MONITORING REPORT FOR TIST PROGRAM IN KENYA VCS-001, VERIFICATION 02

The International Small Group & Tree Planting Program

Document Prepared By Clean Air Action Corporation

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Prepared By	Charlie Williams, Vice President
Contact	Clean Air Action Corporation P.O. Box 4607 Tulsa OK, USA 74159 Telephone 918-747-8749 CharlieWilliams@CleanAirAction.com Tist.org

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1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

The International Small Group and Tree Planting Program (TIST) empowers Small Groups of subsistence farmers in Kenya, Uganda, India and Tanzania to combat the devastating effects of deforestation, poverty and drought. Combining sustainable development with carbon sequestration, TIST 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 long-term income stream and developing sustainable environments and livelihoods. TIST in Kenya began in 2004 and has grown to nearly 55,000 TIST participants in over 7,000 Small Groups.

KE PD-VCS-001 is a small scale AFOLU project, eligible under the Afforestation, Reforestation and Revegetation (ARR) category. It is a subset of the TIST project in Kenya and initially applied to 117 of the Small Groups, 853 members, 484 project areas and 354 ha. The PD was validated and first verified on 11 April 2011 by Environmental Services, Inc. (ESI). At that time all of the Project Areas were established and the monitoring systems were in place. The following is the Verification history, including what has been determined for this report.

Verification Number	Date	Monitoring Period	Gross Reductions	Buffer	Issuance
Cumulative	11-Aug-15	01-Jan-04 to 11-Aug-15	73,127	11,222	61,904
Less Verif 01	11-Apr-11	01-Jan-04 to 31-Dec-10	39,094	7,819	31,275
Net This Report	11-Aug-15	01-Jan-11 to 11-Aug-15	34,032	3,403	**30,628**

1.2 Sectoral Scope and Project Type

This project is registered under the Verified Carbon Standard (VCS, 3.2) as an Afforestation, Reforestation and Revegetation (ARR) project and has been developed in compliance with the VCS Guidance for Agriculture, Forestry and Other Land Use Projects (VCS, 3.2). It is not a grouped project.

1.3 Project Proponent

Organization name	Clean Air Action Corporation (CAAC)
Contact person	Charles E. Williams
Title	Vice President

Address	P.O. Box 4607 Tulsa OK, USA 74159 United States of America
Telephone	+1-918-747-8770
Email	CharlieWilliams@CleanAirAction.com

1.4 Other Entities Involved in the Project

Organization name	Institute for Environmental Innovation (I4EI)
Role in the project	Manages sustainable development components of TIST
Contact person	Trena Workman
Title	Executive Director
Address	P.O. Box 4607 Tulsa OK, USA 74159 United States of America
Telephone	+1-918-712-1866
Email	Trenaworkman@i4ei.org

Organization name	United States Agency for International Development (USAID)
Role in the project	Provides funding for sustainable development components
Contact person	Enoch Kanyanga
Title	Technical Officer
Address	USAID-Kenya c/o American Embassy United Nations Avenue, Gigiri, P. O. Box 629, Village Market-00621 Nairobi, Kenya
Telephone	+ 254-20-862-2000
Email	ekanyanya@usaid.gov

Organization name	Environmental Services, Inc (ESI)
Role in the project	Validator and First Verifier
Contact person	Shawn McMahon
Title	Lead Validator, Forester
Address	3800 Clermont St., NW North Lawrence, OH 44666 United States of America

Telephone	+1-330-833-9941
Email	smcmahon@ESINC.CC

Organization name	EPIC Sustainability Services Private Limited
Role in the project	Second Verifier
Contact person	Dr. G. Vishnu
Title	Lead Auditor
Address	No.41, Anugraha, First Cross road, Near BEL Circle, Bengaluru – 560054. Karnataka State, India
Telephone	+91 94827 59072, +91 95909 29935
Email	vishnu@epicsustainability.com epicsustainability@gmail.com sudheendra@epicsustainability.com

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 a KML file, Appendix 03[1].

