the surrounding protected forest have High Conservation Values.

Queen Elizabeth National Park is west of the project areas and occupies about 1978 km^2 on the east side of Lake Edward. Formed in 1952, it has one of the highest bio-diversity ratings of any national park in the world, with over 500 different bird species, and about 100 mammal species. It is the home of the tree-climbing lion and about 20 other predators such as lions, leopards, side striped jackals and spotted hyenas. Other big mammals include the kob, bushbuck, topi, waterbuck, buffalo, elephant, warthog and the world's highest concentration of hippos. There are also various primates such as chimpanzees, red-tailed monkeys, blue monkeys, black and white Colobus monkeys, and olive baboons, among others. The park and neighboring forest preserves are listed as a UNESCO Biosphere Reserve.

Bwindi Impenetrable National Park is located in southwestern Uganda, near the Kanungu project areas. The 331 square kilometer park is a combination of both montane and lowland forest. The Bwindi Impenetrable Forest is one of the richest ecosystems in Africa and has half the world's population of the endangered mountain gorillas. It is habitat for some 120 species of mammals, 348 species of birds, 220 species of butterflies, 27 species of reptiles and more than 1,000 flowering plant species. The Bwindi Impenetrable National Park is a UNESCO-designated World Heritage Site.

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.

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, Bwindi Impenetrable 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 are, 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.[14] There are over 500 species of birds that include black bee-eaters, 11 different species of Kingfisher, flamingos, shoebills, fish eagles,

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

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.[15]

Table 1.8: 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

Notes:

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

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

G2. Baseline Projections

G2.1 Most likely scenario

The most likely land-use scenario was based on CDM small scale afforestation reforestation methodology 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.* The most likely scenario, without TIST, was for the project areas to continue to be grasslands and cropland. The baseline field observation, as detailed in worksheet "Grove Summary", indicated the project areas were grassland and cropland prior to implementation of the project activity. As areas of long term and continuous human occupancy and activity, they have already undergone deforestation, loss of natural habitat and loss of biodiversity. Literature indicates that the project zone continues to undergo deforestation, loss of habitat and loss of biodiversity (see G2.2, Forest Policies). It is projected that, without the intervention of TIST, that under favorable conditions, at best, the landscape will remain the same. Under less favorable conditions, lands would continue to degrade. This baseline projection is supported by:

- The project areas are all private lands owned by subsistence farmers conducting the project activity, or on some sort of communal land that has been affected by human activity. The land has a history of farming and land use 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 (see G2.2, Forest Policies), 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 would revert to forest without intervention.
- Without intervention there were no alternative uses of this land that can be reasonably expected.

G2.2 Document how project benefits would not have occurred without project

Additionality of TIST is proven using the "Assessment of Additionality" contained in Appendix B of Clean Development Mechanism Methodology AR-AMS0001, which demonstrates that the project activity would not have occurred in the absence of the proposed project activity. The barriers selected were "investment barrier" and "barriers due to social conditions, lack of organization".

From the Project Participant's perspective, TIST had 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 were 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."[16]

Referring to the Southwest Region 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.[17] Muwanga (2001) reinforces this and, referring to rural Uganda, concludes "lack of credit contribute[s] to community and household poverty."[18]

TIST members are the people described above. They are subsistence farmers with little access to the credit required for a plantation. Table G2.2.A is from Bushenyi District Planner based on discussion about the Small Group income.

Table G2.2.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

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16 Accessed 22 September 2010 at http://www.ifad.org/media/press/2004/38.htm.

17 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

18 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

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 would have had to buy the seedlings and incur labor costs. Without TIST, an investment would have been required, but there would have been no credit available to fund it. TIST overcame the investment barrier two ways. First, it provided 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.[19] 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 carbon profits.

Table G2.2.B Start-up Cost Comparison: 1 ha Plantation20		
	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. 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.

Forest Policies. Uganda has had a series of forest policies since 1929. In spite of them, there is a clear pattern of rural firewood use and forest degradation in Uganda that supports the case that deforestation, loss of natural habitat and loss of biodiversity on each individual project area would continue, and at best, stay the same, without an intervention, such as TIST. The lands of and surrounding the project areas have been degrading for decades, due to human intervention.

The Uganda Forest Policy[21] cites a decline in forest resources:

[19] See Exhibits 03 and 04.
[20] See Appendix 04, "Plantation Costs" worksheet for assumptions and references.
[21] Ibid, p. 2

The 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[22] 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.

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. As shown in Appendix 4, very few trees existed in the project areas prior to TIST tree planting, demonstrating the level of deforestation that continued in spite of government policies.

G2.3 Calculate carbon stock changes without project

The methodology used to calculate the changes in carbon stock is based on CDM small scale afforestation reforestation methodology 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.* As described in section G2.1, the most likely scenario for the project lands is to continue as agricultural land, subject to ongoing intervention through human habitation. As described in Section G2.2 (Forest Policies), the project zone is undergoing a decrease in forest cover and therefore carbon stocks.

The conservative case for the change in baseline carbon stocks, without the project, is that the biomass and carbon in the cropland and grassland remain constant, and that the baseline trees continue to grow, unmolested and unaffected by actuarial mortality. Making reference to the worksheet "Baseline Strata," the baseline tree count was obtained and the mean diameter was calculated. Dividing the baseline tree count, by the total project area, yielded a baseline tree density for the project. When the average diameter of the baseline trees was grown at 0.5 cm per year and the biomass was calculated using the proper allometric equation, the tonnes of CO_2 per hectare could be calculated (see Baseline Tree worksheet). When calculated for the entire project, the conservative change in carbon stocks without the project was estimated to be 4,394 tons (see worksheet "Baseline Growth").

[22] Global Forest Resources Assessment, 2005 (FAO). http://www.fao.org/forestry/fra/fra2005/en/

There are no non-CO_2 emissions. The project does not use chemical fertilizers and the project does not own any vehicles or power equipment.

G2.4 Affect on communities without project

Without the project, thousands of subsistence farmers in the project zone would not be participating in the sustainable development, reforestation and health training of TIST. The communities would not receive the added income that has been paid to the TIST farmers as a carbon stipend and they would not receive the 70% of the project profits, once the carbon sequestered in the trees is enough to sustain the project. This added income would not be available to help pay for primary education uniforms, secondary education, metal roofs and other necessities. The farmers would not have planted the over two million trees already documented by the project. They would not have built nurseries and grown millions of seedlings. They would not have begun to grow their own sustainable on-farm fuel supplies. They would not have started using FAO conservation farming practices, which have been documented to increase crop yields two to ten times. They would not have received training in using more fuel-efficient cooking stoves, or received training on the effects of indoor cooking smoke. They would not have received training on HIV/AIDS, malaria, hygiene, clean drinking water and nutrition. They would not have had the opportunity for developing leadership skills and become Small Groups leaders regardless of gender, religion, education or general background.

Likely changes in water, soil and other locally important ecosystems, without the project, are a continued decline. Illegal harvesting of wood and charcoal in protected areas continues, supported directly or indirectly by the people who live in the project zone, because of their need for cooking fuel. The cutting of these trees leads to loss of soil stability and erosion. It also leads to a loss of water retention. The result is higher sediment load in the critical water supplies, loss of soil, due to erosion and decrease in year-round water, as run-off increases with each rainfall and less water is absorbed in the soil. Continued deforestation leads to loss of habitat and biodiversity. The project addresses each of these and helps reverse or mitigate them.

G2.5 Affect on biodiversity without project

Biodiversity in Uganda has been declining for decades. Although the Government of Uganda has passed laws and regulations to halt deforestation, they have not succeeded (see G2.2). The increasing population continues to put more pressure on existing biodiversity, the project zone and what little is left in the project areas. Without TIST, there would be two million less trees on sustainable woodlots that reduce the pressure on protected high biodiversity areas. There would be fewer indigenous trees. Although the threatened species in the project zone are long gone from the project areas, the indigenous trees and additional forest cover will have a positive effect on them, by improving connectivity and corridors among the protected areas.

G3. Project Design and Goals

G3.1 Summary of climate, community and biodiversity objectives

The objectives of TIST are to:

- increase biomass and carbon sequestered in project areas,
- provide a sustainable fuel wood supply for the members,
- provide a new source of revenue to the members from the sale of carbon credits,
- provide training in important social and health related subjects, and
- improve the biodiversity of the area by adding canopy and indigenous trees.

