

Gold standard for the global goals
Monitoring report



June 2017, version 1

Title of the project	Energy Efficient Cook Stoves for Siaya Communities, Kenya
Gold Standard project id	GS 879
Version number of the monitoring report	V4.3
Completion date of the monitoring report	19/06/2020
Date of project design certification	03/07/2012
Start date of crediting period	2 nd crediting period: 01/01/2018
Duration of this monitoring period	01/01/2019 to 31/12/2019
Duration of previous monitoring period	01/01/2018 to 31/12/2018
Project representative(s)	Job Orina, Foundation myclimate Jared Buoga, Tembea
Host Country	Kenya
Certification pathway (activity certification/impact certification)	Impact certification
SDG Contributions targeted (as per approved PDD)	SDG1, SDG3, SDG4, SDG5, SDG7, SDG8, SDG12 & SDG13
Gold Standard statement/product certification sought (GSVER/ADALYs/RECs etc.)	GS VER
Selected methodology(ies)	Gold Standard methodology "Technologies and Practices to Displace Decentralized Thermal Energy Consumption (24/04/2015).
Estimated amount of annual average certified SDG impact (as per approved PDD)	SDG 1: KSh 12906 & 404 hours SDG 5: 30% of employees are women SDG 13: 144,910 tCO ₂ e/tCO ₂ e
Total amount of certified SDG impact (as per approved methodology) achieved in this monitoring period	SDG 1: KSh 8482 & 242 hours SDG 3: 100% of stove users stating improved air quality SDG 4: 1211 persons reached awareness creation SDG 5: 48% of employees are women SDG 7: 35,614 beneficiaries SDG 8: 160 employees SDG 12: 53.3% fuel saving by project technology

	SDG 13: 145,500tCO ₂ e
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SECTION A. Description of project

A.1. Purpose and general description of project

1. The project disseminates a rocket-type improved cook stove to replace the use of open fires for cooking. The efficient cook stoves are constructed using locally available materials, such as mud, bricks and sawdust. Local artisans are identified in the villages and trained in stove construction and household mobilization.
2. The employed technology is a fixed installed biomass rocket stove designed for burning wood and consisting of two cooking units that can be separately fired. The efficient cook stoves are constructed using locally available materials, such as mud, bricks and sawdust.



Installed project rocket stove with two cooking units.

3. Relevant dates for the project activity:

Start date of the project: 04 October 2010

Date of first stove sale: 04 October 2010

Date of registration: 03 July 2012

Start date of the first crediting period: 01 January 2010

- First monitoring period: 01 January 2011 – 02 July 2012
- Second monitoring period: 03 July 2012 to 31 Dec 2013
- Third monitoring period: 01 Jan 2014 to 31 Dec 2014
- Fourth monitoring period: 01 Jan 2015 to 31 Dec 2015
- Fifth monitoring period: 01 Jan 2016 to 31 Dec 2016
- Sixth monitoring period: 01 Jan 2017 to 31 Dec 2017

Start date of the second crediting period: 01 January 2018

- 1st monitoring period: 01 January 2018 – 31 December 2018
- 2nd monitoring period: 01 January 2019 – 31 December 2019

Project is in continuous operation.

4. Total emission reductions achieved in this monitoring period are **145,500tCO₂e**

A.2. Location of project

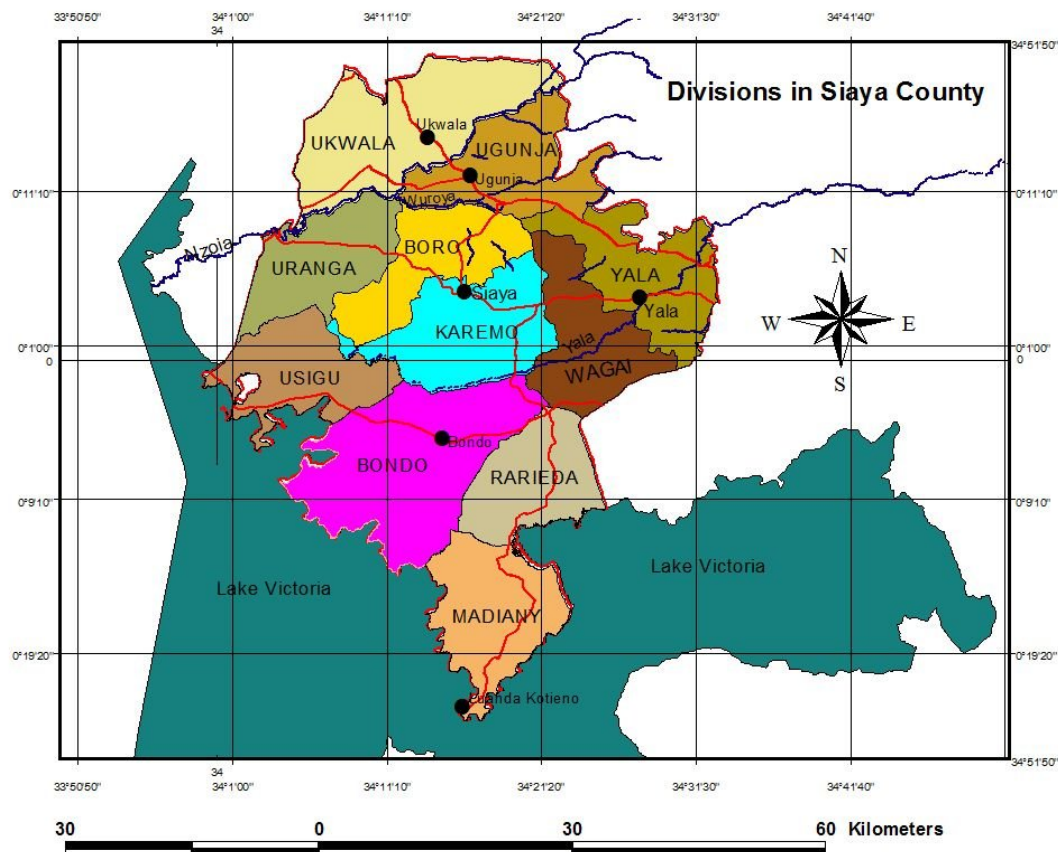
Country: Kenya

Provinces: Nyanza

County: Siaya

Coordinates: The County is located between the following coordinates: 0°24'08.52"S, 34°17'24.05"E to the south, 0°01'57'59"S, 34°00'31.65"E to the west, 0°19'04.01"N, 34°16'52.80"E to the north and 0°06'38.41"N, 34°33'16.82"E to the far east.

