MONITORING REPORT FOR TIST PROGRAM IN KENYA VCS-006

The International Small Group & Tree Planting Program

Document Prepared By Clean Air Action Corporation

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1 PROJECT DETAILS

1.1 Summary Description of Project

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 65,000 subsistence farmers. Carbon credit sales generate participant income and provide project funding to address agricultural, HIV/AIDS, nutritional and fuel challenges. As TIST expands to more groups and more areas, it ensures more trees, more biodiversity, more climate change benefit and more income for more people.

Since its inception in 1999, TIST participants organized into over 9,000 TIST Small Groups have planted over 11 million trees on their own and community lands. GhG sequestration is creating a potential long-term income stream and developing sustainable environments and livelihoods. TIST in Kenya began in 2004 and has grown to nearly 52,000 TIST participants in over 7,000 Small Groups.

As a grass roots 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 Verified Carbon Standard 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 the "TIST Data System," a high-tech approach to quantify the benefits and report the results in a method transparent to the whole world, which includes palm computers, GPS, and a dynamic “real time” internet based database.

This project description (PD) is for a subset of the TIST project in Kenya and initially applies to 3,961 of the Small Groups, 29,222 members, 18,099 project areas and 7,419.2 ha. The individual project areas are listed in Appendix 08, the Excel spreadsheet that contains the monitoring data. Locations, boundaries and the areas of each project area were supplied in the Project Description document and appendices and are unchanged. The main species planted are Eucalyptus spp., Grevillea Robusta and Cupressus spp.

1.2 Sectoral Scope and Project Type

This project is registered under the Voluntary Carbon Standard (VCS, 3.1) as an Afforestation, Reforestation and Revegetation (ARR) project and has been developed in compliance with the VCS Guidance for Agriculture, Forestry and Other Land Use Projects (VCS, 3.1). It is a grouped project.

1.3 Project Proponent

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

1.4 Other Entities Involved in the Project

Other Entities	Point of contact	Roles/ Responsibility	Contact Details
Institute for Environmental Innovation (I4EI)	Vannesa Henneke, Executive Director	Manages sustainable development components of TIST	Institute for Environmental Innovation 7134 South Yale Ave, Suite 310 Tulsa, Oklahoma 74136 United States of America Phone: +1-918-712-1866
United States Agency for International Development (USAID)	Enoch Kanyanga, Technical Officer	USAID provides funding for sustainable development components of TIST	USAID-Kenya c/o American Embassy United Nations Avenue, Gigiri, P. O. Box 629, Village Market-00621 Nairobi, Kenya
Environmental Services, Inc (ESI)	Shawn McMahon	Validator/Verifier	Environmental Services, Inc. 3800 Clermont St., NW North Lawrence, OH 44666 United States of America Phone: +1-330-833-9941

1.5 Project Start Date

01-January-2004.

1.6 Project Crediting Period

30 years starting 01-January-2004 and ending to 31-December-2033

1.7 Project Location

The TIST Kenya Project is located in central Kenya in the Central, Rift Valley and Eastern Provinces. Most of the project activity is centered around Meru and Nanyuki. The individual project areas, their location and their boundaries are presented in the appendices. Appendix 01 displays the project area locations overlain on 1990 Landsat image. Appendix 02 displays the project area locations overlain on 2000 Landsat image. Appendix 03 displays the project area boundaries on Google Earth using a KML file. Appendix 08 is an Excel spreadsheet of data, which includes a list of each project area.

1.8 Title and Reference of Methodology

The monitoring methodology used by the Project is CDM AR-AMS0001 Version 06: Simplified baseline and monitoring methodologies for small-scale afforestation and reforestation project activities under the clean development mechanism implemented on grasslands or croplands.

2 IMPLEMENTATION STATUS

2.1 Implementation Status of the Project Activity

The project has been fully operational since 2004. The project was implemented in accordance with the PD and the validation report. The Project Description (PD) was written after the project had been in operation in the project areas for several years. As such, the PD was written reflecting the way the project had been implemented. In addition, this monitoring report is being written within weeks of issuing the final version of the PD. No events were identified during this monitoring period that were not already reflected in the PD.

As discussed more thoroughly in Section 4.3, no further leakage monitoring is required.

Permanence is addressed through the risk buffer. A Non-Permanence Risk Report was prepared under VCS 3.1 and provided to the Verifier. According to the risk tool, the overall risk rating is 2.5, qualifying the project for the minimum buffer, 10%.