G3.2 Description of project activities

The project activities are:

- **Nursery training and development.** Farmers are trained on species selections and their benefits, on how to gather and prepare seeds, how to build and maintain nurseries. Special attention is called to the benefits of indigenous trees and trees that provide food and other regularly available products. This is to help reduce the cost of entry to farmers. Where nurseries are highly successful, farmers can sell their excess for additional revenue. This is the first step in tree planting for climate change and revenue enhancement.
- **Tree planting.** Farmers are trained to plant seedlings using the FAO conservation farming techniques. The trees will sequester carbon as they grow and address climate change. Increased canopy, new woodlots and new indigenous trees help biodiversity. The carbon revenues and tree stipends paid to the members provide a new source of revenue.
- **Selective use of tree products.** The farmers own the trees and their products, such as nuts and fruits. They are permitted to use any deadwood. Use of trimming and thinning is permitted, as long is it is sustainable. All of these enhance income and some improve food security.
- **Provide training social and health training.** TIST conducts training seminars, trains directly in the field, and at Small Group meetings. They also use a newsletter for training and disseminating best practices. Besides subjects related to tree planting, training includes Conservation Farming, building and use of more fuel efficient stoves, malaria, HIV/AIDS, water quality, benefits of trees, erosion control, water quality, leadership skills, climate change and any other subject of interest to the members.

G3.3 Maps of project location and zone

The thousands of individual project areas are presented as follows:

- Appendix 01. This is a Landsat 4/5 image of the project zone, with dots depicting the location of each discrete project area.
- Appendix 02. This is a Landsat 7 image of the project zone, with dots depicting the location of each discrete project area.
- Appendix 03. This is a KML file for use in Google Earth that has the GPS track of each project area. Although the native format is for Google Earth, it is a GIS file that can be imported into other GIS programs.

G3.4 Project Lifetime

The project life is at least 30 years, beginning January 1, 2003 and ending December 31, 2032. If AR climate change programs continue to provide revenues to these subsistence farmers for maintaining their forests, the project life can be extended.

Justification: TIST, as a project, began with training, in late 1999, and tree planting, per se, began in Tanzania in 2000. The project, including tree planting, began in Uganda in 2003.

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.

Implementation Schedule:

2003 Initial field visit, consultation with local stakeholders, hold initial seminars, registration of initial Small Group members, planting of first trees, deploy monitoring system, hire local staff, hire and train Quantifiers, begin training trainers.

2004-2010 Project expansion focused on adding new groups, members and trees. Continue with regular monitoring and training. Hold regular seminars. Ongoing and regular consultation with stakeholders.

2011 VCS and CCB validation and first verification.

2012-2063 Periodic verifications to be held in accordance with the minimums required by the CCB and VCS standards. Project expansion focused on adding new groups, members and trees. Continue with regular monitoring and training. Hold regular seminars. Ongoing and regular consultation with stakeholders.

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 frequently 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

G3.5 Natural and human-induced risks

The long-term sustainability of TIST is dependent upon a carbon market for afforestation/reforestation credits. As of the date of this PD, the market for CDM-based AR credits is essentially nonexistent. AR credits have been locked out of the largest trading system (i.e. the EUETS) and buyers have no practical use for the currency (i.e. tCERs). The market for VCS credits exists but, by definition, is dependent upon the entities buying credits to voluntarily offset their carbon emissions. An expected US market may or may not materialize and, if it does, may or may not allow AR credits.

TIST is different than most AR projects, in that it was created for small-scale subsistence farmers. Because of the rules of CDM, many of the farmers in this PD have project areas too small to meet the Host Country definition of a forest. Should VCS, or a possible US program, put the same limitation on size, many of the farmers in TIST will no longer be eligible to participate in the carbon market and will lose the financial incentive to participate in the program. TIST has mitigated this risk by achieving what it has, at the lowest costs possible. Rather than using expensive Western experts, it has deployed a sophisticated, yet easy to use, monitoring system and relies on capacity building with the Small Group members and their desire to improve their lives.

Another risk is that farmers will drop out of the program. This is mitigated by the fact that there are thousands of individuals involved already and TIST continues to grow. Having a few farmers quit will not have a significant effect on the project.

Natural risks include drought, pestilence and fire. These, however, are mitigated by the fact there are thousands of individual project areas spread over thousands of square kilometers. We provide training on minimizing risks from fires in newsletter and in training broadcasts on area radio programming.

G3.6 Maintenance of the high conservation value attributes

Ongoing deforestation in Uganda is a fact. The project areas have been settled for generations and little, if any, of the natural biodiversity exists. The continued need for wood and the expanding population has carried the deforestation into the protected forest, having a negative effect on biodiversity there, too. TIST is reversing this trend by planting millions of new trees, many of them indigenous. While some parties have raised barriers to prevent AR credits from participating in a global carbon market, TIST has recognized that nearly 20% of deforestation is a result of the need for wood for cooking and heating. This type of program is the only way to provide the resources needed by this vast population of subsistence farmers, as well as make a positive impact on biodiversity.

TIST trees are planted on the lands of small hold farmers, so the maintenance of HCV areas is indirect. The proximity of the Project Areas to the HCV forests will reduce illegal wood harvesting. The addition of indigenous trees, tree cover and fruit trees enhance biodiversity by providing an expanded range for some of the animals that rely on the HCV area. TIST trees are being planted where deforestation has taken place and the addition of many discrete project areas helps improve the wild life corridors between HCV areas needed for healthy animal populations.

G3.7 Measures to maintain benefits beyond the project lifetime

TIST is a comprehensive program that includes training in climate change and biodiversity. The following describes some of the training and their benefits.

- Training in the benefits of specific tree species will result in more trees selected that have a value other than as harvested wood or for carbon revenue. Examples include: macadamia trees for their nuts, citrus trees for their fruits and *Croton megalocarpus* as a source for biofuels.
- Training in the maintenance of a sustainable woodlot. Wood and charcoal are some of the greatest expenses for subsistence farmers. Learning the value and convenience of a sustainable woodlot will ensure that it is maintained beyond the life of the project.
- Training in the benefits of biodiversity will help the farmers make the choice to keep trees, rather than cut them down. The benefits include more productive soil, return of edible indigenous plants, enhanced area ecotourism, and return of native wildlife that is useful to them personally (e.g. bees).

G3.8 Communities and other stakeholders

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 and over local radio programming.

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.

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,	As churches, we have grown trees on our land. Do we, also,

0782-584759	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,	Of the youth who have land, we don't have money to invest, so

Makerere University, ainemmyx@yahoo.com	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.

There have been no negative comments received suggesting that TIST should not exist.

G3.9 Publicizing the CCBA public comment period

TIST announced the intent to apply for a CCBA validation in Kampala papers, announced a public meeting and held a public meeting. In addition, emails were sent to stakeholders announcing the public meeting, announcing the intent to apply and providing a link to the CCBA website where the project description is posted. Specifics regarding the announcements, public meeting, emails and email recipients are in support document "TIST UG PD-VCS-Ex 14 Public Comments PD-001.doc."

G3.10 Handling unresolved conflicts and grievances

TIST has already gone through this process and there have been no grievances, or conflicts. This is because the program is voluntary, participants use their own land and it is considered environmentally and socially beneficial.

As a policy, all grievances are first brought to the attention of the Uganda Staff, where the issues are compared to standard TIST policy, TIST values[23] and/or the Greenhouse Gas agreement among the Small Group members and CAAC. The policies and values are the subject of training at seminars, in the field and are published in the newsletter. Unresolved issues are presented to TIST Management. Where precedence or policy exists, they are used in final decision-making. Where new issues arise that are outside the existing precedence, or policy, decisions are made by Uganda Staff and TIST Management.

G3.11 Project Financial Support

TIST began, in late 1999, on the expectation that once the trees were large enough, the project would be self-funding. A series of financial projections were developed that showed that after six to ten years (depending on different financial cases regarding market price, growth rate, tree mortality, etc.) the project would be sustainable based solely on carbon revenues. The key to success was very low costs. TIST has designed the program to minimize cost, developing an award winning monitoring system, building Host Country capacity and relying on voluntary effort. Still, there is a cash shortfall in the early years of the project. This has beens made up by external sources. CAAC has provided funding to make up this shortfall on the carbon side, through its own profits and advanced sales of credits. I4EI has provided sustainable development funding that offsets much of the project cost, obtaining funding through private donors. The fact that TIST is in its 12th year demonstrates its longevity.

G4. Management Capacity and Best Practices

G4.1 Project Proponent

The project proponent is Clean Air Action Corporation (CAAC). The role of CAAC and other parties involved with TIST are summarized:

- **Clean Air Action Corporation (CAAC)** is a for-profit US corporation that manages the GhG component of TIST. CAAC is TIST’s largest contributor, provides technical assistance and uses its host country subsidiaries to manage operations.
- **Institute of Environmental Innovation (I4EI)**, a US based non-profit organization, manages the TIST sustainable development program components. I4EI provides funding from government agencies, foundations, and private donors.

[23] TIST Values: We are Honest. We are Accurate. We are Mutually Accountable. We are Transparent. We are Servants to each other.

