



EASTERN PROVINCE-JURISDICTIONAL SUSTAINABLE LANDSCAPE PROJECT

STANDARD OPERATING PROCEDURES FOR ENERGY

AUGUST 2023



BioCarbon Fund
Initiative for Sustainable Forest Landscapes

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About the Standard Operating Procedure (SOP)

Standard Operating Procedure			
Version	V1	Date of Issue	June 2023
Purpose	This SOP details how to set up and execute data collection for energy, which focuses on measurement for household daily wood fuel consumption and approaches to assist in quantifying the amount of GHG emissions from this source within the eastern province landscape		
Responsibilities	<p>MRV coordinator</p> <ul style="list-style-type: none"> a) In coordination with the PIU, the role will entail working with energy sector lead officers to deliver high-quality MRV outputs. b) Will serve as a focal point for enquiries regarding national MRV systems. c) Will work closely with energy sector leads person, traditional leaders, community leaders, and private sector partners in developing and maintaining the MRV systems. d) Oversee data collection according to indicators and metrics provided for in the standard operating procedures for Forestry. e) Provide guidance in the development of the sampling framework for Energy, Forestry, and Agriculture. f) Supervise data collection at district and chiefdom level for Forestry. 		
Prerequisites	Sampling design are provided in MRV management plan		
Related documents	<p>The following are the related documents to be used alongside the SOP:</p> <ul style="list-style-type: none"> a) MRV management plan b) ZIFLP-MRV mobile application software c) Integrated Land Use Assessment Phase II Zambia Biophysical Field Manual d) Forest Biophysical Field Data Entry Booklet Integrated Land Use Assessment Phase II Zambia 		

ACRONYMNS

EP-JSLP	Eastern Province Jurisdictional Sustainable Landscape Programme
GHG	Greenhouse Gas
GPS	Global Positioning System
MRV	Measuring, Reporting and Verification
QA/QC	Quality Assurance and Quality Control
PPE	Personal Protective Equipment
PIU	Project Implementation Unit
SOP	Standard Operating Procedure
ZEMA	Zambia Environmental Management Agency
ZIFLP	Zambia Integrated Forest Landscape Project

1.0 INTRODUCTION

The Zambia Integrated Forest Landscape Project (ZIFLP) in Eastern province is supported by World Bank and its objective is to improve landscape management and increase environmental and economic benefits for targeted rural communities in the Eastern Province and to improve Zambia's capacity to respond promptly and effectively to an Eligible Crisis or Emergency.

The project provides support to rural communities in Eastern Province to allow them to better manage the resources of their landscapes so as to reduce deforestation and unsustainable agricultural expansion; enhance benefits they receive from forestry, agriculture and wildlife; and reduce their vulnerability to climate change. Simultaneously, the project is supporting the creation of the enabling environment for subsequent carbon emission reduction purchases. The ZIFLP's key beneficiaries are the rural poor communities of the Eastern province.

The Zambia Environmental Management Agency (ZEMA) with support from ZIFLP have been mandated to develop national and subnational (EP-JSLP) Measurement, Reporting and Verification System (MRV) and other GHG emission-related processes and systems under subcomponent 1.2: Emissions Reduction Framework. With this support, ZEMA will have one integrated and robust MRV that will be used to monitor emissions for the EP-JSLP and at the national level.

The aim of this document is to provide standard field measurement approaches to assist in quantifying the amount of biomass consumed for firewood and charcoal within the eastern province landscape. The methods presented in Standard Operating Procedure (SOP) are based on good practices and lessons drawn from national, regional, and international experiences.

This SOP will be used in collaboration with the following:

- e) MRV management plan
- f) ZIFLP-MRV mobile application software

The SOPs are grouped by purpose. The first set of SOPs are general and can be used for many field measurement goals. A set of SOPs are also presented on the measurement of all the carbon pools. These can be used to estimate the standing stock of a carbon pool within a stratum. Another set of SOPs are presented to estimate the emissions resulting from selective logging. Various SOPs are also presented on estimating canopy cover. These SOPs should only be used when the purpose of data collection is known. This SOP along with the above-mentioned documents should be used after receiving extensive field training in the measurement methods performed by a qualified forester or ecologist.

2.0 SOP FIELD SAFETY

No matter what activities are engaged in or where they are carried out, *safety is the first priority* and all precautions must be well thought out in advance and then strictly adhered to. Planned field activities must remain flexible and allow for adjustments in response to on-the-ground assessments of hazards and safety conditions. Accordingly, field personnel must be vigilant and always avoid unnecessary risks.

Field crew members must be well prepared. It is recommended that personnel engaging in field activities hold general first aid training. The following guidelines will apply to all field-based activities:

- a) Mandatory buddy system. Field crews will include no less than two people who must be directly accompanying each other for the entire duration of field work.
- b) For each day in the field, specific location and scheduling information must be logged in advance with a point person who can be reached at any time during the anticipated duration of field work. While in the field, crews should check in with their designated point person once per day.
- c) Each independent crew must carry cell phone provided by the institution. Crews should make sure to check batteries each time before entering the field.
- d) Trip planning will include identification of the nearest medical facility and specific directions to reach that facility. When in areas with poisonous snakes, advance communication should be made to verify that appropriate antivenins are available. Where applicable, hunting regulations should be checked with local state agencies prior to field work.
- e) Personnel will always carry personal and institutional insurance cards with them. As well, personnel will carry identification and, if possible, institutional business cards at all times.
- f) Field crews will always carry a first aid kit with them. First aid kits should contain Epinephrin/Adrenalin or an antihistamine for allergic reactions (e.g., bee/wasp stings). Sun block and insect repellent should be carried in the field.
- g) Where poisonous snakes are common, snake chaps are recommended. In the event of snake bite, the victim should be taken immediately to a medical facility. Conventional "snake bite kits" (e.g., suction cups, razors) have been proven ineffective or even harmful and should not be used.
- h) Basic field clothing or PPE should be appropriate for the range of field conditions likely to be encountered. This will include: sturdy boots with good ankle support or rubber boots, long sleeves and pants, rain gear, and gloves. Blaze orange (vest or hat) is recommended when and where hunting may be taking place. Where necessary, to avoid extended contact with plant oils, ticks, and/or chiggers, a change of clothes should be made at the end of each day in the field and field clothes should not be re worn without first laundering.
- i) Ensure personnel stay sufficiently hydrated and carry enough clean water for the intended activity. Carry iodine tablets or other water purification tablets in case there is a need to use water from an unpurified source.

3.0 SOP DATA COLLECTION

General procedures

Data collection should be collected for wet season, hot season and cold season. For each season, the whole exercise lasts a minimum of six days. The following steps should be undertaken

- 1) The first day is dedicated to courtesy calls with the District Administrative Staff, traditional leadership and area ward councillors.
- 2) The second day involved meetings in the morning with village heads, general populace in the villages identified, and focus group meetings.

