Safe Access to Fuel and Energy (SAFE) Standard Operating Procedures for Fuel Efficient Stoves and Briquettes kits Intervention in the BAY States

Food and Agriculture Organization of the United Nations

NIGERIA FOOD SECURITY SECTOR

Acronyms

- BAY: Borno, Adamawa, and Yobe states
- CCCM: Camp Coordination and Camp Management
- FAO: Food and Agriculture Organization
- FES: FUEL Efficient Stoves
- FSS: Food Security Sector
- GBV: Gender-Based Violence
- IDP: Internally Displaced People
- LGA: Local Government Area
- PDM: Post-Distribution Monitoring
- SAFE: Safe Access to fuel and Energy
- SAFE Kits: Fuel Efficient Stove and Briquettes
- SEA: Sexual Exploitation and Abuse
- SEMA: State Emergency Management Agency
- SOP: Standard Operating Procedure

Contents

Context

The North-Eastern region of Nigeria comprising Borno, Adamawa, and Yobe (BAY) states has experienced conflict for over a decade. The protracted crisis caused displacement, which eroded household coping mechanisms, significantly weakened their resilience, and heightened vulnerabilities. Insecurity continues to be the main trigger for large-scale population displacements. In addition, recurrent flooding and inter-communal tensions also characterize the region. Although the crises brought untold hardships to everyone in the region, women and children were particularly affected. Access to energy has been identified as a very pressing issue. It has exposed vulnerable people to several challenges and risks related to limited energy access, directly linked to food insecurity and malnutrition (e.g., insufficient fuel to cook food), deforestation (e.g., unsustainable felling of trees for fuel), protection risks (e.g., harassment, assault, physical and sexual violence when collecting wood-fuel) and health risks (smoke inhalation provoking respiratory illnesses). To address the pressing energy needs and reduce the exposure of vulnerable households to insurgent attacks and health risks, the SAFE partners opted for the distribution of SAFE Kits.

Background

The SAFE Kits Standard Operating Procedure (SOP) establishes minimum technical standards for donor interventions in North-Eastern Nigeria, a region marred by over a decade of conflict, displacement, and vulnerabilities, particularly among women and children. The prolonged conflict and environmental challenges, such as flooding which have resulted in critical energy access issues, exposing vulnerable populations especially women and children to food insecurity, deforestation, protection risks especially Gender Based Violence (GBV), and health hazards. The SAFE partners address these challenges by distributing SAFE Kits, primarily Fuel-Efficient Stoves (FES) and Carbonized Briquettes. These kits reduce wood usage by up to 58%, curbing protection risks associated with frequent firewood collection especially from distant locations which exposes them to GBV and the usage of firewood which exposes them to health hazards such as Asthma, Chronic bronchitis, reduced lung function, increased cancer risk and reduced immunity. The SOP delineates the criteria for selecting stoves and briquettes, vulnerability assessment, gender roles and responsibilities of partners, safety precautions, quality control, and a structured feedback mechanism. Through this, the initiative aims to reduce protection risk associated with, energy and fuel collection in high-risk areas, and improve health outcomes for women and girls while also promoting sustainable and efficient energy solutions.

Standard Operating Procedure for SAFE Kits (Fuel Efficient Stoves and Briquettes kits Intervention in the BAY States)

Introduction

The SAFE Kits Standard Operating Procedure (SOP) provides technical minimum standards for use by Partners in the direct and indirect intervention provided by Donors. The SOP describes processes essential in achieving the technical standards, considered minimum requirements, in all areas of intervention in North-Eastern Nigeria. The guideline is to be reviewed annually when necessary and revised according to needs due to the continuous changes in the security situation, environmental factors, and context.