The coordinates of the town Ugunja, where the office of the project owner Tembea Youth Centre for Sustainable Development is located, are 00° 10' 59.88" N and 34° 17' 59.99" E.



Map 1: Divisions in Siaya County

A.3. Reference of applied methodology

The approved monitoring methodology applied to the project activity is Gold Standard methodology "Technologies and Practices to Displace Decentralized Thermal Energy Consumption (24/04/2015)." The reference is <http://www.cdmgoldstandard.org/project-certification/gs-methodologies>

A.4. Crediting period of project

The start date of the first crediting period is 01 January 2011.

The start date of the second crediting period is 01 January 2018.

The crediting period of the project was renewed for another 7 years starting January 2018.

SECTION B. Implementation of project

B.1. Description of implemented project

1. Start date of operations: 04 October, 2010

- Actual Operations:** The project continuously installed efficient cook stoves since the start of project implementation. Since then a total of 67,836 project stoves have been installed. In this way the project could provide clean and efficient cooking to 343,628 persons. The project also continuously trained community members in the Community Savings and Loaning Methodology (CSL) and established to date a total of 1806 groups with 68,159 participants: of it there are 1560 supervised groups with 63,159 participants. 100% of all cook stoves installed were purchased through the CSL mechanism. This clearly

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shows how important this saving and loaning mechanism is for the dissemination and affordability of the cook stove. In 2019, 114 CSL groups were formed, with 6,467 women and 1,291 men members with 7,758 having efficient stoves.

Table 1: Annual stove installations

Year	number of stoves
2011	4,662
2012	5,139
2013	5,187
2014	6,840
2015	14,186
2016	7,819
2017	8,360
2018	7,885
2019	7758
TOTAL	67836

Furthermore, the project trained 222 (7 artisans trained in the monitoring period) persons in efficient stove construction and conducted awareness and education events on efficient cooking and climate change. The trainings are conducted by lead artisans with support from Tembea field officers. The trainings are on stove construction, maintenance, data collection, stove usage and customer support. The trainings are field based with both theory and practical content. The trainings were conducted on 15th /07/2019 to 23rd/07/2019. The project's awareness creation activities reached a total number of 1211 people in 2019.

3. Impact on applicability of methodology: No events occurred during this monitoring period, which impact the applicability of the monitoring methodology.

B.2. Post-registration changes

B.2.1. Temporary deviations from Certified Key Project Information, Project Design Document, Monitoring & Reporting Plan, applied methodology or applied standardized baseline

N.A.

B.2.2. Corrections

N.A.

B.2.3. Changes to start date of crediting period

The crediting period of the project was renewed for another 7 years in January 2018. The start date of the second crediting period is 01 January 2018.

B.2.4. Permanent changes from registered monitoring plan, applied methodology or applied standardized baseline

N.A.

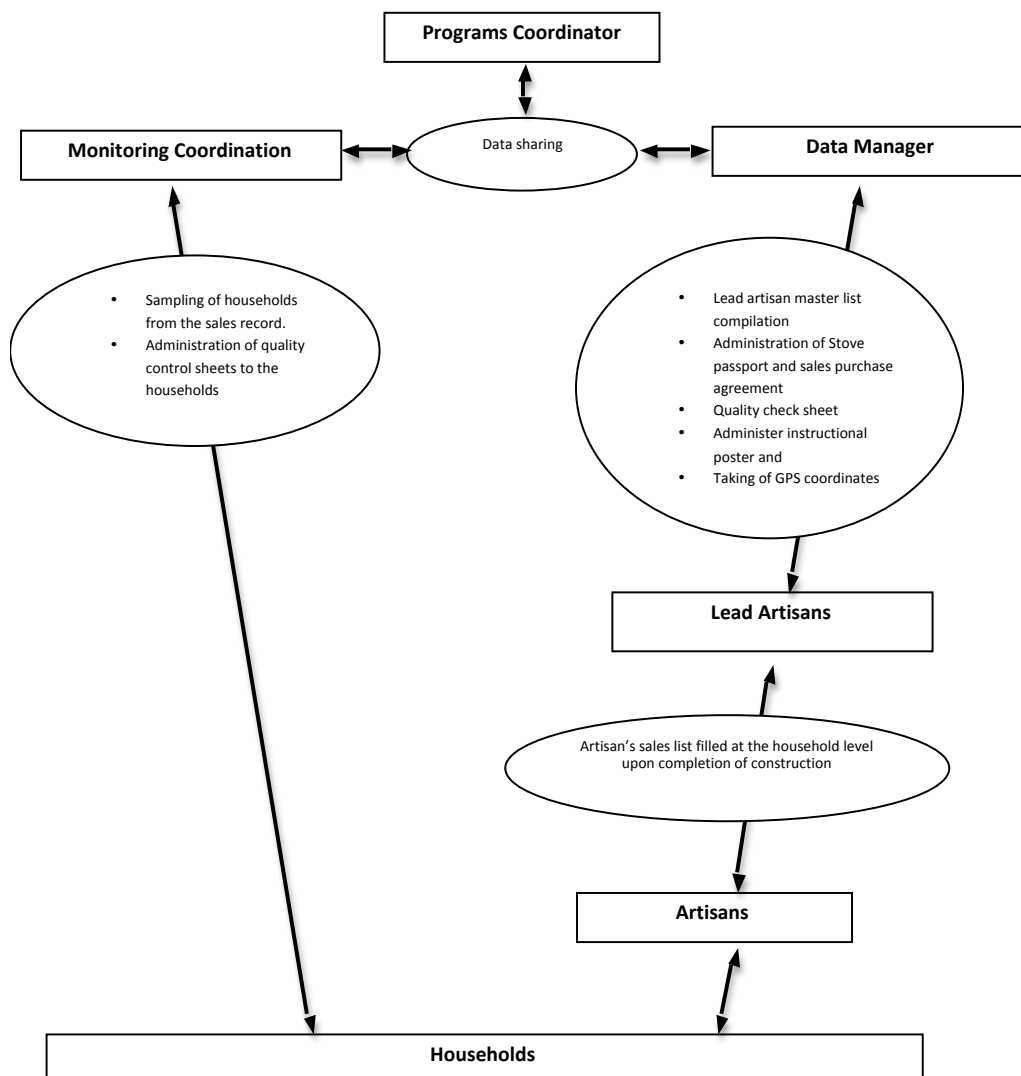
B.2.5. Changes to project design of approved project

No changes on the project design.

