

Gold standard for the global goals
Monitoring report



June 2017, version 1

Title of the project	Fuel Efficient Stoves for North Darfur Women
Gold Standard project id	GS2896
Version number of the monitoring report	Version 3.0
Completion date of the monitoring report	26/06/2019
Date of project design certification	11/04/2017
Start date of crediting period	11/14/2015
Duration of this monitoring period	(01/11/2017) to (30/04/2019)
Duration of previous monitoring period	(11/04/2015) to (31/10/2017)
Project representative(s)	Haggar Co. Ltd
Host Country	The Republic of Sudan
Certification pathway (activity certification/impact certification)	Impact Certification
SDG Contributions targeted (as per approved PDD)	1 – SDG 1: Poverty 2 – SDG 5: Gender 3 – SDG 13: Climate
Gold Standard statement/product certification sought (GSVER/ADALYs/RECs etc.)	Product Certification: GSVER
Selected methodology(ies)	Gold Standard VER Methodology "The Gold Standard simplified methodology for efficient cook stoves" – February 2013
Estimated amount of annual average certified SDG impact (as per approved PDD)	SDG 13: 8,837 tCO ₂ e
Total amount of certified SDG impact (as per approved methodology) achieved in this monitoring period	SDG 13: 14,955 tCO ₂ e

SECTION A. Description of project

A.1. Purpose and general description of project

The main objective of the Fuel-Efficient Stoves for North Darfur Women project is to reduce net anthropogenic greenhouse gas emissions (GHG) by decreasing the use of non-renewable biomass as a cooking fuel by households in North Darfur State (El Fashir and El Kuma localities) of Sudan.

The project is a joint partnership between the Women's Development Association Network (WDAN) and Hagggar to distribute fuel-efficient cookstoves. Improved cookstoves are subsidised by Hagggar, who are providing the capital, procurement and distribution of the stoves to the project sites. WDAN's role consists of the implementation, distribution planning and the monitoring of the project's activity in the targeted areas.

This is achieved by providing improved cookstoves with increased heat transfer efficiency to displace less efficient traditional cookstoves used in the business-as-usual scenario. A total of 4,974 stoves, with potential of increasing in future within the GS Simplified methodology's threshold, have been delivered to beneficiary households since the project started in April 2014. The project is displacing non-renewable biomass, resulting in anticipated greenhouse gas emission reductions of around 41,674 tCO₂e¹ over the 7 years (first) crediting period.

The project is located in El Fasher and El Kuma localities in the southern portion of Shamal (Northern) Darfur province. The Project Implementer, Women's Development Association Network (WDAN) located in El Fasher represents over 50,000 women in Sudan and has issued the country's first carbon credits. The villages with participating households are listed in Table 1.

Table 1: User Locations

Locality	Village
El Kuma	Al Kuma
	Hazar Sari
El Fasher	Lawabed
	Al Fasher
	Shagra C
	Shagra A
	Golo C
	Azagarfa
	Mafdoob A
	Sarfaia

During the last four decades, Greater Darfur was severely hit by repetitive droughts and famines. These environmental incidents have caused massive population movements from the north to the south, within the State, and to other parts of the country, mainly central Sudan. At each drought recurrence, the population almost loses all its wealth, mainly animals, and undergoes very difficult and degraded livelihood situations. The successive droughts and desertification have created unstable living conditions in the region. Further, about one half of the total population of Darfur, or 3.45 million people, have been directly affected by the conflict that started in 2003, through violence, displacement and degraded livelihoods.

Both environmental incidents and conflict have resulted in the creation of many Internally Displaced People (IDP) camps mainly located around the major capital cities and towns, namely: El Fashir, El Geneina, Nyala, Kaas, Kutum, Kabkabiya, and Mornay. High demand for firewood can lead to environmental degradation in areas that host Internally Displaced People (IDPs), as supplies of dead

¹ See PDD

wood are progressively exhausted and live trees cut in an uncontrolled manner. Cutting trees for fuel often tends to be the most prominent of the environmental impacts associated with IDPs/refugee camps and settlements. In areas already suffering from firewood scarcity the IDPs have to spend significant amounts of time, money, and labour securing sufficient fuel to meet their cooking energy needs. In some instances, they may be exposed to physical risk in the process. Use of energy by IDPs is therefore an important issue to consider from several perspectives, not only environmental, but also social, economic and protection-related.

The project proponents commissioned a baseline survey (BS)² (June 2014) carried out over 197 households and all the villages. The survey was carried out by WDAN and technical support was provided by Practical Action. WDAN and Practical Action had previously implemented a carbon finance project and had experience in the collection of baseline data.

The BS provided critical information on target population characteristics, baseline technology use, fuel consumption, leakage, and sustainable development indicators. During the baseline data collection, most of the household interviewed, have reported to use three stone traditional fires commonly known as “Ladaya” (97%) followed by traditional mud stove (3%). The fuel type used is wood by all the interviewed households. The BS also found that 85% of households interviewed cooked indoor, with only 14% cooking both indoor and outdoor. Kitchens in the Darfur area were found to have little to no ventilation. The smoke produced is inhaled by the cook, and common practice of mother’s tying their children to their backs while cooking puts the children at risk of smoke and lung related diseases. Around 63% of interviewed households gather firewood for household cooking. In some cases, respondents have reported to travel up to 15 km to gather firewood. In Darfur, where natural resources are particularly bleak, the time spent, and distance travelled by the household for firewood gathering is increasing. Due to the ongoing increase of firewood prices, purchasing fuel wood negatively impacts household economics. Most Interviewed households (92%) reported agriculture/farming as their primary source of income at household level and the remaining 8% reported other source of income including daily wage labour, government and self-employment. Sorghum and millet are the two main crops production in the project area, a rain-fed agricultural zone.

