

Cooking with Power: The Somali eCookbook



Traditional Somali Recipes Tested with
Modern Electric Cooking



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Location:

Sheder Refugee Camp,
Somali Region, Ethiopia

COOKING WITH POWER: THE SOMALI ECOOKBOOK

Recipes of the Somali Community

Sheder Refugee Camp, Fafan Zone, Somali Regional State, Ethiopia

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1. Introduction

Clean cooking remains one of the most persistent energy and health challenges facing displaced and host communities. Heavy reliance on charcoal and fuelwood contributes to high household expenditures, environmental degradation, and negative health outcomes, particularly for women and children.

In Sheder Refugee Camp, recent investments in renewable and reliable electricity supply have created a critical opportunity to transition households toward modern electric cooking solutions. Affordable and dependable electricity is opening new opportunities to address unsustainable cooking practices. However, adoption depends not only on access to electricity, but also on evidence: households and stakeholders must understand how electric cooking performs in real-world conditions, how much energy it uses, how long it takes, and how costs compare to traditional fuels.

Energy cookbooks are a key resource in supporting this understanding. They measure the energy use, cooking time, and cost of preparing traditional dishes with energy-efficient appliances, translating complex findings into accessible and practical formats. This helps households, utility providers, humanitarian actors, and policymakers make more informed decisions about cooking fuels and technologies.

The Somali eCookbook responds directly to this need. It combines traditional Somali recipes with measured data on cooking time, electricity consumption, and cost, generated through controlled cooking tests (CCTs) using Electric Pressure Cookers (EPCs), induction stoves, and infrared stoves. By linking energy use with everyday cooking practices and showcasing a range of modern energy-efficient appliances, the eCookbook presents technical evidence in a practical and culturally relevant way that supports informed decision-making and promotes sustainable cooking solutions.

2. Cooking With Power

2.1. Solar Mini-Grids and the Opportunity for Electric Cooking

This E-Cookbook is grounded in access to renewable, reliable electricity provided through a 254kWh solar mini-grid in and around Sheder Refugee Camp, located in Ethiopia's Somali Regional State. The mini-grid supplies households, small businesses, and community infrastructure with consistent power, creating conditions where modern energy services, including electric cooking are possible in everyday life.

For many residents, this represents a significant shift. Until recently, electricity in displacement settings was scarce or limited to lighting and phone-charging from unsustainable diesel generator sources. The availability of renewable electricity has opened a new opportunity: using electricity for energy-intensive daily activities like cooking.

This eCookbook was created to help answer a practical question that naturally follows access: Can everyday Somali foods really be cooked with electricity—affordably, efficiently, and in ways that fit local cooking practices? The recipes and results in these pages show that, under the right conditions, electric cooking is not only viable, but in many cases faster, cleaner, and cost-competitive.

2.2. Cooking Fuels Before Electricity

Before the introduction of electric cooking appliances, most households in Sheder relied overwhelmingly on charcoal, supplemented at times by fuelwood. Charcoal was used for nearly all meals, despite its rising cost, which takes up a substantial share of household budgets.

Beyond cost, charcoal cooking brought other challenges. Kitchens were smoky and hot, cooking took a long time, especially for foods like beans, sorghum, or stews, and the work of cooking was physically demanding. Charcoal use also contributed to environmental degradation through unsustainable wood harvesting.

The arrival of reliable electricity does not automatically replace these fuels. Adoption depends on trust, familiarity, and evidence. By documenting how common meals perform when cooked with electric appliances, how long they take, how much electricity they use, and what they cost, this eCookbook links renewable energy access with real household cooking decisions.

2.3. Somali Cuisine and Cooking Practices, and Gendered Roles

Somali cuisine is shaped by strong culinary traditions based on grains, legumes, sauces, and spices. Common foods include rice, pasta, sorghum, maize porridge (shuuro), beans, and lentils. Many meals involve sauces cooked with onions, tomatoes, spices, and oil, often requiring extended simmering.

Cooking practices follow familiar patterns. Some dishes are prepared in one pot, while others are cooked in stages and combined at serving. Meals are typically prepared from scratch, often several times a day, with spices such as hawash, black pepper, chili, and cinnamon playing a central role in flavour.

Cooking is also highly gendered. As documented in the Cooking Diary study, women are primarily responsible for food preparation, fuel management, and time allocation around cooking, alongside childcare and other domestic and livelihood activities. Decisions about cooking fuels and technologies therefore directly affect women's workloads and well-being.

This eCookbook reflects these realities. All recipes were prepared by women using familiar techniques, ensuring that results reflect real household cooking practices rather than laboratory conditions.

2.4. The Somali eCookbook Context

The Somali eCookbook was developed in a context that is both culturally Somali and politically Ethiopian. Ethiopia's Somali Region is home to long-standing Somali communities as well as refugees displaced from the neighbouring Somalia, with Sheder Refugee Camp embedded in this broader cultural landscape.

As a result, the recipes in this book represent Somali food shared across host and displaced communities, rather than "refugee food" alone. Cooking practices, ingredients, and tastes overlap significantly, even as living conditions differ.

Drawing on insights from the cooking diary work and combining them with measured cooking data, this eCookbook offers a practical view of how energy access, food, and daily life intersect in Somali communities. Rather than focusing on technical details, it tells a simple story: how people cook, what fuels they use, and how reliable electricity can expand everyday choices in the kitchen.

2.5. How to Use This Book

This book is for anyone interested in cooking Somali food using electricity—whether you are a household cook, a business owner, a practitioners, or anyone else interested in the links between food, energy, and daily life.

It is designed to be practical, visual, and easy to use. This book is designed to be practical and easy to use, and no technical knowledge is required.

What You Will Find in This Book

Each recipe shows how a familiar Somali dish was cooked using electric stoves, and what happened during cooking. For every dish, you will see:

-  Cooking time – how long the meal took to prepare
-  Electricity used – how much power was consumed
-  Estimated cost – what the electricity cost to cook the meal

You will also find step-by-step descriptions, photos of food cooked with electric appliances, and general experiences shared by the women who prepared the meals.

How to Read the Cooking Results

You do not need to focus on every number. Icons and highlighted results provide quick insights, while simple tables allow stove comparisons. Readers interested primarily in food can focus on the recipes, ingredients, and photos. The numbers are there to support understanding, but the book is also meant to be browsed easily.

Who the Recipes Are For

The recipes in this cookbook reflect real cooking practices used in Somali households. They were prepared by women using familiar methods, ingredients, and cookware.

While the testing took place in Sheder Refugee Camp, the food and cooking styles are shared across Somali communities in Ethiopia and beyond, including both refugee and host populations.

Using This Book in the Community

This book can be used in many ways:

- ▶ As a reference for households considering electric cooking
- ▶ As a learning tool during cooking demonstrations
- ▶ As a discussion starter about clean cooking options
- ▶ As a resource for projects working on energy, health, or livelihoods

You can read it from start to finish or open it at any recipe that interests you.

3. Objectives

- ▶ Demonstrate the technical and cultural feasibility of electric cooking for traditional Somali dishes.
- ▶ Provide evidence on cooking time, energy use (kWh), and cost (ETB) of cooking the same meals across different technologies.
- ▶ Amplify women's voices and lived experiences in clean cooking transitions.
- ▶ Provide evidence to efforts to scale modern electric cooking solutions.

4. Methodology

All recipes were prepared using Controlled Cooking Tests (CCTs) under real-use conditions in Sheder Refugee Camp. Tests were conducted with refugee women using appliances provided through the programme.

Appliances Tested: Three modern electric cooking technologies were evaluated:

- ▶ Electric Pressure Cooker (EPC)
- ▶ Induction stove
- ▶ Infrared stove

Each was tested on a selection of commonly prepared Somali dishes representing rice, pasta, grains, legumes, and sauces.

For every cooking session (recipe), the following indicators were recorded:

- ▶ Ingredient type and quantities,
- ▶ Appliance type and power settings,
- ▶ Step-by-step cooking process,
- ▶ Total cooking time,
- ▶ Electricity consumption (kWh)
- ▶ The corresponding electricity cost (ETB).

These data points provide evidence for understanding energy performance and cost-efficiency across technologies.

In addition to the technical data, qualitative testimonials documented users' perceptions regarding convenience, taste, cost, cleanliness, safety, and challenges encountered.

5. Key Findings: Comparative Study of Stove Performance

a) Energy Consumption and Cost

- ▶ Electric Pressure Cooker (EPC) is the most energy efficient and cost-efficient appliance across nearly all food types.
- ▶ Across all comparable dishes: rice, pasta, shurro, lentil stew (misir wot), beans, and sorghum, the EPC consistently uses 40–70% less electricity and results in the lowest cooking cost.
- ▶ Infrared stoves have the highest energy consumption and cost, especially for long cooking foods such as beans and sorghum.

b) Cooking Time

- ▶ EPC's pressure cooking function significantly reduces cooking time, softening ingredients faster, and shortening overall preparation time.