SECTION C. Description of monitoring system applied by the project

A detailed description of the monitoring system can be found in the latest version of the Monitoring Manual provided as a separate document. This includes roles and responsibilities, organizational structure, etc.

Monitoring coordination



Specific Personnel and Qualifications

Name	Designation	qualification
Job Orina	Internal monitoring manager	Bsc In Disaster Mitigation and Sustainable development, certificate in Low Carbon development (WBI) and monitoring & evaluation (UNPAN), long experience in data collection, analysis and report preparation as well long experience in the climate change sector.
Victor John Mondri	Data Manager/deputy manager	Bsc In Disaster Mitigation and sustainable development, long experience in data management

Nicholas Ngesa	Project officer in charge of construction	Bachelor of Commerce
Joshua Omondi	Project officer in charge of CSL	Certificate in project design and development and Certificate in Community saving and loaning
Erick Otieno	Field officer csl/stove construction	Certificate in Community Saving and Loaning
Sarah Sophy	Finance officer	Diploma in Community development and social work, certificate in Accounting
Vincent Odour	Lead artisan	Long experience in stove construction, Kenya secondary school certificate

General Summary of Monitoring System:

Data management and storage

Tembea has developed internal mechanisms to ensure availability of data within and beyond the project period. All data used for monitoring is stored in soft and hard copies. Tembea uses cloud storage, back up systems as well as file cabinets in the office to ensure safe keeping of the data.

Monitoring data collection tools and methodologies

The following approaches are used in collecting data for monitoring;

a) Office based

1. Sales record: this is an excel file that is used to enter details about the stoves. The file enable entry on the data of sale, name of stove owner, location, postal address, telephone number, GPS coordinates, mode of use, stove type, stove number and other monitoring details.
2. CSL database: this is a customized excel file that is used to analyze and store data on the community savings and loaning approach that is used to facilitate local communities to acquire cook stoves. The file capture the names of the groups, names and sex of the members, dates of formation, asset based information, loan information amongst others.
3. Excel sheet for monitoring data: this is a template that is used to enter and store all the data collected from the field for monitoring surveys. The file captures the questions in the questionnaires and their varying responses. This is used to capture the sustainable development indicators that the project is promoting.

b) Field based

1. Artisan Data sheet: this is a tool used by the artisan involved in the construction of the stoves in the field. They capture the following details; date of construction, name of stove user, sub-location, village, address and phone number.
2. Lead Artisan construction summary sheet: This is a tool that has been developed to help lead artisans collect information on the stoves constructed. The template collects the date of construction, the constructing artisan information, stove owner name, contacts, stove number, mode of purchase, initial amount, GPS coordinates and lead artisans remarks.
3. Transaction books for CSL: these are books that are used by the CSL groups to record their transactions. The book collect the details of the groups including, date of formation, group name, names of members, transaction procedures, loans information and meetings dates.
4. Questionnaires: there are many questionnaires that are administered to monitor project progress. The Questionnaires include the one for monitoring and usage survey. They are all attached in the monitoring manual.

C) Data flow consistency and intervals

1. Sales Record: the sales records is updated once a month. Every other Monday of the week the data manager receives data from the field and throughout the month QA/QC procedures are administered on the data.
2. CSL database: is updated once a month. Throughout the month field officer and the project officer are involved in collecting and verifying data from the groups.
3. Excel sheet for monitoring data: this is done once a year as is agreed upon with the project partners.

D) QA/QC measures

Tembea is responsible for ensuring data quality, the following measures are undertaken for the information described above;

1. Tracking of data
2. Use of SP/SPA
3. Counter checking with field officer documents
4. Review of group transaction books
5. Review of financial records
6. Counter checking of data

SECTION D. Data and parameters

D.1. Data and parameters fixed ex ante or at renewal of crediting period

Relevant SDG Indicator	SDG 12: Sustainable consumption and production Target 12.2 Indicator 12.2.1
Data/parameter:	$P_{b,y}$
Unit	Tons/stove/year
Description	Quantity of woody biomass consumed in the baseline scenario in year y and per day in year y.
Source of data	Baseline and Project Field Performance Tests 2017.
Value(s) applied)	2.7375 t wood/year and 0.0075 t wood/day
Choice of data or measurement methods and procedures	Kitchen performance test
Purpose of data	For SDG 12 and SDG 13 contribution
Additional comments	Values come from combined measures from kitchen performance tests and default values from methodology.

Relevant SDG Indicator	SDG 13: Climate Action Target 13.2 Indicator 13.2.1
Data/parameter:	$EF_{b,co2}$
Unit	tCO ₂ /t _{fuel}

Description	CO2 emission factor arising from use of fuel in baseline scenario
Source of data	2006 IPCC Guidelines for National Greenhouse Gas Inventories, Tables 1.2/1.4 Default IPCC values for wood / wood waste are applied.
Value(s) applied)	1.7472 tCO2/t wood (=112.0 tCO2/TJ * 0.0156 TJ/ t)
Choice of data or measurement methods and procedures	Default values
Purpose of data	Baseline emissions calculations
Additional comments	

Relevant SDG Indicator	SDG 13: Climate Action Target 13.2 Indicator 13.2.1
Data/parameter:	EF _{b,non-co2}
Unit	tCO2/t _{fuel}
Description	Non-CO2 emission factor arising from use of wood-fuel in baseline scenario
Source of data	2006 IPCC Guidelines for National Greenhouse Gas Inventories, Table 2.5
Value(s) applied)	0.1356 tCO2eq/t wood (from 01.01.2013 on)
Choice of data or measurement methods and procedures	Default values
Purpose of data	Project emissions calculations
Additional comments	

Relevant SDG Indicator	SDG 13: Climate Action Target 13.2 Indicator 13.2.1
Data/parameter:	EF _{p,co2}
Unit	tCO2/t _{fuel}
Description	CO2 emission factor arising from use of fuel in project scenario
Source of data	2006 IPCC Guidelines for National Greenhouse Gas Inventories, Tables 1.2/2.5 Default IPCC values for wood / wood waste are applied
Value(s) applied)	1.7472 tCO2/t wood (=112.0 tCO2/TJ * 0.0156 TJ/ t)
Choice of data or measurement methods and procedures	Default values
Purpose of data	Project emissions calculations
Additional comments	

Relevant SDG Indicator	SDG 13: Climate Action Target 13.2 Indicator 13.2.1
Data/parameter:	$EF_{p,non-co2}$
Unit	Data unit: tCO ₂ /t _{fuel}
Description	Description: Non-CO ₂ emission factor arising from use of wood-fuel in project scenario
Source of data	2006 IPCC Guidelines for National Greenhouse Gas Inventories, Table 2.5 Default IPCC values for CH ₄ and N ₂ O emissions for wood / wood waste are applied. The following GWP100 are applied: 25 for CH ₄ , 298 for N ₂ O.
Value(s) applied)	0.1356 tCO ₂ eq/t wood
Choice of data or measurement methods and procedures	Default values
Purpose of data	Project emissions calculation
Additional comments	GWP for second commitment period are applied.