The “Wood fuel Integrated Supply/Demand Overview Mapping” (WISDOM)³ is a spatial-explicit method for highlighting and determining priority areas of intervention and supporting wood energy / bioenergy planning and policy formulation. The role of wood fuels in the energy mix of the Sudan has changed considerably since 1994. Overall, the total consumption in 2011, was estimated at 16.9 million m³. The study provided a comprehensive diagnostic of the difficult wood energy situation of Sudan, revealing a negative supply/demand balance even under the most optimistic scenario. The results show also that 7.6% of the rural population of the country (i.e. some 1.6 million people) live simultaneous conditions of extreme poverty and high-to-critical wood fuel deficit. Another 13.3 % (2.8 million) live in marked poverty conditions and medium-to-high wood fuel deficit. The study clearly indicates that North Darfur is one of the stressed State in Sudan in terms of dependency on woody biomass compared to 1994 trend analysis and comparison between 1994 and 2011.

Due to this rapid depletion of forest resources, the cost for fire fuel is increasing and distance to travel for firewood collection is increasing continuously. This affects the local cooking habits and affects the household economics. This project enables households to reduce their cooking fuel expenditure and better cook through the fuel-efficient stoves. Income saved may be invested for productive assets.

The project delivers a number of important social benefits, in addition to the reduction of net anthropogenic greenhouse gas emissions (by decreasing the use of non-renewable biomass as a cooking fuel). Due to the reduction of biomass fuel use, level of stress amongst women due to volatile fuel availability, pricing and environmental degradation is expected to reduce. Fuel efficiency is

² Checked and approved during validation

³ Link: <http://www.wisdomprojects.net/global/csdetail.asp?id=27>

estimated to be 27.8% with the fuel-efficient stoves, meaning families will significantly reduce expenditure on fuel costs. The reduction in the use of fuels also perceived to reduce air pollution in households and thus provides users with healthier kitchens. Furthermore, women's exposure to harassment and physical assault is reduced during firewood collection as women do not have to venture into disputed or dangerous territory. Firewood fetching time is freed up for care-giving, while income at households' level is freed up for other uses such as food, clothes, medicines and livelihoods.

In summary, the improved fuel and appliance combination is expected to reduce overall household energy expenditures for low-income households and reduce pressure on dwindling forest resources in the Darfur region of Sudan. Finally, the project strengthens the managerial capacity of the community-based Women's Development Associations and creates local employment during the project implementation period as well increasing the community's capacity by obtaining additional revenue from the sale of carbon credits.

The main objectives of the project are to:

- Distribute thousands of fuel-efficient cookstoves in North Darfur;
- Improve the livelihoods of low-income families and reduce fuel consumption by facilitating a switch from the use of traditional cookstoves to fuel-efficient cookstoves increasing heat transfer efficiency;
- Support the following Sustainable Development Goals:
 - 1. Reducing poverty, through cash saving;
 - 5. Achieving gender equality, by building women's managerial capacity;
 - 13. Climate action, by reducing greenhouse gas emissions associated with burning non-renewable biomass in a resource-deprived region.

This grant managed and administered by WDAN has allowed the employment of several local people to carry out the project steadily and established a micro-financing facility managed by WDAN. Micro-finance is a key element for the households to be able to purchase the appliances. The stoves are distributed to users at a subsidised rate of 50% of net stove cost. The 50% of the stove costs, as well as the management and logistic costs were covered by Haggar, with the expectation it would later be recouped by the sale of carbon credits. As per the MoU mentioned above, half of the proceed of the sale of carbon offsets will go to the WDAN and the other half to Haggar.

The expectation of issuance of Gold Standard verified emission reduction allows the employment of a full-time employee and several seasonal people to manage the project, distribute the stoves, lead trainings, collect instalments from the micro-loans and monitor the sales and use of stoves. It also enables the offering of facilities to households to purchase the Fuel-Efficient Stoves repaid over a 6-month period. The ownership of the emission reduction is transferred to Haggar & WDAN, through discharges signed by the beneficiary households on common document for each CBO.

Also, trained staffs and civil defence are required to educate end-users in the effective operation and maintenance of the technology. The improved stove is an easy to assemble wood fuel stove consisting of a replaceable fire chamber and outer pot support structure. The stove facilitates a 27.8% thermal efficiency.

Implementing partner WDAN, have been established with facilitation of Practical Action and represent 100+ community-based organisations with around 50,000 direct households in North Darfur which contributed positively in the definition of the organisation.

A.2. Location of project

The project is located in El Fasher and El Kuma localities in the southern portion of Shamal (Northern) Darfur province, approximately 800 km west-southwest of Khartoum and 550 km west-northwest of An Nahud. The geographical coordinates are 13.6 degrees north by 25.3 degrees east,

and the altitude is approximately 730 metres above mean sea level. Figure A4.1 gives the location of the project.

A.3. Reference of applied methodology

The project activity uses the following approved baseline Gold Standard VER Methodology "The Gold Standard simplified methodology for efficient cook stoves" released in February 2013.