C) Compatibility/Convenience

- ▶ Infrared stoves are the only appliances capable of preparing all foods tested, including injera (thin bread), due to compatibility with aluminium mitad and other pans.
- ▶ Infrared works with all common household cookware that the community owns, including aluminium mitad.
- ▶ EPC and Induction stoves are compatible with cooking most kinds of food, except Injera

Stove Compatibility by Dish

Stove types	Injera	Rice	Pasta	Shurro	Beans	Sorghum	Tea
infrared	✓	✓	✓	✓	✓	✓	✓
Epc	✗	✓	✓	✓	✓	✓	✓
induction	✗	✓	✓	✓	✓	✓	✓

d) Taste

- ▶ Overall, the food taste was reported as excellent across all technologies. In particular, EPC dishes were frequently described as having superior flavour.
- ▶ Few taste variations, such as a burnt flavour, occurred with induction cooking when thin stainless-steel pots overheated. This was reported by the HHs and businesses, and it was also observed in few instances during the CCT.

e) Safety

- ▶ No heat-related burns or electrical shocks occurred during testing.
- ▶ All stoves were safely connected to the mini-grid energy ports.
- ▶ The cooks were trained in proper handling and well familiarized before the tests.

6. Testimonials

Three women who had previously participated in the cooking diary study were randomly selected for the CCT. Their prior engagement and willingness to participate provided valuable firsthand insights into the testing process.

a) Sahra Ali Hassen – Infrared stove user

Sahra Ali Hassen, a 40-year-old single mother of nine, previously relied exclusively on charcoal for cooking using Jikakoa improved imported stove) She purchased around three sacks per month at a cost of 1,000–1,300 birr each.

After receiving an infrared stove, she expressed great satisfaction with the technology. She highlighted its quick cooking time, clean operation without smoke, and versatility for preparing all types of food. Importantly, she noted that the taste of food cooked with the infrared stove is comparable to charcoal cooking.

However, Sahra observed that the stove consumes more electricity than expected, making the cost of electricity nearly equal to charcoal. Despite this, she remains enthusiastic about modern cooking technologies and expressed her interest in continuing to own an Electric Pressure Cooker (EPC) in the future, appreciating the convenience and health benefits these innovations bring to her household.



b) Roda Ahmed Ismail – Induction stove user

Roda Ahmed Ismail is a 50-year-old married woman with a family of eleven. Before receiving the induction stove, she cooked with charcoal using a Jikakoa stove and sometimes fuel wood with three stones, consuming about two sacks of charcoal and two camel loads of fuel wood monthly. The cost was 1,200 birr per sack of charcoal and 1,000 birr per load of fuel wood.

After adopting the induction stove, Roda expressed great satisfaction with the technology. She highlighted its quick cooking time, clean operation without smoke, and the improved cleanliness of her kitchen. She noted that the taste of food prepared with the induction stove is even better compared to charcoal cooking.

She observed that the cost of electricity is almost the same as charcoal and fuel wood, but she reported no challenges in using the induction stove. Roda expressed her interest in continuing to own the induction stove for her family and is also interested in acquiring an Electric Pressure Cooker (EPC) in the future, as it is very efficient in cooking beans. The only limitation she mentioned is that induction stoves cannot be used to cook Injera and cake.



c) Nadiya Ibrahim Jama - Electric Pressure Cooker (EPC) user

Nadiya is a 31-year-old married woman (second wife) with a family of seven. Before receiving the EPC, she relied on charcoal (Jikakoa), using about three sacks per month at a cost of 1,000–1,200 birr each.

Since adopting the EPC, Nadiya has been very pleased with the technology. She highlighted its quick cooking ability, especially in the mornings when preparing food before sending her children to school. She noted that some foods which previously required a long time to cook with charcoal, for example beans, with charcoal are now prepared much faster. She also appreciates that cooking with the EPC is clean, requires relatively little water, and produces tastier food compared to charcoal.

She observed that electricity is more affordable than charcoal, making the EPC cost-effective. The only challenge she mentioned is the small size of the appliance (6 litres), which is not sufficient for her large family. Despite this, Nadiya expressed her willingness to own an EPC for her household because of the many advantages it offers.

She uses the EPC for nearly all types of food, including boiling tea, milk, and baking cake, with the exception of Injera. Overall, she values the EPC highly and considers it a modern, efficient, and healthier alternative to traditional cooking methods



7. Recipes

To ensure the consistency and reliability of the findings presented in this eCookbook, all recipes were prepared using the practices of the women in the community with standardized ingredient types and portion sizes across each eCooking appliance. This methodological consistency allowed for fair and accurate comparison of stove performance when cooking traditional Somali dishes. By applying the same measurements and mostly similar procedures in every test, the study was able to evaluate appliance compatibility, cooking time, energy consumption, and associated costs with a high degree of precision.

Each recipe in the following section is presented in a uniform format to support clear interpretation of results and to enable readers whether community members, practitioners, or policymakers to draw meaningful insights about the efficiency and practicality of modern electric cooking technologies.

7.1. Bariis isu dhex karisa oo leh hilib (Rice with vegetable sauce cooked together)

In Somali culture, rice is a common food and prepared in two different ways: either by cooking the sauce first and then adding the rice letting them simmer together (section 7.1), or by making the rice and sauce separately and mixing them when eating (section 7.2). During the CCT, we tried both methods.

Ingredients:

- ▶ **Grain (Staples):** Rice (250 g)
- ▶ **Vegetables:** Onion (97 g), Carrot (50 g), Tomato (110 g), Beetroot (93 g), Green pepper (11 g), Garlic-parsley mix (1 tablespoon)
- ▶ **Condiments & Oils:** Oil (50 ml), Tomato paste (25 g)
- ▶ **Seasonings & Spices:** Salt, Jumbo seasoning cube ($\frac{1}{2}$ cube), Hawash spice ($\frac{1}{2}$ tablespoon), Black pepper ($\frac{1}{2}$ tablespoon), Cinnamon ($\frac{1}{2}$ tablespoon), Red pepper/Chili powder ($\frac{1}{2}$ tablespoon)
- ▶ **Water**

Preparation Steps Before Cooking

- ▶ Peel, wash, and chop the onions, carrots, and garlic-parsley mix, and set them aside separately.
- ▶ Peel, wash, and chop the potatoes, beetroot, and tomatoes separately. Keep them aside.
- ▶ Wash the rice thoroughly with clean water and set it aside.
- ▶ Grind the dried spices - black pepper and cinnamon. The other spices were purchased ready-made from the market.

Note: The ingredients and preparation steps are the same for all three stoves.

Cooking Steps with Three Technologies

A) Cooking Procedure with EPC - Rice with Vegetable Sauce



Function: Rice Function

- ▶ Add the oil to the EPC and let it heat for a 1 minute.
- ▶ Once hot, add the onion and carrot. Mix well with the oil, then put the lid on, secure it and cook with pressure for 3 minutes.
- ▶ Add the tomato and green pepper and stir occasionally and cook for 2 minutes.
- ▶ Add a little water, cover with the lid (not secured) and cook for 3 minutes.
- ▶ Open the lid, and add tomato paste, Jumbo seasoning cube, garlic-parsley mix, chili pepper, black pepper, and Hawash spice.

- ▶ Allow these ingredients to cook for 3 minutes with the lid lightly on.
- ▶ Add the beetroot, stir well, and cook for 2 minutes.
- ▶ Add the washed rice and mix with the sauce and cook for 2 minutes.
- ▶ Add 850 ml water and salt and mix it well.
- ▶ Place the lid on, secure it and cook with pressure for 20 minutes.

Serving:

- ▶ Serve hot with lemon and salad on the side.



Figure 1. Rice with vegetable sauce cooked together using EPC.

B) Cooking Procedure with Induction Stove - Rice with Vegetable Sauce



- ▶ Set the stove at 800 watts and heat the oil in a pot for 1 minute.
- ▶ Add the chopped green pepper, tomato, and carrot, and cook until softened for 5 minutes.
- ▶ Add a small amount of water to prevent sticking and continue cooking for 3 minutes.
- ▶ Add Jumbo seasoning cube and stir to dissolve.
- ▶ Add the other spices: chili powder, Hawash spice, black pepper, and garlic–parsley mix and cook for 2 minutes.
- ▶ Add the tomato paste, followed by a little more water, and mix thoroughly and cook for 6 minutes.
- ▶ Add the washed rice and stir to combine.
- ▶ Add 1 litre of water and increase the heat to 1,600 watts.
- ▶ Add salt and the sliced beetroot to the pot and continue cooking until the rice is fully cooked for 22 minutes.
- ▶ Total water used: 1,070 ml.

Serving:

- ▶ Serve hot with lemon and salad on the side.