1.8 Title and Reference of Methodology

The monitoring methodology used by the Project is CDM 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" and the associated tools. AFOLU Non-Permanence Risk Tool version 3.2 was also used. No other tools or methodologies were used for this verification report.

1.9 Other Programs

[1] See Appendix 03, TIST KE PD-VCS-001d App03 PA Plots.kml at http://www.tist.org/PD-KE-VCS-001-004%20Documents.php

The Project is certified under Climate, Community and Biodiversity Standard (CCBA) as "TIST Program in Kenya CCB-001." CCBA does not issue GhG credits. The Project does not participate in any other forms of environmental credits or GHG programs.

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. No new incidences have been added.

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 3.2 and provided to the Verifier (Appendix 09)[2].

For this verification, 392 PAs (20.47% of the carbon volumes) have been put in a "Pending" category because they need requantification. The status of each individual PA is addressed in column AO of the "PA Summary" worksheet, verification data spreadsheet. If the column indicates something other than active, their status is given. The carbon of all removed or pending PAs have been set to zero. This means that remaining PAs must first make up the carbon loss before any new credits can be issued.

There are several reasons for the removal of the PA. First, however, each category description is preceded by a "treatment" code. The codes are as follows:

1. Active: These are PAs that are active in TIST and have valid tree counts and calculated carbon volumes. Only Active PAs contribute to the carbon volume of this verification.
2. Pending: These are PAs that need to be reviewed to determine if they will continue as TIST PAs or need a current quantification. They will still be listed on the PA Summary sheet to acknowledge they are currently part of the PD but for this verification their trees and carbon are zero. Once their circumstances have been reviewed, they will either be removed or listed as active. If they are listed as active, we will reestablish the tree count and carbon in subsequent verifications.
3. Removed: These PA are being permanently removed from the program. They will still be listed on the PA Summary sheet to acknowledge they were part of the PD but their trees and carbon are zero. They will not participate in the future.

The following describes the different categories and the way they are treated:

a. Pending: Baseline Error: These are cases where the baseline and boundaries of a grove were taken at one location but the farmer decided to plant somewhere else. Due to the rules of VCS, the groves with the trees are not part of this PD. The baselined area can still be a project area if it is ever planted. Until that time the tree and carbon will be set to zero.
b. Pending-Change in ownership: This includes sale to others; transfer to family members that don't want to be in TIST; and subdividing to family members whom want their groves to be treated separately. If the new owners want to keep their groves in the PD, they are eligible.
c. Pending-Fire. These groves were lost to fire. If the member replants the trees will be eligible under this PD.
d. Pending-Group Quit. Some groups have quit the program. Reasons include they registered in more than one group, they were too small to qualify for carbon payments, they had a

[2] See Appendix 09, TIST KE PD-VCS-001j App09 Verif 02 Risk Analysis 160323.doc at http://www.tist.org/PD-KE-VCS-001-004%20Documents.php

misunderstanding with another member. A group can rejoin if they change their mind and rejoin before the next verification.