A.4. Crediting period of project

The project applies a renewable crediting period of 7 years starting on 11th April 2015. This date corresponds to the beginning of the 2-year retro-active period after the Gold Standard registration date: 11th April 2017.

SECTION B. Implementation of project

B.1. Description of implemented project

In May 2013, Hagggar and WDAN entered into an official partnership through the signing of the Memorandum of Understanding (MoU). In December 2013, the Local Stakeholder's Consultation was held. A few months later in April 2013, the final contract was signed, confirming Hagggar's funding of the stoves and their distribution as well as each party's roles. In April 2014, the distribution of the stoves began, and 4,974 stoves were distributed to households. No additional stoves have been distributed since December 2014.

Due to various difficulties, the project took time to be certified. The PD finally hired an external consultant in September 2016. In January 2017, the project obtained internal validation and in April 2017 it was registered by the Gold Standard. In October 2018, the first batch of VERs was issued, corresponding to the first monitoring period. At the time of the present report a very marginal amount of VERs have been sold.

Therefore, due to no revenues being available in the course of the second and present monitoring period, no additional stoves were distributed and only monitoring activities have been carried out.

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

The project's previous main monitoring survey (usage survey) was undertaken in October 2017 and since this survey should be carried out annually, the next survey should have been carried out in October 2018. However, due to internal organisational issues at the PD as well as safety issues in Sudan related to national-wide strikes and in Darfur, the usage survey was only carried out in February 2019 or 4 month later than anticipated.

The usage survey is thought to be better corresponding to the timing of the second monitoring period as it is happening at its closing, but it is also considered to be more conservative as the stoves for which the surveys were carried out were 4 months older.

This deviation is considered as a temporary deviation and does not require the Gold Standard deviation approval.

The next set of usage survey is planned to occur in February 2020 at the latest, or less than 12 months after the previous survey.

B.2.2. Corrections

Not correction to project information or parameters fixed at validation have been applied.

B.2.3. Changes to start date of crediting period

There has been no changes to the start date of the crediting period, that is relevant for this monitoring period.

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

During the project registration, the PD has stated it would use a value of 1.129 t/households per year for $B_{b,y}$ (Firewood consumption for cooking in baseline) for baseline fuel consumption.

However, since the microscale methodology used allows PDs to determine this value in various ways, the PD has decided to use a different option to determine the quantity of firewood consumed in the baseline. The minimum level of service (see section 4.2 option c) of 0.5 tonnes per capita per year has been used in assessing the various project impacts.

B.2.5. Changes to project design of approved project

There are no changes to the design of the project relevant for this monitoring period.

SECTION C. Description of monitoring system applied by the project

C.1. Monitoring tasks undertaken

The following tasks have been undertaken at different frequencies as stated in Table 3.

Maintenance of the Sales Record

Information on the households was provided by the WDAN to Haggar after stove distribution.

Beneficiaries are considered as households who have received an EzyStoves through the project. Each beneficiary (a representative member of the households) signed an agreement with WDAN for the acquisition of an EzyStove and instalment repayments.

In the form of an Excel datasheet, the main goal of the Sale Records (aka list of beneficiaries) is to keep track of the equipment sold and assess the use of equipment and the benefits associated with them.

The ‘list of beneficiaries’ or Sales Records contain the information listed in table below:

Table 2. Items included in the list of beneficiaries

Items
Contract ID (contract signed between CBO and end-beneficiary)
Name of beneficiary (in English)
Name of beneficiary (in Arabic)
Gender
Model/type of stove purchased
Community Based Organisation (the beneficiary is affiliated to)
Batch number (stoves are purchased batch by batch)
Location (locality)
Address of beneficiary (for El Fashir) or address of CBO
Date of Distribution/Date of contract: date on which the stove was given to the beneficiary
Mode of use: for “household use” or for “commercial use”
Contact point of beneficiary or head of CBO’s phone number (when available)

As requested during the validation:

- the related carbon rights waivers were signed by all beneficiaries in each locality and shared and approved by the Gold Standard during the first verification; and
- the PD provided the Gold Standard with the updated Sales Records which were approved by the Gold Standard during the first verification.

Usage Survey (US)

The main goal of the US is to capture the use and benefits associated with the purchase of fuel-efficient stoves by the households and assesses the number of stoves that are still under use over the time.

Households were randomly selected from the Sales Records. Electronic questionnaires were designed on Kobo Humanitarian⁴ and submitted by the relevant enumerators who collected the data through smartphones. 100% of the surveys were carried out face-to-face by members of local CBOs at the households’ place.

⁴ Kobo website: <https://kobo.humanitarianresponse.info>

The methodology specifies that “Monitoring shall consist of checking of a representative sample, once every year (annually) to ensure that project cookstoves are still operating by carrying out the usage survey as per the guidelines below: A usage survey must be conducted to estimate the drop off rates as project cookstove may not be adopted or may be disposed of and potentially replaced by a baseline stove again. Prior to the verification, a usage survey for each cookstove age-group is required. For example, if only cookstoves in the first year of use (age₀₋₁) are being credited, a usage parameter must be established for age- group 0-1, through a usage survey for cookstove age 0-1. If cookstoves of age 0-1 and age1-2 are being credited (as part of first request for issuance), usage parameter must be established for age-group 0-1 and 1-2, respectively through usage survey. If cookstoves of age-group 0-1 and age-group 1-2 are being credited (as part of second request for issuance), usage parameter must be established for age- group 1-2 only through usage survey as the usage rate for cookstoves of age group 0-1 can be applied from the previous issuance.”