The SAFE Kits

To find sustainable solutions to the health implication of cooking with firewood and protection issues associated with its collection in the BAY States, the SAFE partners adopted the distribution of SAFE Kits as a form of emergency response. The Fuel-Efficient Stove (FES) requires less wood per cooking regime due to enhanced energy efficiency, lessening the amount of wood required per cooking by 58%, thus reducing the number of firewood collection times and exposure to associated risks from 4 times to 1.5 in a week (FAO, PDM 2021). Similarly, briquette utilization enhances natural resources management by transforming agro-waste into a clean alternative energy source, substituting it with fuelwood. Thus, vulnerable households, including IDPs, returnees, and host community members, are being targeted and trained in FES and briquettes to serve as adaptation and mitigation strategies towards climate change and income-generating activities.

Purpose:

The SOP illustrates the steps to be considered when intervening in Fuel-Efficient Stoves and briquettes (SAFE Kits) to reduce the protection risks, environmental and health Hazards associated with using three stones for cooking. Thus, understanding its context will guide who the target beneficiaries should be to enhance their protection associated with energy and fuel collection, especially in high-risk areas.

Scope of the SOP

Fuel Efficient Stoves

Selection Criteria for Preferred Stove

1. Fuel Efficiency: Choose a stove that maximizes fuel efficiency to reduce the quantity of fuel needed for cooking, which is crucial in resource-constrained settings.
2. Availability of Fuel: Ensure the selected stove uses readily available and sustainable fuel sources in the IDP area, such as wood, biomass, or briquette.
3. Safety: Partners should prioritize stove(s) with safety features, like stable construction, handles, and proper ventilation, to minimize the risk of burns and accidents.
4. Affordability: Select affordable stoves for IDPs, considering their limited financial resources.
5. Durability: Consider a durable, efficient cook stove; for a clay stove, the quality of the clay used, the design and how well molded, dried, fired, and well reinforced with thick walls are more durable. For metal stoves, the quality of the metal used, how well it is coupled, and the technology used determines its longevity.
6. Environmental Impact: Consider stoves with low emissions and minimal environmental impact to promote sustainable cooking practices.
7. Ease of Use: Ensure the stove selected is user-friendly and requires minimal training or skills to operate effectively.
8. Cooking Capacity: Assess the cooking needs of vulnerable households and select stoves that can accommodate their meal preparation requirements and pot size.

9. Local Adaptability: Engage with the communities to understand their cooking habits and preferences and choose a stove that aligns with their cooking practices.
10. Availability of Spare Parts: Check if spare parts and maintenance services are available for the stove model.
11. Easy for Capacity Building: Choose a stove whose materials can be locally sourced and is easy to empower vulnerable households on how to produce to serve as a means of livelihood/income generation.
12. Monitoring and Evaluation: Establish a system for monitoring stove usage and collecting feedback from beneficiaries to assess the stove's effectiveness and make necessary improvements. Or make use of reports from other agencies who have conducted such assessments.
13. Testing: It is essential for SAFE partners to perform quality assurance testing on the procured briquettes before distributing them to beneficiaries. This precautionary measure ensures that the distributed briquettes meet safety standards and eliminates the risk of distributing products made from potentially harmful materials.

Carbonized Briquettes

Selection Criteria for the Carbonized Briquettes

1. Material Composition: Briquettes can be made from various materials, such as charcoal, wood, or biomass. Consider the material that is harmless to the vulnerable households/ beneficiaries that best suits their cooking or heating requirements.
2. Burn Time: Different briquettes burn for varying durations, for long-lasting heat or consistent cooking temperatures; partners should consider briquettes that offer extended burn times e, e.g., briquettes made from coconut shells or well-compressed agro-waste.
3. Heat Output: The heat output of briquettes can vary. Some are designed for high heat, ideal for grilling, while others provide lower, more steady heat for smoking or slow cooking.
4. Ash Production: Consider how much ash the briquettes produce. Less ash means less maintenance during and after cooking or heating.
5. Lighting Ease: Some briquettes are easier to light than others. Quick-start options should be preferable to get cooking or heating faster.
6. Environmental Impact: Be mindful of the environmental impact. Look for briquettes made from sustainable sources or those that emit fewer pollutants. The use of any form of nylon should be discouraged.
7. Price: Compare prices to ensure you're getting good value for your money. High-quality briquettes might cost more, but they can offer better performance.
8. Packaging and Storage: Consider the packaging size and how you plan to store the briquettes. Ensure they are convenient for your needs and have a long shelf life.

