CCBA Project Implementation Report
for
TIST Program in Kenya
CCB-001

for validation under

The Climate, Community and Biodiversity Standard

Second Edition

24 February, 2011

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CCBA Project Implementation Plan
for
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Introduction

Clean Air Action Corporation submitted a Project Description (PD), for the TIST project in Kenya, for validation under the Climate, Community Biodiversity Standard (CCB). Because the PD was written after the project had been in the operational for over 5 years, the following Project Implementation Plan (PIR) will look very similar to the PD

Project Overview

The International Small Group and Tree Planting Program (TIST) empowers Small Groups of subsistence farmers in India, Kenya, Tanzania, Uganda, Nicaragua, and Honduras 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 63,000 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 8,900 TIST Small Groups have planted over 10 million trees on their own and community lands. GhG sequestration is creating a potential long-term income stream and developing sustainable environments and livelihoods. TIST in Kenya began in 2004 and has grown to nearly 50,000 TIST participants in over 6,700 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 PIR is for a subset of the TIST Kenya program and corresponds to TIST VCS Project Descriptions VCS-001, VCS-002, VCS-003 and VCS-004. It applies to 1,078 Small Groups and 8,047 members.

General Section

G1. Original Conditions in Project Area

G1.1 General Information, location of the project and basic physical parameters. TIST Kenya is comprised of about 50,000 individual project areas that are owned or controlled by the individual TIST members. The project areas are dispersed in the general vicinity of Mt Kenya, predominately around Nanyuki and Meru. The Nanyuki project area covers the Laikipia District and parts of northern Nyeri District.[1] The Meru project area covers the larger Meru District and parts of Kirinyaga District.

Soils: The Nanyuki area is characterized by tertiary volcanic rocks. The predominate soil types are black grumosolic soil (black clays) occurring on plains and associated with poor drainage; chestnut soils (brown calcareous loam) occurring on plains and derived from volcanic ash; and podsolic soils (yellow-red loamy sand) found on slopes and associated with volcanic ash. In Meru, the rocks are quaternary volcanics with pockets of basement rocks to the east and tertiary volcanics to the south. The soil types are latosolic soils (dark red friable clays with deep humic topsoil) derived from volcanic and basement complexes and found on ridges between parallel rivers; latoolic soil (dark red friable clay) associated with the latosolic soils and occurring on the more sloping land; and yellow red loamy sands are found to the north and south-east.

Geology: The geology of the area is dominated by Mt Kenya, a late tertiary stratovolcano associated with the East Africa Rift Valley. Meru is on the northeast flank of the mountain, Kirinyaga is on the east flank, Nanyuki is on the northwest flank and Nyeri is on the west. The lithologies are silica basic and intermediate rocks including phonolites, trachytes, basalts, kenytes and syenites. Pyroclastic rocks and volcanic ash originating from various secondary eruptions especially on the northern and northeast slopes characterize the landscape. These rocks have also been extensively eroded over time.

Laikipia lies between Mt Kenya and the western branch of the East African Rift. The rocks underlying the plains of Laikipia are Tertiary volcanics.

Hydrology: The area south of a line running northeast from Mt Kenya to beyond Meru is drained by the Tana River. Its tributaries include the Gathita, Thingithu, Kithinu, Nithi, Tungu, Ruguti, Thuci, Rupingazi, Nyamindi, Thiba, Rwamuthambim Ragati, Sagana, and Nairobi Rivers. The area north and west of Mt Kenya is drained by the Ewaso Nyiro. Its tributaries include the Naromoro, Burguret, Liki, Sirimon and Engare Ngare Rivers.

Climate: The general climate of central Kenya is dry tropical but influenced by the 5,200 meter Mount Kenya. The climate within the general project area is highly heterogeneous, with local conditions being heavily contingent upon elevation, location, and amount of rainfall. The average annual rainfall varies widely by locality, but is roughly around 630 mm per year for the entire

[1] The districts in Kenya have been changing. Between 1992 and 2009 they increased from 46 to 254 districts. In 2009, the High Court of Kenya struck down all districts created since 1992. As such, much of the documentation about districts in Kenya is out of date. We are using the 46 districts per the High Court ruling.

country.[2] Within the general project area, rainfall can be as little as about 381 mm[3], or as much as 2,500 mm per year. The lowest rainfall is in the plains west of Mt Kenya. The highest rainfall is on the south-eastern slopes, which are exposed to the dominant wind blowing from the Indian Ocean. Most parts of the country experience two wet seasons each year, with long rains from March-June and short rains from October-November.[4] The dry season occurs around June-July and December-January.[5]

The average annual temperature is about 20.0°C, but ranges from 15.5°C to 30.0°C, depending on the region.[6] While night frost occurs above 3,000 meters, along the flanks of Mt Kenya, the project activities take place between 1,500 and 2000 meters. The average temperatures around Nanyuki are highs between 20-25°C and lows of about 5°C. Highs in Meru are similar, but the lows are about 5-10°C.

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."[7] 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."

G1.3 General information, boundaries of the project area and the project zone. There are 4,264 individual project areas in the associated Voluntary Carbon Standard (VCS) PD and a total of over 24,000 TIST project areas currently in Kenya. 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 central Kenya 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 central Kenya 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 central Kenya surrounding Mt Kenya. It extends south of Embu, northwest to near the Nyambeni Forest, north almost to Isiolo, northwest almost to the Baringo Province, west to Nyahururu and south west to Nyeri.

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2 Irrigation in Africa in figures – AQUASTAT survey 2005: Kenya, AQUASTAT, at http://www.fao.org/nr/water/aquastat/countries/kenya/index.stm, accessed 7 July 2009. (”AQUASTAT”)
[3] Barr.
[4] AQUASTAT.
[5] *Country Profiles: Kenya*, Food and Agriculture Organization of the United Nations, at http://www.fao.org/countryprofiles/maps.asp?iso3=KEN&lang=en, accessed 7 July 2009.FAO. (“FAO”)
[6] FAO.
[7] All worksheets are in Excel spreadsheet "TIST KE PD-CCB-001d Data 100826.xls"

G1.4 Climate Information, baseline carbon stocks. The baseline carbon stocks were estimated based on the approved Clean Development Mechanism methodology AR-AMS0001, Version 05: *Simplified baseline and monitoring methodologies for small-scale afforestation and reforestation project activities under the clean development mechanism implemented on grasslands or croplands*. 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	257.0	16.4%	18.3	19.4	37.7
Grassland as grassland	1,308.1	83.6%	16.0	19.4	35.4
Total	1,565.2	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 15.3 stems per ha (23,881 trees over 1,565 ha). The number of baseline trees was determined by a physical count of each tree. See worksheet "Baseline Strata."
- Average dbh of pre-existing trees = 33.5 cm (from inventory of pre-existing trees, see worksheet "Baseline Strata.")
- Aboveground tree biomass calculated applying equation from Brown et al. (1989) for dry forest, where Kg dry mass = exp(-1.996+2.32*ln(dbh cm))[8]
- Root:shoot ratio of 0.48 (IPCC GPG, Table 3A.1.8, Woodland/savannah)
- Carbon fraction of dry biomass = 0.5

G1.5 Community information, description of communities in project zone. The predominant ethnicity of the people in the project zone and of the TIST members is Meru and Kikuyu. The Meru people are concentrated on the east side of Mt Kenya and the Kikuyus are located on the west side. The Meru people are believed to have migrated to the Mt Kenya area in the 14th century and the Kikuyu people in the 16th century. There are no "indigenous" people living in the project areas or project zones.

[8] Brown, S. 1997. Estimating biomass and biomass change of tropical forests: a primer. FAO Forestry Paper 134, Rome, Italy. http://www.fao.org/docrep/W4095E/W4095E00.htm, Section 3, Methods for Estimating Biomass Density from Existing Data. Also See Appendix C of AR-AMS0001.

The following community information is based on a survey of 416 households in the Meru and Nanyuki project areas. The gender breakdown was 206 (49.5%) males and 210 (50.5%) females. See Table G.1.5.1.

G1.5.1: Distribution of respondents by Gender and the Project Areas

	Total Sample		Meru Project area Sample		Nanyuki Project area Sample	
Gender	Freq.	%	Freq.	%	Freq.	%
Male	206	49.5	123	48.6	83	50.9
Female	210	50.5	130	51.4	80	49.1
Total	416	100	253	100	163	100

The sample shows that young, middle age and elderly respondents were included, although more households in relative young age categories (31 to 45) were interviewed, as compared to other age brackets as indicated in Table G1.5.2.

G1.5.2: Age Distribution of Household Respondents

	Total Sample		Meru Project area Sample		Nanyuki Project area Sample	
Age categories (Years)	Freq.	%	Freq.	%	Freq.	%
21 to30	56	13.5	43	17.0	13	8.0
31 to 45	156	37.5	96	37.9	60	36.8
46 to 60	125	30.0	80	31.6	45	27.6
61 and above	79	19.0	34	13.4	45	27.6
Total	416	100	253	100	163	100.0

The majority of the households sampled (88.9%) are married, which is an indication of the household typologies over the project areas. A combined household of the unmarried, of the widowed couples and those separated or divorced represents slightly over 10 percent of the entire households as contained in Table G1.5.3.

G1.5.3: Marital Status of Households Sampled

	Total Sample		Meru Project area Sample		Nanyuki Project area Sample	
Marital Status	Freq.	%	Freq.	%	Freq.	%
single	19	4.6	10	4.0	9	5.5
Married	370	88.9	229	90.5	141	86.5
Widow/widower	20	4.8	13	5.1	7	4.3
Separated/divorced	7	1.7	1	0.4	6	3.7
	416	100	253	100	163	100

As can be observed in Figure G1.5.1, the project area's illiteracy levels stand at 12.5 percent. Nanyuki area has less illiteracy level (6.7%) and has a generally higher number of respondents who have secondary education, which is the ordinary education level in Kenya.