Usage Surveys training was provided prior to the surveys in January 2019⁵. The table below presents the list of usage surveys undertaken during the monitoring period.

Table 3. List of Usage Survey(s) carried out

Monitoring Tasks	Date	Target Population	Sample size	Raw data file name
Usage Surveys	February 2019	4,974	197	US Report Feb.2019.pdf

The US have found that beneficiary households are rather large (7.57 people) and beneficiaries cook mainly indoor, with firewood and with their Ezystoves. It is rather common in the project area for households to keep cooking with their traditional stoves, notably for cooking some of the traditional dishes than cannot be cooked with a modern and efficient stove. The survey of 197 beneficiary households have revealed that 36.1% of the meals were cooked with the baseline stove. It was also found that as much as 80% of beneficiary households have kept their stove in a good condition, 18.5% have a distorted or deformed working stove and 1.5% (3 out of 197) have damaged their stove significantly. The usage rate has been accounted to be 98.5% (80% + 18.5%).

During the previous Internal Verification, the following Forward Action Request (FAR) was raised: “PP shall include the distorted stoves as well for the calculation of efficiency” in the emission reduction calculation. The rational for this request was to ensure a better understanding of whether distorted and deformed stoves were considered as having or not a lower efficiency. In order to do so, the PD has amended the questionnaire of US from the 1st MP in order to have a better understand from households whether they perceived a change in the stove efficiency. As per the Annex I of the US report, question 13a. has been added and asks project beneficiaries “if your cookstove is slight deformed, distorted, damaged and/or with cracks; is your stove: (a) still working like new; (b) consumes more wood than when new; or (c) is no longer working”. Answers to this question were then integrated into the usage rate as demonstrated in the US raw data and report provided. Stoves from beneficiaries answering (b) and (c) were considered as no longer working.

Table 4 below shows the monitored parameters as defined in the Transition Annex.

⁵ Kobo training workshop Report v1.1.1.pdf

Table 4. Monitored Parameters

ID number	Data variable	Source of data	Data unit	Measured (m), calculated (c) or estimated (e)	Planned Recording frequency	Actual Recording frequency	Proportion of data to be monitored	How will the data be archived?	Relevant SDG indicator
#1. Usage rate in project scenario p during year y	Up,y	Usage Surveys	Fraction	e	Annually	After 16 months	Sample	Electronic	SDG 13, SDG 1
#2. Number of Project Cookstoves Installed	Np,y	Sales Records (List of Beneficiaries)	Number	m	Continuous	Continuous	100%	Electronic and paper	SDG 13, SDG 1
#3. Discount factor to account for efficiency loss of project cookstove	DF_{η}	Default value: 0.99 i.e., 1% efficiency loss per year	Fraction	e	Annually	Annually	Sample	Electronic	SDG 13
#4. Discount factor to account for the baseline stove use in Project Scenario during year y	$DF_{b,stove,y}$	Usage Survey	Fraction	e	Annually	After 16 months	Sample	Electronic	SDG 13
#5. Cumulated saving from an average household using the project cookstoves in year y	$S_{p,y}$	Usage Survey	SDG / year	e	Annually	After 16 months	Sample	Electronic	SDG 1
#6. Estimated time saved fetching or purchasing cooking fuel	T_y	Usage Survey	Hours / year	e	Annually	After 16 months	Sample	Electronic	SDG 5
#7. Estimated time saved fetching or purchasing cooking fuel	CT_y	Usage Survey	Hours / year	e	Annually	After 16 months	Sample	Electronic	SDG 5
#8. Number of females working on the project management in year y	$N_{w,y}$	Usage Survey	FTE	e	Annually	After 16 months	Sample	Electronic	SDG 5

Section D.2 gives the detail of each of these parameters and their value.

C.3. Third party inputs to Quality Assurance

Data processing and archiving

The data was collected through smartphone via an online platform (KoboToolBox). The relevant information required in the monitoring and computation of emission reduction contained in these forms is then automatically available in English and in Arabic. Then, Haggar and its consultant analysed this data and drafted a Usage Survey report and the Monitoring Report. All the data was readily available online to Haggar after the data collection was completed by WDAN. It can also be made available to the Gold Standard or to auditors upon request.

Specific attention was paid on:

Sale Records

- to ensure all information was accurate and in line with reality;
- the sales records are consolidated and controlled by the WDAN Project Manager (Suha Omer Mohammed) in El Fashir;
- contracts for stoves between CBOs and households are allocated a beneficiary ID number and scanned for a more accurate identification of households in time;
- Scanned contracts (when possible) and sales records database are sent to Haggar office in Khartoum where spot checks are done on a regular basis (Semi-annually) by the Corporate Sustainability & Social Impact Manager. He/she ensures dates, ID numbers all other information are consistent.