Households

- 3) During the village meetings, households for sampling wood fuel consumption should be selected and requested to prepare bundles of wood fuel in readiness for measurement.
- 4) Administer the questionnaire on the tablet
- 5) In the afternoon of Day 2 measurement would commence for wood fuel to be used on Day 3.
- 6) Request participants to prepare another bundle of wood for use on Day 4 and this bundle should be measured on Day 3. The same exercise should be repeated until Day 6 in the morning.

Tobacco

For a farmer or household involved in tobacco farming the following should be undertaken

- 1) Administer the questionnaire on tobacco
- 2) Conduct measurement/weighing of wood equivalent to drying/curing a bale of tobacco.

Fishing

For a farmer or household are involved in fishing the following should be undertaken

- 1) Administer the questionnaire on tobacco.
- 2) Conduct measurement/weighing of wood for smoke drying 10 kg of fish.

Institutions-schools/colleges/clinics/hotels

For institutions to include schools, colleges, lodges, hotels, clinics and restaurants the following should be undertaken:

- 1) Administer the questionnaire on institutions
- 2) Conduct measurements for daily fuel wood consumption

Mining

- 1) Administer the questionnaire on mining companies/activities
- 2) Conduct measurements for daily fuel wood consumption

Breweries

- 1) Administer the questionnaire on breweries
- 2) Conduct measurements for daily fuel wood consumption

Bakeries

- 1) Administer the questionnaire on bakeries
- 2) Conduct measurements for daily fuel wood consumption

Specific procedures

Procedure	
Step 1: Planning the data collection	<p>Step 1a Identify data to be collected.</p> <p>The baseline fuel usage must be identified through the survey. The demographic, cooking habits and socio-economic characteristics of the target areas will be identified and a detailed questionnaire must be completed for every household. The questionnaire is embedded in the mobile MRV application can be found in Appendix 1.</p> <p>This data will be collated to generate the wood fuel usage in Eastern Province in Zambia. The kitchen survey tests will take place in kitchens with traditional, 3-stone fires. Participants will be asked several questions and to show the amount of fuel wood used on a typical day, this amount will be weighed using a weighing scale. It is advised that daily wood fuel use is weighed typically over a 3-day period.¹ EB Guidance (EB 50, Annex 30 and EB 47, Annex 27) Guidance document for identifying the average household wood fuel usage in Zambia.</p> <p>Step 1 b. The MRV Coordinator estimates the necessary level of effort for the data collection using.</p> <p>Step 1c. The MRV Coordinator identifies the persons who may be involved in the data collection in line with the records in the MRV Management Plan.</p> <p>Step 1d. The data collection timeline to be followed is as stipulated in the MRV management plan.</p> <p>Step 1 e. The PIU will arrange logistics, including safety kit, field clothing, tablets, GPS, weighing scales, notebooks, sufficient time for data collection, remunerations arrangements.</p> <p>Tools: The tools used included hanging scales, cameras, Global Positioning System (GPS), and ropes.</p> <ol style="list-style-type: none"> 1) The hanging scales are used to measure the mass of the wood fuel for household. 2) Pellet scales are used for measuring fire wood for tobacco curing and fish smoking/drying 3) In order to keep the record of field observations cameras were used to take pictures.

	<p>4) The GPS are used for locating every sampled village by means of coordinates (latitude and longitude) and altitude above sea level.</p> <p>5) Lastly, ropes are used to tie the bundles of wood fuel for ease of weighing.</p>
<p>Step 2: Identification of areas and households in the district for sampling</p>	<p>Step 2a. The MRV Coordinator compiles list of areas in each district where the survey should be conducted. The areas should be identified and marked geographically on the Map. The sample should include the following:</p> <p>Households</p> <ol style="list-style-type: none"> 1. Household using efficient cookstoves-at least 60 in an area 2. Households using ordinary 3 stone fire-At least 60 in an area 3. Household using ordinary mbaula-60 <p>Lodges</p> <ol style="list-style-type: none"> 1) Every lodge in a district <p>Restaurants</p> <ol style="list-style-type: none"> 1) At Every market restaurant at districts <p>Schools and colleges</p> <ol style="list-style-type: none"> 1) At every school and college in a district <p>Clinics</p> <ol style="list-style-type: none"> 1) At every clinic/hospital in a district <p>Tobacco</p> <ol style="list-style-type: none"> 1) At least 10 tobacco farmers in a district <p>Fishing</p> <ol style="list-style-type: none"> 1) At least 20 fishermen <p>Mining</p> <ol style="list-style-type: none"> 1) At least 3 mining companies 2) At least 3 individual mining activities <p>Breweries</p> <ol style="list-style-type: none"> 1) At least 3 brewing companies 2) At least 5 individual local brewers <p>Bakeries</p> <ol style="list-style-type: none"> 3) At least 5 bakeries 4) At least 5 individual local bakers <p>The ideal sample frame is identified by estimating the population living in each target area that meets the stove criteria stated above.</p>
<p>Step 3: Training and calibration</p>	<p>Step 3a. As a first step in the data collection, the MRV Coordinator and the Trainer organize and prepare a training event for the persons identified in sub-step 1c as data collectors, who have confirmed their participation. The training should cover the following topics as a minimum:</p> <ol style="list-style-type: none"> a) The brief project background.

	<ul style="list-style-type: none"> b) How to conduct, focus group meetings, interviews with Key Informants, observations, and Rural Appraisal Techniques. Importance of accuracy in data capture c) Sampling and instruments for data capture rural and urban surveys d) How to administer household questionnaire for Wood fuel, e) How to conduct field measurements with GPS, f) How to use the Tablet g) How to enter data on the MRV mobile App h) How to conduct measurements of Wood fuel, i) How to conduct institutional survey for clinics, hospitals, hotels, schools, colleges, restaurants, j) Quality management practices <p>Step 3b. The Trainer implements the training event following these basic principles:</p> <ul style="list-style-type: none"> a) Environment for active participation, where participants can share questions and opinions b) Encourage communication between the data collectors. c) Record attendance of the collectors d) Assess the capacity of the data collectors at the end of the training and record the results. <p>Step 3c. The MRV Coordinator and the Trainer prepare a report summarizing the training actions taken, the attendance and the results of the assessment of capacity.</p>
<p>Step 4: Distribute the sample units among Data Collectors</p>	<p>Sub-Step 4a. The MRV Coordinator in collaboration with MRV Energy Sector Lead and MRV provincial sector leader decides on sample units to be assessed.</p> <p>Sub-Step 4b. The MRV Coordinator allocates sample units to Data Collectors in each district. The MRV Coordinator uses a list of locations in each district to distribute the samples to the collectors.</p> <p>Sub-Step 4c. The coordinator records the number of sample areas, the Data Collectors assigned to assess those areas</p>
<p>Step 5: Data collection by Data Collectors</p>	<p>Step 5a. Identify the community leaders and ask them to identify and choose randomly householders, tobacco farmers and fishermen that meets the criteria described in Step 2a above.</p> <p>Step 5 b. Identify institutions in the province to include schools, colleges, lodges, hotels, restaurants, clinics and hospitals</p> <p>Step 5c. Explain to households' member, farmers, fishermen, institutional authorities the purpose of the survey and arrange to measure their fuel consumption. Stress to household members that their cooking practices, fish drying, tobacco curing should remain as close to normal as possible. Record the weight of the wood fuel used to cook in a normal day. If liquid and / or gaseous fuels are used, also record the fuel used in a normal day. Fuel should keep dry, if the family does not normally store fuel indoors and there is a chance that rain may occur during the measurement period, request that the family moves the fuel inside or covers it to prevent it from getting wet and come back another day in order to measure dry fuel.</p>