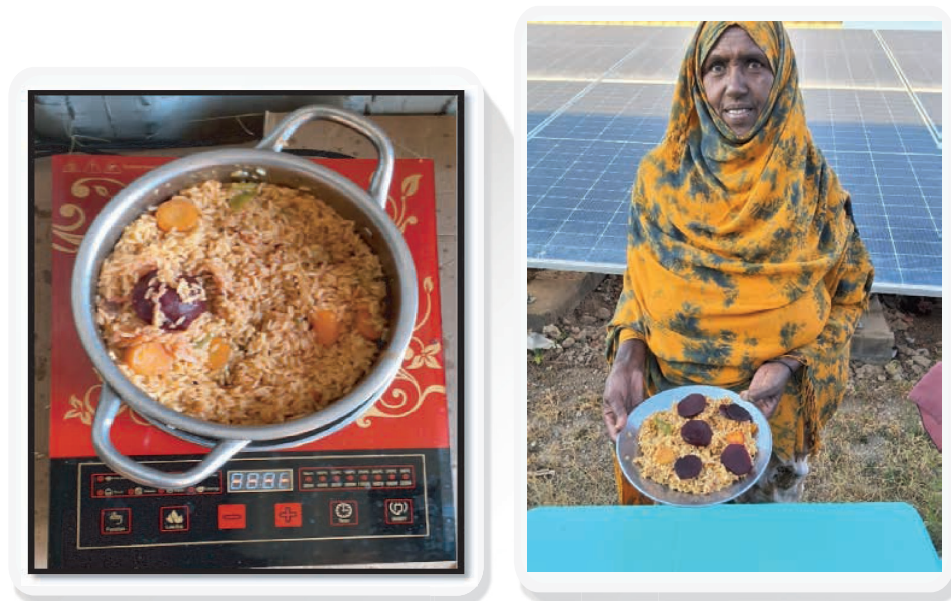


Figure 2. Rice with vegetable sauce cooked together using Induction Stove.

C) Cooking with Infrared Stove – Rice with Vegetable Sauce



- ❖ Start sauce preparation by heating the pot at 2000W.
- ❖ Add oil and heat it for 2 minutes.
- ❖ Add the onion and green pepper together and cook for 4 minutes.
- ❖ Add the carrot and chopped tomato, stir well, and cook for 5 minutes.
- ❖ Add Jumbo seasoning cube and tomato paste, then cook for 1 minute.
- ❖ Add 100 ml of water and simmer for 3 minutes.
- ❖ Add garlic-parsley mix and Hawash spice, then cook for 1 minute.
- ❖ Add black pepper and chili pepper spices, then cook for 1 minute.
- ❖ Add one litre of water and cook for 1 minute.
- ❖ Add beetroot and cook for 5 minutes.
- ❖ Add the washed rice and cook for a further 24 minutes, stirring gently at intervals to ensure proper mixing.

Serving:

- ▀ Serve hot with salad or any side dish of your choice.



Figure 3. Rice with vegetable sauce cooked together using Induction Stove.

Table 1. Comparative Energy and Time Performance of Three Electric Cooking Appliances in Cooking Rice with Vegetable Sauce.

Stove Types	Total Cooking Time (minutes)	Electricity Used (kWh)	Estimated Cost (ETB)
EPC	38	0.524	9.95
Induction	40	0.714	13.57
Infrared	47	1.017	19.31

7.2. Bairiis leh suugo hilib leh (Rice with meat sauce cooked separately)

Ingredients:

- ▶ **Grain (Staples):** Rice (250 g)
- ▶ **Protein:** Meat (104 g)
- ▶ **Vegetables:** Onion (97 g), Carrot (50 g), Tomato (110 g), and potato (144g), Green pepper (11 g), Garlic-parsley mix (1 tablespoon)
- ▶ **Condiments & Oils:** Oil (50 ml), Tomato paste (25 g)
- ▶ **Seasonings & Spices:** Salt, Jumbo seasoning cube ($\frac{1}{2}$ cube), Hawash spice ($\frac{1}{2}$ table-spoon), Black pepper ($\frac{1}{2}$ tablespoon), Cinnamon ($\frac{1}{2}$ tablespoon), Red pepper/Chili powder ($\frac{1}{2}$ tablespoon)
- ▶ **Water**



Preparation Steps Before Cooking

- ▶ Peel, wash, and chop the onions, carrots, and Garlic-parsley mix and set them aside separately.
- ▶ Peel, wash, and chop the potatoes, and tomatoes separately. Keep them aside.
- ▶ Wash the rice thoroughly with clean water and set it aside.
- ▶ Grind the dried spices - black pepper and cinnamon. The other spices were purchased

A) Cooking Procedure with EPC – Rice with meat sauce cooked separately

Function: Rice Function



This is the total time, energy and the corresponding cost required to cook the rice and its sauce.

Rice Sauce Preparation

- ▶ Heat the oil in the EPC pot for 1 minute.
- ▶ Add onion put the lid on, secure and pressurize and cook for 3 minutes.
- ▶ Add meat and carrot, mix well, then cover the lid lightly and cook for 4 minutes.
- ▶ Add potato and cook for 3 more minutes with lid covered lightly.



- ▶ Add a little water and cover the lid, secure and pressurize and cook for another 3 minutes.
- ▶ Add the chopped tomato and green pepper, followed by spices: jumbo cube, red pepper, Hawash spice, black pepper, garlic-parsley mix, and the tomato paste.
- ▶ Stir the mixture and allow to cook for 4 minutes by covering the lid lightly.
- ▶ Stir the mixture occasionally and cover the lid and pressurize lightly and allow cooking for 3 minutes.
- ▶ Add salt and a little more water and allow to cook for 5 minutes.
- ▶ Total water used: about 450 ml.

Rice Cooking

- ▶ Add 550 ml water to the EPC, mix with washed rice, and begin cooking.
- ▶ Add salt and pressurized for 20 minutes.
- ▶ Depressurize and open the lid, add 50 ml more water (total 600 ml) and mix gently.
- ▶ Apply partial pressure (cover the lid lightly) for four minutes until it is fully cooked.

Serving:

- ▶ Serve rice with sauce on top hot, accompanied by salad and lemon or any side dish of choice.



Figure 4. Rice with meat sauce cooked separately using EPC.

B) Cooking Procedure with Induction - Rice with meat sauce cooked separately



This is the total time, energy and the corresponding cost required to cook the rice and its sauce.

Functions: Boil / Steam

Rice Sauce Preparation

- ▶ Set the induction cooker at 800 watts most of the time.
- ▶ Add the oil to the pot and allow it to get hot for 1 minute.
- ▶ Add the meat and onion and cook for 5 minutes until it is light brown.
- ▶ Add the chopped tomato, green pepper, and jumbo seasoning cube and cook for 5 minutes.
- ▶ Add the potato and carrot and cook for 2 minutes.
- ▶ Add a little water and allow it to cook for 5 minutes.
- ▶ Add the tomato paste and a little more water and let it cook further for 7 minutes.
- ▶ Once everything was well cooked, add spices: red pepper, salt, Hawash spice, garlic-parsley mix, and black pepper.
- ▶ Add more water and cover the pot and allow it to cook for 5 minutes.
- ▶ Total water used: ~700 ml.

Cooking Rice

- ▶ Set induction stove at 2000 watts.
- ▶ Add 700 ml of water to the pot.
- ▶ Bring the water to a boil (for about 6 minutes).
- ▶ Add the washed rice and cover the pot to cook for 10 minutes.
- ▶ During cooking, stir and check periodically
- ▶ Then add 50 ml of water and reduce the heat to 1,600 watts.
- ▶ Then add another 50 ml of water after 4 minutes (total water used = 800 ml).
- ▶ Reduce the heat to 1,300 watts and continue cooking for a further 4 minutes until the rice is fully cooked.

Serving:

- ▶ Serve rice with sauce on top hot, accompanied by salad and lemon or any side dish of choice.



Figure 5. Rice with meat sauce cooked separately using Induction Stove.

C) Cooking Procedure with Infrared - Rice with meat sauce cooked separately



This is the total time, energy and the corresponding cost required to cook the rice and its sauce.

Rice Cooking

- ▶ Add 1 litre of water to the pot and bring to a boil.
- ▶ After 8 minutes, add the washed rice to the boiling water.
- ▶ After 20 minutes, add 100 ml of water.
- ▶ Continue cooking for 7 minutes until the rice is fully done.

Rice Sauce Preparation

- ▶ Heat the oil for 2 minutes in the pot.
- ▶ Add meat and cook for 2 minutes until lightly brown.
- ▶ Add the chopped onion and cook for 1 minute.
- ▶ Then add the chopped potato and carrot together and cook for 4 minutes.
- ▶ Add the chopped tomato and green pepper, mix well, and cook for 8 minutes.
- ▶ Add black pepper, garlic-parsley mix and cook for 2 minutes.
- ▶ Add the other spices: Jumbo cube, chili pepper spice, and Hawash spice together and cook for 1 minute.
- ▶ Add the tomato paste and cook for 3 minutes.
- ▶ Add salt and cook for 1 minute.
- ▶ Add 150 ml of water and simmer for 10 minutes and complete the cooking.