e. Pending-Grove inaccessible. These PAs are too remote to be able to be serviced. If quantified in the future, they will be added in subsequent verifications.
f. Pending-Member quit. Some members have quit. Reasons include, they refuse to be quantified so they are dropped from the program; they say they have not received any carbon payments, they had a misunderstanding with another member; they felt that participation was not in their best interest; because they did not want to participate; because they felt the carbon payment was not adequate and some for undisclosed reasons. Sometimes members change their minds about quitting so they are put in a pending category. If they don't change their minds buy the next verification they will be removed.
g. Pending-Merged with another grove. These are cases where there were 2 or more original tracks on a farm and in a subsequent quantification the Quantifier merged the groves into one. Since this is not allowed under VCS rules, the carbon and trees in these groves were set to zero. If the PAs are un-merged and are requantified properly, they can become eligible in a subsequent verification.
h. Pending-Needs requantification. These are groves that are still active but we do not believe the quantification to be accurate. Most are groves that had no trees at the time of the first verification and have not been requantified. Their carbon was zero at the time of the first quantification and remains zero. Two other reasons for questioning the quantification are the data was lost during synchronization and poor quality of quantification.
i. Pending-Never planted. The members have not planted any trees in these PA. If they do they will be included in subsequent verifications.
j. Pending-Ownership dispute. This generally results when the farmer dies and the family does not agree on the inheritance. These are pending because sometime the new owners decide they want to be in TIST. Since these PAs have been validated and the baseline and additionality are not affected, this change in ownership is permitted if the new owners decide they want to keep the PAs in TIST.
k. Pending-Pest. These groves were lost to pest or disease fire. If the member replants the trees will be eligible under this PD.
l. Remove-Baseline Error. These are groves where baseline trees were erroneously marked as TIST trees. These trees have been removed and the PAs are not eligible under the PD.
m. Remove-Change in ownership: This includes sale to others; transfer to family members that don't want to be in TIST; and subdividing to family members whom want their groves to be treated separately. These are cases where new owners will not be eligible for membership.
n. Remove-Double registration. These are cases where subsequent to validation we learned that the grove had been registered twice. This includes cases where the same farmer registered the same grove in two different Small Groups and where the same grove was quantified under 2 different names.
o. Remove-Group Quit. Some groups have quit the program. Reasons include they registered in more than one group, they were too small to qualify for carbon payments, they had a misunderstanding with another member. We do not expect groups in this category to change their minds.
p. Remove-Harvest. While TIST allows beneficial thinning, we do not allow harvest. Those in this category have violated the contract and have been marked inactive. We expect most of them will be removed from TIST permanently. We have identified a few, however, that removed eucalyptus trees in order to plant indigenous trees. If that can be demonstrated, those PAs may be allowed to stay in the PD. In such a case, the carbon from the harvested trees will have been debited from the total carbon of the PA and only the carbon from the new trees will be counted.
q. Remove-Member quit. Some members have quit. Reasons include, they refuse to be quantified so they are dropped from the program; they say they have not received any carbon payments, they had a misunderstanding with another member; they felt that participation was not in their best interest; because they did not want to participate; because they felt the carbon payment was not adequate and some for undisclosed reasons. We do not expect members in this category to change their minds.

r. Remove-Nursery, not a tree grove. This was a nursery mislabeled a grove.
s. Remove-Overlap. These are cases where subsequent to validation we learned that the grove boundary overlapped with another grove boundary. These groves have been removed to avoid double counting.
t. Remove-Registration Error. These are groves that the farmers says were not part of TIST. The likely cause is the Quantifier misunderstood the farmer during baseline and tracked the wrong area.
u. Remove-Trees Removed. These are PAs where trees were removed because the land was needed for cultivation, home construction, powerlines, road expansion or school expansion. The land is not expected be available in the future as a TIST grove.
v. Remove-Unauthorized registration: These are cases where an unauthorized person registered the grove for TIST. Sometimes it is the wife joining and the husband later refusing.

Loss of a few PAs was discussed in the External Risk section of the Non-Permanence Risk Report. It was considered possible but of minimal risk to the carbon asset. Since this monitoring report has determined that the total carbon stocks have increased from the previous one, it is clear that the loss has not caused a loss event or reversal. According to the risk tool, the overall risk rating is 2.5, qualifying the project for the minimum buffer, 10%.

2.2 Deviations

2.2.1 Methodology Deviations

None.

2.2.2 Project Description Deviations

There is a deviation from the PD. In the PD we stated "the operational processes for monitoring the actual GhG removal by the sinks are for TIST Quantifiers to visit each grove once per year and, at minimum, once every five years to count trees and collect circumference, GPS and other data" (Section 4.1.3). TIST Quantifiers are not visiting each PA (grove) once per year.