Usage Survey

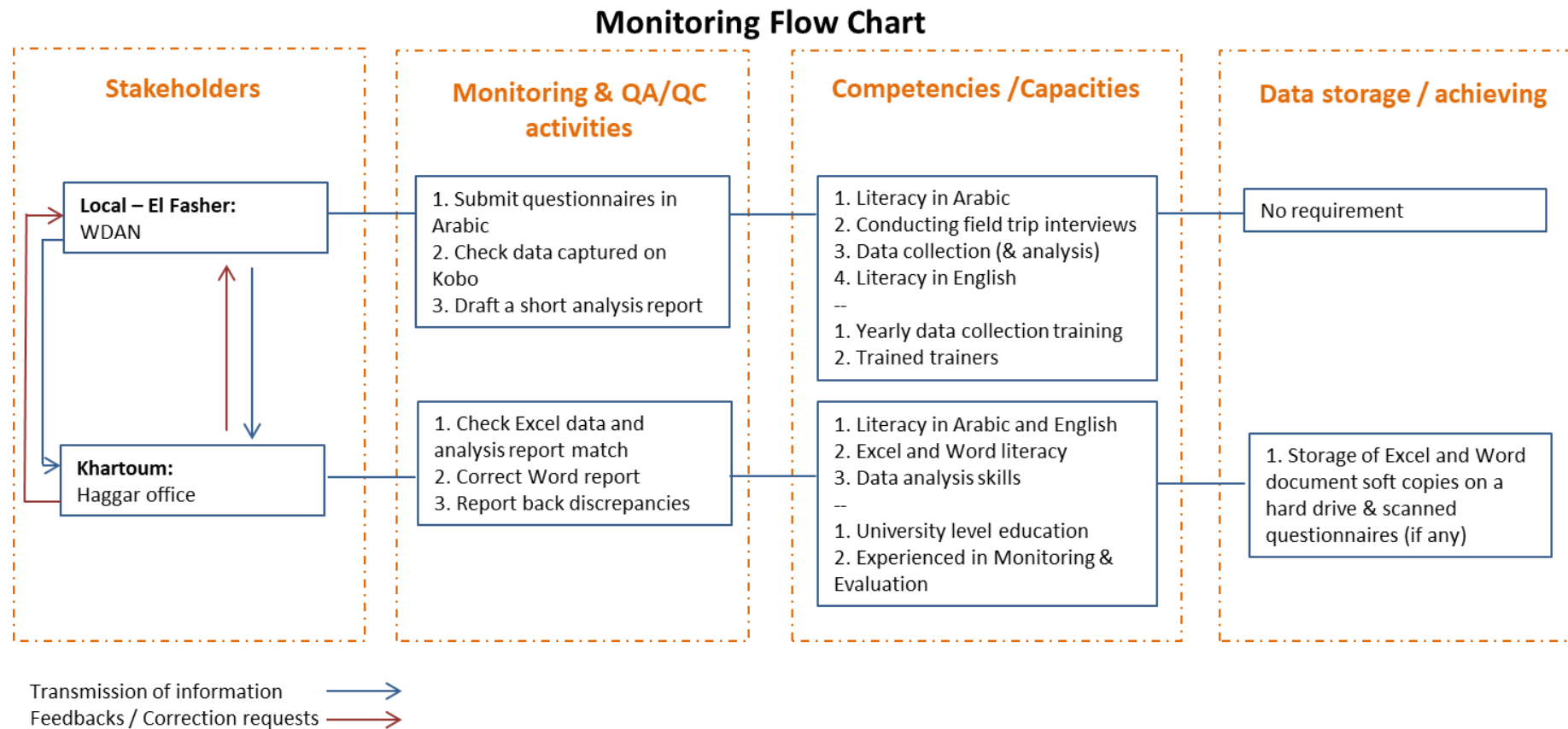
For at least 10% of households interviewed, the Project Manager ensures:

- spot checks are carried out on the data collected;
- data was correctly uploaded onto KoboToolBox;
- the data is consistent:
 - check names of beneficiaries
 - ensure the beneficiaries have been randomly selected
- Haggar:
 - corrects spelling mistake(s) in the Word analysis report;
 - cross-checks names of beneficiaries;
 - ensures the beneficiaries have been randomly selected;
 - feedbacks to the project manager in order to address the potential issues.

Data quality check process

The following flow chart (Figure 1) provides an overview of the key quality check process made by Haggar in Khartoum.

Figure 1. Monitoring Flow Chart



Trainings

The implementing partner (WDAN) has been trained by Practical Action and Haggat staff members to be able to submit the questionnaires to the households and assess the appropriateness of the information supplied. The training received during the Monitoring Period is as follows:

January 2019 (30th to 31st January):

- 5/5 of the enumerators attended an informal workshop / training provided by Haggat emphasising on questionnaire, anticipated and expected answers, etc.

Table 5. List of participants to training(s)

Name	Organisation	Role
Amira Adam Salih	Practical Action	M&E Officer
Tayseer Ahmed Mohammed	WDAN	Project Officer
Sundus Omer Elfarooq	WDAN	Project Officer
Mihrab Mohammed Ali	WDAN	Project Officer
Arafa Mohammed Abdarrahman	WDAN	Project Officer

SECTION D. Data and parameters

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

Relevant SDG Indicator	SDG 13
Data/parameter	$EF_{b,fuel,CO_2}$
Unit	tCO ₂ /tonne of firewood
Description	CO ₂ emission factor arising from use of firewood in baseline scenario
Source of data	Section 4 of The Gold Standard Simplified Methodology for Efficient Cookstoves
Value(s) applied	1.747 tCO ₂ /ton of firewood
Choice of data or Measurement methods and procedures	Factor recommended by the methodology.
Purpose of data	Deriving the greenhouse gas emission released by non-renewable biomass saved.
Additional comment	-