Serving:

- ▀ Serve rice with sauce on top hot, accompanied by salad and lemon or any side dish of choice.

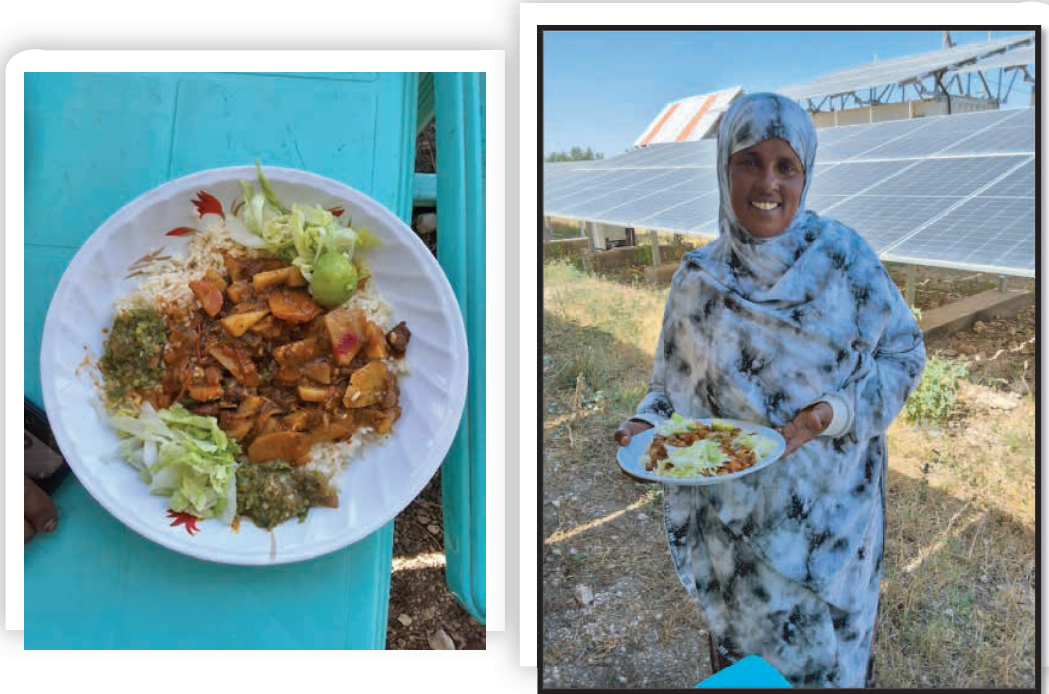


Figure 6. Rice with meat sauce cooked separately using Infrared Stove.

Table 2. Comparative Energy and Time Performance of Three Electric Cooking Appliances in Cooking Rice and Meat Sauce separately.

Stove Types	Total Cooking Time (minutes)	Electricity Used (kWh)	Estimated Cost (ETB)
EPC	46	0.723	13.74
Induction	56	1.028	19.54
Infrared	69	1.448	27.51

7.3. Baasto leh suugo hilib leh (Pasta with meat sauce cooked separately)

Spaghetti with meat and vegetable sauce is a commonly prepared meal that can be conveniently cooked using all three stoves. Just like rice, pasta (spaghetti) can be prepared in two ways: either cook the pasta and sauce separately (section 7.3) or cook the pasta together with the sauce in one pot (section 7.4). The test demonstrates the suitability of electric cooking stoves for preparing pasta-based meals efficiently and cleanly.

Ingredients:

- ▶ **Grain (Staples):** Pasta (500 g)
- ▶ **Protein:** Meat (81.6 g)
- ▶ **Vegetables:** Onion (183 g), Carrot (77 g), Tomato (115.6 g), Beetroot (93 g) and potato (196.5g), Green pepper (15.8 g), Garlic-parsley mix (1 tablespoon)
- ▶ **Condiments & Oils:** Oil (80ml), Tomato paste (50 g)
- ▶ **Seasonings & Spices:** (1&1/2 tablespoon), Jumbo seasoning cube (1 cube), Hawash spice (1 tablespoon), Black pepper (½ tablespoon), Cinnamon (½ tablespoon), Red pepper/Chili powder (½ tablespoon)
- ▶ **Water**



A) Cooking Procedure with EPC - Pasta with meat sauce cooked separately



This is the total time, energy and the corresponding cost required to cook the pasta and its sauce.

Cooking Pasta – with Spaghetti Function

- ▶ Boil two litres of water in the pot with Spaghetti function and add one tablespoon of salt.
- ▶ After 18 minutes, add the pasta to the boiling water.
- ▶ Stir the spaghetti with a fork and cook for 2 minutes without closing the lid to allow mixing and prevent the strands from sticking together
- ▶ Close the lid and cook the spaghetti for 7 minutes until fully done.
- ▶ Then drain the water and set aside.

Pasta Sauce Preparation

- ▶ Heat the oil in the pot for 1 minute.
- ▶ Add the chopped onion and cook it for 2 minutes.
- ▶ Add the meat and carrot. Mix well, secure the lid and pressurize it for 5 minutes.
- ▶ Open the lid and add the potato and green pepper. Mix well and cover the lid slightly and cook for 3 minutes.

- ▶ Add finely ground garlic-parsley mix and cook for 2 minutes.
- ▶ Add chopped tomato and cook for 3 minutes.
- ▶ Then add tomato paste, garlic-parsley mix, and the spices: red pepper, Hawash spice, and Jumbo seasoning cube and mix well and cook for 3 minutes.
- ▶ Add water and stir well and allow the sauce to simmer for 5 minutes.
- ▶ Finally add the remaining seasoning: black pepper, cinnamon and salt and mix well.
- ▶ Add some water and cook it for about 4 minutes.

Serving:

- ▶ Serve the cooked spaghetti mixed with the prepared sauce, or with the sauce on top, while hot.



Figure 7. Pasta with meat sauce cooked separately using EPC.

B) Cooking Procedure with Induction Stove - Pasta with meat sauce cooked separately



This is the total time, energy and the corresponding cost required to cook the pasta and its sauce.

Cooking Pasta

- ▶ Add 2 litres of water to a pot and place it on the induction stove.
- ▶ Set the stove to steam / boil function at 1600 W and allow the water to boil for about 17 minutes.
- ▶ Once boiling, add 1 tablespoon of salt.
- ▶ Add spaghetti to the boiling water.
- ▶ Mix with fork until it is fully cooked for 8 minutes.
- ▶ Remove the pot from the stove and drain the extra water.
- ▶ Set the spaghetti aside.

Pasta Sauce Preparation

- ▶ Place a clean pot on the induction stove and set power to 2200 W.
- ▶ Heat the pot for 1 minute and add 50 ml of cooking oil and heat it for 1 minute.
- ▶ Add chopped onion and sauté until lightly golden for 3 minutes.
- ▶ Add the meat and cook until golden brown for another 4 minutes.

- ❖ Add chopped potato, tomato, carrot and green pepper, then reduce the stove power to 1300 W and cook for 7 minutes, stirring occasionally.
- ❖ Add a small amount of water to prevent sticking and cook for 4 minutes.
- ❖ Add tomato paste and the following seasonings: garlic-parsley mix, red pepper, Hawash spice, black pepper, salt, Jumbo cube, and cinnamon powder.
- ❖ Stir well and allow the sauce to simmer for 4 minutes.
- ❖ Continue cooking for 4 minutes until the sauce is well blended and fully cooked.

Serving:

- ❖ Serve the cooked spaghetti mixed with the prepared sauce, or with the sauce on top, while hot.



Figure 8. Pasta with meat sauce cooked separately using Induction Stove.

C) Cooking Procedure with Infrared Stove - Pasta with meat sauce cooked separately



This is the total time, energy and the corresponding cost required to cook the pasta and its sauce.

Cooking Pasta

- ▶▶ Boil 2 litres of water in the pot at 2000W and add 1 tablespoon of salt.
- ▶▶ After 31 minutes, add the pasta to the boiling water.
- ▶▶ Cook the pasta for 8 minutes until it is done, then drain the water and set aside.

Pasta Sauce Preparation

- ▶▶ Heat the oil in the pot at 1600W for 1 minute.
- ▶▶ Add the onion and cook for 3 minutes.
- ▶▶ Add the meat and green pepper. Mix well and cook for 4 minutes.
- ▶▶ Add the chopped carrot, tomato, and potato. Stir and cook for 3 minutes.
- ▶▶ Add salt and cook for 2 minutes.
- ▶▶ Add garlic-parsley mix, stir and cook for 3 minutes.
- ▶▶ Stir in tomato paste and cook for 2 minutes.
- ▶▶ Add 50 ml of water, and the seasonings: Hawash spice, Jumbo cube, red pepper, black pepper, and cinnamon. Cook for 1 minute.
- ▶▶ Add another 50 ml of water and cook for 7 minutes.
- ▶▶ Increase the power to 2000W, add 20 ml water, and cook for 5 minutes.