Relevant SDG Indicator	SDG 13: Climate Action Target 13.2 Indicator 13.2.1
Data/parameter:	$f_{NRB,i,y}$
Unit	Fractional non-renewability (%)
Description	Non-renewability status of woody biomass fuel in scenario i during year y
Source of data	Official CDM default value is applied. This value was accepted by the DNA of Kenya on 19 September 2012 and it is the latest available official value for fNRB. http://cdm.unfccc.int/DNA/fNRB/index.html
Value(s) applied)	92%
Choice of data or measurement methods and procedures	Default value
Purpose of data	Baseline and project emissions calculation
Additional comments	This value is fixed for the duration of the crediting period. However, the PP can at any time chose to reassess and adjust the NRB value.

The following project parameter from the PFT was also known at validation, but it is monitored and updated if needed during the crediting period.

Relevant SDG Indicator	SDG 12: Sustainable consumption and production Target 12.2 Indicator 12.2.1
Data/parameter:	$P_{p,b,y}$
Unit	Tons/stove/year
Description	Quantity of woody biomass consumed in the project scenario in year y and per day in year y.
Source of data	Project Field Performance Tests 2017.
Value(s) applied)	1.241 t wood/year and 0.0034 t wood/day
Choice of data or measurement methods and procedures	Kitchen performance test
Purpose of data	For SDG 12 and SDG 13 contribution
Additional comments	Values come from combined measures from kitchen performance tests and default values from methodology.

D.2. Data and parameters monitored

Relevant SDG Indicator	SDG 1: No Poverty Target 1.4 Indicator 1.4.1
Data / Parameter	Time and monetary savings
Unit	Hours / Kes per household per year
Description	Time (hours) and money (Kes) saved per household per year due to fuel savings achieved by project stoves
Measured/calculated/default	Calculated
Source of data	Monitoring Survey
Value(s) of monitored parameter	242 hours' time saved per households per year KES 8,482 saved per household per year
Monitoring Equipment	Monitoring usage survey data analysis 191215_Monitoring_Usage_Survey_2019_analysis_V01.xlsx
Measuring/reading/recording frequency	Annual
Calculation method (if applicable)	1. Annual time expenditures (hours) in the baseline minus annual time expenditures in the project 2. Annual monetary (kes) expenditures in the baseline minus annual monetary expenditures in the project
QA/QC procedures	Transparent data analysis and reporting
Purpose of data	SDG 1 Contributions
Additional comment	NA.

Summary:

The BS estimated an expenditure of KES 12,906 on fuel per year and 404 hours used in fuel gathering per year for the baseline scenario. The monitoring survey 2019 showed average annual expenditures of KES 4424 on fuel and 162 hours for fuel collection. This results in average annual savings of KES 8482 and 242 hours per household.

Relevant SDG Indicator	SDG 3: Good health and well-being Target 3.9 Indicator 3.9.1
Data / Parameter	Air quality improvement
Unit	% of stove users stating improved air quality
Description	Number of positive comments from stove users on air quality improvement with project stove
Measured/calculated/default	Calculated
Source of data	Monitoring Survey
Value(s) of monitored parameter	100%
Monitoring equipment	Monitoring usage survey data analysis 191215_Monitoring_Usage_Survey_2019_analysis_V01.xlsx
Measuring/reading/recording frequency	Annual
Calculation method (if applicable)	Number of stove users stating air quality improvement with project stove divided by total users interviewed.
QA/QC procedures	Transparent data analysis and reporting
Purpose of data	SDG 3 Contributions
Additional comment	NA.

Relevant SDG Indicator	SDG 4: Quality education Target 4.3 Indicator 4.3.1
Data / Parameter	Awareness creation in the community
Unit	Number of schools and persons
Description	Number of schools and number of persons reached with awareness creation
Measured/calculated/default	Measured
Source of data	TYSCD records
Value(s) of monitored parameter	1211 persons
Monitoring Equipment	Awareness creation reports
Measuring/reading/recording Frequency	Annual
Calculation method (if applicable)	Counting number of schools visited and number of participants in awareness creation activities
QA/QC procedures	Transparent data analysis and reporting
Purpose of data	SDG 4 Contributions
Additional comment	NA.

Relevant SDG Indicator	SDG 5: Gender equality Target 5.5 Indicator 5.5.2
Data / Parameter	Number of female employees Atleast 30% of employees are female.
Unit	Number of female employees
Description	Number of jobs offered by TYCSD to local female employees.
Measured/calculated/default	Measured
Source of data	TYCSD employment records
Value(s) of monitored parameter	31% Female community mobilizers earning income 66% Female artisans earning income 50% women project staff earning income 35 female community mobilizers, 8 office staff and 35 artisans
Monitoring Equipment	Employment register
Measuring/reading/recording frequency	Annual
calculation method (if applicable)	1. Counting number of female employees 2. Number of female employees divided by total number of employees.
Monitoring frequency	Annual
QA/QC procedures	Transparent data analysis and reporting
Purpose of data	SDG 5 Contributions
Additional comment	NA.

Relevant SDG Indicator	SDG 7: Affordable and clean energy Target 7.1 Indicator 7.1.2
Data / Parameter	Number of persons that benefit from efficient and clean cooking technologies
Unit	Number of beneficiaries
Description	Number of persons that benefit from efficient and clean cooking technologies
Measured/calculated/default	Measured
Source of data	Project database, Monitoring survey
Value(s) of monitored parameter	35614
Monitoring equipment	Not applicable
Measuring/reading/recording	Annual
Calculation method (if applicable)	Total number of stoves sold multiplied with usage rates multiplied with average household size
QA/QC procedures	Transparent data analysis and reporting
Purpose of data	SDG 7 Contributions
Additional comment	NA

Summary:

The project installed stoves into 7758 households in the monitoring period. Applying the latest usage rate of 90% this results in 6983 stoves in use. From the latest monitoring and usage survey we know that households have on average 5.1 members. Thus, the project provided clean and efficient cooking stoves for 35614 persons.