Beneficiary/Vulnerability selection criteria

The SAFE programme is meant to enhance the protection of women and children. Therefore, Partners should work closely with the GBV sub-sector for referrals of GBV survivors in collaboration with other Protection partners working in the targeted locations. Similarly, the Partners should work closely with Camp Coordination and Camp Management (CCCM), and Community Development officers/SEMA representatives in the various beneficiary LGA communities to consider the criteria below to achieve the SAFE intervention's aim.

Hence, the minimum selection requirements should be.

1. Households with limited access to safe and sustainable energy resources.
2. Survivors of GBV and SEA.
3. Persons with disabilities.
4. Female Headed Household
5. Child-headed households, especially girls.
6. Most vulnerable and food insecure households among IDPs, returnees, and host communities.
7. Households with large numbers of family members.
8. Households with malnourished children.
9. Additional criteria for briquette training should include empowering fuelwood or charcoal sellers to influence mindset/business change.

Gender Mainstreaming Benchmarks and Action Points: Incorporating gender mainstreaming benchmarks and action points in the planning and implementation of the SAFE KITS intervention can have several positive impacts including Ensuring the inclusion and participation of women and girls; Promoting women's economic empowerment; Addressing gender disparities; and Strengthening sustainability. Gender mainstreaming benchmarks and action points are therefore intended to ensure that each gender is well represented in all processes and that the specific needs and interests of each gender are met:
The following points should be considered.

- Inclusion of women in decision-making: Women should be represented in all decision-making processes related to the SAFE Kits, including the selection of beneficiaries and monitoring of the project. This will ensure that their voices are heard, and their interests are represented.
- Gender-sensitive selection of beneficiaries: The selection of beneficiaries for the SAFE Kits should be done using a gender-sensitive approach. This means that the selection criteria should not discriminate against women or disadvantage them in any way.

- Monitoring and reporting on gender impacts: Monitoring and evaluation of the SAFE Kits project should include a gender analysis to track the impact on different genders. This will help identify any gaps or challenges that may arise and inform future interventions for improving gender equality. Additionally, regular reporting on the gender-specific outcomes of the project should be included in all project reports.

Responsibilities

- Government and Coordination

The State governments of Borno, Adamawa and Yobe, led by the Ministries of Environment through the FSS coordination mechanism shall coordinate the activities of SAFE partners. The ministry has the pivotal role of setting the agenda. The state ministries have the responsibility of establishing regulatory framework to ensure that SAFE interventions comply with minimum standards. Consequently, SAFE partners are expected to share their plans and activities with the government through the FSS, ensuring alignment with the established SOPs to avoid duplication of efforts. This collaboration seeks to embed SAFE initiatives within state and national frameworks, and the humanitarian context prioritizing areas with more protection and environmental risks. The state governments will provide guidance on SAFE activities including targeting, distribution or training guaranteeing transparency and accountability. The relevant state ministries which include Environment, Agriculture, and women Affairs to advocate for SAFE issues, seeking international support in tandem with development partners and other INGOs and NGOs to have a smooth transition from emergency aid to developmental efforts, focusing on building local NGO capacities to bolster response sustainability.