- **Berkeley Reafforestation Trust (BRT)**, a UK charity dedicated to planting trees and protecting forests in damaged environments. BRT has provided sustainable development funding to TIST Uganda.
- **Thousands of TIST Farmers** make up the Small Groups, plant the trees on their lands, manage their own trees and make up the core or TIST.

G4.2 Document key technical skills for successful implementation

The two founders of CAAC have almost 75 years combined experience in energy, natural resources, monitoring, quality control, transportation, biofuels, pollution control technologies, emission trading, trading program development, third party due diligence, computer technology and management. They began CAAC in 1993 and helped develop emission trading programs in the US and Canada and were responsible for many firsts in innovative emission control (See CAAC website).

TIST was established in direct response to the needs developed and expressed by Small Groups of Tanzanian subsistence farmers in 1999 and 2000. Attending a Small Group training seminar organized by the Anglican Diocese of Mpwapwa in July 1999, one of CAAC's founders participated in a visioning exercise with local subsistence farmers. They expressed deep concern about recurrent famine, poor crops, lack of shade and firewood, declining rainfall, declining soil fertility, poor access to water for personal and agricultural use, poor diet, regular health problems including TB and Malaria, lack of economic opportunity, poor cattle forage on eroded lands, and the decline of wildlife due to over hunting and lack of forests. The Small Group seminar, however, did not stop with identifying the local problems; participants established the goals of starting hundreds of Small Groups to plant trees, reduce poverty, improve health, and prevent famine. They decided the groups should work together with each other, and with resources in the US and the UK, to share “njia bora” (best practices) and to start achieving the goals.

With CAAC's involvement with nascent GhG trading in Canada, there was an obvious way to bring these improvements to the farmers using carbon credits as a financial tool.

TIST has been operating successfully for over 11 years and has expanded to four countries, 65,000 farmers and planted over 11,000,000 documented trees. The monitoring system they developed won a Computerworld Honors Laureate in 2007. TIST has a registered CDM project in India.

The following summarizes CAAC carbon project development experience:

- **TIST Program, Tanzania**, a small-hold farmer A/R project. It began in 1999, with the first tree planting in 2000. The project is centered around Mpwapwa and Morogoro and includes over 2,000 farmers.

- **TIST Program, India**, a small-hold farmer A/R project. It began in 2002 in the rural area outside of Chennai, Tamil Nadu. There are over 4,700 farmers. A subset of the project areas has been validated and registered as a CDM project.

- **TIST Program, Uganda**, a small-hold farmer A/R project. It began in 2003 and is centered around three towns in southwest Uganda (Bushenyi, Kabale and Kanungu). There are over 5,000 farmers and almost five million trees. The DNA approved the project contingent on submitting a PDD based on an approved methodology. They also approved the EIA.

- **TIST Program, Kenya**, a series of small-hold farmer A/R projects. The project started in 2004 and is centered around Mt Kenya. There are over 52,000 farmers involved. The project has been accepted by the forest department and DNA for CDM. An EIA was accepted by the National Environmental Management Authority (NEMA). TIST Kenya has four validated and verified VCS projects, all of which were also validated and verified under CCB.

- **TIST Program, Mbeere Kenya**, a series of small-hold farmer A/R projects. The project started in 2009 and is centered around Embu Kenya. This is a separate project from the rest of Kenya because it has a different funder/partner, Catholic Relief Services (CRS). It uses the same monitoring plan as the other TIST projects.

- **Sulfur Hexafluoride Emission Reductions** from electric power equipment in substations of Duquesne Light Company. Reductions were made at numerous locations in Pennsylvania from 1996 through 1999. The reductions were approved as credits under the Pilot Emissions Reduction Trading Program (PERT) in Ontario Canada. CAAC managed the project.

- **Methane emission reductions** through the recovery of landfill gas from the Lancaster Landfill in Lancaster, New York. Reductions were made 1995 through 1998. The reductions were approved as credits under the Pilot Emissions Reduction Trading Program (PERT) in Ontario Canada. CAAC managed the project.

G4.3 Developing Local Capacity

TIST began in the area with a series of orientation seminars such as identified in G3.8. TIST members were introduced to the program and participated in the customization of the program to the locale. Most of the local staff was hired from the TIST membership. All Quantifiers and trainers are from the local membership. Staff and Quantifiers were hired based on ability, not gender, tribe, cultural background, or level of education. However, all effort was made to ensure a balance in gender and tribal affiliation. Training is passed on to new workers through the seminars and working with an experienced TIST member. As needed, the US team holds seminars to provide new information.

Quantifiers receive ongoing training as needed and attend a training seminar at least once per year. During these seminars, they are trained on the TIST monitoring plan, which includes use of the PDAs and GPS, use of the custom data collection software, how to maintain their data, synchronizing their data with the TIST server, the importance of good data, taking tracks of the project area perimeters, taking secondary track of the project area perimeters, counting trees, the importance of proper tree counts, identifying tree species and tree ages, taking proper circumference measurements, keeping accurate expenses, GhG contracts and any new program initiated.

Small Groups training is ongoing. Small Groups are encouraged to meet weekly to plan how to work together, share training and share best practices. Groups also receive training when they receive payments (usually twice each year). Additional training is carried out in the field, on-site by Quantifiers and volunteer Trainers, and through a monthly newsletter, “The Tree” published by TIST Uganda. Training includes conservation farming, biodiversity, improved cook stoves, the GhG contract, climate change, selecting tree species, the benefits of different species, preparing nurseries, tree management, HIV/AIDS, malaria and other subjects of interest to the members.

G4.4 Equal Opportunity Employment

TIST does not have an expatriate staff. Although the main management staff and computer development are in the US, Ugandans run the Uganda program from project areas. The Quantifiers are TIST farmers trained to use the monitoring system. The land and trees planted belong to the TIST farmers. The TIST farmers work together to establish the best practices for their area (whereas the Kenyan and Indian farmers establish their own best practices more suitable to their areas). TIST farmers are trained as trainers. Ugandans run cluster meetings and Small Group meetings. All TIST members have an opportunity to be group leaders, regardless of education or gender. TIST members are utilized as volunteers, independent contractors and employees based on achievement, not gender, education or social status. TIST holds regular training seminars for Quantifiers and conducts regular audits to make sure their skills are honed.

G4.5 Relevant workers right laws

The employment laws are listed below. CAAC uses Uganda 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

G4.6 Occupational Safety

TIST members are conducting activities that they normally do, i.e. farming using manual labor. TIST workers walk or use public transportation. They do not engage in activities that are inherently unsafe. The risks facing TIST workers are minimal and no different than those affecting anyone living in the area. Such risks include:

- riding in a matatu and bota-botas (the local mini bus transportation and motor bike, respectively) where there is risk of crash or robbery;
- venomous or constricting snakes, which, although have been mostly eradicated from the farmlands, still can be encountered.

TIST has a Standard Operating Procedure to address safety. To ensure that safety policy and safety issues are understood, each Quantifier was briefed on the policy.[24]

G4.7 Financial health of CAAC

CAAC has been in business since 1993 and has operated TIST for over 10 years. CAAC is profitable after all TIST expenses. Financial statements and a financial plan were made available to the Validator.

G5. Legal Status and Property Rights

G5.1 List of all relevant local, national and international laws

As a tree-planting program that takes place voluntarily on existing farmland, there are few laws that are relevant to TIST. They are, however:

- The employment laws listed in G4.5. CAAC uses local counsel to advise on issues relating to employment.
- Companies Act, Cap. 110). CAAC is registered as a branch and is in good standing to operate in Uganda.
- 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.[25] 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.[26]
- 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."

G5.2 Project Approvals

There are no approvals necessary for a farmer to plant trees on his/her lands. However, TIST has engaged the Uganda Forest Service and local forest and environmental offices to seek their approval. TIST has received the following approvals and support:

- 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

[24] See " TIST UG PD-VCS-Ex 15 Quantifier Safety 110110.doc"
[25] See Exhibit 01: TIST UG PD-VCS-Ex 01 Environmental Screening 060803.pdf
[26] See Exhibit 02: TIST UG PD-VCS-Ex 02 NEMA EA Approval 070515.pdf

further environmental assessment at this stage", citing the many benefits of the TIST program.

- Mugyenyi Cyril, District Head of Natural Resources, Bushenyi Local Government, 10 October 2008. "TIST has benefited a large number of farmers in Bushenyi District…I highly commend the work you are doing."

- Perez R. Kakumu, Disrtict Forestry Officer, Bushenyi Local Government, 27 June 2007. "We recognize that the TIST program brings about sustainable development and improves the environments by training Ugandan farmers to plant trees, practice sustainable agriculture and improve their health…The District Forestry Service will continue to support the TIST program in its expansion by continuing to provide training to TIST Small Group and trainers in the existing an new areas."