While counting trees and collecting circumference every five years is a requirement of the methodology (and followed by the Project), visiting every PA every year was simply an operational goal. Not making annual visits does not impact the applicability of the methodology, additionality or the appropriateness of the baseline scenario. That it was an operational goal was clearly stated in Section 4.3.5, "TIST's internal goal is to quantify each project area once per year."

There are 18,000 PAs in this PD and over 50,000 in TIST Kenya. Unfortunately, visiting every PA every year proved to be too costly to maintain. Instead the entire TIST program in Kenya was modified and centered on a "Cluster" administrative structure. A Cluster is a group of Small Groups within walking distance that has their own local leadership. It is where Small Groups receive training, voucher payment, share "best practices," share news and newsletters and discuss quantification issues. A Quantifier is assigned to each Cluster and their scope has been broadened to include training and assisting Cluster leaders as they rotate into new positions. The Cluster provides an alternate method of gathering intelligence about what is happening at the Small Group level and to individual groves including information that might assist in monitoring

the actual GhG removal.[3] This allows us to get the same information that a Quantifier might get on a non-quantification visit (i.e. the annual visit) by asking members and their neighbors about changes, at a more sustainable cost. The ideal schedule for Cluster meetings is one per month, increasing the frequency of opportunity to learn about changes at the grove level.

2.3 Grouped Project

There are no new instances. It has been confirmed in the verification data spreadsheet that all of the existing instances remain below the 1% threshold for eligibility.[4]

3 DATA AND PARAMETERS

3.1 Data and Parameters Available at Validation

Data / 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 11, for each result
Justification of choice of data or description of measurement methods and procedures applied	GPS is the modern standard for determining geographic coordinates.
Purpose of the data	Baseline
Comments	None

Data / Parameter	**Boundary of project area**
Data unit	Latitude and longitude
Description	Multiple points of latitude and longitude that describe the boundary of a discrete project area
Source of data	GPS
Value applied:	See KML file, Appendix 3, for all results
Justification of choice of data or description of measurement methods and procedures applied	GPS is the modern standard for determining geographic coordinates.

[3] This includes examples such as if an SG or an SG member has quit or if there has been a major loss from fire, pest, harvest, etc. The type of information collected is reflected in the monitoring spreadsheets where we have indicated an issue with the project area (removed or pending) and zeroed out the carbon for this verification.

[4] In the verification spreadsheet, the maximum carbon limit for each instance is tested in column AD, "PA Summary" worksheet, to demonstrate they are all below the 1% threshold for the project life.

Purpose of the data	Baseline
Comments	None

Data / 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 11, for each result
Justification of choice of data or description of measurement methods and procedures applied	GPS is the modern standard for determining geographic coordinates.
Purpose of the data	Baseline
Comments	None

Data / 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 11, for each result
Justification of choice of data or description of measurement methods and procedures applied	TIST representatives ask if there is a change in ownership when they visit the PA.
Purpose of the data	Baseline
Comments	None

Data / Parameter	**Baseline trees**
Data unit	Baseline Trees
Description	The number of trees existing in a project area is counted, before the planting of project trees.
Source of data	Trees are physically counted in the field
Value applied:	See "Baseline Strata" worksheet, Appendix 4, for each result
Justification of choice of data or description of measurement methods and procedures applied	A physical count provides the most accurate information possible.
Purpose of the data	Baseline

Comments	None

Data / Parameter	**Baseline tree circumference**
Data unit	Centimeters
Description	The circumference of trees existing in a project area, before the planting of project trees, is counted
Source of data	Trees are physically measured in the field
Value applied:	See "Baseline Strata" worksheet, Appendix 4, for each result
Justification of choice of data or description of measurement methods and procedures applied	The circumference of a sample of trees are measured with a tape. The results are used to put the tree size in a bin for estimating mass.
Purpose of the data	Baseline
Comments	None