Serving:

- ▶▶ Serve the cooked spaghetti mixed with the prepared sauce, or with the sauce on top, while hot.



Figure 9. Pasta with Meat Sauce cooked separately using Infrared Stove.

Table 3. Comparative Energy and Time Performance of Three Electric Cooking Appliances in Cooking Pasta and Meat Sauce separately.

Stove Types	Total Cooking Time (minutes)	Electricity Used (kWh)	Estimated Cost (ETB)
EPC		0.822	15.62
Induction		1.063	20.20
Infrared	70	1.435	27.27

7.4. Baasto isu dhex karisa oo leh hilib (Pasta with vegetable sauce cooked together)

Ingredients:

- ▶ **Grain (Staples):** Pasta (250 g)
- ▶ **Vegetables:** Onion (183 g), Carrot (77 g), Tomato (115.6 g), Beetroot (93 g) and potato (196.5g), Green pepper (15.8 g), Garlic-parsley mix (1 tablespoon)
- ▶ **Condiments & Oils:** Oil (40 ml), Tomato paste (50 g)
- ▶ **Seasonings & Spices:** Salt (1&1/2 tablespoon), Jumbo seasoning cube (1 cube), Hawash spice (1 tablespoon), Black pepper (½ tablespoon), Cinnamon (½ table-spoon), Red pepper/Chili powder (½ tablespoon)
- ▶ **Water**

A) Cooking Procedure with EPC - Pasta with vegetable sauce cooked together



- ▶ Heat the oil in the pot for 1 minute.
- ▶ Add onion, carrot, cabbage, and green pepper. Mix well, secure the lid and cook under pressure for 4 minutes.
- ▶ Release pressure, open the pot, and mix the ingredients.
- ▶ Add the chopped tomato and cook for another 3 minutes, mixing occasionally.

- ▶ Add a little water and cook under pressure for 3 minutes.
- ▶ Add garlic-parsley mix, red pepper, and black pepper and cook for 2 minutes.
- ▶ Stir in the tomato paste, cinnamon, and salt and cook for 3 minutes.
- ▶ Add a little water, and the chopped potato and cook for 2 minutes.
- ▶ Add 1.3 L of water and let it boil under pressure for 13 minutes.
- ▶ Once the water boils, add the pasta. Mix well with fork, then cook under pressure for 6 minutes.
- ▶ Depressurize and open the pot, then mix the pasta with fork to prevent the strands from sticking together and cook for a further 5 minutes.

Serving:

- ▶ Serve hot with salad or any side dish of your choice.



Figure 10. Pasta with vegetable sauce cooked together using EPC.

B) Cooking Procedure with Induction Stove - Pasta with vegetable sauce cooked together



- ▶ Place a pot on the induction stove and set the power to 2200 W to heat the pot.
- ▶ Add the cooking oil to the hot pot and heat it for 1 minute.
- ▶ Reduce the power to 800 W and add the chopped onion. Stir and cook it for 2 minutes to soften.
- ▶ Add the chopped potato and carrot and stir well. Allow them to cook for 3 minutes.
- ▶ Add the green pepper, chopped tomato, and cabbage together, stir to combine, and cook for 3 minutes.
- ▶ Add the red pepper, garlic-parsley mix, Hawash spice, Jumbo cube, tomato paste, cinnamon powder, and salt. Mix well and cook it for 4 minutes.
- ▶ Once the ingredients are well cooked and blended, add 1.4 litres of water.
- ▶ Increase the power to 2200 W and allow the mixture to boil for 9 minutes.
- ▶ Once boiling, add 250 g of spaghetti directly into the boiling sauce.
- ▶ Allow the spaghetti to cook for 15 minutes until the water is fully absorbed with occasional stirring with fork to prevent the strands from sticking together.

Serving:

- ▶ Serve hot with salad or any side dish of your choice.



Figure 11. Pasta with vegetable sauce cooked together using Induction Stove.

C) Cooking Procedure with Infrared Stove - Pasta with vegetable sauce cooked together



- ▶ Heat the oil in the pot at 2000W for 2 minutes.
- ▶ Add the chopped onion and cook 3 minutes.
- ▶ Add the green pepper, cabbage, carrot, and potato. Stir well and cook for 4 minutes.
- ▶ Add 25 ml of water, salt, and seasonings: Hawash spice, red pepper, garlic-parsley mix, and cinnamon and cook for 4 minutes.
- ▶ Add another 25 ml of water, the Jumbo cube, and tomato sauce and cook for 4 minutes.
- ▶ Add 600 ml of water and cook for 7 minutes.
- ▶ Add pasta, stir to mix and cook for 9 minutes and mix the pasta with fork to prevent the strands from sticking together.
- ▶ Add 100 ml of water and stir continuously.
- ▶ After cooking for 4 minutes, complete the cooking.

Serving:

- ▶ Serve hot with salad or any side dish of your choice.



Figure 12. Pasta with vegetable sauce cooked together using Infrared Stove.

Table 4. Comparative Energy and Time Performance of Three Electric Cooking Appliances in Cooking Pasta with Vegetable Sauce.

Stove Types	Total Cooking Time (minutes)	Electricity Used (kWh)	Estimated Cost (ETB)
EPC	43	0.604	11.49
Induction	37	0.632	12.00
Infrared		0.748	14.21

7.5. Shuuro (Maize Porridge)

Somali Shuro is a traditional maize-based porridge commonly prepared for its simplicity and nutritional value.

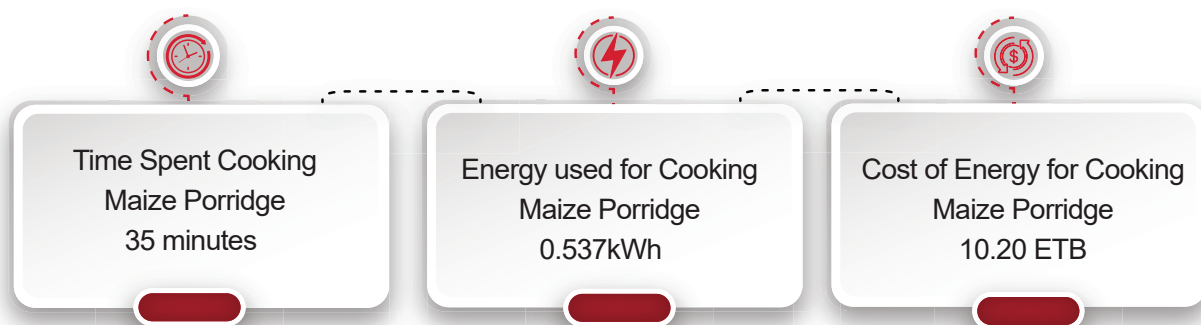
Ingredients:

- ▶ **Maize flour (coarsely ground)** – 175g
- ▶ **Maize flour (well ground)** – 75g
- ▶ **Salt** – ½ tablespoon
- ▶ **Water**



A) Cooking Procedure with EPC – Maize Porridge

Porridge function



- ▶ Bring one litre of water to boil for 10 minutes.
- ▶ Add the coarse flour and mix well, cover the lid, secure and cook under pressure for 5 minutes.
- ▶ Depressurize and open the lid to stir and check consistency, cook for another 5 minutes.
- ▶ Once the mixture thickens, add about 60 ml of water and let it cook for 4 minutes.
- ▶ Add salt and 240 ml of water and continue cooking for 6 minutes.
Add the fine flour and mix thoroughly.
- ▶ Continue cooking until smooth and thickened for 5 minutes.

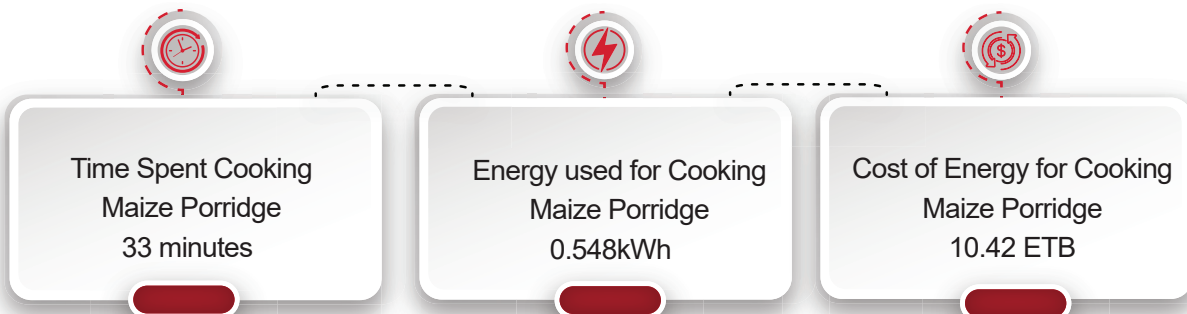
Serving:

- ▶ Serve hot Shurro with milk.



Figure 13. Shuuro (Maize Porridge) cooked using EPC.