Relevant SDG Indicator	SDG 8: Decent work and economic growth Target 8.5 Indicator 8.5.2
Data / Parameter	Number of jobs offered
Unit	Number of employees
Description	Number of jobs offered by TYSCD to local employees on permanent terms
Measured/calculated/default	Measured
Source of data	TYCSD employment records
Value(s) of monitored parameter	1. 16 Project staff Others on contract include 2. 53 Artisans worked during the monitoring period 3. 91 community mobilizers
Monitoring equipment	N/A
Measuring/reading/recording frequency	Annual
calculation method (if applicable)	Total number of employees
QA/QC procedures	Transparent data analysis and reporting
Purpose of data	SDG 8 Contributions
Additional comment	NA

Relevant SDG Indicator	SDG 12: Sustainable consumption and production Target 12.2 Indicator 12.2.1
Data/parameter:	Fuel savings achieved
Unit	%
Description	Fuel savings in % achieved by project technologies compared to baseline.
Measured/calculated/default	Calculated
Source of data	Baseline PFT and PFT Update
Value(s) of monitored parameter	Average: 53.3% fuel saving achieved by project technology compared to baseline.

Monitoring equipment	Hand-held spring weight scales to measure wood weight with accuracy to kilogram; scales checked just prior to measurements using items (bag of sugar purchased from national supermarket) with known and standardized weights (Kenya Bureau of Standards Certified); the scales were tested for their individual accuracy and between scale consistency. In combination with water boiling tests which were used to calculate baseline fuel consumption.
Measuring/reading/recording frequency:	Every two years
Calculation method (if applicable):	Fuel savings divided by baseline fuel consumption expressed in %
QA/QC procedures:	Transparent data analysis and reporting
Purpose of data:	SDG 12 Contributions
Additional comments:	None

Relevant SDG Indicator	SDG 13: Climate Action Target 13.2 Indicator 13.2.1
Data/parameter:	CO _{2e} emissions reductions
Unit	t CO _{2e}
Description	Amount of CO _{2e} reduced by the project per year
Measured/calculated/default	Calculated
Source of data	Project database
Value(s) of monitored parameter	145,500 tCO _{2e}
Monitoring equipment	N.A.
Measuring/reading/recording frequency:	Annual
Calculation method (if applicable):	According to applied methodology "Technologies and Practices to Displace Decentralized Thermal Energy Consumption (TPDDTEC) and as outlined in the PDD V8, section E.
QA/QC procedures:	Transparent data analysis and reporting
Purpose of data:	SDG 13 Contributions
Additional comments:	None

Parameters monitored that are relevant for emissions reduction calculation:

Relevant SDG Indicator	SDG 13: Climate Action Target 13.2
Data/parameter:	P _{p1,y}
Unit	t_biomass/unit-year and t_biomass/unit-day
Description	Quantity of woody biomass consumed in the project scenario during year y
Measured/calculated/default	Measured
Source of data	Performance Field Tests 2019

Value(s) of monitored parameter	1.2776 t wood/year and 0.0035 t wood/day
Monitoring equipment	Hand-held spring weight scales to measure wood weight with accuracy to kilogram; scales checked just prior to measurements using items (bag of sugar purchased from national supermarket) with known and standardized weights (Kenya Bureau of Standards Certified); the scales were tested for their individual accuracy and between scale consistency.
Measuring/reading/recording frequency:	Every two years
Calculation method (if applicable):	Mean (90/30 rule applicable) of wood biomass use of all selected households was calculated
QA/QC procedures:	Transparent data analysis and reporting
Purpose of data:	Emissions reduction calculations
Additional comments:	None

Relevant SDG Indicator	SDG 13: Climate Action Target 13.2 Indicator 13.2.1
Data/parameter:	Usage ($U_{p,2}$)
Unit	Proportion (percentage)
Description	Usage rate in project scenario during year y
Measured/calculated/default	Calculated
Source of data	Usage survey 2019
Value(s) of monitored parameter	90% ¹
Monitoring equipment	Survey questionnaires
Measuring/reading/recording frequency:	Annual
Calculation method (if applicable):	A single usage parameter is weighted to be representative of the quantity of project technologies of each age being credited in a given project scenario. See Project Database for details.
QA/QC procedures:	Random sampling of population. Transparent data analysis and reporting
Purpose of data:	Emissions reduction calculations
Additional comments:	None

¹ The project has capped its usage rate at 90% refer to Annex 2 for more details.

Relevant SDG Indicator	SDG 13: Climate Action Target 13.2 Indicator 13.2.1
Data/parameter:	Project Technology Days ($N_{p,1}$)
Unit	Number of days
Description	Cumulative number of technology days in the project database for project scenario
Measured/calculated/default	Calculated
Source of data	Sales record/Project database
Value(s) of monitored parameter	23,187,668
Monitoring equipment	N.A.
Measuring/reading/recording frequency:	Annual
Calculation method (if applicable):	The number of days between the installation date of each stove and the end of monitoring period was calculated then adjusted for the 21 days time period between date of sale and start of stove usage for households.
QA/QC procedures:	Transparent data analysis and reporting
Purpose of data:	Emissions reduction calculations
Additional comments:	None

Relevant SDG Indicator	SDG 13: Climate Action Target 13.2 Indicator 13.2.1
Data/parameter:	Leakage ($LE_{p,y}$)
Unit	t_CO ₂ eq per year
Description	Leakage in project scenario during year y
Measured/calculated/default	Calculated
Source of data	Monitoring survey 2019
Value(s) of monitored parameter	0 Potential leakage effects were assessed at the stage of Revalidation in 2017 and were considered insignificant. Further, results from Monitoring/Usage Survey conducted in 2019 showed no leakage effects.
Monitoring equipment	N/A
Measuring/reading/recording frequency:	Every other year
Calculation method (if applicable):	N/A
QA/QC procedures:	Transparent data analysis and reporting
Purpose of data:	Emissions reduction calculations
Additional comments:	None

Relevant SDG Indicator	SDG 13: Climate Action Target 13.2 Indicator 13.2.1
Data/parameter:	Similar new project activity in the project area
Unit	Number of new project activities
Description	List of similar cook stove projects and an assessment of how (e.g. target population, cook stove type, etc.) and to what degree overlap occurs
Measured/calculated/default	Reported
Source of data	Gold Standard registry, CDM Pipeline and local field observations.
Value(s) of monitored parameter	0 (no similar project activity was identified)
Monitoring equipment	N.A.
Measuring/reading/recording frequency:	Annual
Calculation method (if applicable):	N.A.
QA/QC procedures:	Transparent data analysis and reporting
Purpose of data:	Emissions reduction calculations
Additional comments:	None