Data / Parameter	**Baseline strata**
Data unit	Hectares
Description	The area of cropland or grassland at baseline
Source of data	Estimate based on visual field observations
Value applied:	See "Grove Summary" worksheet, Appendix 4, for each result
Justification of choice of data or description of measurement methods and procedures applied	The area of the PA was measured using a GPS. The percent cropland and grass land was estimated by an experience TIST Quantifier.
Purpose of the data	Baseline
Comments	None

Data / Parameter	**Project trees**
Data unit	Count of tree
Description	The number of trees per age and species strata in each project area
Source of data	Trees are physically counted in the field.
Value applied:	See "Grove Summary" and "Strata" worksheets, Appendix 4, for each result
Justification of choice of data or description of measurement methods and procedures applied	The trees were all counted by an experience TIST Quantifier.
Purpose of the data	The tree count by strata is used to extrapolate the ex-ante GhG removals

Comments	None

3.2 Data and Parameters Monitored

Data / 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 11
Monitoring equipment	Customized handheld computer
QA/QC procedures to be applied	Part of overall QA/QC procedures discussed in Section 3.3
Purpose of the data	Calculation of project emissions
Calculation method	Not applicable
Comments	None

Data / 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 11
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
Purpose of the data	Calculation of project emissions
Calculation method	Not applicable
Comments	None

Data / 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 11
Monitoring equipment	Computer and database
QA/QC procedures to be applied	Part of overall QA/QC procedures discussed in Section 3.3
Purpose of the data	Calculation of project emissions
Calculation method	Not applicable
Comments	None

3.3 Monitoring Plan

3.3.1 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, whom 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, 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.

3.3.2 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.

- **Multiple Quantifications:** TIST's internal goal is to quantify each project area at least once every 5 years. Inaccurate data and errors are self-correcting with the subsequent visits. If trees have died or have been removed, a new count will reflect the current population. The growth of the trees, as indicated by increased DBH, is monitored with these subsequent visits. If a species is mislabeled, it will arise as a conflict when different Quantifiers attempt to perform tree counts for that grove that do not match the previous one. Comparisons are made over time, to determine whether a particular quantification, or tree count, appears unrealistic.

- **Cluster Meeting Updates:** The Cluster provides an alternate method of gathering intelligence about what is happening at the Small Group level and to individual groves including information that might assist in monitoring the actual GhG removal. To facilitate a conservative approach to estimating GhG removals, a minimum of one Cluster meeting will be held within 12 months prior to the end of the verification period unless there has been a quantification within said 12 month period, in which case, the minimum meeting Cluster is waived.

- **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 currently on the Amazon Cloud. However, CAAC could, in the future, change hosts or choose to host the server at its offices.

3.3.3 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 every day. As each PA is revisited, the old data is achieved and the results of the new quantification are 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 is monitored. They are documented in the "PA Summary" worksheet of Appendix 11.[5] The location of each area was obtained with a GPS and are also provided in Appendix 11.[6] The boundary of each project area was obtained using a GPS and provided in PD Appendix 03.[7] The area was calculated and is listed with each project area in the "PA Summary" worksheet of Appendix 11.

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

[5] "PA Summary" worksheet of Appendix 11 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. See Appendix 04, TIST KE PD-VCS-001e App04 Data 100826 Chugu.xlsx at http://www.tist.org/PD-KE-VCS-001-004%20Documents.php.
See Appendix 11, TIST KE PD-VCS-001l App11 Verif 02 Monitor Data 150811.xlsx at http://www.tist.org/PD-KE-VCS-001-004%20Documents.php
[6] The locations of the PAs presented in the PD have not changed. The reader is referred to the original Appendices.
[7] The boundaries of the PAs presented in the PD have not changed. The reader is referred to the original Appendix.

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 11.[8]

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 11, 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.