2.2 Deviations from the Monitoring Plan

While there are no deviations from the monitoring plan, there were three issues that were identified during the previous VCS validation and verification, for a different subset of TIST project areas. They were:

- The project counts all trees, but no circumference measurements are taken if the trees are less than breast height. ESI was concerned that not having these included as a zero circumference measurement could have a material effect on the total carbon calculated.
- The field observation indicated that the Cordia africana were subject to extensive pruning, in order to get the main trunk growing straight. ESI was concerned that use of circumference measurements from these trees in the allometric equations could have a material effect on the total carbon calculated.
- In spite of the thousands of circumference readings taken for the project, circumference readings were not being taken in project areas, where the tree count was less than twenty. ESI was concerned this could have a material effect on the total carbon calculated.

All three of these issues are addressed in the Accuracy section of this report (see Section 3.3.2, below).

2.3 Grouped Project

This is the first group of projects under the TIST Program in Kenya VCS-006. The instances in the PD are the same instances as in this verification report.

In addition to the eligibility requirements of the methodology, there are two criteria for inclusion of new instances of each project activity. The first is that it must be in the geographic area defined

in Section 1.9 (i.e. be in Kenya). This is demonstrated with the geographic coordinates supplied in Appendix 08.

The second is that the ex ante carbon estimates for each project area (i.e. instance) must be below the pertinent capacity limits. The CDM small scale AR methodology has a 16,000 tonne per year average limit on a project that equates to 480,000 tonnes CO_2e for a 30-year project life. VCS places a one percent limit on each instance and requires instances that exceed this limit to be divided into clusters. To be eligible for this PD, each project area shall either be at or below the one percent level (4,800 tonnes CO_2e), or will meet the requirements for inclusion as a cluster.

For the subset of TIST project areas that are in this PD, all of the instances are less than the one percent threshold. This is documented in Appendix 08 ("Proj Life Ex ante CO2e" column of the "PA Summary" worksheet). The calculations are based on the ex ante estimates for each strata in the "Ex Post Strata" worksheet. The results were further modified to adjust for project areas that, because of the area (ha), exceeded the ex ante estimates, but, because of the stem density, does not. All of the documentation is presented in a transparent and verifiable manner in the worksheets.

3 DATA AND PARAMETERS

3.1 Data and Parameters Available at Validation

Data Unit / Parameter:	**Location of project area**
Data unit:	Latitude and longitude
Description:	Single point location of the area where project activity has been implemented
Source of data:	GPS
Value applied:	See "PA Summary" worksheet, Appendix 08, for each result
Purpose of the data:	Baseline
Any comment:	None

Data Unit / Parameter:	**Boundary of project area**
Data unit:	Latitude and longitude
Description:	Multiple points of latitude and longitude that describe the boundary of a discrete project area
Source of data:	GPS
Value applied:	See KML file, Appendix 3, for all results
Purpose of the data:	Baseline
Any comment:	None

Data Unit / Parameter:	**Area of project area**
Data unit:	Hectares
Description:	Size of the area where the project activity has been implemented
Source of data:	GPS
Value applied:	See "PA Summary" worksheet, Appendix 08, for each result
Purpose of the data:	Baseline
Any comment:	None

Data Unit / Parameter:	**Ownership of project area**
Data unit:	Name
Description:	Ownership of land of project area
Source of data:	“Carbon Credit Sale Agreement”
Value applied:	See "PA Summary" worksheet, Appendix 08, for each result
Purpose of the data:	Baseline
Any comment:	None

Data Unit / Parameter:	**Baseline trees**
Data unit:	Baseline Trees
Description:	The number of trees existing in a project area, before the planting of project trees, is counted
Source of data:	Trees are physically counted in the field
Value applied:	See "Baseline Strata" worksheet, Appendix 4, for each result
Purpose of the data:	Baseline
Any comment:	None

Data Unit / Parameter:	**Baseline tree circumference**
Data unit:	Centimeters
Description:	The circumference of trees existing in a project area, before the planting of project trees, is counted
Source of data:	Trees are physically measured in the field
Value applied:	See "Baseline Strata" worksheet, Appendix 4, for each result

Purpose of the data:	Baseline
Any comment:	None

Data Unit / Parameter:	**Baseline strata**
Data unit:	Hectares
Description:	The area of cropland or grassland at baseline
Source of data:	Estimate based on visual field observations
Value applied:	See "Grove Summary" worksheet, Appendix 4, for each result
Purpose of the data:	Baseline
Any comment:	None