B) Cooking Procedure with Induction Stove – Maize Porridge



- ▶ Put 1.2 litres of water into a pot and place it on the induction stove.
- ▶ Set the stove power to 2200 W and allow the water to boil.
- ▶ Once the water is boiling, add the coarse maize grain and stir continuously.
- ▶ Allow the mixture to cook until it begins to thicken.
- ▶ Reduce the stove power to 800 W.
- ▶ Add of salt and stir well.
- ▶ Once the Shuuro becomes thicker, add the fine maize grain gradually while stirring continuously.
- ▶ Continue stirring until the mixture is well cooked and smooth.
- ▶ Add a small amount of water as needed (total additional water used: 150 ml) to achieve the desired consistency.
- ▶ Continue cooking until fully cooked, then turn off the induction stove.

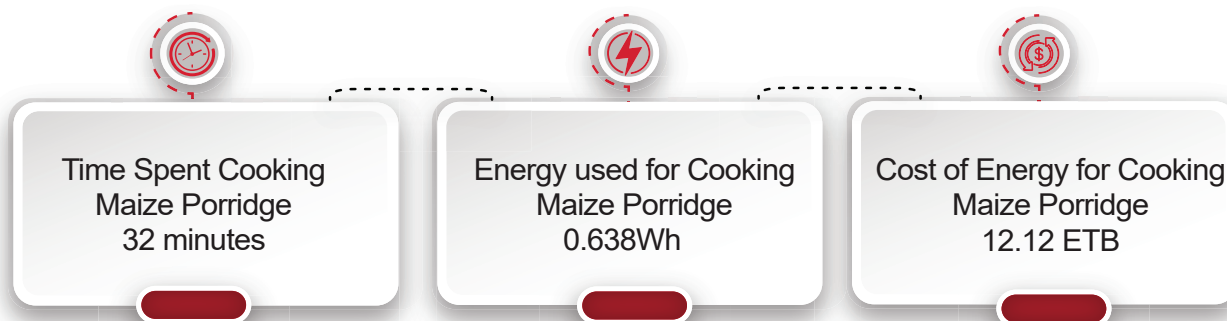
Serving:

- ▶ Serve hot Shurro with milk.



Figure 14. Shuuro (Maize Porridge) cooked using Induction Stove.

C) Cooking Procedure with Infrared Stove – Maize Porridge



- ▶ Boil water in the pot at high power (2000W).
- ▶ After 2 minutes add the coarse maize flour and stir continuously to avoid lumps.
- ▶ After 10 minutes, add salt and add the fine flour and mix thoroughly until smooth.
- ▶ Continue cooking until the mixture is well blended and reaches a smooth consistency.
- ▶ Stir gently to ensure proper mixing.

Serving:

- ▶ Serve hot Shуро with milk or yoghurt and enjoy.



Figure 15. Shуро (Maize Porridge) cooked using Infrared Stove.

Table 5. Comparative Energy and Time Performance of Three Electric Cooking Appliances in Cooking Shurro.

Stove Types	Total Cooking Time (minutes)	Electricity Used (kWh)	Estimated Cost (ETB)
EPC		0.537	10.20
Induction		0.548	10.42
Infrared	32	0.638	12.12

7.6. Misir (Lentil) Stew

Misir (lentil) stew is a widely prepared legume-based dish known for its nutritional value and suitability for electric cooking.

Cooking Preparation

- ▶ Peel, wash, and chop the onion, green pepper, tomato, and garlic-parsley mix. Keep them aside.
- ▶ Wash the lentils thoroughly with clean water and keep them aside.

Ingredients:

- ▶ **Grain (Staples):** Lentils (250 g)
- ▶ **Vegetables:** Onion (104 g), Tomato (190 g), Green pepper (10 g), Garlic-parsley mix (1 tablespoon),
- ▶ **Condiments & Oils:** Oil (50 ml), Tomato paste (25 g)
- ▶ **Seasonings & Spices:** Salt (¼ tablespoon), Jumbo seasoning cube (1 cube), Hawash spice (1/4 tablespoon), Black pepper and cinnamon (¼ tablespoon), Red pepper/Chili powder (1/4 tablespoon)



A) Cooking Procedure with EPC – Lentil Stew (Beans Function)



- ▶ Add the oil to the EPC and heat it for 1 minute.
- ▶ Add onion, mix well and secure the lid and pressurize for 3 minutes.
- ▶ Open the lid and add the chopped tomato and stir well and cover the lid slightly and cook for 3 minutes.
- ▶ Add a little water and cook it for another 2 minutes.
- ▶ Add green pepper and all the spices: Jumbo seasoning cube, garlic-parsley mix, chili pepper, black pepper, Hawash spice, and salt, and cook for 6 minutes.
- ▶ Then add tomato paste and cook for 3 minutes.
- ▶ Add the washed lentils and mix it with the sauce.
- ▶ Add about 850 ml water (total water used 1 litre) and pressurize it and cook it for 37¹ minutes.

Serving:

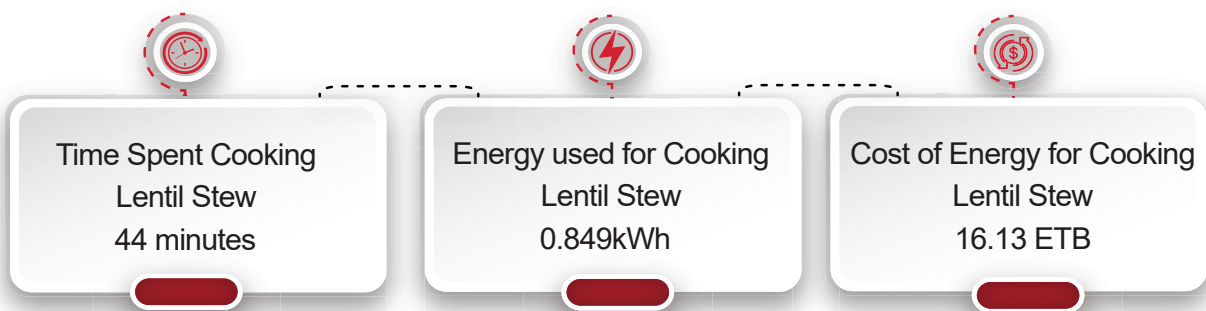
- ▶ Serve hot with Somali injera, bread, or rice, or any side dish of your choice.

1. This cooking period seems slightly longer than necessary. The lentils appear to be somewhat overcooked; therefore, a reduction in cooking time is recommended.



Figure 16. Misir (Lentil) Stew cooked using EPC.

B) Cooking Procedure with Induction Stove – Lentil Stew



- ▶ Place a pot on the induction stove and set the power to 2200 W to heat the pot.
- ▶ Add cooking oil to the hot pot and let it heat for 1 minute.
- ▶ Reduce the stove power to 800 W using the low-fire function.

- Add the chopped onion and cook until soft for 3 minutes.
- Add the chopped tomato and green pepper, stir well and cook for 6 minutes.
- Add Jumbo seasoning cube and stir.
- Add a small amount of water and allow the mixture to simmer for 4 minutes.
- Add the other seasonings: red pepper, Hawash spice, black pepper, salt and the garlic-parsley mix. Stir thoroughly and cook for 4 minutes.
- Add the tomato paste, mix well, and cook for 3 minutes.
- Add the washed lentils and 700 ml of water, then stir.
- Increase the stove power to 2200 W and allow the stew to cook for 12 minutes, with occasional mixing.
- Continue cooking and gradually add the remaining 300 ml of water and stir occasionally and ensure the lentils are well cooked for another 10 minutes.

Serving:

- Serve hot with Somali injera, bread, or rice, or any side dish of your choice.



Figure 17. Misir (Lentil) Stew cooked using Induction Stove.

C) Cooking Procedure with Infrared Stove – Lentil Stew



- ▶ Heat oil in the pot at 2000W for 1 minute.
- ▶ Add the chopped onion and cook for 1 minute.
- ▶ Add the green pepper and stir for 2 minutes.
- ▶ Add the chopped tomato and cook until softened for 8 minutes.
- ▶ Stir in the tomato paste and cook for 1 minute.
- ▶ Add the Jumbo cube seasoning and mix well.
- ▶ Add 25 ml water, garlic-parsley mix, red pepper, Hawash spice, black pepper, and salt. Stir thoroughly cook for 3 minutes.
- ▶ Add 500 ml water and the washed lentils. Mix well and simmer for 10 minutes.
- ▶ Add 200 ml water and continue simmering for another 14 minutes, mixing occasionally until the lentils are soft and completely cooked.

Serving:

- ▶ Serve hot with Somali injera, bread, or rice, alongside tea or any side dish of your choice.