G5.3 Document project will not encroach on other lands

CAAC and TIST do not own or lease any of the project lands. TIST takes place on the existing land of farmers and their families. CAAC enters into contracts with the Small Group members. In the contract, the members attest in that they have the rights to plant on these lands.

G5.4 Involuntary relocation

CAAC and TIST do not own or lease any of the project lands. TIST takes place on the existing land of farmers and their families. Participation is strictly voluntary. CAAC has no authority to relocate any of the members or landowners.

G5.5 Illegal Activities

Illegal harvesting of trees and charcoal making exist in the protected forests of the project zone. This is an ongoing problem for Ugandan forestry and is not related to TIST or caused by TIST. TIST, through its development of on-farm, sustainable, wood lots, has had a positive impact on these activities by providing an alternate, sustainable source of fuel to some of the population.

G5.6 Title to carbon rights

Greenhouse Gas Agreements among all the Small Groups, with each member as a signatory, and CAAC exist. Under the terms of the contract, all rights and title to the carbon is transferred to CAAC. The members retain the land and trees. There is not a national law that governs carbon, per se. However, the ownership of tree and tree products can be subject to contract and transferred to others.

Climate Section

CL1. Net Positive Climate Impacts

CL1.1 Change in carbon stock due to project activity

The change in carbon stocks due to project activities are based on 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* as adopted by the Voluntary Carbon Standard.

Change with the project. The change with the project is based on the ex-ante estimation required of the methodology. The trees to be planted are stratified by major species and year planted and each strata is grown over time, based on accepted annual volume increments. The following lists the major species and the factors used to estimate the sequestered carbon that result from TIST trees.

<u>Pinus patula</u>

Iv = 24 m3/ha/yr.27
Where:
I_v = annual increment in volume based on over the bark log volumes.
BEF = 1.3.[28]
WD = 0.45 t.d.m/m^3.[29]
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.[30]

<u>Eucalyptus spp.</u>

I_v = 32.5 m^3/ha/yr.[31]
Where:
I_v = annual increment in volume based on over the bark log volumes.
BEF = 1.5.[32]

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[27] Winrock International, "Fact Sheet, A quick guide to multipurpose trees from around the world," Fact 98-05, September 1998. ("Winrock Fact Sheet 98-05"). Accessed 22 September 2010 at http://www.winrock.org/fnrm/factnet/factpub/FACTSH/grevillea.htm.
[28] GPG-LULUCF, Table 3A.1.10, Default Values Of Biomass Expansion Factors (BEF), Tropical, pines.
[29] 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.
[30] GPG-LULUCF, Table 3A.1.8, Tropical/Sub-tropical dry forest.
[31] 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.

WD = 0.51 t.d.m/m^3.[33]

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.[34]

Grevillea robusta

I_v = 12 m^3/ha/yr.[35]

Where: I_v = annual increment in volume based on over the bark log volumes.

BEF = 1.5.[36]

WD = 0.60 t.d.m/m^3.[37]

R = 0.27.[38]

Cupressus spp.

I_v = 24 m^3/ha/yr.[39]

Where:

I_v = annual increment in volume based on over the bark log volumes.

BEF = 1.2.[40]

WD = 0.43 t.d.m/m^3.[41]

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.[42]

Other Africa, Dry Tropical

N_A = 15 t.d.m/ha/yr.[43]

Where: N_A = annual increment of above ground biomass, t.d.m/ha/yr

BEF = 1.5.[44]

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[32] GPG-LULUCF, Table 3A.1.10, Default Values Of Biomass Expansion Factors (BEF), Tropical, broadleaf.

[33] 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.

[34] GPG-LULUCF, Table 3A.1.8, Temperate broadleaf forest/plantation, Eucalyptus Plantation. AGB means aboveground biomass.

[35] Winrock International, "Fact Sheet, A quick guide to multipurpose trees from around the world," Fact 98-05, September 1998. ("Winrock Fact Sheet 98-05"). Accessed 22 September 2010 at http://www.winrock.org/fnrm/factnet/factpub/FACTSH/grevillea.htm.

[36] GPG-LULUCF, Table 3A.1.10, Default Values Of Biomass Expansion Factors (BEF), Tropical, broadleaf.

[37] Winrock Fact Sheet 98-05.

[38] GPG-LULUCF, Table 3A.1.8, Tropical/Sub-tropical dry forest.

[39] GPG-LULUCF, Table 3A.1.7, Average Annual Above Ground Net Increment in Volume in Plantations By Species.

[40] GPG-LULUCF, Table 3A.1.10, Default Values Of Biomass Expansion Factors (BEF), Tropical, Pines.

[41] 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.

[42] GPG-LULUCF, Table 3A.1.8, Conifer forest/plantation. AGB means aboveground biomass.

[43] GPG-LULUCF, Table 3A.1.6, Annual Average Above Ground Biomass Increment in Plantations By Broad Category, Africa, Other Species, Dry.

[44] GPG-LULUCF, Table 3A.1.10, Default Values Of Biomass Expansion Factors (BEF), Tropical, Pine.

WD = 0.60 t.d.m/m^3.[45]
R = 0.27.[46]

The age class of the strata is based on the age of the trees already planted and listed in worksheet "Strata." The data is tabulated in worksheets "Ex-Ante Carbon Est" and "Ex-Ante Strata Est" and presented in worksheet "Table CL1.1."

Change without the Project. The methodology allows the change in baseline carbon without the project to be ignored, providing it is less than 10% of the change in carbon that results from the project. The existing trees were recorded and measured during the baseline study (worksheet "Baseline Strata"). The non-woody areas were stratified and the area estimated (worksheet "Grove Summary). A conservative case was used to estimate the increase in carbon overtime (worksheet "Baseline Growth"). The ex-ante estimate of the baseline without the project is 0.3% of the ex-ante estimate with the project and the baseline case is ignored in the calculations.

Net change in Carbon Stocks. Due to the methodology, the change in baseline carbon is ignored and the ex ante net change in carbon stocks is 1,487,293 tonnes of CO_2e.

CL1.2 Change in the emissions of non-CO_2 GHG emissions

The change in emissions of non-CO_2 carbon stocks is expected to be below 5% and is ignored.

The potential source of methane is burning of biomass. Because the farmers planting the trees are subsistence farmers that rely on wood for cooking food, they are not expected to engage in widespread burning; available wood will be used for domestic fuel and would just offset fuel wood gathered from outside the project area. In addition, the burning of biomass is neither necessary for the project, nor promoted. Any methane emissions have been and are expected to stay de minimis and well below the 5% threshold.

N_2O is a potential source from chemical 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.

CL1.3 GHG emissions resulting from project activities

In accordance with the methodology, ex ante leakage is assumed to be zero. TIST does not own any vehicles or fossil fuel equipment. Planting and site preparation is done manually. TIST promotes the use of natural fertilizers and does not supply any chemical fertilizers. N-fixing species are not left to degrade. Any dead wood is used by the farmers for fuel wood.

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[45] A sample set of tree counts by species planted by TIST farmers around Mt Kenya was obtained from the TIST database. The wood densities where tree counts of a species exceeded 500 trees were obtained and a weighted average was calculated. See Table 4.3.B.
[46] GPG-LULUCF, Table 3A.1.8, Tropical/Sub-tropical dry forest.

CL1.4 Demonstrate a positive net climate impact

The ex-ante estimate is that TIST trees will sequester 1,487,293 tonnes of CO_2e over the 30 years and will, therefore, have a net positive impact on the climate. At the time of the first verification about 145,000 tonnes had been sequestered. In addition, planting the trees has benefited the overall ecosystem and, through the use of deadwood from the project, resulted in reduced deforestation outside the project boundaries.

CL1.5 Double Counting

The project areas that make up this CCB PD are being validated and verified under VCS. If they are validated and verified, VCS will issue VERs that will be entered on one registry. The registry rules will prevent these VERs from being sold twice.

Uganda is not subject to an emissions cap.

CL2. Offsite Climate Impacts (Leakage)

CL2.1 Potential Sources of Leakage

It was determined that there is no leakage from the project. The potential sources of leakage were reviewed and the reasons why these don't apply to the project are presented.

- **Activity shifting or displacement:** The members of TIST were questioned, as part of the baseline survey, to determine if planting trees would cause shifting of activity or displacement. They stated "no". In addition, the value of the carbon that the trees generate is very small compared to the value of the crops the land can provide. Since, by definition, these crops are the primary source of food for the farmers, the farmers did not displace their primary activity. Because membership is voluntary, there is no reason for any displacement to occur. While TIST farmers are encouraged to plant trees around their homes, they are never asked or encouraged to move from their residence.
- **Market effects (effect of reduced harvest):** The project areas are owned by the farmers and the trees are new sources of wood for them. The need for fuel wood is one of the main reasons Uganda has been undergoing deforestation. Farmers, either directly or indirectly, take wood from gazetted forest. The project has allowed the farmers to use the deadwood produced by their project trees, providing a more convenient and lower cost fuel source and reducing the pressure on the gazetted forests.