- Risk assessment: SAFE partners should be engaged in risk assessment to identify and mitigate any potential risks associated with a particular intervention, for instance, a stove model, a type of briquette, etc. This can be presented during the SAFE working group meetings and be incorporated during the SOP periodical review.
- Capacity building: To build the resilience of vulnerable households, The SAFE working group, in partnership with the government and previously empowered communities or groups as well as established SAFE centres, should prioritize strengthening the capacities of various stakeholders, including government agencies, Women Led/Women Right Organizations, INGOs, NNGOs, community organizations and vulnerable households, to facilitate knowledge transfer as well as to play a meaningful role in implementing the SOP. This should also involve training on how to safely produce, handle, store, and desired fuel-efficient stove(s) and alternative energy sources. As well as support by linking them to access to finance and market linkages to enhance their income generation.
- Sensitization and Awareness Campaign: The SAFE working group, in collaboration with the government and other partners including Women Led/Women Right Organizations, should employ mass media channels such as radio, television, and various social media platforms to not only promote awareness regarding the alternative use of energy sources but to also highlight the existing SAFE centers in the BAY states, emphasizing their roles in production and training. This initiative aims to facilitate a change in mindset, encouraging a shift from

lifestyles that contribute to climate change towards the sustainable utilization of energy resources.

- Fuel and Alternative Energy procurement and distribution: To enhance the protection, health and resilience of vulnerable communities, SAFE partners should be procuring SAFE kits for distribution to beneficiaries from trained beneficiaries this will not only motivate the beneficiaries but also serve as a means of empowerment them through income generation. Partners can also adopt the cash or voucher system.
- Monitoring and evaluation: Through the coordination of the FSS, SAFE partners should monitor and evaluate the implementation of the SOP to ensure that it is achieving its intended objectives and being implemented safely and effectively. This should involve collecting data on the number of beneficiaries reached, the types of fuel and energy provided, and the impact of the intervention on beneficiary households.

The Safety Precautions of SAFE Kits Intervention

1. Personal safety: SAFE Partners should take all necessary precautions to protect their safety and security, as well as the safety of beneficiaries during the distribution of SAFE Kits. Partners should ensure the safety and security of beneficiaries by involving -Local community structures especially women networks during distribution for orderliness, accountability and should also provide canopies in the waiting area for beneficiaries to have a place to sit. At the same time, to await their turn for the collection of the SAFE kits. Also, priority should be given to persons with disabilities and pregnant women. The distribution time should also be considered by consulting with the women beneficiaries what time of the day is more convenient for them also the distance to the distribution points should also be considered thereby reducing any form of risk to the proposed beneficiaries.

2. Fuel and Energy Safety: SAFE partners should take all necessary precautions to ensure the safe handling, storage, and use of fuel and energy. This should include training staff who implement the activities in the field and the beneficiaries on how to handle/use the items being produced or distributed. Additionally, follow up by implementing partners in form of monitoring visits to the beneficiaries to check how the items are being used should be considered.

3. Environmental Safety: SAFE partners should take all necessary precautions to minimize the environmental impact of fuel and energy consumption, especially the necessary procedures to follow during the carbonization of briquettes and awareness of proper disposing of waste products in a safe and environmentally friendly manner. Partners should also include the need for sensitization and awareness campaigns on sustainable energy utilization of SAFE kits.

Quality Control

The types of stoves commonly distributed in the BAY states include the Dadin Kowa, Gasifier, and Charcoal/Briquettes Stoves. However, to ascertain the most suitable stove(s) to be considered, various PDM reports, market surveys and technical clearances would be used to grade the stoves.

S/ N	Criteria	Dadin Kowa	Gasifier	Briquette/Charcoal
1	**Fuel Efficiency**	It is a tier II stove with an efficiency between 31-33%.	It is a tier III stove with efficiency between 71-73%.	It is a tier II stove with efficiency between 31-33%
2	**Affordability (average Market Price)**	N3500	N12,500	N7,500
3	**Accessibility**	available for production and procurement from vulnerable households who have been empowered to produce it across the BAY states	Sold by few vendors/non-empowered vulnerable households outside the BAY states	Sold by few vendors/non-empowered vulnerable households outside the BAY states
4	**Suitability for capacity building**	All the materials needed to produce the stove are locally sourced, and it does not require a machine to couple it	All the materials needed to produce the stove are foreign and require advanced technology to couple it.	The materials needed to produce the stove are locally sourced but require. a machine to couple it
5	**Compatibility with fuel choices**	The stove provides combustion chambers for all three fuel types (firewood/sticks/corn stalk, charcoal, and briquettes).	Provides combustion chambers for only (corn stalk/briquettes and charcoal)	The stove provides combustion chambers for only (charcoal and briquettes) used.
6	**Compatibility with Pot types**	Compatible with the type of cooking pots generally used by vulnerable and poor households across the BAY state.	Similar shape to the Charcoal briquette stove and NO based on the PDM report	NO(based on the PDM report by FAO)