	<p>Step 5c. Visit each household, farmer, fishermen, institution without being intrusive. Administer the questionnaire for respondents appropriately and enter information on the tablet accordingly.</p> <p>The balance for weighing wood and other solid fuels will be a large capacity spring scale with 0.1 – 0.5 kg accuracy or pellet scale.</p> <p>Households: each of the selected households conduct the following:</p> <ol style="list-style-type: none"> a) Measure wood fuel to be used for day 1 using weighing scale and enter the data on MRV application appropriately. b) At the end of day 1, weigh wood fuel for use in day 2 c) At beginning of day 2 measure, remaining wood fuel meant for day 1 to arrive at wood fuel consumed on Day 1. d) Repeated the process for the next two days. <p>Sub-Step 5b. During the data collection, the district MRV supervisor, organizes random checks on the data collectors in the field to ensure quality control.</p> <p>Sub-Step 5c. The district MRV supervisor conducts notes challenges and limitations during the data collection as well as potential sources of bias during the data collection.</p>
<p>Step 6: Data assembly</p>	<p>Sub-Step 6a. After the data collection is completed, the MRV Coordinator ensures data is well compiled and archive in readiness for analysis.</p> <p>Sub-Step 6b. The MRV Coordinator checks that all necessary data and sample information is archived and included in the final database.</p>

5.0 SOP DATA ANALYSIS

Data analysis	
<p>Step 1: Estimating firewood consumptions</p>	<p>Step 1a Estimate daily firewood consumption for each household using the following equation.</p> $F_{cd\ i} = W_f - W_s,$ <p>Where F_{cd} is daily firewood/charcoal consumption for day i for each household, institution, W_f is mass of firewood/charcoal on the first reading for day i; W_s is mass of firewood/charcoal on the second day reading for day i;</p>

Step 1b Estimate average firewood/charcoal consumption for each household for three days using the following equation.

$$F_{ca} = \frac{f_{cd1} + f_{cd2} + f_{cd3}}{3},$$

Where F_{ca} is daily average firewood/charcoal consumption for each household, f_{cd1} is firewood/charcoal consumption for day 1 for each household; f_{cd2} is firewood/charcoal consumption for day 2 for each household; f_{cd3} is firewood/charcoal consumption for day 3 for each household.

Step 1c Estimate average household firewood/charcoal consumption for all the household in the sampling area using the following equation.

$$F_{cv} = \frac{f_{ca1} + f_{ca2} + \dots + f_{cann}}{n_v}$$

Where F_{cv} is daily average firewood/charcoal consumption for each sampling area/location, f_{cai} is average firewood/charcoal consumption for household 1 to n; n_v is number of households in a sampling area/location.

Step 1d Estimate average household firewood/charcoal consumption for each district.

This is estimated by obtaining an average of firewood/charcoal consumption in for all locations in the district.

Step 1e Estimate firewood/charcoal consumption for the province using the following equation.

$$F_{p \text{ charcoal}} = \frac{f_{d \text{ charcoal}} * H_c * 365}{1000},$$

Where $F_{p \text{ charcoal}}$ is annual charcoal consumption in the province(tonnes), $f_{d \text{ charcoal}}$ is average provincial charcoal consumption(kg/day), H_c number of households using charcoal in the province.

$$F_{p \text{ firewood}} = \frac{f_{d \text{ firewood}} * H_f * 365}{1000},$$

Where $F_{p \text{ firewood}}$ is annual firewood consumption in the province(tonnes), $f_{d \text{ firewood}}$ is average provincial firewood consumption(kg/day), H_f number of households using firewood in the province.²

Step 2: Identification of areas and households in the district for sampling

Step 2 a calculate the arithmetic mean (mean) is the average value of the replicated samples (i.e., sample units) using equation 1 below:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^{i=n} x_i, \text{-----equation 1}$$

Where \bar{x} is the mean, x is the sampled value, and n is number of sample units

Step 2 b calculate standard deviation provides a measurement of variation from the average value using equation 2 below:

$$S = \sqrt{\frac{1}{n-1} \sum_{i=1}^{i=n} (x_i - \bar{x})^2} \text{-----equation 2}$$

Where S is the sample standard deviation, x is the sampled unit value, n is the number of sample units, and \bar{x} is the arithmetic mean. This equation is applicable to simple random sampling.

Step 2 c calculate the standard error provides the standard deviation of the mean.

$$SE_{\bar{x}} = \frac{s}{\sqrt{n}} \text{-----equation 3}$$

Where SE is the standard error, \bar{x} is the arithmetic mean, s is the sample standard deviation, and n is the number of sample units. This equation is applicable to simple random sampling.

Step 2 d: The confidence interval gives the estimated range of values likely to include an unknown population parameter at the chosen confidence level.

$$CI = t^* SE_{\bar{x}} \text{-----equation 4}$$

Where CI is the half width of the confidence interval at a specific confidence level or absolute error, often 95% or 90%, t is the t-value, function of the confidence level and the number of sample units, SE is the standard error, and \bar{x} is the mean.

Step 2 e: Calculate uncertainty or relative margin of error, which is estimated as a percentage, using the half width of the confidence interval as a percent of the mean.

$$Uncertainty = \frac{CI}{\bar{x}} \text{-----equation 5}$$

	<p>Where CI is the half width of the confidence interval at a specific confidence level, and \bar{x} is the mean.</p> $U_{total} = \sqrt{U_1^2 + U_2^2 + \dots + U_n^2} \text{-----equation 6}$ <p>Where U_{total} is the total percentage uncertainty in the product of the quantities, at the chosen CI, and U_n is the percentage uncertainty associated with each of the quantities.</p> $U_{total} = \frac{\sqrt{(U_1 \cdot x_1)^2 + (U_2 \cdot x_2)^2 + \dots + (U_n \cdot x_n)^2}}{ x_1 + x_2 + \dots + x_n } \text{-----equation 7}$ <p>Where U_{total} is the total percentage uncertainty in the product of the quantities, at the chosen CI, U_n is the percentage uncertainty associated with each of the quantities, and X_i</p>
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6.0 SOP QUALITY ASSURANCE/QUALITY CONTROL

Those responsible for aspects of data collection and analysis should be fully trained in all aspects of the field data collection and data analyses. Standard operating procedures should be followed rigidly to ensure accurate measurement and remeasurement. It is highly recommended that a verification document be produced and filed with the field measurement and calculation documents that show that QA/QC steps have been followed.