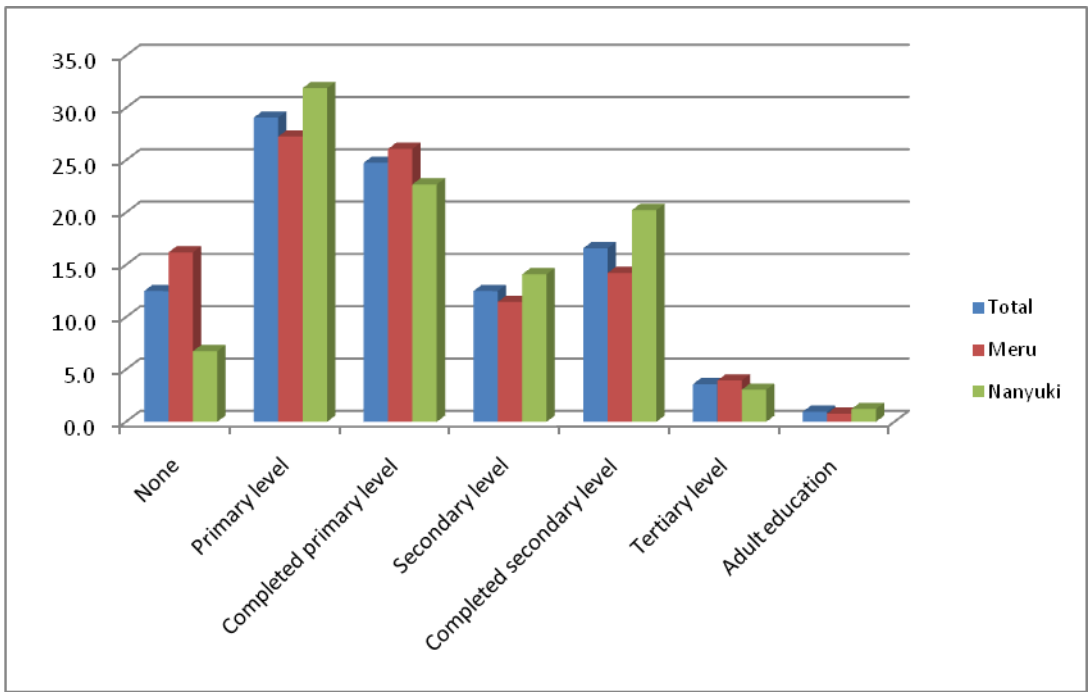


Figure G1.5.1: Education Status of the Respondents.

Farming is the main occupation of the respondents. Other insignificant livelihood activities are casual labor, employment, business and reliance on pension as presented in Table G1.5.4.

Table G1.5.4: Occupational Status

	Total Sample		*Meru Project area Sample*		*Nanyuki Project area Sample*	
Occupational Status	*Freq.*	*%*	*Freq.*	*%*	*Freq.*	*%*
Farmer	379	91.1	232	91.7	147	90.2
Casual Labour	2	0.5	1	0.4	1	0.6
Formal employment	14	3.4	10	4.0	4	2.5
Business	14	3.4	6	2.4	8	4.9
Informal employment	6	1.4	4	1.6	2	1.2
Pension	1	0.2			1	0.6
Total	416	100	253	100	163	100

The people that live in the project zone are mostly subsistence farmers. Average annual income is shown in Table G1.5.5 and is based on community data developed by the Kenya Ministry of Agriculture in Miriga Meru East and West Divisions, using Participatory Analysis of Poverty and Livelihood Dynamic (PAPOLD).

Table G1.5.5 Annual Income Brackets

Income Level (Ksh)		*Income Level US$*		*Pct of*
Min	*Max*	*Min*	*Max*	*Groups*
0	12,000	$0	$160	5%
12,000	60,000	$160	$800	40%
60,000	180,000	$800	$2,400	25%
180,000	300,000	$2,400	$4,000	15%
300,000	420,000	$4,000	$5,600	10%
420,000	above	$5,600	above	5%

G1.6 Community Information, current land use and customary and legal property rights. Kenya's land system is undergoing a transformation from a communal-based system to a system in which individuals hold title to their land. Approximately 80% of Kenya has been converted to an individual land-based system. As such, most individuals in Kenya hold title to the land under land title statutes. The remainder own their land under customary tenure.

The project zone has been long settled and has not been subject to the land rights disputes that have occurred in some areas of Kenya.

The following details the relationship between the land owners, TIST members and Project Participants.

- Each project area is a tree grove planted by a Small Group. It is either owned by the member, or a family member, or is being used with the permission of the land owner.
- The Project Participants do not own any of the land. TIST is a project name, not a legal entity, and does not own any of the land.
- The landowner covenants together with other farmers to form a Small Group. The Small Groups own the trees that they plant and determine how tree products and carbon revenues are divided among themselves.
- Host Country land law is silent as to the ownership of carbon and carbon pools. However, the Small Groups own the trees that they plant together and grant the rights to all carbon associated with TIST to Clean Air Action Corporation (CAAC) under a "Carbon Credit Sale Agreement."
- Under Paragraph 4 of the "Carbon Credit Sale Agreement," the members affirm their ownership or rights to the land designated as project areas.
- CAAC is registered as a branch in Kenya under the Companies Act and is a legal entity in Kenya.
- Under the associated VCS PD, VERs shall be issued to CAAC.
- The current land use is agricultural. See worksheet "Grove Summary."

G.1.7 Biodiversity Information, current biodiversity within the project zone. Kenya is widely known for its abundant and diverse wildlife, especially large mammals. Although many of these animals are occasionally present in the project zone, the long history of human habitation and agriculture have pushed them to isolated pockets of protected areas such as the Mt Kenya National

Park, Mt Kenya Forest, Meru Forest, Upper Imenti Forest, Nyambini Forest and Ndare Forest. Human animal conflicts are present in the general area. For example, there are many long distance fencing systems present in the Meru area to keep elephants away from areas of human habitat. Both the project areas and the non-protected parts of the project zone are lands under the control of subsistence farmers, where wildlife has been long removed and replaced by domesticated animals and plants.

The native ecology of the project zone that is located on the slopes of Mt Kenya and on the northeast trending highlands that pass through Meru and include the Nyambeni Hills, are in the East African montane forest.[9] The lower altitude areas in the vicinity of Nanyuki and Naro Moru are part of the Northern Acacia-Commiphora bushlands and thickets.[10] With the exception of some protected forests, little of the project zone that surrounds the project areas is in a natural state. This is due to high level of human activity, primarily for agriculture.

G.1.8 Biodiversity Information, High Conservation Values and attributes. Mt Kenya and the surrounding protected forest have High Conservation Values. The core of the mountain is located within Mt Kenya National Park. The lower flanks of the mountain are within the Mt Kenya Forest reserve, which also serves as a buffer between the park and populated farmland where the TIST project areas are located. Extending to the northeast towards the Nyambeni range and Meru National Park are a series of gazetted forests that serve as wildlife corridors. They include the Upper Imenti, Meru and Lower Imenti Forests. To the southwest of Mt Kenya is the Nyeri Forest that helps form a corridor to the Aberdare National Park and Forest.

The HCV of Mt Kenya is recognized. The national park was established in 1949. It was designated as a UNESCO biosphere reserve in 1978 and was made a UNESCO World Heritage Site in 1997. As the second tallest mountain in Africa, it is a vital water catchment for Nairobi and central Kenya. At 17,057 feet and straddling the equator, it provides diverse ecosystems ranging from African savannah to alpine glaciers.

Aberdare National Park was established in 1950. The mountains in which it is located are considered one of the five "water towers" of Kenya.

Rare and Endangered Species: A list of rare and endangered species that are present in the project zone and, at one time, 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 villagers indicate the absence of any endangered or rare species in the project areas.

[9] World Wildlife Fund. http://www.worldwildlife.org/wildworld/profiles/terrestrial/at/at0108_full.html
[10] World Wildlife Fund. http://www.worldwildlife.org/wildworld/profiles/terrestrial/at/at0711_full.html

Table G.1.8. IUCN Red List of Threatened Species		
Scientific Name	**Common Name**	**Status**
Mammals		
Acinonyx jubatus	Cheetah	VU
Bdeogale jacksoni	Jackson's Mongoose	NT
Caracal aurata	African Golden Cat	NT
Ceratotherium simum	White Rhinoceros	NT
Crocidura allex	East African Highland Shrew	VU
Crocidura fumosa	Smoky White-toothed Shrew	VU
Diceros bicornis	Black Rhinoceros	CR
Eidolon helvum	Straw-coloured Fruit Bat	NT
Equus grevyi	Grevy's Zebra	EN
Eudorcas thomsonii	Thomson's Gazelle	NT
Grammomys gigas	Giant Thicket Rat	EN
Hippopotamus amphibius	Hippopotamus	VU
Hyaena hyaena	Striped Hyaena	NT
Litocranius walleri	Gerenuk	NT
Loxodonta africana	African Elephant	NT
Lycaon pictus	African Wild Dog	EN
Oryx beisa	East African Oryx	NT
Otomops martiensseni	Large-eared Free-tailed Bat	NT
Panthera leo	Lion, African Lion	VU
Panthera pardus	Leopard	NT
Surdisorex norae	Aberdare Mole Shrew	VU
Surdisorex polulus	Mt. Kenya Mole Shrew	VU
Taphozous hildegardeae	Hildegarde's Tomb Bat	VU
Tragelaphus eurycerus	Bongo	NT
Tragelaphus imberbis	Lesser Kudu	NT
Birds		
Acrocephalus griseldis	Basra Reed Warbler	EN
Aquila clanga	Greater Spotted Eagle	VU
Aquila heliaca	Asian Imperial Eagle	VU
Ardeola idae	Madagascar Pond-Heron	EN
Balaeniceps rex	Shoebill	VU
Cinnyricinclus femoralis	Abbott's Starling	VU