Data Unit / Parameter:	**Project trees**
Data unit:	Count of tree
Description:	The number of trees per age and species strata in each project area
Source of data:	Trees are physically counted in the field.
Value applied:	See "Grove Summary" and "Strata" worksheets, Appendix 4, for each result
Purpose of the data:	The tree count by strata is used to extrapolate the ex ante GhG removals
Any comment:	None

3.2 Data and Parameters Monitored

Data Unit / Parameter:	**Number of trees**
Data unit:	Trees
Description:	Number of trees in a project area by strata
Source of data:	Physical counts
Description of measurement methods and procedures to be applied:	Physical count of the trees in each stratum by Quantifiers with each visit
Frequency of monitoring/recording:	Ongoing measurement taken by Quantifiers as they visit project areas. Each PA could be visited as much as once per year.
Value monitored:	See "Ex-post Strata" worksheet of Appendix 08
Monitoring equipment:	Customized handheld computer
QA/QC procedures to be applied:	Part of overall QA/QC procedures discussed in Section 3.3

Calculation method:	Not applicable
Any comment:	None

Data Unit / Parameter:	**DBH**
Data unit:	cm
Description:	Diameter of tree at breast height (1.30 m)
Source of data:	Physical measurements
Description of measurement methods and procedures to be applied:	TIST measures DBH of up to 20 representative trees of each age/species stratum in different project area
Frequency of monitoring/recording:	Ongoing measurement taken by Quantifiers as they visit project areas
Value monitored:	See "Circ" worksheet of Appendix 08
Monitoring equipment:	Measuring tape and customized handheld computer
QA/QC procedures to be applied:	Part of overall QA/QC procedures discussed in Section 3.3
Calculation method:	Not applicable
Any comment:	None

Data Unit / Parameter:	**Total CO2**
Data unit:	Tonnes
Description:	Total CO2 sequestered by the trees
Source of data:	Calculation
Description of measurement methods and procedures to be applied:	Allometric equations are assigned to each stratum. DBH values are applied to the allometric. Average biomass of a tree in each stratum is calculated and multiplied by number of trees in each stratum. Biomass is converted to CO_2e and the CO_2e of the stratum are totaled.
Frequency of monitoring/recording:	Calculation takes place with each monitoring report
Value monitored:	See "Ex-post Strata" worksheet of Appendix 08
Monitoring equipment:	Computer and database
QA/QC procedures to be applied:	Part of overall QA/QC procedures discussed in Section 3.3
Calculation method:	Not applicable
Any comment:	None

3.3 Description of the Monitoring Plan

3.3.1 Monitoring and Carbon Calculations

The overall plan employs TIST Quantifiers going to each PA, counting each tree by stratum and taking circumference measurements of up to 20 trees in a stratum. The data is recorded on a handheld computer using a custom database. The data is uploaded to the TIST database via the Internet where it is incorporated with all the other monitoring data and displayed on the TIST website (tist.org). This is an ongoing process that takes place almost everyday. As each PA is revisited, the old data is achieved and the results of the new quantification is displayed on the website. The data used in this monitoring report is the most current information from each PA. It was accessed from the database by the proponent and used in the carbon calculations.

The following provides the step-by-step procedure used to determine the Project GhG removals:

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 was monitored. They are documented in the "PA Summary" worksheet of Appendix 08.[1] The location of each area was obtained with a GPS and provided in PD Appendices 01 and 02.[2] The boundary of each project area was obtained using a GPS and provided in PD Appendix 03.[3] The area was calculated and is listed with each project area in the "PA Summary" worksheet of Appendix 08.

Step 2. The strata for the ex post estimation of the actual net greenhouse gas removals was done by species and year similar to the ex ante estimate as described in PD Section 3.2. Stratification was done within each individual project areas. The area of a stratum in a project area ("Area of a Stratum (ha)") was determined by multiplying the area of project area (see Step 1) by the percentage of trees of that stratum in the respective project area. The results are provided in the "Ex-post Strata" worksheet of Appendix 08.[4]

Step 3. Where a tree species exceeded 10% of the total tree inventory, it was assigned to a Major Strata. All other tree species were assigned to an "Other" strata. Based on the tabulations in Appendix 08, there are four major strata: eucalyptus, grevillea, *Cupressus* and other.

Step 4. Allometric equations were used to convert DBH values to biomass. An allometric equation for each Major Strata was identified. If a species specific equation for a Major Strata was unavailable, it used the "Other" equation as a default. Allometric equations were researched and the most appropriate ones identified by the Proponent were assigned to the major strata. Because no better allometric equations could be found for grevillea and *Cupressus*, they were assigned to the "other" equation. The following is the assignment.