Quality management	
QA / QC procedures	<p><i>Note: multiple re-measurements for all samples are not considered in this SOP template. Some modifications would need to be introduced in countries where such multiple re-measurements for all samples are planned.</i></p> <p>Sub-step Q1. The coordinator provides warning labels or excludes impossible transitions through logical checks built into response design.</p> <p>Sub-step Q2. The coordinator conducts ongoing hot, cold and auxiliary data checks during data collection and conduct regular review meetings among all interpreters.</p> <p>Auxiliary data checks: use an external data source, such as externally created maps, to compare to the sample unit classification. Discrepancies between the two datasets can be flagged for rechecking. Confirmed differences between the two datasets can be documented to showcase why sample-based area estimation may give difference results than other data sources.</p> <p>Cold checks: sample units that are randomly selected from the data produced by interpreters. The decisions made by the interpreters are reviewed by the coordinator or group of interpreters meeting together. If the error by the interpreter reflects a systematic error in their interpretation, it is discussed directly with the interpreter and the affected sample units are corrected.</p> <p>Hot checks: sample units that are flagged as low confidence. These marked</p>

	sample units should be further reviewed by the coordinator or group of interpreters meeting together. Once reviewed, labels that are deemed to be incorrect on these sample units should be adjusted by the interpreter.
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Quality Assurance

Data collection in field:

During all data collection in the field, the crew member responsible for recording must repeat all measurements called by the crew member conducting the measurement. This is to ensure the measurement call was acknowledged and that proper number is recorded on the data sheet. In addition, all data sheets should include a 'Data recorded by' field with the name of the crew member responsible for recording data. If any confusion exists, the transcribers will know which crew member to contact. After data is collected at each plot and before the crew leaves the plot, the crew leader shall double check to make sure that all data are correctly and filled. The crew leader must ensure the data recorded matches with field conditions, for instance, by verifying the number of trees recorded.

Data sheet checks:

At the end of each day all data sheets must be checked by team leaders to ensure that all the relevant information was collected. If for some reason there is some information that seems odd or is missing, mistakes can be corrected the following day. Once this is verified and potential mistakes checked, corrected data sheets shall be handed over to the person responsible for their safe keeping while the crew is still in the field. Data sheets shall be stored in a dry and safe place while in the field. After data sheets have been validated by crew leaders, the data entry process can commence.

Field data collection Hot Checks:

After the training of field crews has been completed, observations of each field crew and each crew member should be made. A lead coordinator shall observe each field crew member during data collection of a field plot to verify measurement processes and correct any errors in techniques. It is recommended that the crew chiefs switch to a different crew to ensure data collection procedures are consistent across all field crews. Any errors or misunderstandings should be explained and corrected. These types of checks should be repeated throughout the field measurement campaign to make sure incorrect measurement techniques have not started to take place.

Data Entry checks:

To ensure that data is entered correctly, the person entering data (whether during fieldwork or after a return to the office) will recheck all the data entered and compare it with the original hard copy data sheet before entering another sheet. It is advised that field crew leaders either enter the data or participate in the data entry process. Crew leaders have a good understanding of the field sites visited and can provide insightful assistance regarding potential unusual situations identified in data sheets. Communication

between all personnel involved in measuring and analyzing data should be used to resolve any apparent anomalies before final analysis of the monitoring data can be completed. If there are any problems with the plot data (that cannot be resolved), the plot should not be used in the analysis.

Quality Control

Field measurement error estimation

A second type of field check is used to quantify the amount of error due to field measurement techniques. To implement this type of check, a complete remeasurement of a number of plots by people other than the original field crews is performed. This auditing crew should be experienced in forest measurement and highly attentive to detail. A total of 10% of plots (or clusters if clustered plots are used) should be randomly or systematically chosen to be remeasured. Where clustered plots are used, all plots within a selected cluster shall be measured. All trees shall be remeasured in each plot. Field crews taking measurements should not be aware of which plots will be remeasured whenever possible.

After remeasurement, data analysis is conducted and biomass estimates are compared with estimates from the original data. Any errors discovered could be expressed as a percentage of all plots that have been rechecked to provide an estimate of the measurement error.

Data Entry quality control check:

After all data has been entered into computer file(s), a random check shall be conducted. Sheets shall be selected randomly for re-checks and compared with data entered. Ten percent of all data sheets shall be checked for consistency and accuracy in data entry. Other techniques such as data sorting and verification of resulting estimates shall be employed to ensure data entered properly corresponds to field sites visited. Personnel experienced in data entry and analysis will be able to identify errors especially oddly large or small numbers. Errors can be reduced if the entered data is reviewed using expert judgment and, if necessary, through comparison with independent data.

QA/QC of Laboratory Measurements

Standard operating procedures (SOPs) should be created and rigorously followed for each part of all laboratory analyses. All instruments should be calibrated.

For example, all combustion instruments for measuring total C or C forms should be calibrated using commercially available certified C standards. SOPs should include steps to calibrate and check analyses. Blanks can be analyzed, or analytical runs can include a check sample of known C concentration. One standard per batch/run should be included in the samples sent to a remote lab as an additional check of the quality of the instruments and lab procedures.

All balances for measuring dry weights should be calibrated against known weights. Where possible, 10-20 % of samples could be reanalyzed/reweighed to produce an error estimate.

7.0 SOP DATA STORAGE AND ARCHIVING

Field equipment

Field log book/electronic field log
book Laptop computer
Desktop computer
Connection to
network server

This SOP describes the methods for storing and archiving data in a simple yet safe and retractable way, so data can be accessed whenever necessary. Data storage and archiving is a very important and final component of the data collection process. The basic framework involving data storage and archiving follows.

Data storage in the field

In the field one person is responsible for storing and keeping the field data sheets; this person can also be the person who also validates the data on the sheets and is one of the team leaders.

If the data entry process is being done or started in the field, these sheets will be used after which they must be returned to the person responsible for their safe keeping. These sheets are stored in a dry and safe place where they cannot be tampered with until they are transported to the office.

Data storage in the Office

In the office, all original field data sheets shall be scanned and compiled into a document to be stored electronically. This avoids any changes to be made to the original sheets.

Hard copy

The original data sheets are photocopied and are kept in separate location. The data sheets are placed in a special jacket folder in the filing cabinet with the location name and date written on the label. Inside of these jackets there are folders with the different types of data collected (Biomass, Logging, Skid trails, Roads and Decks, Regrowth, Wood Density etc.). After all data has been entered into a digital format and SOP QA/QC completed, the two sets of data sheets are then stored in secure fireproof filing cabinets in two separate locations.

Soft Copy

The scanned data sheets are stored on a computer in the office, along with all tools with the entered data, including data entered in the field laptop. These data files are backed up on a server. Folders containing data and folders containing tools should be properly named and adequately organized. All digital data collected and compiled (photos, proposal and report for exercise) are also stored in the archive file on both the desktop in the office and on the server. On the server there are a few folders in which all data are placed as follows:

1. 'Field Data', in which sub folders are created and are named the same way (Location) as the hard copy folder so as to have a uniform filing system. In

- each sub folder there are two folders; pictures and scanned data sheets in which the respective information is placed;
2. '*Data Analysis*' in which all completed tools are placed after the data entry has been completed;
 3. '*Template*' in which all tool templates and field data sheets used in the data analysis are placed;
 4. '*Documents*' in which all documents related to the project are placed; and
 5. '*Field Proposal & Report*' in which all field exercise proposals and report are placed. [Procedure for Data File Backup with key implementing partners](#)

6.