Table G.1.8. IUCN Red List of Threatened Species		
Scientific Name	**Common Name**	**Status**
Circus macrourus	Pallid Harrier	NT
Cisticola aberdare	Aberdare Cisticola	EN
Euplectes jacksoni	Jackson’s Widowbird	NT
Falco naumanni	Lesser Kestrel	VU
Francolinus sterptophorus	Ring-necked Francolin	NT
Gallinago media	Great Snipe	NT
Glareola nordmanni	Black-winged Pratincole	NT
Glareola ocularis	Madagascar Pratincole	VU
Gyps africanus	White-backed Vulture	NT
Gyps rueppellii	Rüppell's Vulture	NT
Macronyx sharpei	Sharpe’s Longclaw	EN
Neotis denhami	Denham’s Bustard	NT
Phoeniconaias minor	Lesser Flamingo	NT
Prionops poliolophus	Grey-crested Helmetshrike	NT
Rynchops flavirostris	African Skimmer	NT
Torgos tracheliotos	Lappet-faced Vulture	VU
Trigonoceps occipitalis	White-headed Vulture	VU
Turdoides hindei	Hinde’s Pied Babbler	VU
Fish		
Alcolapia grahami		VU
Aplocheilichthys sp. nov. ‘Baringo’		CR
Barbus sp. nov. ‘Pangani’		VU
Labeo percivali	Ewaso Nyiro Labeo	VU
Labeo trigliceps		VU
Nothobranchius bojiensis	Boji Plains Nothobranch	VU
Other		
Bulinus browni	Gastropod	NT
Burnupia crassistriata	Limpet	VU
Euonyma curtissima	Gastropod	EN
Hyperolius cystocandicans	Frog	VU
Lanistes ciliatus	Gastropod	NT
Malacochersus tornieri	African Pancake Tortoise	VU
Mertensophryne lonnbergi	Toad	NT

Table G.1.8. IUCN Red List of Threatened Species		
Scientific Name	**Common Name**	**Status**
Phrynobatrachus irangi	Frog	EN
Pila speciosa	Gastropod	VU
Pisidium artifex	Bivalve	VU
Platycypha amboniensis	Montane Dancing-jewel	CR
Pseudagrion bicoerulans	Afroalpine Sprite	VU
Subuliniscus arambourgi	Gastropod	EN
Tropodiaptomus neumanni	Crustacean	VU
Plants		
Angylocalyx braunii		VU
Baphia keniensis		VU
Brucea macrocarpa		EN
Colpodium chionogeiton		VU
Colpodium hedbergii		VU
Commiphora pseudopaolii		NT
Commiphora unilobata		NT
Croton alienus		EN
Newtonia erlangeri		NT
Pandanus kajui		VU
Polyscias kikuyuensis	Parasol Tree	VU
Premna maxima		VU
Prunus Africana	Red Stinkwood	VU
Uvariodendron anisatum		VU
Vepris glandulosa		EN
Vepris samburuensis		VU
Vitex keniensis	Meru Oak	VU

Notes:

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

G2. Baseline Projections

G2.1 Most likely scenario. 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", indicates 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. It is projected that without the intervention of TIST, that under favorable conditions, at best, the landscape would 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 in section G2.2, 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 could 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.

There is a clear pattern of rural firewood use and forest degradation in Kenya 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 had been degrading for decades, due to human intervention. Despite a series of forest policies that began in 1957,[11] forests in the TIST areas are in an extremely precarious position.

According to the Kenya environmental group, Green Belt Movement,[12] "at the turn of the 20th century, Kenya had a forest cover of well over 10%. Today, this has been reduced to a meager 1.7% due to deforestation, commercial agriculture, charcoal burning, forest cultivation and replacement of indigenous forest with exotic plantations."

[11] Abwoli Banana, Paul Ongugo, Joseph Bahati, Esther Mwangi and Krister Andersson, "Resource, Recourse And Decisions: Incentive Structures In Forest Decentralization and Governance In East Africa," page 5. Accessed November 5, 2009. http://pdf.usaid.gov/pdf_docs/PDACO151.pdf

[12] UNDP, "Community Action for Mt. Kenya Forest, the Environment and Sustainable Livelihoods," a UNDP GEF/SGP grant report. http://www.ke.undp.org/GEF-SGP/Compact_Summary_Green_Belt_Movement.pdf.

According to the FAO[13], Kenya has lost over 12,000 ha of forest per year between 1990 and 2005, falling from 3,708,000 hectares to 3,522,000 hectares. Primary forest loss during that period averaged 2,400 hectares/yr, dropping from 742,000 hectares to 704,000 hectares. It was estimated that 26.6 million m^3 (over bark) of wood products was removed in 2005, which was equal to 9.5% of the country's growing stock. Of this, 24,256,000 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.

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 05: *Simplified baseline and monitoring methodologies for small-scale afforestation and reforestation project activities under the clean development mechanism implemented on grasslands or croplands*. As described in section G2.1, the most likely scenario for the project lands was to continue as agricultural land, subject to ongoing intervention through human habitation. As described in section G2.2, 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, was that the biomass and carbon in the cropland and grassland remain constant, and that the baseline trees continued 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, yields a baseline tree density for the project. The average diameter of the baseline trees were grown at 0.5 cm per year, the biomass was calculated using the proper allometric equation and the tonnes of CO2 per hectare was calculated (see Baseline Tree worksheet). When calculated for the entire project, the conservative change in carbon stocks without the project was estimated to be 39,643 tons (see worksheet "Baseline Growth").

There are no non-CO2 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, 50,000 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 four 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 2 to 10 times. They would not have received training in using more fuel

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

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 ones of 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 of the "five towers", 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 is helping reverse or mitigate them.

G2.5 Affect on biodiversity without project. Biodiversity in central Kenya has been declining for decades. Although the Government of Kenya 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 four million less trees on sustainable woodlots that reduce the pressure on protected high biodiversity areas. There would be one million 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 helps 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, cluster meetings 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. Several tools are used to display the thousands of individual project areas.

- 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 and GhG accounting period time is a minimum of 60 years. The original contract with the Small Group members was based on the longest possible GhG accounting period allowed under CDM (3 renewable 20 year periods). With the advent of the Voluntary Carbon Standard (VCS), there appears to be a way to continue flowing GhG revenues to the members. If AR climate change programs continue to provide revenues to these subsistence farmers for maintaining their forests, the project life can be extended.

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 Kenya in 2004. TIST has been expanding at the rate of 6,000 trees per day since that time. Expansion to the Mau Forest and Mara River basin began in 2009.

See a visualization of the growth of TIST in Kenya overlain on Google Earth at:

http://www.tist.org/tist/kenyagrowth.php

(Move to subsequent slides using navigation arrows at bottom left of image.)

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.

G3.6 Maintenance of the high conservation value attributes. Ongoing deforestation in Kenya 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. TIST trees are being planted where deforestation has taken place. 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. In addition, the many discrete project areas help 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. This is followed by regular and ongoing meetings where the public is invited to attend. TIST representatives have met with numerous State, District and Village officials seeking comment 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 "Mazingira Bora," a multi-lingual newsletter published by TIST Kenya; and direct contact with community leaders and government officials.

The original TIST program was started in Tanzania, in late 1999, to meet local needs in a sustainable way, while at the same time addressing climate change. In February 2004, TIST was invited to begin the project in Kenya. At that time, a trip was made around Mt Kenya where community leaders in Meru and Nyeri were briefed on TIST to gauge the level interest that local farmers might have. They asked to spread the word about the program and if there was grass roots interest, prospective members were invited to begin planting trees. Between February 2004 and February 2005, additional meetings were held with community leaders and government offices such as the Forest Department.

The first TIST seminar of TIST Kenya was held in Nanyuki from February 21, 2005 to February 26, 2005. The seminar began with the process of customizing TIST to the desires and needs of farmers in the Meru and Nanyuki areas. Seventy-three people attended, 40 men and 33 women. A second training seminar was held April 11, 2005 to April 14, 2005 at the Gitoro Conference Centre in Meru. Seventy-five people attended, 39 men and 36 women.

In February 2005, the first "Mazingira Bora" was published and circulated within the communities to TIST members and those interested in the program. Since that time, TIST has published regular newsletters that document an ongoing dialogue and support with members of the community, both inside and outside the program. These documents are available to the public in a transparent form

on the internet at tist.org.[14] TIST also has a collection of written stakeholder comments (see VCS PD).

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 are summaries of some of the comments TIST has received from stakeholders.

- D.K. Mbugua, Chief Conservator of the Forest, in a letter to the Director General of the National Environment Management Authority on 08 January, 2007. "The forestry Department has looked at the proposal [the TIST PIN for Kenya] and is of the view that the proposal can easily be implemented and the carbon resources can be secured over the proposed time frame. The purpose of this letter is to request your office allow the group [to] develop the project further while preparing a PD for transmission to the UNFCCC Executive Board."

- Dr. A. Muusya Mwinzi, Director General, National Environment Management Authority in a letter dated 19 March 2007. "We wish to refer to the Forest Department on behalf of Clean Air Action Corporation that the above mentioned programme [TIST] be allowed to proceed… As the authorized representative of Kenya, I hereby confirm that we have no objection to the further development of the TIST project.

- N.M. Ndwiga, for the District Forest Officer, Meru North District, in a letter to the Administrator, TIST Kenya, dated September 13, 2007. "This office highly appreciates what your organization is doing and its ready to liaise with your office to enable them achieve their goals which are of enormous importance to this district and the nation at large."

- Shieni K. Kioyiet, NEMA, Bomet District, Chemaner Area – invites TIST to come to this area to plant trees for long-term conservation and climate advantages.

- Waweru Kimani, District Commissioner, Bomet District – invites TIST to Bomet District to advise farmers on reforestation, carbon trading and suitable agriculture.

- Friar Patrick Nkaai, Parish Priest of Ngong, Mulot Catholic Mission – are in support of TIST to help community in training of sustainable farming.

- S.M. Gighohi, District Officer, Mulot Division – fully invites TIST to share efforts in this region and guarantees full cooperation and support.

[14] http://www.tist.org/moreinfo.php

- Edward Wawire, District Environmental Officer, Narok South District – very willing to support TIST program in this area and believes it will help restore Mara Basin.

- Edward Aubey, Office of the President, Meru North District – agrees for TIST team to enter Meru North and train their people in planting trees to clean the air.

- Joseph K. Thirtu, Office of the President, Meru North District – gives permission of Jeremiah Murangiri [a TIST leader] to participate as TSE to facilitate environmental conservation.

- Chief, Meru District – John Kinyua is introduced and approved to train and work as TSE in Kiorimba location to plant trees and conserve soil.

