

THE TANZANIA eCOOKBOOK

Plus eRecipes for
Tanzanian Staple
Foods



Electric Pressure Cooker - the Ultimate Clean Cooking Solution

Save: *Money Time Trees Life*

General Edition - 2020

TATEDO

THE TANZANIA **eCOOKBOOK**

THE EFFICIENT ELECTRIC PRESSURE COOKER (EPC)
THE ULTIMATE CLEAN COOKING SOLUTION

Plus eRecipes for Tanzanian Staple Foods



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The Tanzania
eCOOKBOOK

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EXECUTIVE SUMMARY

This first edition of the Tanzania eCookBook focuses on energy-efficient cooking, specifically the opportunity for cooking with electric appliances. In achieving the goal for the transition from inefficient use of biomass to clean cooking solutions, we have introduced highly efficient electric cooking appliances, specifically the Electric Pressure Cooker (EPC) as the appropriate ultimate clean cooking solution for the Tanzanian context.

The book starts by presenting the current cooking situation in Tanzania, fuels currently used and related appliances, indicating the gap and opportunity for modern energy cooking services. The main section focuses on the highly efficient EPC, enlightening its advantages and how it can be used and adopted in cooking many of the Tanzanian staple foods.

The book also provides evidence on how cooking with efficient electric appliances is possible, cost efficient, time saving and clean. It goes further on how one can save even more energy and money through better kitchen management practices. The twin challenges of lack of awareness and lack of availability are addressed in the final section of the book.

ACKNOWLEDGEMENTS

This eCookbook is based on the research study implemented by TaTEDO. We would like to thank UK Aid (DFID) for funding the research study entitled '*Approach to designing delivery models of modern energy cooking services in Tanzania.*' through the Modern Energy Cooking Services programme (MECS). We are grateful for the insight & expertise from Loughborough University who are implementing the MECS programme for always being there to assist and advise during the course of this project.

We also thank all government officials, the President's Office Regional Administration and Local Government for the required permissions on time, and the Ministry of Energy and other Government institutions for continuous collaboration. We would also like to express our gratitude to the Regional Administrative Secretaries of Dar es Salaam and Morogoro, the District Executive Directors of the three districts, Gairo, Kinondoni and Ubungu, where this project was implemented. We are really grateful to the ward and street leaders as well as the selected households and individuals for providing maximum cooperation and valuable inputs to the project.

Many other people have participated in the preparation of this book. It's our wish to mention each by name but it is not easy. We would finally like to acknowledge their contribution and willingness to be part of this book.

CHAPTER ONE

INTRODUCTION

The Tanzania eCookbook, general edition has been written by TaTEDO-Centre for Sustainable Energy Services as part of a research project on 'Approach to designing delivery models of modern energy cooking services in Tanzania.' The project was implemented under the Modern Energy Cooking Services programme (MECS) supported by the UK Government (UK Aid) through Loughborough University and draws lessons from the previous Tanzania eCook study conducted in 2018 by TaTEDO in collaboration with University of Sussex, University of Loughborough and Gamos Ltd. The aim is to support the ongoing global and national efforts to switch from inefficient use of biomass to clean cooking solutions and provide useful information as to why the transition is necessary.

Some Tanzanians are still hesitant as to whether electricity can be affordably used for cooking. Most are not aware of modern efficient electric cooking appliances that save time, money and cook highly nutritious foods. In areas where eCook demonstrations and trainings have been conducted for both national grid, mini-grid electricity users and solar home systems, with the mobile battery-supported prototype people were willing and

eager to cook in modern ways after understanding the many benefits as compared to the negative effects of using inefficient biomass cook stoves.

This eCookbook edition provides the necessary information and reveals the advantages of modern cooking electric appliances for most of Tanzanian society. It also gives insight on how to easily cook some common Tanzanian dishes using the EPC with similar or better taste whilst saving money, time, life and forests.



eCook training for mini-grid electricity users at Londoni - Singida

CHAPTER TWO

COOKING EXPERIENCE IN TANZANIA

Tanzanians depend mostly on firewood and charcoal for meeting their daily cooking energy needs as in figure 1. Cooking is mainly carried out on traditional, low efficiency stoves with less than 10% combustion efficiency. Such stoves use charcoal produced locally through inefficient practices in informal and poorly managed value chains and with basic, low-yield technologies. Most Tanzanians consume home prepared foods and cooking energy accounts for a significant percentage of and, is a major demand for poorer households income. Hence paying attention to how food is cooked, and the type of energy and appliances in use will save families a lot of money, time and lives as in figure 2.

2.1 Traditional Ways of Cooking in Tanzania

The population of Tanzania was approximately 44.9 million by the 2012 census with many different cooking cultures influencing the amount of fuel used, stoves and the cooking practices employed. It is believed that most of the traditional meals in rural areas are best cooked with firewood and in urban areas with charcoal. The case in point is *Kibulu*, the Chagga traditional food and *Kipaali* of the Singida people which are believed to be best cooked with traditional firewood stoves in clay pots.