Eucalyptus[9]: $Log\ Y = -2.43 + 2.58\ Log\ C$
Grevillea: no species specific equations, will use "Other" equation
Cupressus: no species specific equations, will use "Other" equation
Other (default)[10]: $Y = (0.2035 \times DBH^{2.3196}) \times 1.2$

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 11.

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" of Appendix 11. 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.[11]

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"

[8] "Ex-post Strata" worksheet of Appendix 11 is similar to the "Strata" worksheet of PD Appendix 04. It contains the same list of strata but includes carbon calculation information.
[9] 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).
[10] 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).
[11] 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.

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").

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.[12]

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.

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

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).

3.3.4 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 11.

The "Statistics" worksheet reads all of the circumference readings from the "Circ" worksheets. This was accomplished by using the database functions of Excel (DSUM, DCOUNT, etc). Columns F through L are the results based on all of the Circ data. New with this verification is a modification to identify circumference outliers. We revised the Statistics and Circ worksheets to enable us to identify the circumference measurements of every stratum that is in the 4^{th} standard deviation above the mean. The 4^{th} SD is identified in column L of the Statistics worksheet. Column O of the Circ worksheet compares these thresholds with each circumference measurement. If the value is in the 4^{th} SD it is excluded. Columns N through T of the Statistics worksheet.are the statistics for this subset. The new mean is calculated in Column O.

The results are that when the strata are combined to the project level, the data has a 95% confidence level of 12.21% 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. We learned that during the early stages of the program, that instead of entering a zero in the circumference field Quantifiers sometimes left it null. To make sure this did not bias the results, a conservative approach was adopted and 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 of the first verification (Appendix 11), the CO_2 of all the cordia was determined to be 0.7% 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 of

the first verification (Appendix 08)[13], less than 0.09% 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 remaining issues of concern were shown to be both individually and cumulatively below the 5% materiality threshold.

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 11. 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 Net GHG Emission Reductions and Removals

Year	*Baseline emissions or removals (tCO_2e)*	*Project emissions or removals (tCO_2e)*	*Leakage emissions (tCO_2e)*	*Net GHG emission reductions or removals (tCO_2e)*
Total	-0-	34,032	-0-	34,032

[13] See Appendix 08, TIST KE PD-VCS-001i App08 Monitoring Data 100826.xls at http://www.tist.org/PD-KE-VCS-001-004%20Documents.php

The net GhG emissions reductions can be found in cell AK18108, "PA Summary" worksheet. It reflects the emission reductions calculated from the "Ex-Post Strata" worksheet, less the Pending and Removed groves.

There is no intent to have vintages issued separately in the VCS registry system. The non-permanence risk rating is 2.5 and the required buffer is 10%. The non-permanence risk report is Appendix 09.

Verification Number	Date	Monitoring Period	Gross Reductions	Buffer	Issuance
Cumulative	11-Aug-15	01-Jan-04 to 11-Aug-15	73,127	11,222	61,904
Less Verif 01	11-Apr-11	01-Jan-04 to 31-Dec-10	39,094	7,819	31,275
Net This Report	11-Aug-15	01-Jan-11 to 11-Aug-15	34,032	3,403	**30,628**

APPENDICES:

The following appendices can be found at: http://www.tist.org/PD-KE-VCS-001-004%20Documents.php

- Appendix 03, PA plots, TIST KE PD-VCS-001d App03 PA Plots.kml
- Appendix 04, Validation Spreadsheet, TIST KE PD-VCS-001e App04 Data 100826 Chugu.xlsx
- Appendix 08, First Verification spreadsheet, TIST KE PD-VCS-001i App08 Monitoring Data 100826.xls
- Appendix 09, Non-Permanence Risk Report of this verification. TIST KE PD-VCS-001j App09 Verif 02 Risk Analysis 160323.doc
- Appendix 11, First Verification spreadsheet, TIST KE PD-VCS-001l App11 Verif 02 Monitor Data 150811.xlsx