Any file(s) that is updated during the data analysis will be backed up to a network server. This back up will be done daily on the office computer(s), and at the end of every week they **must** be saved on an external hard drive and the folder on the server which is specifically designated for this data storage.

Procedure for Compiling and Managing Field Log Book or Electronic Log Book

This log book will be both of an electronic form and of the traditional book keeping format (a book). Both log forms will be updated simultaneously and twice for each field venture, before and after each trip. Logbooks will be used for recording the logistics of the field exercise, and providing explanation about field campaigns (e.g. date of departure to the field and date of returning, number of plots, location, field crew, challenges etc.). Each field campaign will be given a unique reference number and each report will also be given a reference number related to that of the campaign. This is to facilitate cross referencing processes.

Upon returning to the office after field records are entered, the log books will be stored in a secure filing cabinet or placed on the network server via desktop computers respectively, after being updated. Upon the completion of field reports of which each report will be given a unique reference number, the log books will be revisited and the report number will be inserted for future references. It is important to restrict access to logbooks and information only to users, as they alone are responsible for making changes.

REFERENCES

1. Guidance EB 50, Annex 30 and EB 47, Annex 27 Guidance document for identifying the average household wood fuel usage in Zambia.
2. UNFCCC/CCNUCC ED50 Report annex 30-page 1 General guidelines for sampling and surveys for small-scale CDM project activities.
3. UNFCCC/CNUCC ED47 report annex 27 page 1 Draft general guidelines on sampling and surveys.
4. II.G/ Version 02 sectoral scope: 03 EB 51 Indicative simplified baseline and monitoring methodologies for selected small- scale CDM project activity categories

Annex II -Household Questionnaire for Wood Fuel

Name of Interviewer.....

SECTION A: General Information	
1. Province:	7. Stove Type: <input type="checkbox"/> Ordinary charcoal stove <input type="checkbox"/> 3 stone Fire <input type="checkbox"/> Paraffin stove <input type="checkbox"/> Gas cooker <input type="checkbox"/> Gel stove <input type="checkbox"/> Improved cookstove <input type="checkbox"/> Electric stove <input type="checkbox"/> Kerosene stove <input type="checkbox"/> Other (please specify)
2. District:	8. Phone Number:
3. Constituency:	9. Household Code:
4. Ward:	
5. Village / Residential areas:	
6. GPS readings:	
SECTION B: Household Socio - Demographic Characteristics	
10. Gender (tick as appropriate, don't ask)	a) Male b) Female
11. What is your highest level of education obtained?	a) None b) Primary c) Secondary d) Tertiary e) University f) Other (specify).....
12. What is your marital status?	a) Married b) Single c)Widowed
13. How many people are in your household (including children)	Number: _____
14. How many children under 10 years old live in your household?	Number: _____
15. What is your household's main source of income?	1. Trade (please specify) 2. Employment 3. Farming 4. Casual labourer (Please specify)
16. Please describe your household type?	1. Permanent 2. Temporary 3. Others (Please specify)
17. Where is the main cooking place for your household?	1. Inside house 2. Outside house 3. Separate kitchen 4. Other (specify):
SECTION C: Fuel Use	
18. What type of fuel are you using mainly?	a) Firewood b) Gas c) Charcoal d) Paraffin e) Husks f) Other (please specify)

19. What foods do you cook using each fuel type?	1. Charcoal a. b. c. 2. Firewood a. b. c. 3. Paraffin a. b. c. 4. Gas a. b. c. 5. Other (please specify) a. b. c.
20. Other than cooking, do you use your fuel for any other purposes?	a) Yes b) No
21. If yes, for what purposes? 1. 2. 3. 4. 5.	
SECTION D: Cooking Applications	
22. For what type of cooking do you use your stove?	a) Domestic b) Commercial c) Both domestic and commercial
23. How many meals do you cook per day?	
24. How many people do you cook for per day?	
25. Do you buy or collect your fuel?	a) buy b) collect
26. If you collect your fuel, where do you collect it from?	
27. If you buy you fuel, where do you buy from?	
28. How much time do you spend collecting it? (Hours per day)	
29. How far is it from your house? (km)	
30. If you buy it, how much is it? How much does it cost per kg/Bundle?	
31. If you buy it, how much do you spend on fuel per day?	

Conduct the fuel wood measurements in accordance with the SOP

Annex II -Tobacco wood fuel consumption questionnaire

Province:

District:

Date:

SOCIO DEMOGRAPHIC DATA

Gender: a) Male b) Female

Age: Below 20 () 20 -30 () 30-40 () Above 40 ()

Education Level: a) None b) Primary c) Secondary d) Tertiary e) University

Marital Status: a) Married b) Single c) Divorced d) Separated e) Widowed

Number of people in the household.....

SECTION B: NATURE OF THE TOBACCO BUSINESS

1. Are you operating as individual or a cooperative/company?
2. If it is a cooperative or company, what is the name of your cooperative?
3. What was your motivation for starting this business?
.....
4. What were the necessary steps to start this business?
.....
5. How long have you been in the tobacco business?

6. Are you a) part time or b) full time?
7. If part time, what else do you do?
.....
8. How many family members/cooperative members/employees work with you in this business?.....
9. What are their ages?.....
10. What are their genders?.....
11. What are their roles?.....
12. Do you make enough to sustain your family/cooperative/company? a) Yes b) No
13. If not, how else do you sustain your business?
14. How many people in your family do you feed with your business?.....

SECTION C: SKILLS IN TOBACCO PRODUCTION

15. Did you receive any training at any point in time since you started?
 - a) Before Commencement of business a) Yes b) No
 - b) During the business a) Yes b) No
16. What kind of training did you receive?.....

17. What kind of production methods do you use for tobacco cultivation,
 - a) Rain-fed b) irrigated c) both
18. What kind of tools do you use for production?

19. What kind of tools/equipment do you use?
.....
20. What technical changes/improvements have taken place since you started? relating to

- a. Cultivation
- b. Harvesting
- c. drying

21. If there have been any changes, are you using any of the new technologies or skills? A) Yes b) No

22. Which ones?

23. If you are not using the new technologies, what are the reasons?

.....
.....

24. For how long have you been using them?

25. How effective have they been?

.....

26. Do you know of any other persons in the tobacco industry who is using them? A) Yes b) No

SECTION D: WOOD FUEL USE

27. How much tobacco do you produce per season or per year (in terms of weight)?

28. How many bales do you dry? a) Daily b) weekly c) fortnightly d) monthly?

29. What is the weight of the bale? (Weigh if possible)

30. How often do you dry the tobacco? a) Daily b) weekly c) Fortnightly d) monthly e) Other

Specify.....