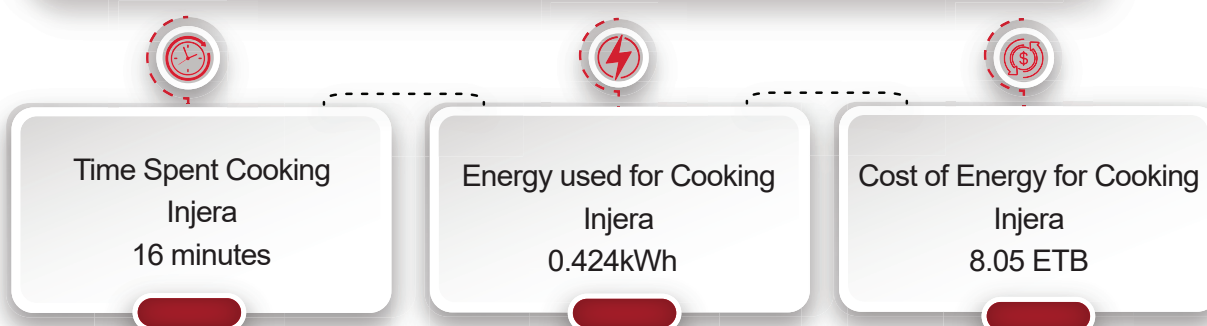


Figure 18. Misir (Lentil) Stew cooked using Infrared Stove.

Table 6. Comparative Energy and Time Performance of Three Electric Cooking Appliances in Cooking Lentil Stew.

Stove Types	Total Cooking Time (minutes)	Electricity Used (kWh)	Estimated Cost (ETB)
EPC	56	0.461	8.75
Induction	44	0.849	16.13
Infrared	4	0.869	16.52

7.7. Laxoox (Injera) - mixed flour of Wheat & Sorghum



Ingredients:

- ▶ Wheat flour – 200g
- ▶ Sorghum flour – 100g
- ▶ Water

Preparation

- ▶ Mix the wheat flour and sorghum flour thoroughly with water.
- ▶ Leave the mixture to ferment overnight (about 12 hours) to prepare the batter (a semi-liquid mixture made by combining flour with water).
- ▶ The prepared batter was measured (691 g) in the morning for baking.

Cooking Procedure with Infrared Stove

- ▶ Heat the baking plate at 2000W until hot.
- ▶ Add a small amount of oil (craw) to the hot pan to grease it evenly.
- ▶ When hot, pour batter for the first injera and take out the injera every 45 seconds (on average). Continue pouring and baking until all batter is used.
- ▶ Total yield from the 300 g flour mix is 13 injeras.
- ▶ Serve warm with tea or any side dish of your choice.



Figure 19. Injera (Laxoox) cooked using Infrared Stove.

Table 7. Energy & Time Performance for cooking Injera.

Stove Types	Total Cooking Time (minutes)	Electricity Used (kWh)	Estimated Cost (ETB)
EPC	X	X	X
Induction	X	X	X
Infrared	16	0.424	8:05

7.8. Digir (Kidney Beans Ful)

Beans (Ful) stew is a nutritious legume-based dish commonly prepared for household meals.

Ingredients:

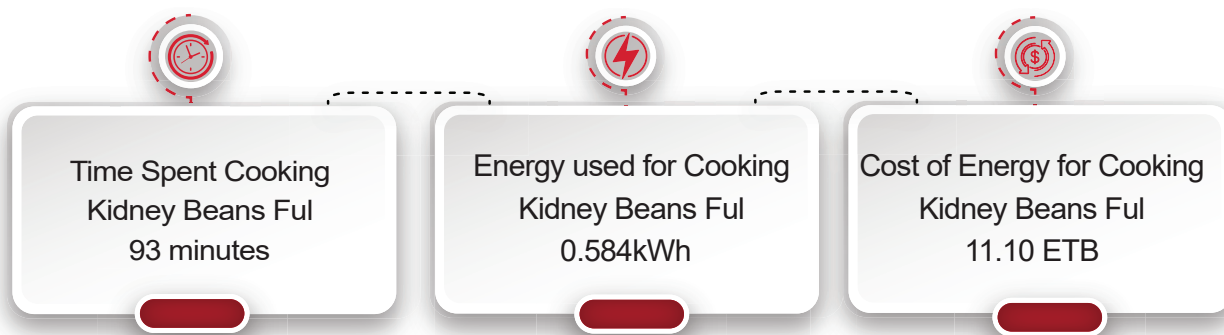
- ▶ **Grain (Staples):** Kidney beans (250 g)
- ▶ **Vegetables:** Onion (148 g), Tomato (120 g), Green pepper (10 g), Garlic mixed with parsley (1 tablespoon),
- ▶ **Condiments & Oils:** Oil (50 ml), Tomato paste (50 g)
- ▶ **Seasonings & Spices:** Salt ($\frac{1}{4}$ tablespoon), Jumbo seasoning cube ($\frac{1}{2}$ cube), Hawash spice ($\frac{1}{4}$ tablespoon), Black pepper and cinnamon ($\frac{1}{4}$ tablespoon), Red pepper/Chili powder ($\frac{1}{4}$ tablespoon)



Preparation Steps Before Cooking

- ▶ Peel, wash, and chop onions, tomato, green paper, and garlic and set them aside separately.
- ▶ Crush the garlic and parsley together and set aside.
- ▶ Grind the dried spices - black pepper and cinnamon. The other spices were purchased ready-made from the market.
- ▶ Clean the beans and wash thoroughly with clean water and set it aside.

A) Cooking Procedure with EPC – Kidney Beans



Cooking Beans

- ▶ Put 1 litre of water into the pot.
- ▶ Add washed beans and pressurize it.
- ▶ Allow the beans to cook for 69 minutes total until it is completely cooked.

Sauce for the beans

- ▶ Add the cooking oil to the pot and heat it for 1 minute.
- ▶ Add the chopped onion and green pepper together and cook for 3 minutes, covering the lid slightly, and stirring occasionally.
- ▶ Add the chopped tomato, mix well, and cook for 2 minutes.
- ▶ Then add about 50 ml of water and cook with the lid covered for 5 minutes.
- ▶ Add the seasoning: salt, Hawash spice, Jumbo, and red pepper powder, garlic and parsley mix, and cook for 2 minutes.

- ▶ Add another 50 ml of water and cook for another 5 minutes.
- ▶ Then add the cooked beans to the sauce.
- ▶ Add 250 ml of water and pressurize for 6 minutes until it is cooked well.

Serving:

- ▶ Once well cooked, mash the beans a little with a spoon and serve with bread.



Figure 20. Beans (Kidney Beans) cooked using EPC.

B) Cooking Procedure with Induction Stove – Kidney Beans Ful



Cooking Beans

- ▶ Put 1 litre of water into a pot and place it on the induction stove.
- ▶ Set the stove to 2200 W using the hot pot/boil setting.
- ▶ Once the water begins to boil, add the dried beans.
- ▶ Allow the beans to cook, monitoring occasionally, stirring, and adding water (used over two litres) as needed.
- ▶ Continue boiling until the beans are fully cooked for a total of two hours and 24 minutes.
- ▶ Remove the pot from the stove, drain the extra water, and set the cooked beans aside.

Preparing the Sauce

- ▶ Place a clean pot on the induction stove and set the power to 2200 W.
- ▶ Add the cooking oil and heat it for 1 minute.
- ▶ Add the chopped onion, green pepper, and stir well, and cook for 3 minutes.
- ▶ Add the chopped tomato and the seasonings: red pepper, Hawash spice, black pepper, parsley-garlic mix, salt, and Jumbo seasoning cube.
- ▶ Stir thoroughly and allow the sauce to cook by adding a little water occasional for 15 minutes.
- ▶ Add the cooked beans to the prepared sauce.
- ▶ Stir well to ensure even mixing and allow to heat for 4 minutes.

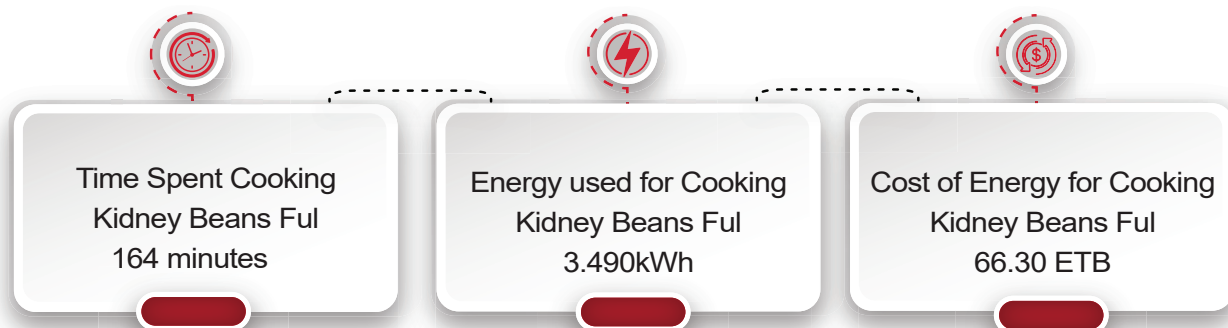
Serving:

- ▶ Serve hot with bread or any side dish of your choice.



Figure 21. Beans (Kidney Beans) cooked using Induction Stove.