- F.D. M.Mugwimi, District Forest Officer, Kirinyaga – his office gives support to Benard Githui [a TIST leader] in working with Community Groups in his District.

- Rev. John Mararo Gachoki, Admin. Secretary, Diocese of Kirinyaga – extend invitation to TIST to promote tree planting in this area and work with to improve farming methods.

- C.M. Wamola, District Forest Officer, Isiolo District – has no objection to the program, and is ready to assist in TIST activities pertaining to forestry.

- Samuel K. Mukundi, District Forest Officer, Laikipia West District – willing to cooperate/add support and believes TIST will add value to their area like it has in Laikipia East District.

- John Maine, African Inland Church, Nyahururu – very interested in TIST and wants a seminar with the community.

- Pastor L.M. Miltiru, Truevine Apolistic Ministry, Nyahururu – requests a date for a seminar to inform them about the program.

- NJuli K. Jeremiah, Kenya Assembly of God, Nyahururu – invite TIST to come to the Salama area and present a seminar and teach them more.

- Rev. J. Mimitha, Jesus Victory Ministry, Mara Meru – invite TIST to come their deforested area and help them improve thru tree planting.

- Fr. John Mbanbum, St. John the Baptist Church, Meru-Kenya – he invites Fabiano Kobia, TSE [a TIST leader], to train farmers in this parish in areas of Thanantu, Macegene, Rurii, Kagwuru and Kiguru.

- L.R. Njagi, District Officer, Tigania West – introduces Jennifer Kithure [a TIST leader] and supports her as the appointed person to work with TIST in their area.

- H. Kayes, District Officer, Buuri Division-Meru – supports Jennifer Kithure [a TIST leader] to work in their division with local farmers in planting trees.

- J.M. Kamau, District Environmental Officer, Igembe/Tigania District – supports Mary Wanyoike, TSE [a TIST leader], to support environmental activities in this district.

- District Officer, Igembe/Nekunudeth Districts – supports Mary Wanyoike, TSE [a TIST leader], in assisting the community in growing trees and cleaning the environment.

- B.M. Muriuki, District Officer, Meru North – supports Mary Wanyoike [a TIST leader] to educate and sensitize people to the need of planting trees in Nguyaya location.

- Jacob J. Mugambi, Assistant Chief of A/NJoune sub-location - agrees to the TIST tree program in his jurisdiction.

- Adam Kubai M'umbeal, Chief, Kiengu location – invites and will assist TIST's noble activities in his area.

- K.M. Ndwiga, District Forest Officer, Meru North District – his office appreciates Mary Wanyoike [a TIST leader] and the TIST organization and is ready to liaison with us.

- B.K. Nanyo, Forest Extension Officer, Igembe South/West Division – is allowing Augenio Akwalu as TSE [a TIST leader] to work in their division.

- C.W. Mwangi, District Environment Officer, Kirinyaga – Bernard Githui [a TIST leader] has their support to improve environment and livelihood thru tree planting.

- C. Wafula, District Officer, Muthambi Division – accords their assistance in supporting a successful program and highly appreciates TIST.

- Brother Timothy Mathenge, Presbyterian Church of E. Africa, Gituamba Parish – interested in the good works of TIST and ready to work and obtain more information.

- Rev. Sammy Kithinil Majuri, Presbyterian Church of E. Africa, Chogorja South – supports a church elder, who is retired teacher, to work with TIST to improve environmental innovation of this area.

- B.M. Birichi, District Environment Officer, Tharaka District – supports Susan Muita, TSE [a TIST leader], and shall collaborate and assist her as necessary.

- J.M. Kamau, District Environment Officer, Igembe/Tigania Districts – welcomes Susan Muita, TSE [a TIST leader], to support environmental activities in this district.

- K.M. Ndwiga, District Forest Officer, Meru North District – his office highly appreciates TIST organization and is ready to work with us to reach enormously important goals.

- Rev. Michael Simba, Methodist Church in Kenya, Marimanti, Tharaka, Kenya – church highly recommends and supports Susan Muita [a TIST leader] in the task of tree planting.

- Dominic Kirimi, Assistant Chief, Kuja sub-location - accepts Susan Muita [a TIST leader] in this location to plant trees and supports community to do same.

- Chief Phillip Koboi, Ntunene Locaiton – TIST is a viable endeavor and gives permission to Susan Muita [a TIST leader] to begin work with group in this location.

- Rev. Justus Mwenda, Superintendent Minister, Laare Circuit – Susan Muita [a TIST leader] presented program to church and find the mission worthy for their district. They will assist her as necessary.

- Chief D. Mutino, Nguyuyu Location – acknowledges and welcomes Susan Nuita as TSE [a TIST leader] in their location.

- Julius Kiruneya, Chairman, St. Julius Catholic Church, Khurene –they are very thankful and request program members come teach their church more about TIST/CAAC.

- B.M. Kinyili, for District Forest Officer, Nyeri – request TIST collaborate, supervise, follow-up and assist in all activities to reforest their area.

- The Chiefs Office, Kabuthee Location – welcomes TIST program and reports residents are very happy to have in their area.

- Group letter from Foresters, Chiefs, Reverend and Pastor Geruasio Kobia Mutia – they are thankful for the TIST – TSE program in all 13 areas of Kenya, and vouch for Paulina Nyoroka [a TIST leader].

- Rev. Solomon Mukindia and Meru North Tree Farmers, Mbaranga/Karama location – acknowledge the good work TIST is undertaking and request extension to the areas of Mbaranga, Uuru, and Antuaduran.

- Pastor Muangi Charles, Full Gospel Church of Kenya – he is sure the program will improve the farmers land, supports TIST and John Kingua [a TIST leader].

There have been no negative comments received.

G3.9 Publicizing the CCBA public comment period. TIST will announce the intent to apply for a CCBA validation and verification in Nairobi papers, announcing a public meeting and a public meeting will be held. In addition, emails will be 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 KE PD-CCB-Spt 14 Public Comments.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.

All grievances are first brought to the attention of the Kenya Staff where the issues are compared to standard TIST policy, TIST values[15] and/or the Greenhouse Gas agreement among the Small Group members and CAAC. The policies and values are the subject of training at seminar, cluster meetings, Small Group meetings 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, the issue is brought to the next seminar or Leadership Council meeting, where decisions are made by representatives of the Small Groups, Kenya 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 6 to 10 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 is 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 USAID and private donors. The fact that TIST is in its 10th 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.
- **Unites States Agency for International Development (USAID)** has committed to provide financial assistance to TIST through I4EI to improve sustainable development activities and biodiversity.
- **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.

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

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 10 years and has expanded to four counties, 60,000 farmers and planted over 10,000,000 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 50,000 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). This CCBA PD is for a subset of this project.

- **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.

- **TIST Program, Nicaragua**, a small-hold farmer A/R project. Working with CRS, TIST began expansion to Nicaragua in 2010.

- **TIST Program, Honduras**, a small-hold farmer A/R project. Working with CRS, TIST began expansion to Honduras in 2010.

- **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 participate 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 seminar, 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. The Small Groups are all assigned to "clusters," an administrative unit within walking distance of a central point. The cluster meetings are supposed to be held monthly and while that does not always happen, they take place at least once per year at

each cluster. While attendance is voluntary, Small Groups are encouraged to send representatives to every meeting. Training includes conservation farming, biodiversity, 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, the Kenya program is run by Kenyans from the Meru and Nanyuki area. The 50 plus 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 Ugandan and Indian farmers establish their own best practices more suitable to their areas). TIST farmers are trained as trainers. Cluster meetings and Small Group meetings are run by Kenyans. 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 relevant laws are:

- The Employment Act, 2007
- Regulation of Wages and Conditions of Employment Act
- National Hospital Insurance Fund Act, 1998

Most of the Kenyans working for TIST knew their rights before starting employment. Even so, CAAC uses an employment contract that was vetted by local counsel that reiterates the more important parts of the relevant employment law such as salary, types of leave, rest days and termination. Quantifiers are independent contractors. Their contract has been reviewed by local counsel. Workers are given the contract to read well in advance of signing and given the opportunity to ask any questions about the terms.

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 (the local mini bus transportation) where there is risk of crash or robbery;
- venomous or constricting snakes, which, although have been mostly eradicated from the farm lands, still can be encountered;
- elephants, which are present in the Meru area.

TIST has a Standard Operating Procedure to address safety. To ensure that safety policy and safety issues are understood, each quantifier is briefed on the following safety policy annually.[16]

[16] see "TIST KE PD-CCB-Spt 13 Quantifier Safety 110110.doc"

G4.7 Financial health of the 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 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 farm land, there are few laws that are relevant to TIST. They are, however:

- The employment laws listed in G4.5. CAAC uses Kenya counsel to advise on issues relating to employment.
- Companies Act, (Law of Kenya Cap. 486). CAAC is registered as a branch and must remain in good standing to operate in Kenya.
- Environmental Management and Co-ordination Act, 1999.[17] In conformance with the Act, TIST submitted an EIA to the National Environmental Management Authority (NEMA) and because it received not further communication from NEMA, completed all of its obligations under the Act.

As a recipient of a USAID award, I4EI is subject to:

1. Applicability of 22 CFR Part 226 (MAY 2005)
2. Ineligible Countries (MAY 1986)
3. Nondiscrimination (MAY 1986)
4. Nonliability (NOV 1985)
5. Amendment (NOV 1985)
6. Notices (NOV 1985)
7. Subagreements (JUN 1999)
8. OMB Approval Under The Paperwork Reduction Act (DEC 2003)
9. USAID Eligibility Rules for Goods and Services (APR 1998)
10. Debarment, Suspension, and Other Responsibility Matters (JAN 2004)
11. Drug-Free Workplace (JAN 2004)
12. Equal Protection of the Laws for Faith-Based and Community Organizations (FEB 2004)
13. Implementation of E.O. 13224 -- Executive Order on Terrorist Financing (MAR 2002)
14. Marking Under USAID-Funded Assistance Instruments (DEC 2005)
15. Regulations Governing Employees (AUG 1992)
16. Conversion of United States Dollars to Local Currency (NOV 1985)
17. Use of Pouch Facilities (AUG 1992)
18. International Air Travel and Transportation (JUN 1999)

[17] Environmental Co-ordination and Management Act states that all Kenyans have the right to a clean and healthy environment and sets up the administrative and legal structure to provide it. It sets up the National Environmental Management Authority (NEMA) to oversee this effort. It requires a national environmental plan and district plans. It also requires environmental impact assessments conducted by an authorized consultant for any project that is "out of character with its surroundings." Included in this category is "reforestation and afforestation." Relying on Section 59.8 and 59.9 of the Act, if there is no response from NEMA within 6 of submitting the EIA, the proponent may begin its undertaking.