CL2.2 Leakage mitigation

Because no leakage sources were identified, no mitigation is necessary.

CL2.3 Subtracting unmitigated leakage

Because no leakage was identified, the amount to be subtracted from the net climate impact of the project is zero.

CL2.4 Non-CO_2 leakage in excess of 5%

None were identified.

CL3. Climate Impacts Monitoring

CL3.1 Initial Monitoring Plan

Because TIST was designed as a climate change project and has been operational since 2003, the monitoring plan in this section is operational.

Each project area is owned and managed by a different group of people, which TIST calls Small Groups. 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 own and maintain the trees and the tree products. 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, training, 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 allow 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.

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.

Monitoring change in baseline carbon. The selected CDM/VCS methodology did not require monitoring of the baseline. As determined with the ex-ante calculation, the change in baseline carbons stocks was fixed at the value derived in Section G2.3.

Monitoring selected carbon pools. The selected carbon pools are above ground and below ground biomass. The following monitoring plan is being used and will continue to be used.

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 is 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 is by species and year. Stratification is done within each individual project areas. 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 was assigned to a Major Stratum. All other tree species were assigned to an "Other" stratum.

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

> Pinus[47].$Y = 0.887+[(10486 \times (DBH)^{2.84})/((DBH^{2.84})+376,907)]$
> Eucalyptus[48]: $Log\ Y = -2.43 + 2.58\ Log\ C$

[47] IPCC 2006 AOLU, Annex 4A.2, Table 4.A.1. Temperate/Tropical Pines.
[48] 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

Cupressus: no species specific equations, will use "Other" equation
Other (default)[49]: $Y = (0.2035 \times DBH^{2.3196}) \times 1.2$

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

Step 5. The DBH of up to 20 trees per stratum, per project area, were measured. Height was not measured or used in the allometric equations. Each DBH value for each tree measured was applied to the appropriate allometric equation and the biomass of each per tree in the stratum was 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 was multiplied times the number of trees to yield the "above ground biomass in stratum (kg)." The results were divided by 1,000 to obtain "above ground biomass in stratum (t)."

Step 7. The methodology required the use of tons of biomass per hectare in a subsequent step. It was 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 was 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) was 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 was used.[50] The result is "below ground carbon" (t/ha).

Step 10. The total carbon stocks (CO2e) was 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.

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).
[49] 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).
[50] GPG-LULUCF, Table 3.A.1.8

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

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 aboveground 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 belowground 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)

The data monitored for monitoring actual net GhG removals by sinks were 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 was 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. The operator enters this data 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. The operator enters this data 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.

The confidence and precision levels will be assessed in future monitoring.

The following table summarizes the monitoring plan.

Data/ Para-meter	Data unit	Descrip-tion	Source of data	Value of Data[51]	Measure-ment Methods[52]	QA/QC	Comment
Location	Latitude and longitude	Single point location of the area where project activity has been implemented	GPS	See "Grove Summary" worksheet for each result	Go to each project area, take a single location point per area with GPS/PDA, up-load to server	SOP, audit and multiple visits	The location of each project area is obtained with a GPS
Project area	ha	Size of the areas where the project activity has been implemented	GPS	See "Grove Summary" worksheet for each result	Go to each project area, take a track of the perimeter with the GPS/PDA, up load to server. Software computes area inside track	SOP, audit and multiple visits	The area of each project area is obtained with a GPS by walking and mapping the boundary of the project area
DBH	cm	Diameter of tree at breast height (1.30 m)	Measur-ing tape	Multiple values specific to strata taken from selected project areas	Ongoing measurement taken by Quantifiers as they visit project areas	SOP, audit and multiple visits, multiple locations	TIST measures DBH of up to 20 representative trees of each age/species stratum in different project area
No of trees	trees	Number of trees in a project area by strata	Physical count	See "Grove Summary" worksheet for current results. This number will change over time for each project area based on replanting and mortality	Physical count by Quantifiers with each visit	SOP, audit and multiple visits	
Ownership	name	Ownership of land of project area	Project registra-tion data	See "Grove Summary" worksheet for each result	Ask members about changes in ownership. Record on PDA	SOP, audit and multiple visits	List of owners of each PA, their contract status and the status of their carbon rights will be reviewed with

[51] TBD means to be determined during quantification.
[52] PDA means personal digital assistant, the hand held computer and custom software used by TIST.

Data/ Para-meter	Data unit	Descrip-tion	Source of data	Value of Data[51]	Measure-ment Methods[52]	QA/QC	Comment
							each monitoring event to confirm ownership
Total CO2	Mg	Total CO2	Project activity	Changes over time based on tree count, strata and growth	Calculated using allometric equations and conversion factors	See above for tree count and circum-ference. Calculation subject to verification.	Based on data collected from all plots and carbon pools

Data will be maintained for at least two years following the end of the last crediting period.

TIST uses 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 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 are 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 was not counted more than once, an overlap script was used that compares the outline of all project areas. If an overlap was

detected, the project areas were visually compared. If an overlap was determined, the overlapping project area was 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 stratum, in a project area, are taken and archived to develop a localized database of growth data by strata. This data provides the circumference data for each stratum. This sampling exceeds the 10% precision, at the 95% confidence level, required by the methodology.
- **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 day 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.

Monitoring Leakage. Leakage was monitored within five years of the start of the project, by surveying the members responsible for a discrete project area, on whether participation in the program caused leakage, in the form of displaced activity. The answers were universally no. Because no leakage has been identified, no further leakage monitoring is necessary.

CL3.2 Commit to developing a full monitoring plan

A full monitoring plan was developed and is available as Appendix 06.[53]

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[53] Appendix 06 is "TIST UG PD-CCB-001g App06 Monitoring Plan 111102.doc"

Community Section

CM1. Net Positive Community Impacts

CM1.1 Impacts on community

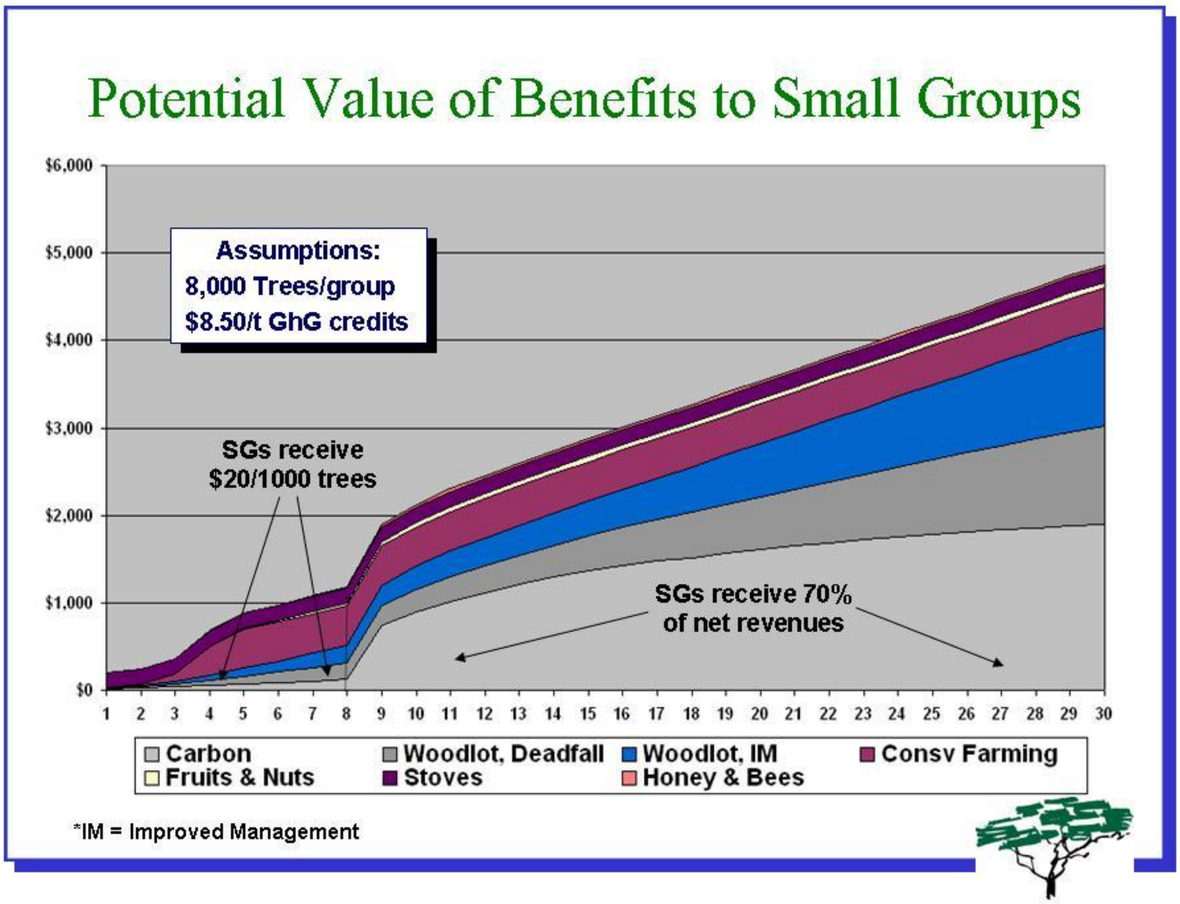
The project creates a positive socio-economic impact. Some of the benefits that have been realized by the Small Group members and their families include:

- **New job opportunities:** TIST requires a Host Country staff to operate. There are currently four staff employees and 18 Quantifiers. 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.
- **Fruits and nuts from tree plantings:** The members select the trees to plant on their land and retain ownership of the trees and their products. To the extent that they plant fruit or nut trees, they gain the food security and economic benefits the trees provide.
- **Wood products and limited timber from trees:** Besides owning the trees, the farmers have the rights to all dead wood. They may prune branches and collect fallen branches. The growth models used for extrapolating biomass includes up to 70% mortality over a 30-year period. The farmers can use this biomass for their own consumption without affecting the estimated carbon stocks. In addition, the farmers may thin their trees as part of the on-going management of the project area and sell the harvested stems as timber.
- **Natural medicines, insecticides and other benefits from trees:** Some of the trees, such as the Neem and moringa, provide other non-wood related benefits.
- **Capacity building on agricultural improvements, business skills, nursery development, and reforestation:** TIST has a well developed capacity building program that promotes rotating leadership within the Small Groups, that focuses on gender equality and is made available to all members, regardless of education or social standing. TIST provides training in subjects such as conservation farming, nursery development reforestation, climate change, biodiversity, building and using more fuel-efficient stoves and runs the program like a business.
- **Small Groups organize to deal with other social and economic problems such as famine and AIDS.** TIST also supplies training in these subjects. Famine is also addressed

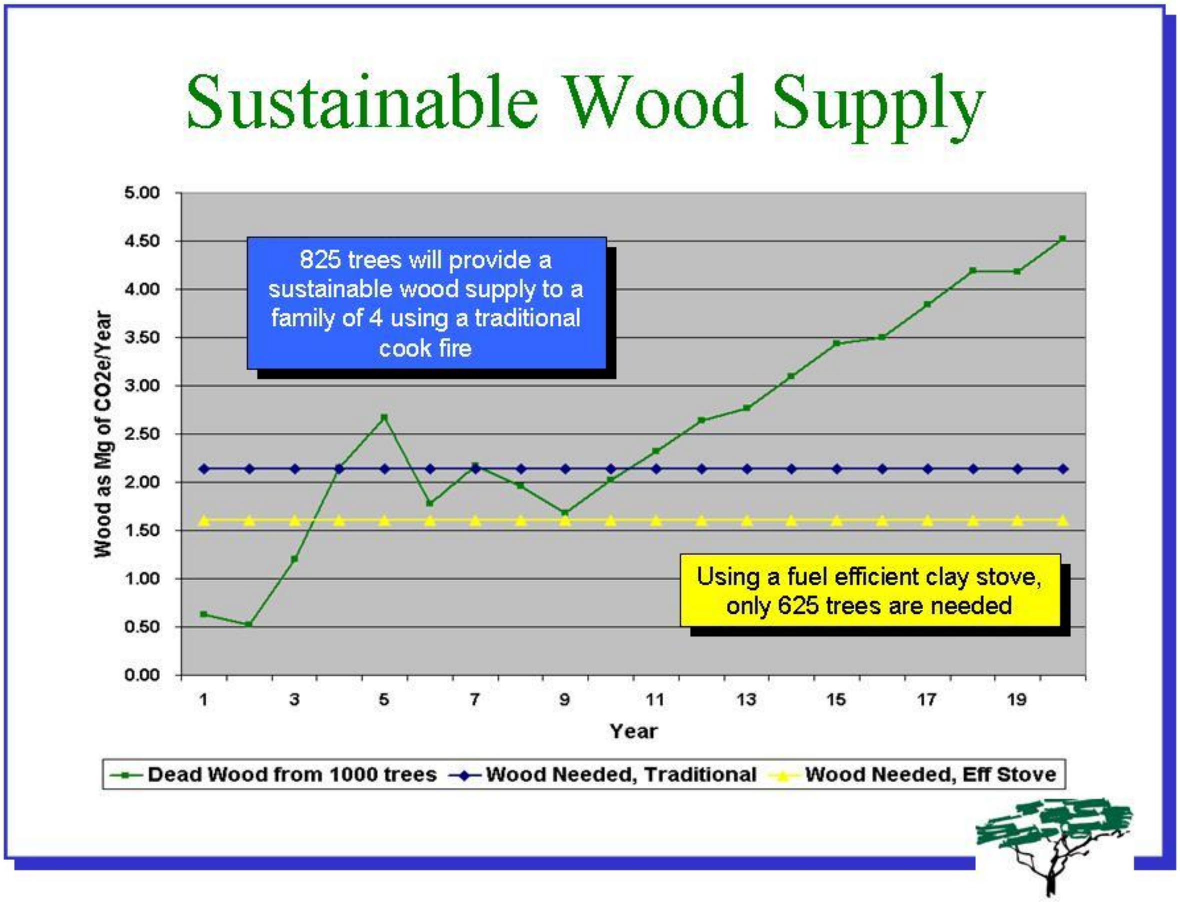
with the FAO Conservation Farming program, which can lead to over a doubling of crop yield for practitioners, and through proper tree selection (fruits and nut).

- **Improved beauty of the landscape:** This is a welcome attribute in an overused and degraded landscape.

The economic value to each member is dependent on which program elements they choose to adopt. The following chart illustrates the combined potential of several programs over time. As noted on the chart, it assumes that the Small Group plants 8,000 trees, which is about 1,000 trees per person. Underlying assumptions are based on conservative adoption rates and values gathered from TIST members.



Another benefit that the program provides is the potential for a sustainable fuel wood supply. The following chart models the deadwood available from planting 825 trees and how it can, if managed properly, lead to a sustainable wood supply for a family of four. The number of trees can be reduced by adopting fuel saving stoves.



TIST's goal is to surpass "sustainability," so that people meet their needs today, in ways that improve the next generation's ability to meet its needs in the future.

Comparison with "without project" scenario. Quite simply, none of these benefits would exist without the project. There would be no carbon revenues, no incentive to take farmland out of production to garner a long-term benefit, no new trees that can provide food and economic benefits from their products, no training in sustainable development activities and no new employment opportunities.

CM1.2 No High Conservation Values negatively affected

The project does not have a negative effect on the HCV areas. The project takes place on private lands that have been under human habitation and agriculture for generations. The planting of trees for the program does not cause displacement or move activities to the HCV areas. On the contrary, the two greatest threats to the HCV areas are deforestation and loss of biodiversity. The planting of new trees and availability of some of the biomass for use by the participants reduces deforestation pressure. The planting of woodlots on farms, especially where indigenous trees are planted, has improved biodiversity and helps connect dispersed HCV areas with canopy.

CM2. Offsite Stakeholder Impacts

CM2.1 Identify potential negative offsite stakeholder impacts

Because the project takes place on private lands and the tree planting is by the landowners, and because the planting of trees is akin to the farming that has taken place on the lands for generations, there are few negative potential impacts to offsite stakeholders.

One that has been identified is the effect of eucalyptus trees on ground water and watercourses. As stated, the farmers get to choose the type of trees they plant on their own lands. During training, TIST has been clear about some of the negative effects of eucalyptus trees, and there is ongoing training about alternatives to eucalyptus.

CM2.2 Mitigation of negative offsite stakeholder impacts

In order to reduce the number of eucalyptus trees, TIST has been training members and trainers on indigenous trees and their benefits, as well as the negative effects of eucalyptus in sensitive areas.

CM2.3 No net negative impact

The multitude of listed benefits to the community members and benefits to the environment are much greater than the potential negative impact from the eucalyptus. Quantified, there are 314.8 ha of eucalyptus, out of 1,613.6 ha total project areas. This can be compared to the thousands of square kilometers that make up the project zone.

CM3. Community Impact Monitoring

CM3.1 Initial monitoring plan of community variable

The following were the components of the initial Community Impact Monitoring plan.