31. What do you use to dry the tobacco? a) firewood b) charcoal c) sun

32. What equipment do you use for drying? a) sun b) solar c) traditional barns d) electrical

33. What other means of drying the tobacco do you use?

34. Do you buy or collect firewood /charcoal? a) Yes b) No

35. If yes, who supplies you with the firewood/charcoal?

36. If no, from where do you purchase or collect your firewood for drying?

37. How far is it?

38. Where do you dry the tobacco from? a) indoors b) outdoor

39. What is the process of cultivating and drying tobacco?

Process	Cost	Duration of activity

40. What type of bundles do you normally sell?

41. How many do you sell? Daily..... Weekly.....Monthly.....

Seasonally.....Yearly.....

42. How much do you sell per bundle?

43. How much revenue do you make?

44. What package of wood do you often use?

45. How much do you use? a) Daily..... b) Weekly..... c) Fortnightly..... d) monthly.....

Demonstrate how much wood can dry certain quantity of tobacco for the purpose of weighing

Weigh bundles of tobacco against the bundle

Weight of tobacco dried	Weight of tobacco dried	Weight of wood used	Weight of tobacco per bundle

46. How is the supply of wood/charcoal on the market? a) always available b) seasonal?
47. In cases of scarcity of wood/charcoal, what options/alternatives do you use? a)
48. How often do you use the alternative? a) Daily b) weekly c) Fortnightly d) monthly
49. Is it as reliable as wood/charcoal?
50. Is it as effective as wood/charcoal?
51. What do you do with the remaining firewood/charcoal?
52. How has the production quantity changed generally over the years?
53. What factors have contributed to these changes?
54. How have you coped with the changes?
55. How has it affected your business?
56. What specific changes have taken place?
57. Do the authorities or buyers control your production? a) Yes b) No
58. If yes, how do they control your production?.....
59. Other (specify).....
60. What do you do with the remaining firewood/charcoal?
61. Do you know of any other persons in the tobacco industry who is using them? A) Yes b) No
62. How has the production quantity changed generally over the years?
63. What factors have contributed to these changes?
64. How have you coped with the changes?
65. How has it affected your business?
66. What specific changes have taken place?
67. Do the authorities control your production? a) Yes b) No
68. How much do you make from this business?
- a) Per season
- b) Per Month
- c) Per year

SECTION E: INSTITUTIONAL ARRANGEMENT

69. Do you belong to any organization/association? a) Yes b) No
70. Which organization/association do you belong to?.....
71. What are the roles and responsibilities of the organization/association?.....
72. What type of services does the organization/association provide?.....
73. Do you play any role in the organization/ association? a) Yes b) No
74. What role do you play in the organization/association?.....
75. What are the two major opportunities for tobacco selling?
-
-

76. What are the two major problems for the vendors who trade in tobacco?.....
.....

Any comments.....

Annex II -Fish Drying wood fuel consumption questionnaire.

Province:

District:

Date:

SOCIO DEMOGRAPHIC DATA

Gender: a) Male b) Female

Education Level: a) Non b) Primary c) Secondary d) Tertiary e) University

Age: Below 20 () 20 -30 () 30-40 () Above 40 ()

Marital Status: a) Married b) Single c) Divorced d) Separated e) Widowed

Number of people in the household.....

SECTION B: NATURE OF THE TOBACCO BUSINESS

1. What was your motivation for starting this business?
.....
2. What were the necessary steps to start this business?
.....
3. How long have you been in the fish business?
4. Are you a) part time or b) full time?
5. If part time, what else do you do?
.....
6. How many family members work with you in this business?.....
7. What are their
ages?.....
8. What are their
genders?.....
9. What are their
roles?.....
10. Do you make enough to sustain your family? a) Yes b) No
11. How many people in your family do you feed with your business?.....
12. How many other people work with you in this
business?.....

SECTION C: WOOD FUEL USE:

13. Do you dry your fish? a) Yes b) No
14. How often do you dry the fish? a) Daily b) weekly c) Fortnightly d) monthly
15. How many times do you dry the fish in a month?
16. How many times do you dry the fish in a month?
17. What do you use to dry the fish? A) firewood b) charcoal c) sun d) salt
18. What type of firewood do you use?
19. What species of wood do you use?
20. Who supplies you with the firewood/charcoal?
21. Do you buy or collect the firewood /charcoal? a) Yes b) No
22. From where do you purchase or collect your wood for drying?
23. How far is it?
24. Where do you dry the fish from? a) indoors b) outdoor
25. What is the process of drying the fish?
26. What is the cost of each process from start to finish?

- a)
- b)
- c).....
- d).....
- e)
- f)

27. How long does it take to dry each collection a) days.....b) weeks.....

28. What type of package or bundle do you often use?

29. How often? a) Daily b) weekly c) Fortnightly d) monthly

30. How much does it cost per bundle?

31. How is the supply of wood/charcoal on the market? a) always available b) seasonal?

32. Do you always use wood for drying? a) yes b) No

33. In cases of scarcity of wood/charcoal, what options/alternatives do you have? a)

34. How often do you use the alternative? a) Daily b) weekly c) Fortnightly d) monthly

35. Is it as reliable as wood/charcoal?

36. Is it as effective as wood/charcoal?

37. How much firewood/ charcoal do you use to dry your fish at a given time for each of the following packages.

- a)
-
- b)
-
- c)
-
- d)
-
- e)
-

Weigh the amount of fish against the wood used and record?

38. Average weight of fishAverage weight of wood.....

39. What do you do with the remaining firewood/charcoal?

40. Did you receive any training at any point in time since you started?

c) Before Commencement of business a) Yes b) No

d) During the business a) Yes b) No

41. What kind of training did you receive?.....

42. What kind of tools/equipment do you use?

43. What technical changes/improvements have taken place since you started? relating to production

a. Tools:

b. Bundles

c. Trainings (specify):

d. Other:

44. If there have been any changes, are you using any of the new technologies or skills? A) Yes b) No

45. Which ones?

46. If you are not using the new technologies, what are the reasons?

47. For how long have you been using them?
48. How effective have they been?

49. Do you know of any other persons in the charcoal industry who is using them? A) Yes b) No
50. How has the production quantity changed generally over the years?
51. What factors have contributed to these changes?
52. How have you coped with the changes?
53. How has it affected your business?
54. What specific changes have taken place?
55. Do the authorities control your production? a) Yes b) No
56. If yes, how do they control your production?
- a. Arrest us
 - b. Make us pay penalty fees
 - c. Control tree cutting
 - d. Warning/ caution
57. Other (specify).....
58. How much do you make from this business?
- d) Per Bundle
 - e) Per Month
 - f) Per year

SECTION E: INSTITUTIONAL ARRANGEMENT

59. Do you belong to any organization/association? a) Yes b) No
60. Which organization/association do you belong to?.....
61. What are the roles and responsibilities of the organization/association?.....

62. What type of services does the organization/association provide?.....

63. Do you play any role in the organization/ association? a) Yes b) No
64. What role do you play in the organization/association?.....
65. What are the two major opportunities for fish selling?