19. Ocean Shipment of Goods (JUN 1999)
20. Local Procurement (APR 1998)
21. Voluntary Population Planning Activities – Mandatory Requirements (MAY 2006)

I4EI is subject to audit by the US government.

G5.2 Project Approvals. There are no approvals necessary for a farmer to plant trees on his/her lands. However, TIST engaged the Kenya Forest Service and sought their approval. TIST received the following approvals:

- A letter from the Chief Conservator of the Forest to the Director General of the National Environment Management Authority dated 08 January 2007 requesting that TIST be allowed to operate.
- A letter from the National Environment Management Authority dated 19 March 2007 confirming they have no objection to the further development of the TIST project.

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 land owners.

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 the Kenya Forest Service and is not related to TIST or caused by TIST. TIST, through its development of on-farm, sustainable, wood lots, has 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 05: *Simplified baseline and monitoring methodologies for small-scale afforestation and reforestation project activities under the clean development mechanism implemented on grasslands or croplands* 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 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 carbon that will result from TIST trees.

Eucalyptus spp.
I_v = 32.5 m^3/ha/yr.[18]
Where: I_v = annual increment in volume based on over the bark log volumes.
BEF = 1.5.[19]
WD = 0.51 t.d.m/m^3.[20]
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.[21]

Grevillea robusta
I_v = 12 m^3/ha/yr.[22]
Where: I_v = annual increment in volume based on over the bark log volumes.
BEF = 1.5.[23]
WD = 0.60 t.d.m/m^3.[24]
R = 0.27.[25]

[18] 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.
[19] GPG-LULUCF, Table 3A.1.10, Default Values Of Biomass Expansion Factors (BEF), Tropical, broadleaf.
[20] GPG-LULUCF, Table 3A.1.9-2**,** Basic Wood Densities (D) of Stemwood (Tonnes Dry Matter/M^3 Fresh Volume) for Tropical Tree Species, Tropical America, Eucalyptus robusta.
[21] GPG-LULUCF, Table 3A.1.8, Temperate broadleaf forest/plantation, Eucalyptus Plantation. AGB means aboveground biomass.
[22] 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.
[23] GPG-LULUCF, Table 3A.1.10, Default Values Of Biomass Expansion Factors (BEF), Tropical, broadleaf.
[24] Winrock Fact Sheet 98-05.
[25] GPG-LULUCF, Table 3A.1.8, Tropical/Sub-tropical dry forest.

Cupressus spp.
I_v = 24 m^3/ha/yr.[26]
Where: I_v = annual increment in volume based on over the bark log volumes.
BEF = 1.2.[27]
WD = 0.43 t.d.m/m^3.[28]
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.[29]

Other Africa, Dry Tropical
N_A = 15 t.d.m/ha/yr.[30]
Where: N_A = annual increment of above ground biomass, t.d.m/ha/yr
BEF = 1.5.[31]
WD = 0.60 t.d.m/m^3.[32]
R = 0.27.[33]

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 2.3% 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 net change in carbon stocks is 1,699,076 tonnes of CO_2e.

CL1.2 Change in the emissions of non-CO_2 GHG emissions. The change in emissions of non-CO2 carbon stocks are below 5% and are 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 do not engage in widespread

[26] GPG-LULUCF, Table 3A.1.7, Average Annual Above Ground Net Increment in Volume in Plantations By Species.
[27] GPG-LULUCF, Table 3A.1.10, Default Values Of Biomass Expansion Factors (BEF), Tropical, Pines.
[28] GPG-LULUCF, Table 3A.1.9-2, Basic Wood Densities (D) of Stemwood (Tonnes Dry Matter/M^3 Fresh Volume) for Tropical Tree Species, Tropical America, Cupressus lusitanica.
[29] GPG-LULUCF, Table 3A.1.8, Conifer forest/plantation. AGB means aboveground biomass.
[30] GPG-LULUCF, Table 3A.1.6, Annual Average Above Ground Biomass Increment in Plantations By Broad Category, Africa, Other Species, Dry.
[31] GPG-LULUCF, Table 3A.1.10, Default Values Of Biomass Expansion Factors (BEF), Tropical, Pine.
[32] 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.
[33] GPG-LULUCF, Table 3A.1.8, Tropical/Sub-tropical dry forest.

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 emission is 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 be used by the farmers for fuel wood.

CL1.4 Demonstrate a positive net climate impact. The ex-ante estimates are that TIST trees have already sequestered 285,000 tons CO_2e, will sequester over 1.6 million net tonnes of CO_2e over the 30 year life of the project and, therefore, have a net positive impact on the climate. In addition, planting the trees will benefit the overall ecosystem and, through the use of deadwood from the project, result in reduced deforestation outside the project boundaries.

CL1.5 Double Counting. The project areas that make up this CCB PD make up four PDs 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.

Kenya is not subject to an emissions cap.

CL2. Offsite Climate Impacts (Leakage)

CL2.1 Potential Sources of Leakage. It has been 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 have 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 do 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 (particularly when timber harvest volumes are reduced by the project):*** 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 Kenya has been undergoing deforestation. Farmers, either directly or indirectly, take wood from gazetted forest. The project allows 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 2004, 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 Kenya 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 are now allowing synchronization from remote tree groves and project areas, providing near real-time data.

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

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 does not require monitoring of the baseline. As determined with the ex-ante calculation, the change in baseline carbons stocks is 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 worksheet "Grove Summary." The boundary of the project area was obtained with a GPS (Appendix 02) and the area calculated (see worksheet "Grove Summary.").

Step 2: The strata for the ex-post estimation of the actual net greenhouse gas removals is by species and year similar as described in CL1.1. The DBH of up to 20 trees per stratum per project area was measured. Height is not be used in the allometric equations.

Step 3: Following are allometric equations that were be used. The list will be updated as new or more appropriate ones become available.

$Y = (0.2035 \times DBH^{2.3196}) \times 1.2$ for default for non eucalyptus[34]
$\text{Log } Y = -2.43 + 2.58 \text{ Log } C$ for eucalyptus.[35]

[34] 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).
[35] DH Ashton, "The Development of Even-aged Stands in Eucalyptus regnans F. Muell. in Central Victoria," Australian Journal of Botany, 24 (1976): 397-414, cited by Tim Pearson, Sandra Brown and David Shoch, in "Assessment of Methods and Background for Carbon Sequestration in the TIST Project in Tanzania," Report to Clean Air Action Corporation, (December 2004).

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 4: Each DBH value for each tree measured is applied to the appropriate allometric equation to determine the average biomass per tree in the stratum.

Step 5: The average biomass per tree is multiplied times the number of trees of the stratum to yield the above ground biomass of the stratum.

Step 6: The above ground biomass of each stratum is multiplied by 0.5 to convert biomass to carbon.

Step 7: The t C/ha of the above ground biomass of each stratum is be calculated as follows:

$$\text{t C/ha} = \frac{\text{Carbon in a specific stratum x Area of PA}}{\text{Total Carbon in PA}}$$

Where:
PA = Project Area
Total Carbon = Sum of carbon in each stratum in PA

Step 8: The above ground biomass of each stratum is multiplied by the appropriate root to shoot ratio to determine the below ground biomass. Where national values are not available, the default value is 0.27 for tropical/subtropical dry forest.[36]

Step 9: The t C/ha of the below ground biomass of each stratum is calculated as follows:

$$\text{t C/ha} = \frac{\text{Carbon in a specific stratum x Area of project area}}{\text{Sum of carbon in each stratum in project area}}$$

Step 10: The area of each project area determined in Step 1 and the results of Step 7 and Step 9 is applied to the general equation required by the methodology.

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

Where:

$P_{(t)}$ = carbon stocks within the project boundary at time *t* achieved by the project activity (t C)

[36] GPG-LULUCF, Table 3.A.1.8

$PA_{(t)}I$ = carbon stocks in above-ground biomass at time *t* of stratum *i* achieved by the project activity during the monitoring interval (t C/ha) from Step 7

PB(t)I = carbon stocks in below-ground biomass at time *t* of stratum *i* achieved by the project activity during the monitoring interval (t C/ha) from Step 7

Ai = project activity area of stratum *i* (ha) from Step 1

I = stratum *i* (*I* = total number of strata)

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

- Identify or confirm identification of the project area by its unique name combination of Small Group name and grove name (grove is the vernacular used by the project for a project area).
- Determine the latitude and longitude of the approximate center point of the project area with a GPS. It is automatically logged into the hand-held computer database for temporary storage.
- Map the boundaries of the project area by walking the perimeter using a GPS. The data is stored in the hand-held computer database for temporary storage.
- Count each tree in the project area by age and species strata. This data is entered by the operator directly into the handheld computer database for temporary storage.
- Measure the circumference of up to 20 trees in the age and species strata of a project area. This data is entered by the operator 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[37]	Measure-ment Methods[38]	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.

[37] TBD means to be determined during quantification

[38] 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[37]	Measure-ment Methods[38]	QA/QC	Comment
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 each monitoring event to confirm ownership.