Relevant SDG Indicator	SDG 13
Data/parameter	$EF_{b,fuel,non-CO_2}$
Unit	tCO ₂ /tonne of firewood
Description	Non-CO ₂ emission factor arising from use of firewood in baseline scenario
Source of data	Section 4 of The Gold Standard Simplified Methodology for Efficient Cookstoves
Value(s) applied	0.455 tCO ₂ /ton of firewood
Choice of data or Measurement methods and procedures	Factor recommended by the methodology.
Purpose of data	Deriving the greenhouse gas emission released by non-renewable biomass saved.
Additional comment	-

Relevant SDG Indicator	SDG 13
Data/parameter	η_b
Unit	Fraction
Description	Efficiency of the cookstove being used in the baseline scenario
Source of data	Default value
Value(s) applied	10%
Choice of data or Measurement methods and procedures	Default factor as suggested by the methodology.
Purpose of data	Feeding the calculation for quantity of firewood that is saved in year y.
Additional comment	-

Relevant SDG Indicator	SDG 13
Data/parameter	η_p
Unit	Fraction

Description	Efficiency of the cookstove being used in the project scenario
Source of data	Ezystove manufacturing and tests specifications
Value(s) applied	27.8%
Choice of data or Measurement methods and procedures	Manufacturer tests and specifications as the most reliable source of information.
Purpose of data	Feeding the calculation for quantity of firewood that is saved in year y.
Additional comment	-

Relevant SDG Indicator	SDG 13
Data/parameter	fNRB
Unit	Fraction
Description	Fraction of non-renewable biomass
Source of data	Default value as approved by the UNFCCC in December 2014: https://cdm.unfccc.int/DNA/fNRB/index.html
Value(s) applied	85%
Choice of data or Measurement methods and procedures	Default factor approved by the host country as the most reliable source of information.
Purpose of data	Considering only the non-renewable portion of biomass as subject to emission reductions.
Additional comment	-

Relevant SDG Indicator	SDG 13
Data/parameter	B _{b,y}
Unit	tonnes firewood per household per year
Description	Firewood consumption for cooking in baseline
Source of data	Derived from the minimum service level (MSL)
Value(s) applied	0.5 tonnes per capita per year (MSL method)
Choice of data or Measurement methods and procedures	For MSL, the household size is assessed during the usage survey carried out on a yearly basis.
Purpose of data	Feeding the calculation for quantity of firewood that is saved in year y.
Additional comment	-

Relevant SDG Indicator	SDG 13
Data/parameter	L _y
Unit	Fraction
Description	Leakage adjustment factor period y
Source of data	Default value
Value(s) applied	-
Choice of data or Measurement methods and procedures	According to GS Simplified methodology leakage related to NRB saved by project activity is not considered for micro-scale project activities.
Purpose of data	Taking into account potential additional emission being emitted as a side effect from the project.

Additional comment	-
---------------------------	---

D.2. Data and parameters monitored

Relevant SDG Indicator	SDG 13, SDG 1
Data/parameter:	$U_{p,y}$
Unit	Fraction
Description	Usage rate in project scenario p during year y
Measured/calculated/default	Calculated
Source of data	Usage Surveys
Value(s) of monitored parameter	98.5%
Monitoring equipment	N/A. Use of questionnaires
Measuring/reading/recording frequency:	Annual
Calculation method (if applicable):	(Number of stoves in intact + Number of stoves deformed or slightly distorted - Number of stoves deformed or slightly distorted consuming more energy now than before) / Total number of households interviewed.
QA/QC procedures:	Gathered data is cross-checked with sales record for user identification and stove installation date. During the usage surveys, qualitative checks on the physical condition of stoves are performed to cross-check with information provided by the user and potentially flag premature stove failure. All information gathered during the survey was analysed by staff of WDAN, Haggard and reviewed by an external consultant.
Purpose of data:	Calculating NRB saved and calculating SDG 1 impacts.
Additional comments:	-

Relevant SDG Indicator	SDG 13, SDG 1
Data/parameter:	$N_{p,y}$
Unit	Number
Description	Number of project cookstoves installed
Measured/calculated/default	Measured through contracts
Source of data	Sales records
Value(s) of monitored parameter	4,974
Monitoring equipment	Contracts signed and entered into the sales records
Measuring/reading/recording frequency:	Continuous
Calculation method (if applicable):	N/A
QA/QC procedures:	Checks that contracts contains all information required, once information is entered into the spreadsheet, checks that information match over a 10% sample.
Purpose of data:	Calculating NRB saved and calculating SDG 1 impacts
Additional comments:	All 4,974 stoves were installed within 6 months so have not been categorized under different age groups.

Relevant SDG Indicator	SDG 13
Data/parameter:	DF_{η}
Unit	Fraction
Description	Discount factor to account for efficiency loss of project cookstoves
Measured/calculated/default	Default
Source of data	Methodology recommendations
Value(s) of monitored parameter	Default value: 0.95-0.97 i.e., 1% efficiency loss per year

Monitoring equipment	N/A
Measuring/reading/recording frequency:	Annual
Calculation method (if applicable):	N/A
QA/QC procedures:	N/A
Purpose of data:	Calculating NRB saved.
Additional comments:	-

Relevant SDG Indicator	SDG 13
Data/parameter:	$DF_{b, stove, y}$
Unit	Fraction
Description	Discount factor to account for usage of baseline cookstove during the year y in project scenario
Measured/calculated/default	Calculated
Source of data	Usage Surveys
Value(s) of monitored parameter	36.1%
Monitoring equipment	N/A. Use of questionnaires
Measuring/reading/recording frequency:	Annual
Calculation method (if applicable):	Average number of daily meals cooked with the baseline stove / Average number of daily meals cooked
QA/QC procedures:	Gathered data is cross-checked with sales record for user identification and stove installation date. All information gathered during the survey was analysed by staff of WDAN, Hagggar and reviewed by an external consultant.
Purpose of data:	Calculating NRB saved.
Additional comments:	-