[1] "PA Summary" worksheet of Appendix 08 is an abbreviated version of the "Grove Summary" worksheet of PD Appendix 04. It contains the same list of Project Areas but omits the baseline information.
[2] The locations of the PAs presented in the PD have not changed. The reader is referred to the original Appendices.
[3] The boundaries of the PAs presented in the PD have not changed. The reader is referred to the original Appendix.
[4] "Ex-post Strata" worksheet of Appendix 08 is similar to the "Strata" worksheet of PD Appendix 04. It contains the same list of strata but includes carbon calculation information.

Eucalyptus[5]: $Log\ Y = -2.43 + 2.58\ Log\ C$
Grevillea: no species specific equations, will use "Other" equation
Cupressus: no species specific equations, will use "Other" equation
Other (default)[6]: $Y = (0.2035 \times DBH^{2.3196}) \times 1.2$

Where:

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

The result is that there are only two Allometric Strata: eucalyptus and other. See "Circ" worksheet, Appendix 08.

Step 5. The DBH of up to 20 trees per stratum, per project area, were measured. The results of these measurements are presented in the "Circ (cm)" column of worksheets "Circ-1," "Circ-2" and "Circ-3" of Appendix 08. Each DBH value for each tree measured was applied to the appropriate allometric equation and the above ground biomass ("AG Biomass, kg") of each per tree in the stratum was obtained.[7]

The "Average Above Ground Biomass per Tree (kg)" of the "Ex-post Strata" worksheet was created by processing the "AG Biomass (kg)" values in the "Statistics" worksheet. The individual "AG Biomass" values were transferred by strata to the "Sample Data" section of the "Statistics" worksheet. To be conservative, where the strata age was one year, a zero was entered in the column (see Section 3.3.2, below). The "Statistics" worksheet has a row ("Mean, t BM"), which used the Excel "Average" function to derive the average biomass for each strata.

The values from "Mean, t BM" of each allometric/age strata were transferred to the "Biomass/ Tree, kg" column of the "Circ" worksheet using an Excel "Lookup" function.

Step 6. For each stratum in each project area, the average above ground biomass per tree ("Biomass/ Tree, kg" column "Ex-post Strata" worksheet) was multiplied times the number of trees, to yield the above ground biomass in stratum (kg), and divided by 1,000 to obtain above ground biomass in stratum ("AG Biomass in Stratum, t").

[5] 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).
[6] 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).
[7] The "AG Biomass (kg)" column is the result of this operation. The "Code" function in the formula is looking for an "E" (ASCII 69) in the first letter of the entry in the "Allometric Strata" column to indicate eucalyptus. If the "Code" is E, then the first (eucalyptus) equation applies. If not, the "other" equation applies.

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

$$\text{Above Ground Biomass in Stratum (t/ha)} = \frac{\text{Above Ground Biomass in Stratum (t)}}{\text{Area of the Stratum (ha)}}$$

Step 8. The above ground biomass in stratum ("AG Biomass in Stratum, t/ha") was multiplied by 0.5 to convert biomass to carbon. The result is above ground carbon in stratum ("AG Carbon in Stratum, t/ha").

Step 9. The carbon stocks of the below ground biomass of each stratum ("BG Carbon in Stratum, t/ha") were calculated by multiplying "AG Biomass in Stratum, t/ha" by the appropriate roots to shoot ratio and by 0.5, the carbon fraction of the biomass. A root to shoot factor of 0.27 will be used.[8]

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

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

Where:

$P_{(t)}$ = carbon stocks within the project boundary at time *t* achieved by the project activity (t CO_2e)

$PA_{(t)}I$ = carbon stocks in above-ground biomass at time *t* of stratum *i* achieved by the project activity during the monitoring interval (t C/ha) from Step 8.

PB(t)I = carbon stocks in below-ground biomass at time *t* of stratum *i* achieved by the project activity during the monitoring interval (t C/ha) from Step 9.

Ai = project activity area of stratum *i* (ha) from Step 2.

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

The first part of this equation required adding the "AG Biomass in Stratum, t/ha" and "BG Carbon in Stratum, t/ha" and multiplying the sum by the area of each stratum and by 44/12 to convert carbon to CO_2. This is accomplished in the "CO2 in Stratum (t)" column.

The second part of this formula required summing the values in the "CO2 in Stratum (t)" column. The result is in the "CO2 in Stratum (t)" column of the "Ex-Post Strata" worksheet on the "Project Total" row (bottom of worksheet).

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

3.3.2 Accuracy

Precision at 95% confidence level

The methodology required showing that the stratification approach could achieve a targeted precision level of ±10% of the mean at a 95% confidence level. This demonstration was made in the "Statistics" worksheet of Appendix 08.