66. What are the two major problems for the vendors who sell fish?.....
67. Any comments.....

Annex III -Mining wood fuel consumption questionnaire.

Province:

District:

Date:

SOCIO DEMOGRAPHIC DATA

Gender: a) Male b) Female

Education Level: a) Non b) Primary c) Secondary d) Tertiary e) University

Age: Below 20 () 20 -30 () 30-40 () Above 40 ()

Marital Status: a) Married b) Single c) Divorced d) Separated e) Widowed

Number of people in the household.....

SECTION B: NATURE OF THE MINING BUSINESS

1. What was your motivation for starting this business?
2. What were the necessary steps to start this business?
3. How long have you been in the Mining business?
4. Are you a) part time or b) full time?
5. If part time, what else do you do?
6. How many family members work with you in this business?
7. What are their ages?
8. What are their genders?
9. What are their roles?
10. Do you make enough to sustain your family? a) Yes b) No
11. How many people in your family do you feed with your business?
12. How many other people work with you in this business?

SECTION C: WOOD FUEL USE:

13. Do you use firewood or when mining? a) Yes b) No
14. How often do you Use Firewood or Charcoal? a) Daily b) weekly c) Fortnightly d) monthly
15. How many times do you mine in a month?
16. What do you use to mine? A) firewood b) charcoal c) Coal
17. What type of firewood do you use?
18. What species of wood do you use?
19. Who supplies you with the firewood/charcoal?
20. Do you buy or collect the firewood /charcoal? a) Yes b) No
21. From where do you purchase or collect your wood for mining?
22. How far is it?
23. Where do you mine from? a) underground b) open pit
24. What is the process of mining?
25. What is the cost of each process from start to finish?
 - a)
 - b)
 - c).....
 - d).....
 - e)
 - f)
26. How long does it take to mine a) days.....b) weeks
27. What type of wood packages or bundles do you often use?

28. How often? a) Daily b) weekly c) Fortnightly d) monthly
29. How much does it cost per bundle?
30. How is the supply of wood/charcoal on the market? a) always available b) seasonal?
31. Do you always use wood for mining? a) yes b) No
32. In cases of scarcity of wood/charcoal, what options/alternatives do you have? a)
33. How often do you use the alternative? a) Daily b) weekly c) Fortnightly d) monthly
34. Is it as reliable as wood/charcoal?
35. Is it as effective as wood/charcoal?
36. How much firewood/ charcoal do you use to mine at a given time for each of the following packages.
 - f)
 - g)
 - h)
 - i)
 - j)
- Weigh the amount of minerals against the wood used and record?
37. Average weight of fishAverage weight of wood.....
38. What do you do with the remaining firewood/charcoal?
39. Did you receive any training at any point in time since you started?
 - e) Before Commencement of business a) Yes b) No
 - f) During the business a) Yes b) No
40. What kind of training did you receive?.....
41. What kind of tools/equipment do you use?.....
42. What technical changes/improvements have taken place since you started? relating to production
 - a. Tools:
 - b. Bundles
 - c. Trainings (specify):
 - d. Other:
43. If there have been any changes, are you using any of the new technologies or skills? A) Yes b) No
44. Which ones?
45. If you are not using the new technologies, what are the reasons?
46. For how long have you been using them?
47. How effective have they been?
48. Do you know of any other persons in the firewood/charcoal industry who is using them? A) Yes b) No
49. How has the production quantity changed generally over the years?
50. What factors have contributed to these changes?
51. How have you coped with the changes?
52. How has it affected your business?
53. What specific changes have taken place?
54. Do the authorities control your production? a) Yes b) No
55. If yes, how do they control your production?
 - a. Arrest us
 - b. Make us pay penalty fees

- c. Control tree cutting
 - d. Warning/ caution
56. Other (specify).....

57. How much do you make from this firewood/charcoal business?
- g) Per Bundle
 - h) Per Month
 - i) Per year

SECTION E: INSTITUTIONAL ARRANGEMENT

58. Do you belong to any organization/association? a) Yes b) No
59. Which organization/association do you belong to?.....
60. What are the roles and responsibilities of the organization/association?.....
61. What type of services does the organization/association provide?.....
62. Do you play any role in the organization/ association? a) Yes b) No
63. What role do you play in the organization/association?.....
64. What are the two major opportunities for selling the minerals mined?
65. What are the two major problems for people selling minerals mined?
66. Any comments.....

Annex IV -Beer Brewing wood fuel consumption questionnaire.

Province:

District:

Date:

SOCIO DEMOGRAPHIC DATA

Gender: a) Male b) Female

Education Level: a) Non b) Primary c) Secondary d) Tertiary e) University

Age: Below 20 () 20 -30 () 30-40 () Above 40 ()

Marital Status: a) Married b) Single c) Divorced d) Separated e) Widowed

Number of people in the household.....

SECTION B: NATURE OF THE BEER BREWING BUSINESS

1. What was your motivation for starting this business?
2. What were the necessary steps to start this business?
3. How long have you been in the Beer Brewing business?
4. Are you a) part time or b) full time?
5. If part time, what else do you do?
6. How many family members work with you in this business?
7. What are their ages?
8. What are their genders?
9. What are their roles?
10. Do you make enough money to sustain your family? a) Yes b) No
11. How many people in your family do you feed with your brewing business?
12. How many other people work with you in this brewing business?

SECTION C: WOOD FUEL USE:

13. Do you brew beer? a) Yes b) No
14. How often do you brew beer? a) Daily b) weekly c) Fortnightly d) monthly
15. How many times do you brew beer in a month?
16. What do you use to brew beer? A) firewood b) charcoal c) coal d)
17. What type of firewood do you use?
18. What species of wood do you use?
19. Who supplies you with the firewood/charcoal?
20. Do you buy or collect the firewood /charcoal? a) Yes b) No
21. From where do you purchase or collect your wood for drying?
22. How far is it?
23. Where do you brew beer from? a) indoors b) outdoor
24. What is the process of brewing beer?
25. What is the cost of the brewing process from start to finish?
 - a)
 - b)
 - c).....
 - d).....
 - e)
 - f)
26. How long does it take to brew beer? a) days.....b) weeks...
27. What type of wood package or bundle do you often use?
28. How often? a) Daily b) weekly c) Fortnightly d) monthly
29. How much does it cost per bundle?
30. How is the supply of wood/charcoal on the market? a) always available b) seasonal?

31. Do you always use wood for beer brewing? a) yes b) No
32. In cases of scarcity of wood/charcoal, what options/alternatives do you have? a)
33. How often do you use the alternative? a) Daily b) weekly c) Fortnightly d) monthly
34. Is it as reliable as wood/charcoal?
35. Is it as effective as wood/charcoal?
36. How much firewood/ charcoal do you use to brew beer at a given time for each of the following packages.
 k)
 l)
 m)
 n)
 o)
 Weigh the amount of against the wood used and record?
37. Average number of litters of the beer
38. Average amount of wood fuel used for brewing
- 39.
40. What do you do with the remaining firewood/charcoal?
41. Did you receive any training at any point in time since you started?
 g) Before Commencement of business a) Yes b) No
 h) During the business a) Yes b) No
42. What kind of training did you receive?.....
43. What kind of tools/equipment do you use?