Relevant SDG Indicator	SDG 1
Data/parameter:	Sp, y
Unit	SDG / year
Description	Cumulated saving from an average household using the project cookstoves in year y
Measured/calculated/default	Calculated
Source of data	Usage Surveys
Value(s) of monitored parameter	10,171,134
Monitoring equipment	N/A. Use of questionnaires
Measuring/reading/recording frequency:	Annual
Calculation method (if applicable):	$Sp, y = Np \times Up, y \times Spi, y$ Where: Up, y = usage rate in project scenario p during year y Spi, y = yearly cumulated money saving made by an average representative household in year y
QA/QC procedures:	Gathered data is cross-checked with sales record for user identification and stove installation date. All information gathered during the survey was analysed by staff of WDAN, Hagggar and reviewed by an external consultant.
Purpose of data:	Calculating SDG 1 impacts
Additional comments:	-

Relevant SDG Indicator	SDG 5
-------------------------------	-------

Data/parameter:	ST _y
Unit	hours / year
Description	Estimated time saved cooking with project stove
Measured/calculated/default	Calculated
Source of data	Usage Surveys
Value(s) of monitored parameter	312
Monitoring equipment	N/A. Use of questionnaires
Measuring/reading/recording frequency:	Annual
Calculation method (if applicable):	Estimated weekly hours saved x 52 weeks
QA/QC procedures:	Gathered data is cross-checked with sales record for user identification and stove installation date. All information gathered during the survey was analysed by staff of WDAN, Haggard and reviewed by an external consultant.
Purpose of data:	Calculating SDG 5 impacts
Additional comments:	-

D.3. Implementation of sampling plan

The only monitoring task requiring sampling is the usage survey. This this survey, a sample of 197 HHs beneficiaries were randomly selected for the survey out of the total households that received a fuel-efficient stove in 2014 (age 2-3 in 2017; age 3-4 in 2018; age 4-5 in 2019). All the villages where stoves have been distributed have been surveyed.

Within the target surveys target areas, beneficiaries were randomly selected. The enumerators contacted the head of CBO to meet them in the targeted areas. From there, households interviewed were those, among the list of randomly pre-selected, available at the time the enumerators were in the target area.

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)

SDG 1 impacts will not be certified as ‘Certified Impact Statements’ and therefore no specific methodologies for estimation and monitoring will be applied.

The impacts will be assessed thorough the cumulated saving from all households using the project cookstoves in year y ($S_{p,y}$)

$$S_{p,y} = N_p \times U_{p,y} \times S_{pi,y}$$

Where:

N_p = number of households who have received or acquired a new improved stove.

$U_{p,y}$ = usage rate in project scenario p during year y

$S_{pi,y}$ = yearly cumulated money saving made by an average representative household in year y

$$N_p = 0$$

$$U_{p,2018} = 100\%$$

$$S_{pi,2017-19} = 0 \text{ SDG (Sudanese Pounds)} \times 12 \text{ months}$$

$S_{p,y}$ would amount to 0 SDG.

SDG 5 (Gender equality)

SDG 5 impacts will not be certified as ‘Certified Impact Statements’ and therefore no specific methodologies for estimation and monitoring will be applied.

The impacts will be assessed thorough the estimated yearly time saved cooking with the new stove (ST_y).

$$ST_y = 0 \text{ hours} \times 52 \text{ weeks}$$

As of the date of this report, the average amount of time saved on cooking and collecting/purchasing fuel per household would be 0 hours per year

SDG 13 (Climate Action)

The SDG 13 outcome will be quantified as CO₂ emission reductions and certified as ‘Certified SDG 13 Impact Statement’ allowing the generation of carbon credits (VERs).

For the calculations and estimation of emission reductions, the Gold Standard simplified methodology for efficient Cookstoves (version 2013) has been adopted. Calculation and estimation were carried out using the Gold Standard’s Emissions Reduction Calculation Tool for the Simplified Methodology for Efficient Cookstoves.

As per the methodology the below formula was applied to determine the emission reduction values.

$$ER_y = \sum_{t=0}^{x_{toy}} N_{p,y} * P_y * U_{p,y} * (f_{NRB,y} * EF_{b, fuel, CO_2} + EF_{b, fuel, non_CO_2}) * (1 - DF_{b, Stove, y})$$

Where:

$N_{p,y}$ = Number of project cookstoves of each age group operational in the year y

P_y = Quantity of firewood that is saved in the year y (tonnes per household in year y)

$U_{p,y}$ = Usage rate for project cookstoves in year y, based on adoption rate and drop off rate revealed by usage surveys (fraction)
 $f_{NRB,b,y}$ = Fraction of non-renewable biomass, used in year y for baseline scenario.
 $EF_{b,fuel,CO_2}$ = CO₂ emission factor of firewood that is substituted or reduced.
 $EF_{b,fuel,non_CO_2}$ = Non-CO₂ emission factor of firewood that is substituted or reduced.
 $DF_{b,Stove,y}$ = Usage of baseline cookstove during the year y (fraction) in project scenario
 x = $y - 1$
 y = Year of the crediting period