Data/ Para-meter	Data unit	Descrip-tion	Source of data	Value of Data[37]	Measure-ment Methods[38]	QA/QC	Comment
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 arises 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 was measured at least twice or until two tracks that reliably define the project area are obtained. Quantifiers are be required to re-trace the tract with each quantification, to verify that they are at the correct project area and that they are counting the correct trees.
- **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 will exceed 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.[39]

[39] Appendix 06 is "TIST KE PD-CCB-001g App06 Monitoring Plan 110214.doc"

Community Section

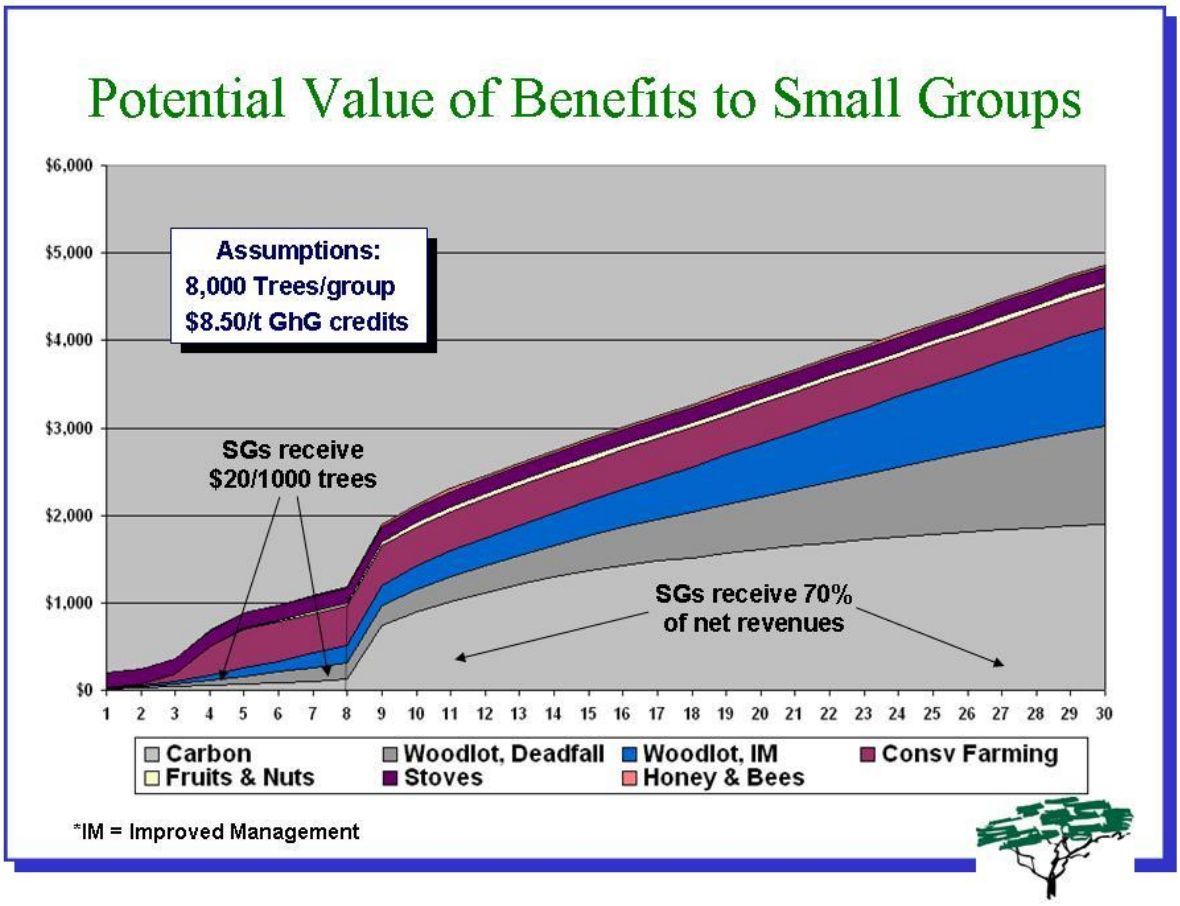
CM1. Net Positive Community Impacts

CM1.1 Impacts on community. The project will create a positive socio-economic impact. Some of the benefits that will be realized by the Small Group members and their families:

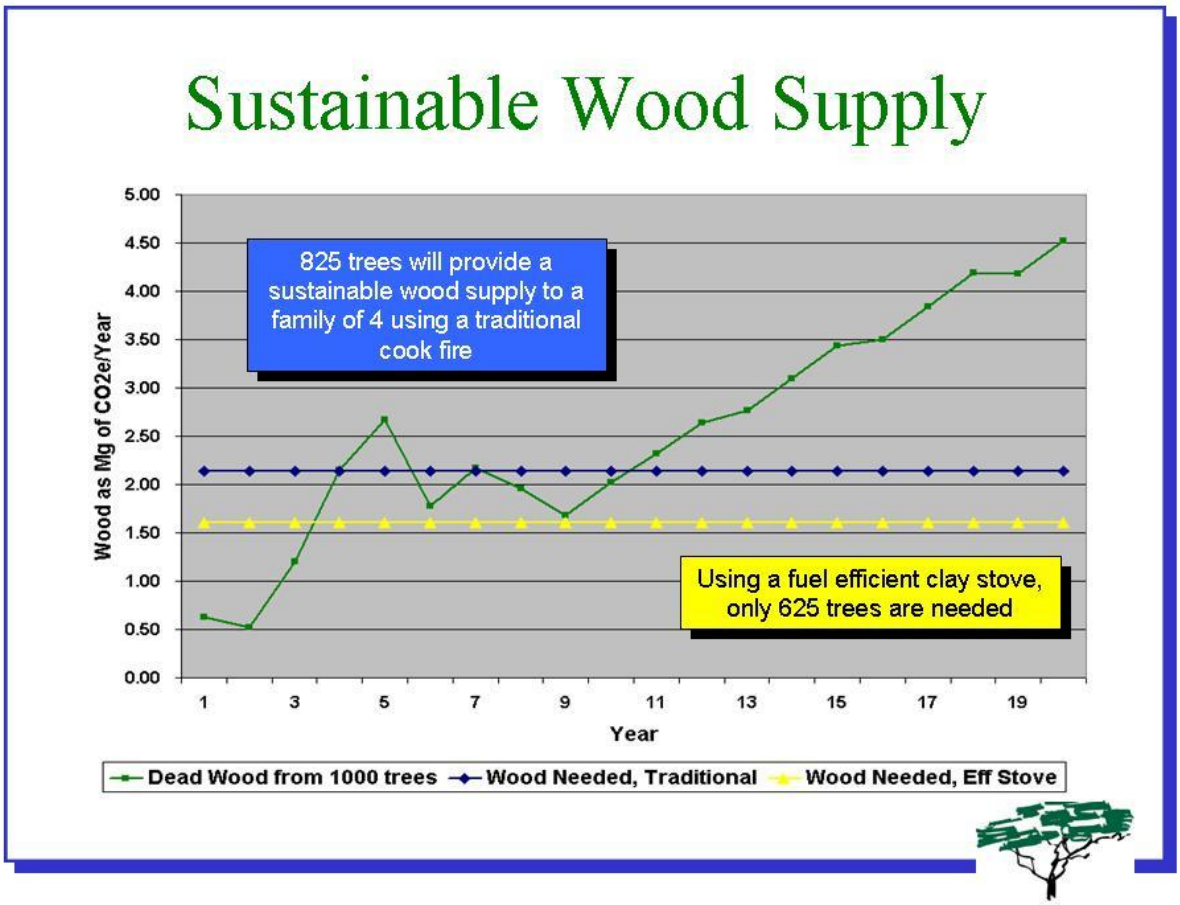
- **New job opportunities:** TIST requires a Host Country staff to operate. There are currently six staff employees and over 50 contract Quantifiers. TIST personnel travel by public transportation and buy food and supplies from local merchants, bolstering the local economy. TIST uses Host Country professionals 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 will 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 savings 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 tree 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, improves 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 water courses. 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. However, the Kenya Forest Department (now Kenya Forest Service) had historically encouraged the planting of eucalyptus, for years, to meet local needs for timber and utility poles. Kenya Power and Lighting Company has been very vocal about their need for poles. Because of this, there are many eucalyptus trees in the project.

CM2.2 Mitigation of negative offsite stakeholder impacts. In order to reduce the number of eucalyptus trees, TIST has been requiring all Small Groups to reduce their percentage of eucalyptus to under 30% of their total trees and file forest plans that show how they are going to achieve this reduction. In addition, TIST is now offering a higher per tree incentive to encourage the planting of indigenous trees in riparian 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 384 ha of eucalyptus, out of 1,579 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 Kenya (male and female).
4. Number of Small Groups in TIST Kenya.
5. Number of community members active in TIST Kenya.
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 community members adopting Conservation Farming.
10. Number of person-training sessions in climate change (male and female).
11. Number of person-training sessions on HIV/AIDS (male and female).
12. Number of person-training sessions on biodiversity (male and female).
13. Number of live trees planted by TIST Small Groups.
14. Number of fruit or nut trees in TIST Kenya.
15. Number of eucalyptus trees in TIST Kenya.

16. Number of fuel efficient stoves that have been used in TIST Kenya.
17. 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, are obtained in the climate change monitoring plan.

Monitoring is generally annually as part of the overall monitoring of TIST. Data is collected by TIST quantifiers as they visit each Small Group to count trees by species, count and measure Conservation Farming plots and count fuel efficient stoves. Trainers collect training information at meetings, which include the subjects covered and the numbers of people attending. The metric for training is person-sessions meaning the numbers reported can exceed the number of members. Contracts are be 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 is be obtained from administrative records.

Field data is 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 the Mt Kenya HCV. 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.

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 was 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 was planting indigenous trees. Isolated woodlots 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 63,000 new indigenous trees
- 185 ha of indigenous trees

The Table B1.1 lists the indigenous species planted to date.