7	**Portability**	Heavier than the two	Yes	Yes
8	**Durability**	Durable (report shows some have had it for five years from 2018-2023	No record	No record
9	**Reduction in Protection Risk**	From scouting of fuelwood four times to 1.5 times in a week	No record	Yes, based on the FAO comparative assessment report, there was a reduction in the scouting of fuelwood from 5 to 3 times weekly.
10	**Reduction in CO_2**	The stove reduces CO_2 by 0.1-ton equivalent / 33% reduction in CO_2 emission per annum per stove as against a household that uses three stoves to cook food.	No record	No record
11	**Monitoring and Evaluation Report**	Yes	Nil	Partially yes based on FAO's comparative Assessment 2023

Best	
Better	
Good	
No record	

Thus, the above table provides the criteria for selecting the most efficient stove based on the evidence-reports provided and the criteria. Therefore, the SAFE partners should consider the above while making selection for the FES to be considered for their intervention.

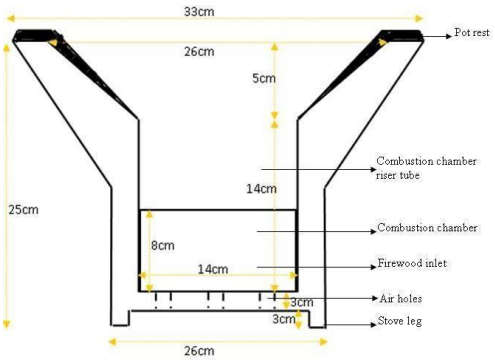
Complaint and Feedback

A context specific and gender sensitive Complaint and Feedback Mechanisms shall be made available to the affected populations, and the prevention of all forms of exploitation and abuse. The complaint and Feedback Mechanism is a channel for targeted Participants/Beneficiaries and Community members to provide feedback, suggestions, complaints, and concerns in a manner that is safe, confidential, transparent, and accessible, enabling the Food Security Sector to respond and make any necessary programmatic or safeguarding adaptations and to ensure the safety and security of program Participants/Beneficiaries. An effective Complaint and Feedback Mechanism will enable the Food Security Sector to practice adaptive management, making all necessary changes to program activities and work plans based on the feedback received. This adaptiveness will help the Food Security Sector respond to changes in context and needs and remain accountable to the communities we serve to execute programmatic and safeguarding best practices.

Contributing Organizations

1. Ministries of Environment BAY States
2. FAO
3. Mercy Corps
4. WFP
5. FAABY
6. IOM
7. FOURCi
8. ICEED
9. GREENCODE
10. GEPaDC
11. OTHERS

Appendix 1 **Technical Specification Dadin Kowa Fuel-Efficient stove**



Performance.

The water boiling test (WBT) version 4.2.3: 2014 protocol will be adopted.

IWA VITA WBT: Tier 2

1. High Power thermal efficiency: ≥ 0.25%
2. Low power Thermal Consumption: ≤ 0.039MJ/min/L
3. High power CO: ≤ 11 g/MJd
4. Low power CO: ≤ 0.13 g/min/L
5. High Power PM: ≤ 386 mg/MJd
6. Low power PM: ≤ 4 mg/min/L
7. Indoor Emissions CO: ≤ 0.62 g/min
8. Indoor Emission PM: ≤ 17 mg/min
9. Safety: ≥ 75 index

Features:

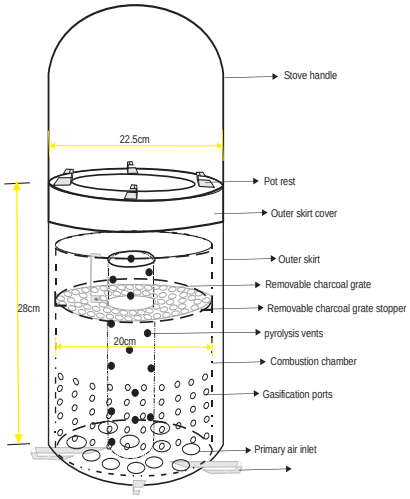
1. Fuel Saving: >55%
2. Fuel Efficiency: 31-33%
3. Operation: Manually
4. Fuel: Charcoal / Briquette / Firewood
5. Removable coal grate
1. Ease of start-up, assembly and cleaning
2. Safety features: stove stands, two handles
3. Price: ₦ 2500 - ₦ 2800.

Other Specification

1. Combustion chamber that accommodates wood sizes of at most 5cm x 3cm x 40cm.

2. The stove accommodates the predominant shape of cooking pots in northeast Nigeria (round aluminium pot).
3. The bottom of the stove has a cylindrical shape, and the top of the stove has the shape of a cone.
4. Weight 14 -15 kg.
5. Height 24 - 26 cm.
6. Diameter top 33 - 36 cm.
7. Diameter bottom 25 - 27 cm.
8. 3 solid stove legs must ensure sufficient stability during cooking.
9. 8 to 9 symmetrical air holes are provided on the bottom of the combustion chamber.
10. Firewood inlet that accommodates up to 2 lengths of wood as specified in (1) above.
11. The ratio of the height of the firewood inlet to the combustion chamber height is 1: 2.3. This allows for more direct flames to get to the pot due to its shape and thickness.
12. 9 symmetrical air holes are provided on the bottom of the combustion chamber. This ensures an optimum supply of oxygen, leading to better combustion and draft and significant reductions in smoke emissions.
13. The stove is produced from a mixture of clay and sawdust (all sieved to remove coarse particles) in the ratio 2: 1 by volume. There have been experiments on increasing the ratio of sawdust to get better insulation, but the resulting mixture was difficult to form.
14. Metal cladding is made from at least 0.5mm mild or galvanised steel sheet and a robust handle from the same material.
15. The stove can be used without metal cladding. However, the one with metal cladding ensures added physical support.

Appendix II: Technical Specification for Gasifier Fuel-Efficient stove



Performance.

The water boiling test (WBT) version 4.2.3: 2014 protocol will be adopted.

IWA VITA WBT: Tier 3

16. High Power thermal efficiency: ≥ 0.35 %
17. Low power Thermal Consumption: ≤ 0.028 MJ/min/L
18. High power CO: ≤ 9 g/MJd
19. Low power CO: ≤ 0.1 g/min/L
20. High Power PM: ≤ 168 mg/MJd
21. Low power PM: ≤ 2 mg/min/L
22. Indoor Emissions CO: ≤ 0.49 g/min
23. Indoor Emission PM: ≤ 8 mg/min
24. Safety: ≥ 88

Features:

25. Fuel Saving: > 65%
26. Fuel Efficiency: 71-73%
27. Operation: Manually
28. Ease of start-up, assembly and cleaning
29. Safety features: stove stands, 2 handles
30. Price: ₦ 15,000 - ₦ 20,000