$N_{p,y}$ = 4,974
 P_y = 3.785
 $U_{p,y}$ = 98.5%
 $f_{NRB,b,y}$ = 85%.
 $EF_{b,fuel,CO_2}$ = 1.747 tCO₂/ton of wood.
 $EF_{b,fuel,non_CO_2}$ = 0.455 tCO₂/ton of wood.
 $DF_{b,Stove,y}$ = 36.1%
 x = 2017
 y = 2018

$ER_{2017} = 1,670 \text{ tCO}_2\text{e}$
 $ER_{2018} = 10,000 \text{ tCO}_2\text{e}$
 $ER_{2019} = 3,285 \text{ tCO}_2\text{e}$

Since the amount of emission reductions is larger than 10,000 tCO₂e per year, VERs requested have been capped to fit into the requirements of the micro-scale projects. The table below shows the approach taken (which can also be found in the ER worksheet).

Period	Emission reduction	Emission reduction (capped)	Emission reduction (pro-rata)
	tCO ₂ e/year	tCO ₂ e/year	tCO ₂ e
31/10/2017 - 31/12/2017	14,549	10,000	1,670
2018	14,453	10,000	10,000
01/01/2019 - 30/04/2019	14,354	10,000	3,285
Total (tCO₂e)	43,356	30,000	14,955
Average annual emission reduction (tCO₂e)	14,452	10,000	9,970

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

SDG 1 (No Poverty)

SDG 1 impacts will not be certified as ‘Certified Impact Statements’ and therefore no specific methodologies for estimation and monitoring will be applied.

The impacts will be assessed thorough the cumulated saving from all households using the project cookstoves in year y ($S_{p,y}$)

$$S_{p,y} = N_p \times U_{p,y} \times S_{pi,y}$$

Where:

N_p = number of households who have received or acquired a new improved stove.
 $U_{p,y}$ = usage rate in project scenario p during year y

$S_{pi,y}$ = yearly cumulated money saving made by an average representative household in year y

N_p = 4,974

$U_{p,2018}$ = 98.5%

$S_{pi,2017-19}$ = 173 SDG (Sudanese Pounds) x 12 months

$S_{p,y}$ would amount to around 10,171,134 SDG (~213,677 USD or 43 USD per household per year as of March 2019).

SDG 5 (Gender equality)

SDG 5 impacts will not be certified as ‘Certified Impact Statements’ and therefore no specific methodologies for estimation and monitoring will be applied.

The impacts will be assessed thorough the estimated yearly time saved cooking with the new stove (ST_y).

ST_y = 6 hours x 52 weeks

As of the date of this report, the average amount of time saved on cooking and collecting/purchasing fuel per household is 312 hours per year.

SDG 13 (Climate Action)

Emission from the project are considered to be 0 tCO₂e

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

SDG 1 (No Poverty)

The baseline indicators for SDG 1 were all equal to 0. Hence the net benefits are those shown in section E.2.

SDG 5 (Gender equality)

The baseline indicators for SDG 5 were all equal to 0. Hence the net benefits are those shown in section E.2.

SDG 13 (Climate Action)

The project indicators for SDG 13 were equal to 0. Hence the net benefits are those shown in section E.2.

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	$S_{p,y} = 0$ SDG	$S_{p,y} = 10,171,134$ SDG	$S_{p,y} = 10,171,134$ SDG
SDG 5	$ST_y = 0$ hour	$ST_y = 312$ hours	$ST_y = 312$ hours
SDG 13	14,955 tCO ₂ e	0 tCO ₂ e	14,955 tCO ₂ e

* Please note that the methodology and the GS ER worksheet used were not designed to calculate the baseline emissions and the project emissions separately but instead focus on wood saved and related emissions. Hence, the table above present the project emissions as 0 while it is in reality not equal to 0 and the baseline emissions as 14,955 tCO₂e while it should be higher. However, the Net Benefit is the accurate value.

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	N/A	$S_{p,y} = 10,171,134$ SDG
SDG 5	N/A	$ST_y = 312$ hours
SDG 13	8,837 tCO ₂ e	14,955 tCO ₂ e

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

Step 4.2 of emission reduction calculation of the GS Simplified Methodology for Efficient Cookstoves offers to determine the quantity of firewood consumed in the baseline scenario through 4 options: (a) use of historical data; (b) survey of local usage; (c) minimum service level; or (d) field performance test.

At the time the PDD was drafted, PD opted for using option (d) field performance test to determine the quantity of firewood consumed in baseline scenario. However, as reflected in the Transition Annex, during the 2nd Monitoring Period PD has chosen to use option (c) minimum service level, since the methodology does not prevent PD to change estimation methods through the crediting period, as long as it is aligned with the methodological requirements.

Option (d) of the methodology was giving an indicative amount of 1.129 tonnes of firewood per household per year while option (c) minimum level of service gives an indicative amount of 0.5 tonne per capita per year.

Beside this difference:

- The usage rate has been found to be slightly higher (98.5% vs 95%) than anticipated ex-ante;
- The baseline cookstove usage has been found much higher ex-post than ex-ante (36% vs 5%); and
- Leakage was wrongly estimated ex-ante (in the PDD) and has been rectified ex-post (5% vs 0%).

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

While there has been a clear mechanism, as stated in the PDD, the project participants have not received any comments or specific feedbacks from any stakeholders during the monitoring period.

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

Not applicable. See F.1.

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

Not applicable. See F.1.