Table B1.1

Scientific Name
Acacia abyssinica
Acacia albida
Acacia mellifera
Acacia polyacantha
Acacia senegal
Acacia seyal
Acacia spp.
Acacia tanganyikensis
Acacia tortilis
Acokanthera oppositifolia
Adansonia digitata
Afzelia quanzensis
Albizia gummifera
Annona senegalensis
Annona spp.
Azanza garckeana
Boscia coriacea
Boscia mossambicensis
Brachystegia spiciformis
Brachystegia spp.
Bridelia taitensis
Calyptrothea taiensis
Canarium schweinfurthii
Celtis durandii
Combretum longispicatum
Combretum molle
Commiphora africana

Scientific Name
Commiphora stuhlmanni
Cordia Africana
Cordia sinensis
Croton megalocarpus
Croton sylvaticus
Cussonia holstii
Dalbergia lactea
Dalbergia melanoxylon
Delonix elata
Dichrostachys cinerea
Dombeya rotundifolia
Dombeya spp.
Dovyalis abyssinica
Ehretia cymosa
Ensete ventricosum
Entada abyssinica
Entandrophragma bussei
Erythrina abyssinica
Euclea divinorum
Euphorbia friesiorum
Euphorbia tirucalli
Faidherbia albida
Ficus sycomorus
Ficus thonningii
Flacourtia indica
Garcinia buchananii
Garcinia livingstonei
Grewia bicolor
Hagenia abyssinica
Harungana spp.
Lonchocarpus capassa
Lovoa swynnertonii
Lumnitzera racemosa
Maesa lanceolata
Maesopsis eminii
Markhamia lutea
Newtonia buchananii
Ocotea usambarensis
Olea capensis
Olea europaea
Olinia rochetiana
Ozoroa insignis
Pentas longiflora
Phoenix reclinata
Podocarpus falcatus
Polyscias fulva
Populus ilicifolia
Prunus africana
Rhus vulgaris
Rubus spp.
Rumex usambarensis
Salvadora persica

Scientific Name
Sapium ellipticum
Sclerocarya birrea subsp. caffra
Sesbania sesban
Solanum aculeastrum
Spathodea campanulata
Spirostachys africana
Strychnos cocculoides
Strychnos henningsii
Strychnos innocua
Syzygium cordatum
Syzygium guineense
Syzygium spp.
Terminalia brownii
Toddalia asiatica
Trema orientalis
Trichilia emetica
Uvaria acuminata
Vangueria apiculata
Vangueria infausta
Vangueria spp.
Vernonia amygdalina
Vernonia brachycalyx
Vitex keniensis
Warburgia ugandensis
Withania somnifera
Ximenia americana
Zanthoxylum gilletii
Ziziphus mauritiana

An Environmental Impact Audit was carried out by Natural Resources Management & Development Agency (NAREDA Consultants) in Meru and Nanyuki areas of Kenya, to assess the environmental conditions and biodiversity of the area and to assess positive and negative environmental impacts of TIST project activities. The EIA and other assessments indicate that the project areas themselves were not areas rich in biodiversity. However, some areas border Mt Kenya and conserved forest, are 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 forest land by increasing food productivity, and consequently, decreasing pressure for land clearing for agriculture. Biodiversity is also enhanced directly through the planting of indigenous trees, both in specific riparian 'biodiversity' groves, and through dispersed interplanting, homestead planting and woodlots. Increases in tree biodiversity also enhances diversity of associated species, including pollinators, and other beneficial species, while protection of riparian areas 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 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 eucalyptus, cypress and grevillea fill this niche, and by doing so, reduce deforestation and indirectly contribute to 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.

B.1.2 No HCVs be negatively affected by the project. The Mt Kenya HCV will not be negatively affected by the project. The project areas border, or are in the vicinity of, Mt Kenya and other National Forests that have significant conservation value and high diversity. The project provides 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 will have a positive affect on HCVs.

Mt Kenya and surrounding highlands are one of Kenya's five main water towers. The planting of trees will prevent water from running off, and help the water seep into the ground and back into the water table. In addition, 21 hectares are in riparian areas and help provide corridors for animals to move from forest to forest.

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 Kenya. Additional species may be added over the life of the project as additional planting takes place.

Table B1.3

Scientific Name	Indigenous
Acacia mearnsii	no
Acacia seyal	yes
Acacia spp.	yes
Adansonia digitata	yes
Albizia gummifera	yes
Anacardium occidentale	no

Scientific Name	Indigenous
Annona senegalensis	yes
Annona spp.	yes
Artocarpus heterophyllus	no
Azadirachta indica	no
Bombax ceiba	no
Brachychiton acerifolium	no
Brachystegia spiciformis	yes
Brachystegia spp.	yes
Bridelia taitensis	yes
Callistemon spp.	no
Canarium schweinfurthii	yes
Casuarina equisetifolia	no
Cedrela Odorata	no
Celtis durandii	yes
Citrus limonum	no
Citrus sinensis	no
Cordia Africana	yes
Cordia monoica	no
Croton megalocarpus	yes
Croton Sylvaticus	yes
Cussonia holstii	yes
Cyphomandra betacea	no
Cypress spp.	yes
Dombeya rotundifolia	yes
Dombeya spp.	yes
Dovyalis abyssinica	yes
Ehretia cymosa	yes
Entada abyssinica	yes
Erythrina abyssinica	yes
Eucalyptus grandis	no
Euclea divinorum	yes
Ficus sycomorus	yes
Ficus thonningii	yes
Fraxinus berlandieriana	no
Fraxinus pennsylvanica	no
Grevillea robusta	no
Hagenia abyssinica	yes
Harungana spp.	yes
Jacaranda mimosifolia	no
Leucaena leucocephala	no
Lovoa swynnertonii	yes
Macadamia spp.	no
Maesopsis eminii	yes

Scientific Name	Indigenous
Mangifera indica	no
Markhamia lutea	yes
Morus alba	no
Newtonia buchananii	yes
Olea europaea	yes
Persea americana	no
Phoenix reclinata	yes
Pinus Patula	no
Pithecelobium dulce	no
Podocarpus falcatus	yes
Polyscias fulva	yes
Pouteria sapota	no
Prunus africana	yes
Prunus persica	no
Psidium guajava	no
Pterocarpus santalinus	no
Rubus spp.	yes
Rumex usambarensis	yes
Sapium ellipticum	yes
Schinus molle	no
Senna spectabilis	no
Sesbania grandiflora	no
Solanum aculeastrum	yes
Strychnos cocculoides	yes
Strychnos henningsii	yes
Strychnos madagascariensis	no
Tamarindus indica	no
Terminalia brownii	yes
Toddalia asiatica	yes
Toona ciliata	no
Trichilia emetica	yes
Vangueria spp.	yes
Vitex keniensis	yes
Warburgia ugandensis	yes
Withania somnifera	yes

Invasive Species. All listed species have been screened against the global database of invasive species.[40] While two on the above list are included for Kenya, they are high value trees in Kenya, and, according to the Kenya Forest Service, are not invasive.[41]

[40] International Union of Concerned Scientists, Global Invasive Species Database, Accessed 11 January, 2011 at http://www.issg.org/database.
[41] Anampiu G.M., Kenya Forest Service, letter to Charles Ibeere, Clean Air Action Corporation, October 28, 2010.

The first is the guava tree, *Psidium guajava*. It is a mainstay of the Kenyan diet and provides one of the most popular fruit. According to one study in western Kenya, over 25% of the households surveyed consumed guava in a seven day period and 87.5% gathered guava.[42] Believed to be from Central America, it was brought to Africa in the 1800s, where it has become an important fruit that adds to the economic well being and food security of Kenyans. It is being planted on agricultural lands and not in the natural forest. There are 2,932 guava trees, out of 917,775 project trees, or 0.32%.

The second, *Leucaena leucocephala*, is widely planted for forage production and reforestation. It was introduced generations ago, probably from Central America, and while it may be invasive in the natural forest, it is very popular and useful in agriculture. It benefits the soil, is a better fodder than alfalfa, has year-round blooms to foster honeybees, has seeds that can be used for biofuels and is an excellent firewood.[43] It is being planted on agricultural lands and not in the natural forest. There are 121 leucaena trees, out of over 917,775 project trees, or 0.01%.

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 Kenya since its introduction in 1902, for its fast growth,[44] is known to set deep roots that may deplete water resources without sustainable management.

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, and develop group forest plans to decrease eucalyptus on their farms to less than 30% of total trees planted. Farmers are also trained on governmental policies on eucalyptus. Indigenous trees, including water conserving species such as *Bridelia* and *Sysygium* spp, are encouraged in riparian areas, both through training on best species, and through an additional PES, per indigenous tree, planted in groves within 100 meters of a waterway.

For participating groups, there is an additional incentive for indigenous seedlings quantified in their nurseries.

Small Group members are required to follow TIST best practices in riparian areas, for the groves to qualify. They agree not cut down or clear existing indigenous trees, plants or ground cover, not

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[42] Ekesa BN, Walingo MK, and MO Abukutsa-Onyango, " Accessibility to and consumption of indigenous vegetables and fruits by rural households in Matungu division, Western Kenya. 2009. http://www.thefreelibrary.com/Accesibility+to+and+consumption+of+indigenous+vegetables+and+fruits...-a0214999629, accessed October 10. 2010.

[43] World Agroforestry Centre, AgroForestryTree Database, "Leucaena leucocephala." Accessed at http://www.worldagroforestrycentre.org/sea/Products/AFDbases/af/asp/SpeciesInfo.asp?SpID=1069, on October 26, 2010.

[44] The Big Debate Over Eucalyptus, *Daily Nation*, Daniel Wesangula, http://www.greenbeltmovement.org/a.php?id=446

till soil within 30 meters of the waterway, and not plant eucalyptus within 100 meters of a waterway.

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 eucalyptus, cypress and grevillea, 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. The Kenya Forest Service continues to promote eucalyptus to conserve biodiversity since cultivated eucalyptus wood can replace indigenous species otherwise harvested for fuel-wood degrading natural forests.[45] 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

B.2.1 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 reduces the need for fuel wood from external sources. The trees are owned by the Small Group members and as the trees die, either naturally or through selective harvest, they are used as fuel wood by the members. 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.

[45] Kenya Forest Service. A guide to on-farm eucalyptus growing in Kenya. 2009. http://www.wrm.org.uy/countries/Kenya/Eucalyptus_guidelines.pdf

B3 Biodiversity Impact Monitoring

B3.1 Initial plan for biodiversity monitoring. TIST has been operation in Kenya since 2004 and has deployed an award-winning monitor system that collects data for, among other things, biodiversity.

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 populates the website. Annual monitoring of each site is the goal and a minimum of every two years is achieved.