1. Number of Small Group members in PD (male and female).
2. Number of Small Groups in PD.
3. Number of community members in TIST Uganda (male and female).
4. Number of Small Groups in TIST Uganda.
5. Number of community members active in TIST Uganda.
6. Number of community members adopting natural resource management practices.
7. Number of community members with greenhouse gas agreements with TIST.
8. Total payments to community.
9. Number of live trees planted by TIST Small Groups.
10. Number of fruit or nut trees in TIST Uganda.
11. Number of eucalyptus trees in TIST Uganda.
12. Number of people employed by TIST or under contract to deliver services.

In addition, many more program components, such as GPS tracts of all the project areas, were obtained in the climate change monitoring plan.

Monitoring is generally done annually as part of the overall monitoring of TIST. TIST Quantifiers collect data as they visit each Small Group to count trees by species. Contracts are collected and recorded by the administrative staff. The number of people employed or under contract with TIST and the amount of GhG payments to Small Groups are obtained from administrative records.

Field data are recorded on custom programmed hand held computers and uploaded to the TIST database. Data will be kept at least three years from the end of the reporting period.

CM3.2 Initial monitoring plan of HCV impacts

Because the project takes place on private lands that have been under human habitation and agriculture for generations, there is no direct monitoring of HCV areas. Instead, the impact is addressed by the number of indigenous trees planted by the project and the numbers of hectares that contain indigenous trees.

CM3.3 Develop a full monitoring plan

A full monitoring plan was developed and is available as Appendix 06.
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Biodiversity Section

B1: Net Positive Biodiversity Impacts

B1.1 Changes in biodiversity as a result of the project

As noted, the project areas were grasslands or croplands on private lands owned by subsistence farmers. They have a history of farming and as such, the baseline biodiversity is extremely low. Natural wildlife populations were eliminated or driven off long ago and are currently restricted to transient animals. As such, the approach to improving biodiversity in the project areas must start with the basics and, in this case, meant establishing tree cover and planting indigenous trees. Isolated woodlots, especially those with indigenous trees, improve the connectivity of wildlife between natural forests.

Indigenous tree planting data are based on an evaluation of data provided from the monitoring plan, including tree counts by species and by project area. The results of indigenous tree planting to date are:

- Over 4,587 new indigenous trees
- 6.22 ha of indigenous trees

The Table B1.1 lists the indigenous species planted by TIST in Uganda to date.

Table B1.1 Indigenous Tree Species

Scientific Name	**Common name**	**Height (m)**	**Indigenous**
Acacia abyssinica	Flat-top Acacia	15	yes
Acacia albida	White Acacia	30	yes
Acacia mellifera	Black Thorn	7	yes
Acacia senegal	Gum Acacia	15	yes
Acacia seyal	Whistling Thorn, White Thorn	17	yes
Acacia spp.	Acacia	7+	yes
Acacia tanganyikensis	Mheme	15	yes
Acacia tortilis	Umbrella Thorn Acacia	18	yes
Acokanthera oppositifolia	Poison Arrow Tree	6	yes
Adansonia digitata	Baobab	25	yes
Albizia gummifera	Peacock Flower	30	yes
Annona senegalensis	Wild Soursop	6	yes
Annona spp.	Annona	6+	yes
Boscia coriacea	Boscia coriacea	7	yes
Brachystegia spiciformis	Bean-Pod Tree	25	yes
Brachystegia spp.	Miombo	20+	yes
Calyptrothea taiensis	Mwolowolo	6	yes
Cordia Africana	East African Cordia	15	yes

Table B1.1 Indigenous Tree Species			
Scientific Name	**Common name**	**Height (m)**	**Indigenous**
Canarium schweinfurthii	Bush Candle, Gum Resin	50	yes
Celtis durandii	White Stinkwood	25	yes
Combretum longispicatum	Mlama, Mgombogombo	8	yes
Combretum molle	Velvet Bush Willow	13	yes
Commiphora africana	African Myrrh	10	yes
Commiphora stuhlmanni	Mdonho	5	yes
Cordia sinensis	Nyamate, Gundi	8	yes
Croton megalocarpus	Croton	35	yes
Croton sylvaticus	Woodland Croton	30	yes
Cussonia holstii	Cabbage Tree	20	yes
Dalbergia lactea	Large-Leaved Climbing Dalbergia	9	yes
Dalbergia melanoxylon	African Blackwood	7.5	yes
Delonix elata	Flamboyant Tree	15	yes
Dichrostachys cinerea	Sickle Bush	7	yes
Dombeya rotundifolia	Wild Pear	6	yes
Dombeya spp.	Dombeya	5+	yes
Dovyalis abyssinica	Abyssinian Gooseberry	8	yes
Ehretia cymosa	Du-Tsho, Murembu	10	yes
Elaeis guineensis	African Oil Palm	20	yes
Ensete ventricosum	Wild/Abyssinian Banana	12	yes
Entada abyssinica	Tree Entanda	15	yes
Entandrophragma bussei	Wooden Banana	20	yes
Erythrina abyssinica	Coral Tree	15	yes
Euclea divinorum	Magic Gwarra	6	yes
Euphorbia friesiorum	Spurge	9	yes
Euphorbia tirucalli	Pencil	12	yes
Faidherbia albida	Apple-Ring Acacia	30	yes
Ficus sycomorus	Sycamore Fig	20	yes
Ficus thonningii	Common Wild Fig	20	yes
Flacourtia indica	Indian plum	10	yes
Garcinia buchananii	Garcinia buchananii	15	yes
Garcinia livingstonei	Low Veld Mangosteen	10	yes
Grewia bicolor	Bastard/False Brandy Bush, Two-Coloured Grewia	7	yes
Hagenia abyssinica	African Rosewood, Kousso	20	yes
Harungana spp.	Blood Tree, Orange-Milk Tree	25	yes
Khaya nyasica	African Mahogany	60	yes
Lonchocarpus capassa	Rain Tree, Apple Leaf	21	yes

Table B1.1 Indigenous Tree Species			
Scientific Name	**Common name**	**Height (m)**	**Indigenous**
Lovoa swynnertonii	Brown Mahogany	50	yes
Lumnitzera racemosa	Black Mangrove	10	yes
Maesa lanceolata	False Assegai	9	yes
Maesopsis eminii	Umbrella Tree	30	yes
Markhamia lutea	Minguani, Miahangua	15	yes
Newtonia buchananii	Newtonia	40	yes
Ocotea usambarensis	East African Camphor	36	yes
Olea capensis	East African Olive Tree	10	yes
Olea europaea	Olive	10	yes
Olinia rochetiana	Kaavagariet	16	yes
Ozoroa insignis	Tropical/African Resin Tree	8	yes
Pentas longiflora	Pentas longiflora	2	yes
Phoenix reclinata	Senegal Palm, Coffee Palm	12	yes
Podocarpus falcatus	East African Yellow Wood	46	yes
Polyscias fulva	Parasol	30	yes
Populus ilicifolia	Tana River Poplar	30	yes
Prunus africana	Iron Wood, Red Stinkwood	24	yes
Rhus vulgaris	Muthura	9	yes
Rubus spp.	Rubus	5+	yes
Rumex usambarensis	Rumex	2	yes
Salvadora persica	Toothbrush Tree	7	yes
Sapium ellipticum	Jumping Seed Tree	25	yes
Sesbania sesban	Common Sesban	8	yes
Solanum aculeastrum	Bitter Apple	5	yes
Spathodea campanulata	African Tulip Tree	35	yes
Strychnos cocculoides	Monkey Orange	8	yes
Strychnos henningsii	Walking Stick	12	yes
Strychnos innocua	Monkey Orange	8	yes
Symphonia globulifera	Symphonia globulifera	30	yes
Syzygium cordatum	Water Berry	15	yes
Syzygium guineense	Snake-Bean, Woodland Water Berry	30	yes
Syzygium spp.	Syzygium	15+	yes
Terminalia brownii	mbarao	15	yes
Toddalia asiatica	Forest Pepper	15	yes
Trema orientalis	Pigeonwood	18	yes
Trichilia emetica	Cape Mahogany	21	yes
Vangueria apiculata	Wild Medlar	15	yes
Vangueria infausta	Wild Medlar	8	yes

Table B1.1 Indigenous Tree Species			
Scientific Name	**Common name**	**Height (m)**	**Indigenous**
Vangueria spp.	Wild Medlar	8	yes
Vernonia amygdalina	Bitter Leaf	7	yes
Vernonia brachycalyx	Ironweed	6	yes
Warburgia ugandensis	East African Green Wood	30	yes
Withania somnifera	Winter Cherry	2	yes
Ximenia americana	Tallow wood, Sour Plum	7	yes
Zanthoxylum gilletii	East African Satinwood	35	yes
Ziziphus mauritiana	Ber	15	yes

Additionally, increasing the forested area in the project area improves biodiversity indirectly, by providing a sustainable supply of wood that reduces pressure on the natural forest.