The project aims at maintaining a close and continued contact with the stove users to ensure stove usage. This is important to receive feedback from the stove users and to advise on appropriate project stove application. One main instrument for this is the Community Savings & Loaning groups (CSL) approach. In addition also community mobilizers and environmental clubs in schools are crucial to reach out to households:

- The CSL groups play a very important role for the successful adoption and use of the project stove and discontinuation of the baseline technology. CSL groups meet on a weekly basis and provide a perfect framework for peer-to-peer support and knowhow exchange amongst stove users thus increasing use and adoption of the Tembea stoves. Further, Tembea staff attends CSL meetings of each group on a monthly basis. This is a good opportunity to get regular feedback from households on their experience with the project stove, to advise on appropriate stove usage and to discourage the use of the three stone fire.
- A network of community mobilizers visits stove users on a random basis to provide accompaniment/solidarity in decommissioning the traditional stoves. Regular reporting/feedback from the community mobilizers to lead artisans/project staff helps in gauging the level of discontinuation by stove users.
- The environmental clubs run by Tembea in schools in the project catchment area play a crucial role in sensitizing pupils/students in efficient stove usage and to discourage parents from using traditional stoves. In addition a new awards scheme was recently introduced on effective and continuous use of Tembea stove during public awareness campaigns. Best stove users are awarded (e.g. with cooking pans or official certificate of recognition) during regular public awareness and education days as well as during visits by mobilizers.

The project monitors the use of baseline technology through monitoring/usage surveys.

D.3. Implementation of sampling plan

We conducted the sampling for all surveys and tests according to the methodologies outlined in Technologies and Practices to Displace Decentralized Energy Consumption V3.1 (8/2017). Simple random sampling was applied using excel function to generate random sample.

The sample was developed on 25/11/2019 follow up with the monitoring survey that happened from 28/11/2019-03/12/2019.

SECTION E. Calculation of SDG outcomes

E.1. Calculation of baseline value or estimation of baseline situation of each SDG outcome

SDG 1: No poverty

Baseline surveys conducted in 2017 for the renewal of the crediting period provided the baseline values for time expenditures for fuel acquisition per household per year. These values were calculated as the statistical average value of a representative sample from household interviews.

SDG 1 = 404 hours & KSh12906

SDG 3: Good health and well-being

Without the project stoves, no air quality improvements are achieved. Thus, the baseline value is 0% of households stating air quality improvement with project stove.

SDG 4: Quality education

Without the project, no training activities are conducted. Thus, the baseline value is 0 (zero) persons

SDG 5: Gender equality

Without the project, no women receive training or income from the project activity. Thus, the baseline value is 0 (zero) women receiving training or income from the project activity.

SDG 7: Affordable and clean energy

Without the project, no persons benefit from efficient and clean cooking. Thus, the baseline value is 0 (zero) persons that benefit from efficient and clean cooking technologies.

SDG 8: Decent work and economic growth

Without the project, no persons would receive income from the project activity. Thus, the baseline value is 0 (zero) persons receiving an income from project activity, 0 (zero) persons receiving an income in excess of what they were earning prior to project, and 0 (zero) persons employed by the project with salaries at par with or above host country standards.

SDG 12: Sustainable consumption and production

Quantity of woody biomass consumed in the baseline scenario in year and per day were obtained using equation: $B_{fuel} = \eta_{project} / \eta_{baseline} * P_{fuel}$. Thermal efficiencies (η) from water boiling tests (Project technology) and default value for baseline (from methodology page 23 footnote). The data for project KPTs fulfils the 90/30 rule, thus the statistical mean value can be applied.

SDG 12 = 0.0075 t wood/ day/ stove

Baseline stove consumption

SDG 13: Climate Action

According to the applied methodology, there is no need to calculate baseline emissions separately. When the baseline fuel and the project fuel are the same and the baseline emission factor and project emission factor are considered the same, overall GHG reductions achieved by the project activity are calculated as follows (see applied methodology, page 14):

$$ER_y = \sum_{b,y} (N_{p,y} * U_{p,y} * P_{p,b,y} * NCV_{b,fuel} * (f_{NRB,b,y} * EF_{fuel,CO2} + EF_{fuel, nonCO2})) - LE_{p,y}$$

Where:

$\sum_{b,y}$ = sum over all relevant (baseline b/project p) couples

$N_{p,y}$ = cumulative number of project technology days included in the project database for project scenario p against the baseline scenario b in year y.

$U_{p,y}$ = cumulative usage rate for technologies in project scenario p in year y, based on cumulative adoption rate and drop off rate revealed by usage surveys (fraction)

$P_{p,b,y}$ = Specific fuel savings for an individual technology of project p against an individual technology of baseline b in year y, in tons/day, as derived from the statistical analysis of the data collected from field tests.

$NCV_{b,fuel}$ = Net calorific value of the fuel that is substituted or reduced ((IPCC default for wood fuel, 0.015 TJ/ton)

$f_{NRB,b,y}$ = fraction of biomass used in year y for baseline scenario b that can be established as non-renewable biomass

$EF_{fuel,CO2}$ = CO2 emission factor of the fuel that is substituted or reduced. 112 tCO2/TJ for wood/wood waste.

$EF_{fuel, nonCO2}$ = Non-CO2 emission factor of the fuel that is reduced

$LE_{p,y}$ = leakage for project scenario p in year y (tCO2eq/yr)

The parameters $NCV_{b,fuel}$ and $NCV_{p,fuel}$ are not applicable to this project since EF is in units of tCO2/t_{fuel} (see methodology page 21). Therefore the formula applied is:

$$ER_y = \sum_{b,y} (N_{p,y} * U_{p,y} * P_{p,b,y} * (f_{NRB,b,y} * EF_{fuel,CO2} + EF_{fuel, nonCO2})) - LE_{p,y}$$

SDG 13 = 272,812 tCO₂e

E.2. Calculation of project value or estimation of project situation of each SDG outcome

SDG 1: No poverty

Annual household surveys provide data on time expenditures for fuel acquisition in the project scenario. The statistical average of a representative sample from household interviews is used.

SGD 1 = 162 hours & KSh 8482

SDG 3: Good health and well-being

Annual household surveys provide data on improvement of air quality with project stove. The statistical average of a representative sample from household interviews is used.

SDG 3 = 100% of stating improved air quality

SDG 4: Quality education

Tembea records number of persons reached in various training programmes, such as, Community Savings and Loaning, Stove construction, climate change awareness and education, and various other training activities.