At a landscape level, we monitor the number of hectares of riparian land improved with indigenous tree planting by TIST farmers and their location. TIST Small Groups with land in riparian areas who plant indigenous trees to help preserve the area and reduce erosion caused by runoff and flooding receive an additional incentive per live tree. Riparian areas were chosen for their critical importance in providing ecosystem services such as enhanced water quality, reduced sedimentation, and enhanced wildlife habitat.

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 has been obtained. There are 1,565 hectares of new forest comprised of 4,286 individual parcels spread out over 7,000 square kilometers. The location and perimeter of each project area are presented in Appendix 1 and 2. Because the rules of VCS require that the area of the project be fixed for the life of the project, these 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.

Gold Level Section

GL2. Exceptional Community Benefits

GL2.1 Low human development. Kenya meets the requirements of being a medium human development country with at least 50% of the population of the area below the poverty line. According to the UNEP, Kenya ranks 147 out of 182 countries in human development and as such is considered a medium human development country.[46] The UNDEP report also states that 52% of the population is under the poverty line.[47]

GL2.2 Poorest quartile will benefit. The project has been designed to benefit the poorest of the poor and in this case the subsistence farmers of rural Kenya. To join TIST, a farmer only needs to join a Small Group and while most of the rural poor already have land to plant trees, they don't even need that. If they work with their friends, family or neighbors, they can plant trees on those lands and benefit.

There is no minimum project area size that would restrict the smallest small-holder farmer from joining. While the CDM afforestation methodologies requires a minimum area of 0.1 hectares (Kenya forest definition), TIST is applying for VCS credits to be able to go below that threshold. TIST has designed a monitoring plan that allows participation of farmers with the smallest of plots.

TIST has tried to eliminate the barriers to entry to the program. Members do not have to buy seedlings. They are taught to gather local seeds, prepare nurseries and raise their own seedlings. They can sell any surplus. The benefits that can be realized by using Conservation Farming not only don't cost money, they can produce higher yields in less land and result in added revenues or decreased food expenses. Participation in the more fuel efficient stove project is also without cost. While TIST is introducing a manufactured stove, it also trains in making a home built rocket-Lorena stove that can be made for no cash costs, from locally available material. TIST training in nutrition, HIV/AIDS prevention and care, malaria prevention and other health issues is free. Training in improved natural resource management, species selection, nurseries and tree planting, climate change, riparian buffers and other environmental issues is free.

Although table G1.5.5 does not have a bin for the lowest quartile, it shows that 5% of the members make less than $160 per year, demonstrating that there is not an economic barrier that would prohibit the poorest from joining. It also shows that 45% of the members make less than $800 per year.

[46] United Nations Development Program, Human Development Report 2009, page 178. See Kenya, HDI 147. See TIST KE CCB Spt 06 UN Human Dev Rpt 2009.pdf

[47] Ibid. See Population below income poverty line, National Poverty Line.

To demonstrate that 50% of the lower quartile in the entire community will benefit substantially from the project requires looking at the overall benefits of the program, because while TIST is open to all, 50% voluntary participation in a project zone of thousands of square kilometers is beyond the ability of any project.

First is the effect of climate change on this population. At risk are food security, changes in temperature and precipitation, changes in soil moisture and soil fertility, changes in the length of growing season and an increased probability of extreme climatic conditions.[48] These will affect every farmer in rural Kenya, including the lowest quartile. TIST has quantified climate change benefits, which mitigate these negative impacts.

Regarding food security, TIST has community benefits that affect the lowest quartile. According to the FAO:

> "many of Kenya's 32 million people live on US$1 per day and suffer poverty and malnourishment. About one-third of the population is chronically undernourished. Limited or no access to independent food production resources and the effects of the HIV/AIDS pandemic and other chronic diseases such as TB and malaria put additional pressure on people's ability to lead healthy, productive lives."[49]

TIST farmers are planting new fruit and nut trees, engaging in honey production and, through Conservation Farming, getting higher yields from their farms. Some of this food is consumed by the farmers and their families and some are selling surplus food into the community. This is the independent food production resource identified by the FAO as being needed by the poor and undernourished, i.e. the lower quartile. TIST programs help members directly and provide a larger pool of food that indirectly benefits non-members. It should also be noted that because these are local crops, they do not have the negative impact that imports have on subsistence agricultural prices.

The degradation of the local environment affects the lower quartile and TIST tree planting helps address it. As pointed out by the FAO:

> [The] natural resource base of Africa is being degraded and destroyed at a rate that will soon make food and agricultural production un-sustainable. Poverty, coupled with increasing population pressure, is the biggest single cause of this degradation. *The rural poor, the overwhelming majority of Africa's citizens, destroy their own environment, not out of ignorance, but simply to survive*. Peasant farmers preoccupied with survival over-crop marginal [sic] and because there is no alternative employment and no better technologies they can afford. Pastoralists overstock to improve their chances of surviving the next drought. Rural dwellers strip trees and shrubs for fuelwood because they need

[48] Claire McGuigan, Rebecca Reynolds, Daniel Wiedmer; London School of Economics Consultancy Project for The Overseas Development Institute, "Poverty and Climate Change, Assessing Impacts in Developing Countries and the Initiatives of the International Community," 2002. http://www.odi.org.uk/resources/download/2578.pdf accessed October 28, 2010

[49] Food and Agriculture Organization of the United Nations, Special Programme for Food Security, "Success Stories - Kenya (Njaa Marufuku Kenya). See TIST KE CCB Spt 07 FAO Food Security.pdf

> fuel. *In the context of the short-term basic needs of an individual, each decision is rational; in the long run, the effects are disastrous.*[50]

According to the UNEP, trees help "conserve soil and water."[51] They improve soil stabilization and reduce erosion. Erosion affects the quality of water and the lowest quartile are the first to be affected by poor water quality. As observed by the Untied Nations, "poor communities have tended to suffer the greatest health burden from inadequate water supplies and, as a result of poor health, have been unable to escape from the cycle of poverty and disease."[52] The lowest quartile are the people most likely to be negatively affected by drought. Trees also retain soil moisture and help mitigate the affects of drought. TIST tree planting ameliorates these negative results of deforestation and degradation and benefits the lowest quartile.

The lower quartile relies on wood for their primary fuel. According to the UNEP, "it provides 90 per cent of rural households' energy requirements and 85 per cent in urban areas."[53] This would include most of the lower quartile. Further, the UNEP states "biomass is seen as the poor people's source of energy."[54] Looking at it from a supply and demand basis, new sustainable biomass from TIST trees will lead to more supply and lower fuels costs, therefore benefiting the lower quartile.

TIST health training will also have an indirect benefit on poor non-members. According to Kawewa:

> The major factor contributing to the high incidence of HIV/AIDS in Kenya is the rising level of poverty among Kenyans, where over 50 percent of the population lives below the poverty line (economic survey 2000), with an average annual basic income of less $300 that's less than $1 per day. The impoverished families spend less on such basic needs as food, shelter routine preventive health care, general medical care and education. There is a direct link between levels of poverty of the family and enrollments, participation and completion of learning in educational institutions.[55]

Peer training is a way to disseminate information throughout a community. For example, the list of myths associated with AIDS is long and they are circulated worldwide. The poor have little access to HIV/AIDS education and base their decisions on these myths. TIST training will help

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[50] Food and Agriculture Organization of the United Nations, "Land and environmental degradation and desertification in Africa," 1995. Accessed 11 January, 2011 at http://www.fao.org/docrep/x5318e/x5318e02.htm. Or see TIST KE CCB Spt 08 FAO Enviro Degradation

[51] United Nations Environmental Programme, "The Billion Tree Campaign." Facts and Figures. Accessed 11 January, 2011 at http://www.unep.org/billiontreecampaign/FactsFigures/QandA/index.asp. Or see " TIST KE CCB Spt 09 UNEP Tree Benefits.pdf"

[52] UN-Water, Coping with Water Scarcity, 2007 World Water Day, 2007, page 6, Accessed 11 January, 2011 at http://www.fao.org/nr/water/docs/escarcity.pdf.

[53] United Nations Environmental Programme, "Kenya: Integrated Assessment of the Energy Policy," 2006, page 13. Accessed 11 January, 2011 at http://www.unep.ch/etb/areas/pdf/Kenya%20ReportFINAL.pdf. Or see TIST KE CCB Spt 11 UNEP KE Energy.pdf.

[54] Ibid.

[55] Kawewa, Janet, "SITUATIONAL ANALYSIS ON HIV/AIDS IN KENYA," UNESCO Institute for Education Programs, Learning and Empowerment: Key Issues in Strategies for HIV/AIDS Prevention, International Workshop/Seminar March 1-5, 2004, Chiangmai, Thailand, page 1. Accessed 11 January, 2011 at http://www.unesco.org/education/uie/pdf/Kawewa.pdf

counter these myths, giving the friends and neighbors of non-members the information that can lead to better decision making.

TIST was designed to benefit the poorest of the poor. While all in the lowest quartile are invited to join and would reap more benefits as members, all of the program activities have community benefits that will benefit the non-members in the lowest quartile.

GL2.3 Barriers to benefits addressed. The barriers that might prevent benefits going to poorer households have been identified and addressed in the project design. As discussed in GL2.2., they have been removed to the greatest extent possible.

GL2.4 Negative impacts on the poor identified. TIST was developed through visioning sessions with poor small-hold subsistence farmers in Tanzania in 1998 and 1999. 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 AIDS 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. TIST Kenya adopted this approach and was designed to do as much of this as possible at the subsistence farmer level. Because this was the approach to the project, no poorer and more vulnerable households and individuals whose well-being or poverty may be negatively affected by the project have been identified.

GL2.5 Monitoring Community Impacts. As noted, TIST is a community based program comprised of over 50,000 Kenyans (although not all subject to this PD). They are all part of the existing monitoring plan to determine the effectiveness of TIST in achieving its goals. By monitoring TIST as a project, the positive and negative impacts to the community can be determined.

TIST is developing a differentiated monitoring plan to supplement its existing plan, that will be able to identify positive and negative impacts on poorer and more vulnerable groups. The social impact monitoring will take a differentiated approach that can identify positive and negative impacts on poorer households and individuals and other disadvantaged groups, including women.