An Environmental Screening was submitted to the National Environment Management Authority (NEMA) of Government of Uganda, to assess the environmental conditions and biodiversity of the area and to assess positive and negative environmental impacts of TIST project activities in 2006. The assessment indicated that the project areas themselves are not areas rich in biodiversity. "The area where the TIST Program operates is deforested. According to researchers, "it is immediately apparent that in Kisoro, Kabale, Rukungiri, [Kanungu], Bushenyi and Kasese, no extensive areas of natural vegetation remain outside the main [Protected Areas]."[54]

However, some areas border areas rich in biodiversity. By providing fuel wood from sustainable wood lots and improving livelihoods, the project has a positive effect on biodiversity.

Promotion of Conservation Farming further reduces pressure on forestland by increasing food productivity by, and consequently decreasing pressure for, land clearing for agriculture. Biodiversity is also enhanced directly through the planting of indigenous trees in homesteads and woodlots. Increases in tree biodiversity also enhance diversity of associated species, including pollinators, and other beneficial species, while new trees in riparian areas reduces erosion, improves water quality and provides other important ecosystem services.

Most Likely Scenario: baseline 'without project.' None of the tree planting would occur without the project. In the case of the indigenous trees, the biodiversity benefit is clearly positive.

The members of TIST also plant non-indigenous trees. While they would not have been planted without the project, and some lack the clear biodiversity benefit of the native species, they too have a net biodiversity benefit. Going back to the on-going deforestation affecting the entire

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[54] Derek Pomeroy and others, Uganda Ecosystem and Protected Area Characterization, A contribution to the Strategic. Criteria for Rural Investments in Productivity (SCRIP) Program of the USAID Uganda Mission, Makerere University Institute Of Environment And Natural Resources and The International Food Policy Research Institute, April 2002. http://www.foodnet.cgiar.org/scrip/docs&databases/scrip_II_outputs2001/pdfs/UG-ecosystem&protecetdarea_characterisation.pdf. Accessed March 8, 2005.

country and the obvious continued need for fuel wood and timber by the expanding population, a fuel wood alternative is necessary. The non-native trees such as pines, eucalyptus, and cypress fill this niche, and by doing so, reduce deforestation and indirectly contribute to biodiversity. In addition, many of the project areas are on very steep hills that were grassy, barren or under cultivation before the project trees were planted. The new trees have helped stabilize the slopes, reducing erosion and having a positive effect on water quality and biodiversity. The "without project" scenario would mean more pressure on the natural forests and more loss of biodiversity. Therefore, even looking at the project from the vantage of the non-native species, the project has a net biodiversity benefit when compared to the "without project" case.

B1.2 No HCVs be negatively affected by the project

The HCVs discussed in G1.8 have not been negatively affected by the project. The project areas are in the vicinity of HCVs and provide vital resources that reduce pressure on these important areas, and through the planting of indigenous trees, expands the range of biodiversity in these forests.

The project areas are on individual farms, with an extensive history of farming and land use, other than natural forest or long-term forestry. As such, any negative effect caused by human activity at the project sites has already happened. Project activity has had a positive affect on HCVs.

B1.3 All species to be used by the project

Because TIST does not provide seeds or seedlings, TIST farmers collect seeds from locally existing trees that have a history of being grown in the country and regionally. Farmers are trained on how to harvest seeds from local trees for their nurseries and tree planting and on benefits of varied species. Because the farmers 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 B1.3 lists the species present in the project areas and indicates whether they are indigenous to Uganda. Additional species may be added over the life of the project as additional planting takes place.

Table B1.3

Table B1.3 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

Table B1.3 Tree Species Selected			
Scientific Name	**Common name**	**Height (m)**	**Indigenous**
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
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
Vangueria spp.	Wild Medlar	8	no
Vernonia amygdalina	Bitter Leaf	7	no
Zanthoxylum gilletii	East African Satinwood	35	no

Invasive Species. All listed species have been screened against the global database of invasive species.[55] None of the species above are included as invasive species in Uganda.

B1.4 Adverse effects of non-native species

As stated in B1.3, TIST does not provide seeds or seedlings, so the trees planted by TIST farmers are locally sourced from existing trees with a history of being grown in the country and regionally. They choose both indigenous and non-native species for their varied benefits. Some species, notably eucalyptus, may have negative impacts if not managed with care. Eucalyptus, popular in Uganda since its introduction in 1912, for its fast growth, is known to set deep roots that may deplete water resources without sustainable management. Eucalyptus is very common in many parts of the country and is promoted by Uganda foresters for fuel wood, building poles and for timber[56].

[55] International Union of Concerned Scientists, Global Invasive Species Database, Accessed 11 January, 2011 at http://www.issg.org/database.
[56] http://www.sawlog.ug/downloads/Guideline%20No.09&10%20-%20Growing%20Eucalypts.pdf

TIST farmers agree, as part of their contract, that trees that damage the environment will not be counted as TIST trees. Groups are trained on the benefits of alternative indigenous trees and how to grow these trees. Trainers grow indigenous tree seedlings, including stinkwood, in their nurseries to increase awareness and access for TIST members.

Training, monitoring, and incentives are all structured to encourage farmers to plant diverse trees with diverse benefits. Because of all of these active steps taken to safeguard against deleterious environmental effects, negative impacts are not expected.

The use of non-native species is justified in a number of ways. Farmers choose species that provide them with needed products and services. Project activities are on lands already impacted by long-term human habitation and agriculture. Many species, like mango and avocado, while not indigenous, have been naturalized over an extended period of time and provide much needed food. Others, like pine, eucalyptus and cypress, are chosen for their fast growth. In a country with a high need for forest products, including fuel wood for cooking and timber for construction, sources of sustainable wood products must be developed to substitute natural forest being lost through deforestation. Uganda National Forestry Authority promotes pine and eucalyptus for their fast growth to conserve biodiversity since cultivated wood can replace indigenous species otherwise harvested for fuel-wood degrading natural forests. No fast growing indigenous alternatives have been identified.

B1.5 No GMOs will be used for GhG removals

No GMOs were used by the project to generate GHG emissions reductions or removals.

B2 Offsite Biodiversity Impacts

B2.1 Negative offsite biodiversity impacts

No negative offsite biodiversity impacts were identified. As pointed out in section CL2.1, evidence that there has not been any displacement of members has been provided in the form of a survey of the land owners and project participants during baseline monitoring. They owned the land before the project and own the land during the project.

In addition, the program is designed to allow sustainable harvest within the project boundary by the members, which will reduce the need for fuel wood from external sources. The Small Group members own the trees and as the trees die, either naturally or through thinning, the members use them as fuel wood. The project activity has a beneficial effect on area deforestation; instead of causing it, it ameliorates it.

B2.2 Mitigation of negative offsite biodiversity impacts

Not applicable, since no negative offsite biodiversity impacts were identified.

B2.3 Justify the net positives biodiversity impact

No negative offsite biodiversity impacts were identified. Therefore, net effect of the project on biodiversity is positive.

B3 Biodiversity Impact Monitoring

B3.1 Initial plan for biodiversity monitoring

TIST has been in operation, in Uganda, since 2003 and has deployed an award-winning monitoring system that collects data for, among other things, biodiversity. The monitoring plan described, herein, is the full monitoring plan required under B3.3, below.

The plan uses TIST's strength in gathering, verifying, and analyzing field data to measure critical biodiversity metrics in the farms and groves where TIST farmers work and live. Trees will be the main focus of biodiversity impact monitoring since they provide important habitat diversity and structural features for biodiversity. Tree biodiversity is expected to increase as a result of awareness raising, training and incentives. We monitor and report on the TIST website the species planted, number of trees of each species planted in each area, and, as the trees grow, the age and circumference of these trees. Quantification is a constant process and as a project area is monitored, new data populate the website. Annual monitoring of each site is the goal and a minimum of every two years will is achieved.

At a landscape level, we monitor the number of hectares of land improved, with indigenous tree planting by TIST farmers and their location.

Trends in landscape connectivity and forest fragmentation have been addressed using the track data collected by the Quantifiers. The location, extent and area of each project area have been obtained. There are 1,613 hectares of new forest comprised of 1,782 individual parcels spread out over thousands of square kilometers. The location and perimeter of each project area are presented in Appendix 1 and 2. Although the rules of VCS allow additional project areas to be added to a grouped project PD, the rules of CCB do not. Though TIST will continue to add project areas, the areas in this PDD will be fixed for the life of the project and the above numbers are not expected to change.

B3.2 Plan to assess effectiveness of measuring effect on HCV

Because there is no direct interaction with the HCV, the monitoring is indirect and based on monitoring direct project achievements per B3.1 and B3.3.

B3.3 Commit to developing a full monitoring plan

A full monitoring plan was developed and is available as Appendix 06.