SDG 4 = 1211 persons reached with awareness creation

SDG 5: Gender equality

Tembea records number of women that receive income and training from the project. The share of female employees is calculated by dividing number of female employees by total number of employees.

SGD 5 = 48%

SDG 7: Affordable and clean energy

Gold Standard®

Number persons that benefit from efficient and clean cooking is calculated by counting total number of stoves installed as recorded in the total sales record multiplied with usage rates from latest usage surveys multiplied with average household size from latest monitoring surveys.

SGD 7 = 35,614 beneficiaries

SDG 8: Decent work and economic growth

Tembea records number of persons that receive income from the project activity, number of persons that receive an income in excess of what they were earning prior to project, and number of persons employed by the project with salaries at par with or above host country standards.

SDG 8 = 160 persons

SDG 12: Sustainable consumption and production

Quantity of woody biomass consumed in the projects scenario in year and per day are obtained from latest project KPTs. In case the data fulfils the 90/30 rule, then the statistical mean value can be applied.

SDG 12 = 0.0035 t wood/ day/ stove

Project stove consumption

SDG 13: Climate Action

>> According to the applied methodology, there is no need to calculate project emissions separately. When the baseline fuel and the project fuel are the same and the baseline emission factor and project emission factor are considered the same, overall GHG reductions achieved by the project activity are calculated as follows (see applied methodology, page 14):

$$ER_y = \sum_{b,y} (N_{p,y} * U_{p,y} * P_{p,b,y} * NCV_{b,fuel} * (f_{NRB,b,y} * EF_{fuel,CO2} + EF_{fuel, nonCO2})) - LE_{p,y}$$

Where:

$\sum_{b,y}$ = sum over all relevant (baseline b/project p) couples

$N_{p,y}$ = cumulative number of project technology days included in the project database for project scenario p against the baseline scenario b in year y.

$U_{p,y}$ = cumulative usage rate for technologies in project scenario p in year y, based on cumulative adoption rate and drop off rate revealed by usage surveys (fraction)

$P_{p,b,y}$ = Specific fuel savings for an individual technology of project p against an individual technology of baseline b in year y, in tons/day, as derived from the statistical analysis of the data collected from field tests.

$NCV_{b,fuel}$ = Net calorific value of the fuel that is substituted or reduced ((IPCC default for wood fuel, 0.015 TJ/ton)

$f_{NRB,b,y}$ = fraction of biomass used in year y for baseline scenario b that can be established as non-renewable biomass

$EF_{fuel,CO2}$ = CO2 emission factor of the fuel that is substituted or reduced. 112 tCO2/TJ for wood/wood waste.

$EF_{fuel, nonCO2}$ = Non-CO2 emission factor of the fuel that is reduced

$LE_{p,y}$ = leakage for project scenario p in year y (tCO2eq/yr)

The parameters $NCV_{b,fuel}$ and $NCV_{p,fuel}$ are not applicable to this project since EF is in units of tCO2/t_{fuel} (see methodology page 21). Therefore the formula applied is:

$$ER_y = \sum_{b,y} (N_{p,y} * U_{p,y} * P_{p,b,y} * (f_{NRB,b,y} * EF_{fuel,CO2} + EF_{fuel, nonCO2})) - LE_{p,y}$$

E.3. Calculation of net benefits as difference of baseline and project values or direct calculation for each SDG outcome

SDG 1: No poverty

Net benefit

Time saving = baseline value minus project value
= 404 hours per year – 162 hours per year
= 242 hours

Money saving = baseline value minus project value
= 12906 KSH per – 4424 KSH per year
= 8482 KSH

SDG 3: Good health and well-being

Net benefit = project value minus baseline value
= (100%)– 0 = 100% of stove users stating improved air quality

SDG 4: Quality education

Net benefit = project value minus baseline value
= 1211persons – 0
= 1211 persons reached with awareness creation

SDG 5: Gender equality

Women receiving income:

Net benefit = project value minus baseline value
= 78women – 0
= 78 women
48% women

SDG 7: Affordable and clean energy

Net benefit = project value minus baseline value
= 35,614 persons – 0
= 35,614 beneficiaries

SDG 8: Decent work and economic growth

Persons receiving income:

Net benefit = project value minus baseline value
Project staff= 16 persons – 0
= 16 persons
Stove artisans=53persons-0
=53 persons
Community mobilizer=91 persons-0
=91 persons
Total project employees=160

SDG 12: Sustainable consumption and production

Fuel savings: = baseline value minus project value
 = 0.0075 t wood/ day/ stove – 0.0035 t wood/ day/ stove
 = 0.0040 t wood/ day/ stove

Savings = 0.004/0.0075
 53.3% fuel saving

SDG 13: Climate Action

>> According to the applied methodology, we applied the formulae:

$$ER_y = \sum_{b,y} (N_{p,y} * U_{p,y} * P_{p,b,y} * NCV_{b,fuel} * (f_{NRB,b,y} * EF_{fuel,CO2} + EF_{fuel, nonCO2})) - LE_{p,y}$$

Where:

$\sum_{b,y}$ = sum over all relevant (baseline b/project p) couples

$N_{p,y}$ = cumulative number of project technology days included in the project database for project scenario p against the baseline scenario b in year y.

$U_{p,y}$ = cumulative usage rate for technologies in project scenario p in year y, based on cumulative adoption rate and drop off rate revealed by usage surveys (fraction)

$P_{p,b,y}$ = Specific fuel savings for an individual technology of project p against an individual technology of baseline b in year y, in tons/day, as derived from the statistical analysis of the data collected from field tests.

$NCV_{b,fuel}$ = Net calorific value of the fuel that is substituted or reduced ((IPCC default for wood fuel, 0.015 TJ/ton)

$f_{NRB,b,y}$ = fraction of biomass used in year y for baseline scenario b that can be established as non-renewable biomass

$EF_{fuel,CO2}$ = CO2 emission factor of the fuel that is substituted or reduced. 112 tCO2/TJ for wood/wood waste.