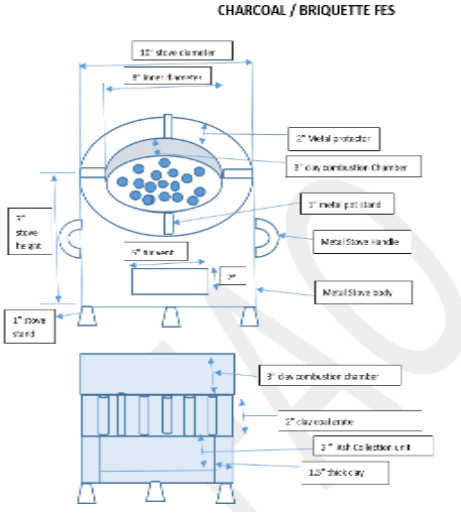
Other Specification

31. Design Type: fabricated metal work

32. Approximate Dimensions: Top 23 cm (W) x 28 cm (H)
33. Weight:3.5 kg.
34. Materials of construction: Galvanised plated M.S, flat bar, & quarter rod
35. Aluminum metal thickness: 1cm
36. Fuel type: Briquette, Charcoal and Fuelwood.
37. Accessories: An inner cylindrical pyrolysis enhancer and pre-heated air chamber, hand handles, stove stand.

Appendix III: Technical Specification Briquette/Charcoal fuel-efficient stove

The Briquette/Charcoal fuel-efficient stove, modified design has the following technical specifications:



Performance.

The water boiling test (WBT) version 4.2.3: 2014 protocol will be adopted.

IWA VITA WBT: Tier 2

38. High Power thermal efficiency: ≥ 0.25%
39. Low power Thermal Consumption: ≤ 0.039MJ/min/L
40. High power CO: ≤ 11 g/MJd
41. Low power CO: ≤ 0.13 g/min/L
42. High Power PM: ≤ 386 mg/MJd
43. Low power PM: ≤ 4 mg/min/L
44. Indoor Emissions CO: ≤ 0.62 g/min
45. Indoor Emission PM: ≤ 17 mg/min
46. Safety: ≥ 75 index

Features:

47. Fuel Saving: >55%
48. Fuel Efficiency: 31-33%
49. Operation: Manually
50. Fixed coal grate
51. Ease of start-up, assembly and cleaning
52. Safety features: The stove stands and Two handles
53. Price: ~~₦~~ 6,000 - N 8,000

Other Specification

54. Design Type: Clay Molded with metal cladding

55. Approximate Dimensions: Top 25cm (W) x 18 cm (H)
56. Weight: 8 kg
57. Materials of construction: Body made of metal cladding, the inner compartment is made up of baked clay and sawdust suitable for retaining heat and reducing cook time.
58. Body metal cladding thickness: 1cm
59. Charcoal grate: Fixed with the stove during molding
60. Fuel type: Briquette and Charcoal.
61. Safety Accessories: Two Hand handles and stove stands

Appendix IV: Technical Specifications Carbonized Briquettes



1.0	Technical specifications	General
1.1	Expected use: Domestic use Cooking food, boiling water & space heating	
1.2	Suitable to be used with FAO's FES (Fuel Efficient Stove)	
1.3	Smokeless	
1.4	Odor free/ natural odor	
1.5	Free of chemicals	
1.6	No trees cut	
1.7	Natural binding materials (cassava starch or gum Arabic)	
1.8	Non addictive materials	
1.9	Non polythene	
2.0	Technical specifications	Briquettes
2.1	Materials: Agro waste	
2.2	Shape: ball, cube, cylindrical,	
2.3	Size (cm): 5.1 x 10. 2	
2.4	Length(cm): 10.2	
	Physical parameters	
2.5	Bulk density 1.2 kg/cm^3	
2.6	Burning time (minutes): 30	
2.7	Durability: 98.12%	
2.8	Hardness: Well compacted	

	Physicochemical parameters
2.09	Moisture content (%): 5%-15%
2.10	Ash content (%): < 10%
2.11	Sulphur content (%): <=0.34%
2.12	Fixed carbon (%): >= 50%
2.13	Volatile matter (%):15% - 30%
	Thermochemical parameters
2.14	Lower heating value 15-30 MJ/kg
3.0	Packaging
3.1	Type (bags, pack, box, pallets): Double zipper lock bag
3.2	Capacity :9 x 12 inches (23 x 30cm)
3.3	Total capacity (kg): 3

Food Security Sector Contact Information

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