The lower portion of the worksheet contains all of the circumference readings from the "Circ" worksheets. This was accomplished by filtering the "Circ" worksheets by the "Allometric Strata" and "Age" columns and cutting and pasting the "AG Biomass (kg)" data into the appropriate column of the "Statistics" worksheet (hereinafter, the "Sample Data"). In the upper portion of the worksheet, a series of statistical measurements were applied to the Sample Data. The Project Level column was developed using the general procedure recommended by Avery and Burkhart.[9]

The results are that when the strata are combined to the project level, the data has a 95% confidence level of 0.4% of the mean. The data meets the precision requirement of the methodology.

No zero values for trees less than breast height

The project counts all trees, but no circumference measurements are taken if the trees are less than breast height. To make sure this did not bias the results, the circumference of all one-year-old trees was set at zero.

Cordia africana

The field observation indicated that the *Cordia africana* were subject to extensive pruning in order to get the main trunk growing straight. There was concern that use of circumference measurements from these trees in the allometric equations could have a material effect on the total carbon calculated. This was tested by examining the effect of removing the cordia from the CO_2 calculations. In the "Misc Calc" worksheet, the CO_2 of all the cordia was determined to be 1.0% of the total for the Project. Therefore, this issue is well below the 5% materiality threshold and the cordia strata received no special treatment.

No circumference sample if less than 20 trees in PA

In spite of the thousands of circumference readings taken for the project, circumference readings were rarely taken in project areas where the tree count was less than twenty. There was concern this could have a material effect on the total carbon calculated. This was tested by looking at the total number of trees that are affected by this issue. As shown in the "Misc Calc" worksheet, less than 0.81% of the trees are in PAs with less than 20 trees. Therefore, this issue is well below the 5% materiality threshold.

Conclusion

In conclusion, the Project meets the precision required by the methodology. In addition, the issue regarding one-year-old trees was addressed by assuming one-year-olds had zero biomass. The

[9] Avery, T.E. and Burkhart, H.E., "Forest Measurements", Fifth Edition, McGraw-Hill Book Company, New York. 2001, pp 42-43.

remaining issues of concern were shown to be both individually and cumulatively below the 5% materiality threshold.

3.3.3 Organization and Responsibilities

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

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

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

3.3.4 Data Management and QA/QC

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. 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.

- **US Team Audits:** Staff members from the US headquarters audit the TIST audit staff at least once per year.

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

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

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

- **Data Quality:** TIST Quantifiers counted every tree in each discrete project area. Counting each tree is 100% sampling and provides greater than 10% precision at the 95% confidence level. Up to 20 circumference readings for each strata in a project area were taken and archived, to develop a localized database of growth data by strata. This data provided the circumference data for each stratum. This sampling exceeds the 10% precision at the 95% confidence level required by the methodology.

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

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

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

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

4 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

4.1 Baseline Emissions

No monitoring of the baseline is required. As demonstrated in Section 4.2 of the PD, the change in baseline carbons stocks is below the threshold that would require monitoring. Because only

the trees planted as part of the project are counted in the estimation of project removals, the baseline carbon stocks are fixed at zero.

4.2 Project Emissions

Project emissions are considered zero. As addressed in the PD, this is due to the manner in which the Project is operated, such as: no vehicles, manual labor conducted by the small-hold farmers on their own land, restrictions on chemical fertilizers, no clearing of baseline trees and minimal disturbance of the ground for planting.

Project removals are as calculated in the "Project Total" row (bottom of worksheet), "CO2 in Stratum (t)" column, "Ex-Post Strata" worksheet of Appendix 7. The total is provided in Section 4.4, below.

4.3 Leakage

For ex-post leakage, the methodology requires the monitoring of cropland, domesticated grazing animals and domesticated roaming animals displaced by the project activity during the first crediting period. If the indicators were less than 10%, leakage is set to zero. The monitoring results provided in the PD indicated cropland and grazing leakage is below the thresholds that require further monitoring and that the ex-post leakage can be set at zero.

4.4 Summary of GHG Emission Reductions and Removals

Project emissions:	-0-	t CO2 equivalents
Emissions due to leakage:	-0-	t CO2 equivalents
Baseline emissions:	-0-	t CO2 equivalents
Project emission reductions:	188,649	t CO2 equivalents
Net emission reductions:	188,649	t CO2 equivalents

5 ADDITIONAL INFORMATION

See Appendix 08, Excel spreadsheet of data with referenced worksheets