$EF_{fuel, nonCO2}$ = Non-CO2 emission factor of the fuel that is reduced

$LE_{p,y}$ = leakage for project scenario p in year y (tCO2eq/yr)

The parameters $NCV_{b,fuel}$ and $NCV_{p,fuel}$ are not applicable to this project since EF in units of tCO2/t_fuel (see methodology page 21). Therefore the formula applied is:

$$ER_y = \sum_{b,y} (N_{p,y} * U_{p,y} * P_{p,b,y} * (f_{NRB,b,y} * EF_{fuel,CO2} + EF_{fuel, nonCO2})) - LE_{p,y}$$

The table below summarizes the values used in **2019** for the parameters of the applied formula:

Parameter	Project Scenario
Baseline wood use (tons/day)	0.0075
Project wood use (tons/day)	0.0035
$P_{p,b,1}$: Fuel savings (tons/day)	0.004
Fraction NRB	0.92
U_p	0.90
N_p	23,187,668
$EF_{fuel,CO2}$	1.7472
$EF_{fuel, nonCO2}$	0.1356

LE _p	0
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The formula for emission reduction calculations including the values used for the parameters is:

$$ER_{2019} = 23187668 * 0.90 * 0.0040 * (0.92 * 1.7472 + 0.1356) - 0$$

Total ERs = ER₂₀₁₉ = 145,500 tCO₂e

Achieved emission reductions per scenario in this monitoring period:

Year	ER (tCO ₂ e)
2019	145,500
Total	145,500

E.4. Summary of ex-post values of each SDG outcome for the current monitoring period

Item	Baseline estimate	Project estimate	Net benefit
SDG 1	404 hours Ksh12906	162 hours Ksh4424	242 hours Ksh 8482
SDG 3	0% Of stove users stating improved air quality	100% Of stove users stating improved air quality	100% Of stove users stating improved air quality
SDG 4	0 Persons reached with awareness creation	1211 Persons reached with awareness creation	1211 persons Persons reached with awareness creation
SDG 5	0 Number of female employees	78 received income Number of female employees	48%of employees women 78 women employees
SDG 7	0 Beneficiaries	35,614 Beneficiaries	35,614 beneficiaries
SDG 8	0 Number of employees	160 Number of employees	160 employees
SDG 12	0.0075t wood/ day/ stove	0.0035t wood/ day/ stove	0.004 t wood/ day/ stove 53.3% fuel saving
SDG 13	272,812	127,312	145,500 tCO ₂ e

E.5. Comparison of actual value of outcomes with estimates in approved PDD

Item	Values estimated in ex ante calculation of approved PDD	Actual values achieved during this monitoring period
SDG 1	No estimate available	242 hours Kes 8482
SDG 3	Expect participants to respond that indoor air quality has improved over baseline.	100%
SDG 4	No estimate available	1211 persons reached with awareness creation
SDG 5	Project is expected to train and generate income for 300 women.	48% 78 women received income
SDG 7	No estimate available	35,614 beneficiaries
SDG 8	No estimate available	160 Persons
SDG 12	No estimate available	53.3% fuel
SDG 13	138,395	145,500 tCO ₂ e

E.6. Remarks on difference from estimated value in approved PDD

The differences between ex ante SDG 13 predictions in PDD and actual monitored emission reductions for crediting period are due to the following differences:

1. The number of stoves in use during the monitoring period higher than estimated ex ante.

	Ex ante	Achieved
2019	63,152	67,836

SECTION F. Stakeholder inputs and legal disputes

- F.1. List all inputs/grievances which have been received for the project during the monitoring period together with their respective answers/actions

No input/grievance recorded.

- F.2. List all inputs/grievances from previous monitoring period where follow up action is to be verified in this monitoring period

N.A.

- F.3. Provide details of any legal contest or dispute that has arisen with the project during the monitoring period

N.A.

Annex 1: Fulfillment of updated requirements and guidelines for carrying out usage survey for projects implementing improved cooking devices

The PP has undertaken measures to meet the update rules for conducting usage surveys for cook stove projects published on 23/08/2017.

A. Mandatory requirements

- I. Definition of stove user vs non-user-The PP defines households as stove using if the stove is used at least once a day. In this monitoring period households that used the stove not at least once a day are considered as not using.
- II. Household observation
 - Kitchen observation- The PP has in the past used this criterion to check stove usage and quality. However, during this monitoring, the enumerators were trained on other techniques of checking stove use. This include; presence of ash- if the ash is there, and if hot, appearance of soot-could be on the cooking service, wall or firewood inlet.
 - Interview with primary cook-a new section was introduced in the questionnaire to capture details of the primary cook. Enumerators were under instructions to suspend interviews if they didn't meet the primary cook. There responses are captured on question number 20 of the questionnaire.
 - Photos of the cooking area-The PP took photos of all the households visited for monitoring activity. However, the PP notes that considering the size of some kitchens it was difficult to achieve very clear photos however what is presented here captures the requirement.it includes a date stamp. The photos have been submitted saved with name of the household and their respective stove number. The questionnaire was revised to seek consent from the household.
 - GPS coordinates- GPS coordinates for all the households visited for the usage survey were collected and included in the monitoring data.
- III. Verification checks- the monitoring team leader contacted 27 households out of 305 reached for the usage survey translating 8% which is within the 5-10% required by the guideline. The PP developed a template that was used to capture responses from the household compared to those in the questionnaire. The templated is named Tembea Verification checks template. Scanned copies of the same have been uploaded. No

discrepancies were noted. The exercise was undertaken daily to also check the work of the enumerators. The template includes details of the household.

B. Good Practice Monitoring requirements

1. Field team Training and supervision- The PP developed a training guide capturing the updated rules to train enumerators involved in collection of data for usage survey. The train guide and participants list has been uploaded. The PP used the verification check as required in Mandatory requirements of the updated rules to review the works by enumerators. Throughout the exercise there was support from the team leader to the field teams.
2. End user training and follow up- the PP uses the Community Saving and Loaning groups as a platform to train, monitor and promote stove use. The groups are made of between 15-20 members from same locality who form the group to save resources, to collectively guarantee each other to acquire cook stoves. 100% of stoves sold to the community use this approach and hence was considered appropriate platform to train, monitor and promote stove use. The PP has trained and recruited community mobilizers who train community on stove use, economic empowerment and climate change. We have 91 mobilizers (list uploaded). We also use the stove artisan as earliest contact to train household on stove use immediately after stove construction. Due to budgetary constraints these activities are conducted alongside awareness creation events. List of events and dates have been uploaded.
3. Awareness campaign- from the start of the project in 2010 the PP has spent considerable resources to promote community awareness on climate change, its connection to witnessed impacts as well as why use of energy efficient cook stoves matters. In the initial years this included a school programme where children were educated to encourage their parents or custodians to use Tembea cook stoves. This requirement can be considered to be met alongside number 2 (End user training and follow up)

Conclusion

The project seeks issuance using 90% usage rate as provided by the updated rules have taken measures to meet the stated requirements. The PP however notes the requirements for End user training and Awareness can be progressively realized to increase the numbers reached over time, considering its budgetary requirement.