C) Cooking Procedure Infrared Stove - Kidney Beans Ful



Cooking Beans

- ▶ Wash the beans well with clean water.

- ▶ Add one litre of water to the pot and boil it at 2000W for 3 minutes.
- ▶ Add the beans and start cooking.
- ▶ Add 250 ml of water at 41 minutes, then add a further 250 ml each at 57, 92, and 129 minutes into the cooking process.
- ▶ Continue cooking for another 15 minutes, (for a total cooking time of 144 minutes), until the beans are fully boiled.

Preparing the Sauce

- ▶ Heat the oil at 2000W for 3 minutes.
- ▶ Add chopped onion and green pepper.
- ▶ After 3 minutes, add chopped tomato and stir well.
- ▶ After 1 minute, add tomato sauce, garlic-parsley mix, cinnamon, red pepper, Hawash, and salt. Mix thoroughly.
- ▶ After 3 minutes, add 100 ml of water and half a Jumbo cube. Stir gently.
- ▶ After 5 minutes, add the boiled beans together with its cooking water.
- ▶ After another 8 minutes, the sauce blends well with the beans.

Serving:

- ▶ Serve hot with bread or any side dish of your choice.



Figure 22. Beans (Kidney Beans) cooked using Infrared Stove.

Table 8. Comparative Energy and Time Performance of Three Electric Cooking Appliances in Cooking Kidney Beans Ful.

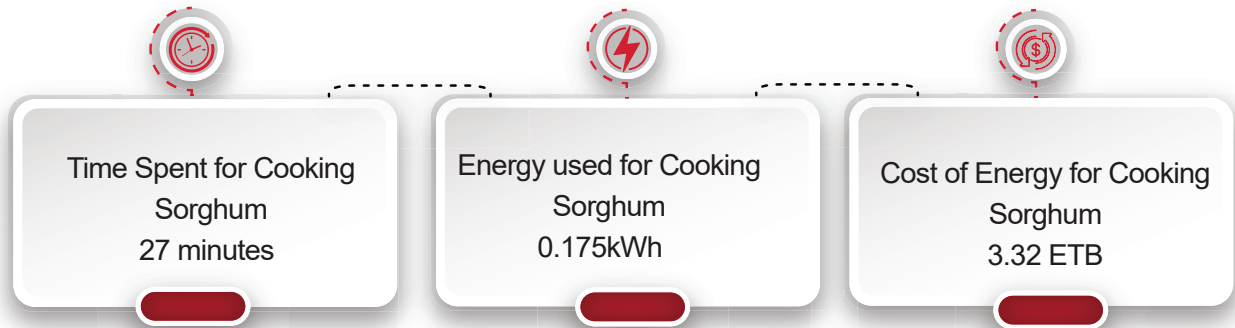
Stove Types	Total Cooking Time (minutes)	Electricity Used (kWh)	Estimated Cost (ETB)
EPC	93	0.584	11.10
Induction	163	3.644	69.23
Infrared	16	3.490	66.30

7.9. Goraw (Sorghum)

Ingredients:

- ▶ Sorghum grain - 250 g
- ▶ Salt
- ▶ Water
- ▶ Milk

A) Cooking Procedure with EPC – Sorghum



Boiling the Sorghum

- ▶ Put 850 ml of water into the EPC pot and boil it for 4 minutes.
- ▶ Wash and add the Sorghum.
- ▶ Pressurize it to cook for 23 minutes.
- ▶ Remove the pot and drain the extra water.

Serving:

- ▶ Serve it hot with boiled milk

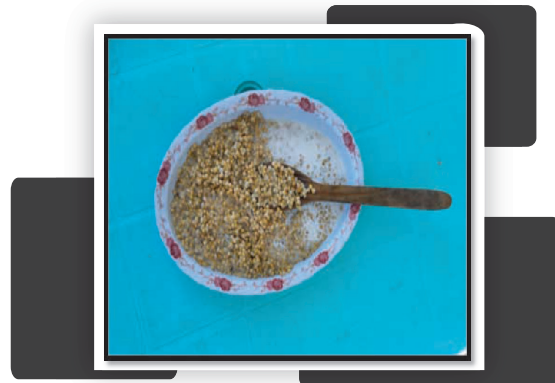
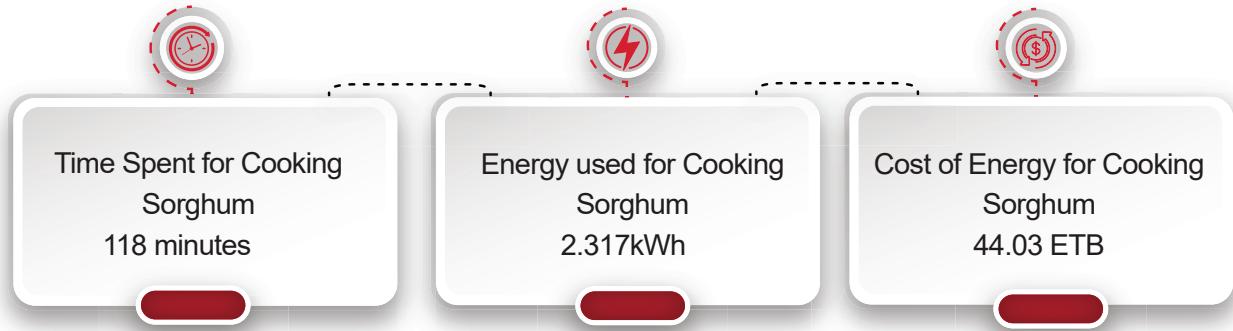


Figure 23. Sorghum cooked using EPC.

B) Cooking Procedure with Induction Stove - Sorghum



Boiling the Sorghum

- Set the stove to 2200 W using the hot pot/boil setting.
- Put 850 ml of water into a pot and boil it for 5 minutes.
- Wash and add the sorghum² and let it cook for 113 minutes, monitoring occasionally, stirring as needed, and adding water gradually until fully cooked (a total of 3 litres used).

Serving:

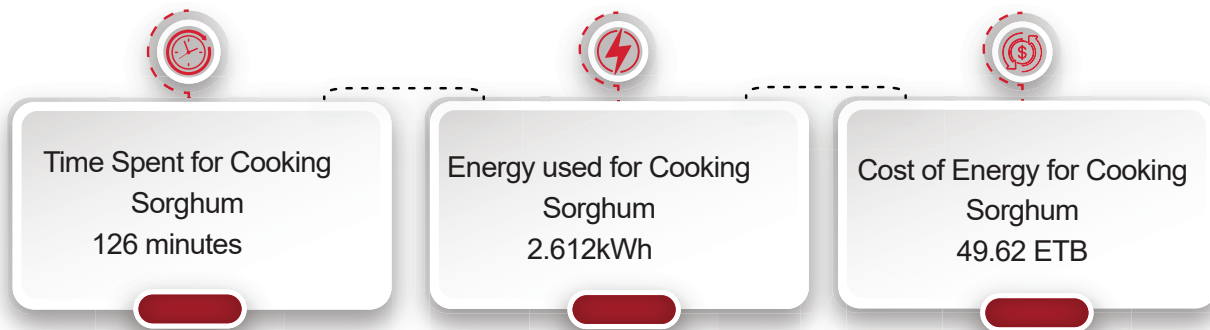
- Serve it hot with boiled milk.



Figure 24. Sorghum cooked using Induction Stove.

2. The cook lightly wet the sorghum with a small amount of water and removed the tip and part of the husk from the grains using a small pestle and metal cup before cooking.

C) Cooking Procedure with Infrared Stove



- ▶ Boil 1 litre of water with 2000W.
- ▶ After 5 minutes, wash the sorghum and add it to the boiling water.
- ▶ Continue simmering and gradually add more water during cooking (a total of 3 litres used).
- ▶ Cooking completed after 2 hours and 6 minutes.

Serving:

- ▶ Serve the sorghum hot with milk or yogurt.



Figure 25. Sorghum cooked using Infrared Stove.

Table 9. Comparative Energy and Time Performance of Three Electric Cooking Appliances in Cooking Sorghum.

Stove Types	Total Cooking Time (minutes)	Electricity Used (kWh)	Estimated Cost (ETB)
EPC	27	0.175	3.32
Induction		2.317	44.03
Infrared	126	2.612	49.62

8. Key Findings:

- Electric cooking significantly reduces cooking time and indoor air pollution.
- Electricity costs are often lower or comparable to monthly charcoal expenditure.
- EPCs deliver the greatest efficiency gains for stews and mixed dishes.
- Women report improved convenience, cleanliness, and taste.

9. Conclusion

The Somali eCookbook demonstrates that electric cooking is a viable, culturally appropriate, and cost-effective solution for refugee and host communities when supported by reliable electricity infrastructure.

By combining rigorous data with lived experience, this eCookbook provides donors, governments, and implementing partners with actionable evidence to scale clean cooking interventions and accelerate progress toward energy access, health, and climate goals.