44. What technical changes/improvements have taken place since you started? relating to production
 a. Tools:
 b. Bundles
 c. Trainings (specify):
 d. Other:
45. If there have been any changes, are you using any of the new technologies or skills? A) Yes b) No
46. Which ones?
47. If you are not using the new technologies, what are the reasons?

48. For how long have you been using them?
49. How effective have they been?

50. Do you know of any other persons in the charcoal industry who is using them? A) Yes b) No
51. How has the production quantity changed generally over the years?
52. What factors have contributed to these changes?
53. How have you coped with the changes?
54. How has it affected your business?
55. What specific changes have taken place?
56. Do the authorities control your production? a) Yes b) No
57. If yes, how do they control your production?
 a. Arrest us

- b. Make us pay penalty fees
- c. Control tree cutting
- d. Warning/ caution

58. Other (specify).....

59. How much do you make from this business?

- j) Per Bundle
- k) Per Month
- l) Per year

SECTION E: INSTITUTIONAL ARRANGEMENT

60. Do you belong to any organization/association? a) Yes b) No

61. Which organization/association do you belong to?.....

62. What are the roles and responsibilities of the organization/association?.....

63. What type of services does the organization/association provide?.....

64. Do you play any role in the organization/ association? a) Yes b) No

65. What role do you play in the organization/association?.....

66. What are the two major opportunities for beer selling?

.....

67. What are the two major problems for the selling beer?.....

68. Any comments.....

Annex V -Bakery wood fuel consumption questionnaire.

Province:

District:

Date:

SOCIO DEMOGRAPHIC DATA

Gender: a) Male b) Female

Education Level: a) Non b) Primary c) Secondary d) Tertiary e) University

Age: Below 20 () 20 -30 () 30-40 () Above 40 ()

Marital Status: a) Married b) Single c) Divorced d) Separated e) Widowed

Number of people in the household.....

SECTION B: NATURE OF THE BAKERY BUSINESS

1. What was your motivation for starting this business?
.....
2. What were the necessary steps to start this business?
.....
3. How long have you been in the fish business?
4. Are you a) part time or b) full time?
5. If part time, what else do you do?
.....
6. How many family members work with you in this business?.....
7. What are their
ages?.....
8. What are their
genders?.....
9. What are their
roles?.....
10. Do you make enough money to sustain your family? a) Yes b) No
11. How many people in your family do you feed with your business?.....
12. How many other people work with you in this
business?.....

SECTION C: WOOD FUEL USE:

13. Do you Bake? a) Yes b) No
14. How often do you Bake? a) Daily b) weekly c) Fortnightly d) monthly
15. How many times do you Bake in a month?
16. What do you use to Bake? A) firewood b) charcoal c) Coal
17. What type of firewood do you use?
18. What species of wood do you use?
19. Who supplies you with the firewood/charcoal?
20. Do you buy or collect the firewood /charcoal? a) Yes b) No
21. From where do you purchase or collect your wood for Baking?
22. How far is it?
23. Where do you Bake from? a) indoors b) outdoor
24. What is the process of Baking?
25. What is the cost of each process from start to finish?
 - a)
 - b)
 - c).....

- d).....
 - e)
 - f)
26. How long does it take to Bake a) days.....b) weeks.....
 27. What type of wood fuel package or bundle do you often use?
 28. How often? a) Daily b) weekly c) Fortnightly d) monthly
 29. How much does it cost per bundle?
 30. How is the supply of wood/charcoal on the market? a) always available b) seasonal?
 31. Do you always use wood for baking? a) yes b) No
 32. In cases of scarcity of wood/charcoal, what options/alternatives do you have? a)
 33. How often do you use the alternative? a) Daily b) weekly c) Fortnightly d) monthly
 34. Is it as reliable as wood/charcoal?
 35. Is it as effective as wood/charcoal?
 36. How much firewood/ charcoal do you use to bake at a given time for each of the following packages.
 - a)
 - b)
 - c)
 - d)
 - e)
 - Weigh the amount of bakery products against the wood used and record?
 37. Average weight of bakery productsAverage weight of wood.....
 38. What do you do with the remaining firewood/charcoal?
 39. Did you receive any training at any point in time since you started?
 - i) Before Commencement of business a) Yes b) No
 - j) During the business a) Yes b) No
 40. What kind of training did you receive?.....
 41. What kind of tools/equipment do you use?

.....
 42. What technical changes/improvements have taken place since you started? relating to production
 - a. Tools:
 - b. Bundles
 - c. Trainings (specify):
 - d. Other:
 43. If there have been any changes, are you using any of the new technologies or skills? A) Yes b) No
 44. Which ones?
 45. If you are not using the new technologies, what are the reasons?

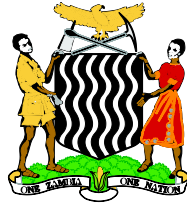
.....
 46. For how long have you been using them?
 47. How effective have they been?

.....
 48. Do you know of any other persons in the baking industry who is using them? A) Yes b) No
 49. How has the production quantity changed generally over the years?
 50. What factors have contributed to these changes?

- 51. How have you coped with the changes?
- 52. How has it affected your business?
- 53. What specific changes have taken place?
- 54. Do the authorities control your production? a) Yes b) No
- 55. If yes, how do they control your production?
 - a. Arrest us
 - b. Make us pay penalty fees
 - c. Control tree cutting
 - d. Warning/ caution
- 56. Other (specify).....
- 57. How much do you make from this business?
 - m) Per Bundle
 - n) Per Month
 - o) Per year

SECTION E: INSTITUTIONAL ARRANGEMENT

- 58. Do you belong to any organization/association? a) Yes b) No
- 59. Which organization/association do you belong to?.....
- 60. What are the roles and responsibilities of the organization/association?.....
- 61. What type of services does the organization/association provide?.....
- 62. Do you play any role in the organization/ association? a) Yes b) No
- 63. What role do you play in the organization/association?.....
- 64. What are the two major opportunities for baking?.....
- 65. What are the two major problems for the vendors who sell fish?.....
- 66. Any comments.....



Ministry of Green Economy and Environment

Zambia Integrated Forest Landscape Project

Improving lives through Sustainable Management of Natural Resources

The Zambia Integrated Forest Landscape Project is a Government initiative which provides support to rural communities in the Eastern Province to allow them to better manage the resources of their landscapes so as to reduce deforestation and unsustainable agricultural expansion; enhance benefits they receive from forestry, agriculture, and wildlife; and reduce their vulnerability to climate change.

Simultaneously the project is creating the enabling environment for emission reduction purchases to be done through the subsequent phase - the Zambia Eastern Province Jurisdictional Sustainable Landscape Programme (EP-JSLP).

The ZIFL- Project is a product of cooperation between the Government of Zambia, the World Bank & partners.

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