Chagga traditional foods - Kibulu, Ngararimo and roasted corn

Despite the cultural diversity across Tanzania, there are some common foods like Ugali, Wali, Kande etc. which are cooked by the majority nationwide. These can also be cooked affordably and easily using modern energy cooking appliances/services as we will see in chapter 4.

2.2 Cooking Fuels in Tanzania

Like in many other developing countries, biomass is the major source of cooking energy in Tanzania. Figure 1 below shows the percentage distribution of households by sources of energy for cooking in Tanzania.

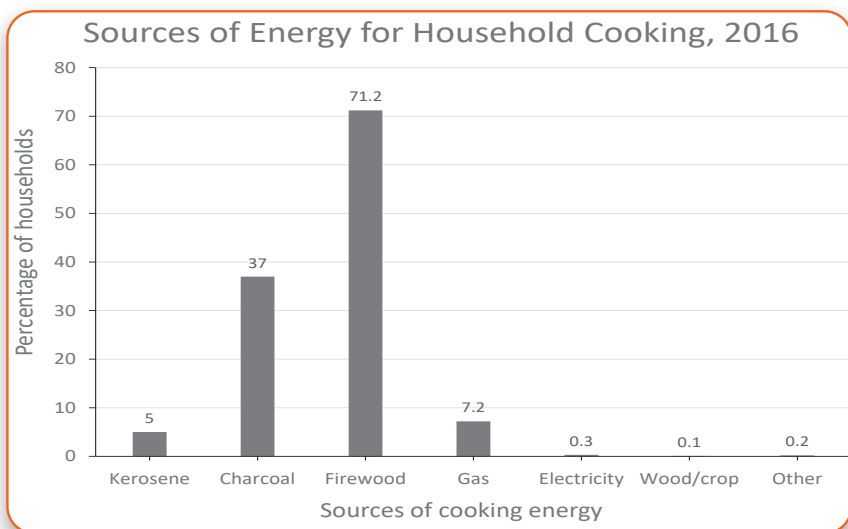


Figure 1; REA, NBS Energy Access Situation (2016)

According to the Energy Access Situation Survey (REA/ NBS (2016)), charcoal is mostly used in urban areas and it is the second most popular cooking energy to firewood, with consumption constituting 37% of total cooking energy used in the country. Also fuel stacking is very common in most of the households (most of which interchangeably use charcoal, Liquefied Petroleum Gas (LPG) and/or kerosene).

2.3 Cooking Appliances

Inefficient three-stone fireplaces are mostly used in rural areas and inefficient low quality metal charcoal stoves are used in urban areas, whereas Improved Charcoal Stoves (ICS) and LPG are used by a small percentage in urban and peri-urban areas. Less than 1% of Tanzanians use electricity as their primary cooking fuel according to the data above and most people in rural areas are not aware of electric cooking opportunities.

Traditional Cook Stoves

In the Tanzanian context, traditional cook stoves are referred to as three-stone fireplace (mafiga matatu) and single-walled metal charcoal stoves as shown in Box 1.



Three-stone fireplace

Uses firewood as the source of energy. It is largely used in rural areas because no initial costs are involved.

Disadvantages

- Air pollution that leads to health problems
- Inefficient energy transfer to the cooking vessel
- Not safe
- Time wasting
- Environmental degradation



Single walled metal charcoal stove

Uses charcoal as the source of energy. It is used in urban, peri-urban and rural areas.

It is mostly used in urban areas because

- Availability of charcoal and the stoves are inexpensive.
- Charcoal is much preferred for barbeque.
- Charcoal is easier to transport than firewood.

Disadvantages

- Charcoal smoke can cause health problems and even death
- Lighting charcoal is tedious
- High heat loss is incurred

Box 1: Traditional cook stoves

Improved Cook Stoves

This is a low cost bridging technology designed to reduce fuel consumption and to reduce smoke emissions. Box 2 describes some common ICS.



*Brick-made with tiles
finishing wood stoves*

Used in rural and in some peri-urban areas. Uses less firewood than three-stone fireplace. Reduced indoor air pollution.

Disadvantages

- Relatively high emissions to the environment.
- Time waste on firewood collection.
- Climate change due to deforestation



*Improved metal ceramic
charcoal stove*

Uses charcoal. It is used in urban, peri-urban and rural areas.

It is mostly used in urban areas because charcoal is largely available, and the ceramic liner prevents heat loss hence, more efficient than single walled metal charcoal stoves. It is also preferred for barbeque.

Disadvantages

- Charcoal smoke can cause health problems and even death
- Lighting charcoal is tedious
- Difficult to control heat output



SeTa Improved charcoal stove

Improved highly efficient charcoal stove which is used mostly in urban areas. It has higher combustion efficiency, uses less charcoal and cooks fast.

Disadvantages

- Lighting charcoal is tedious
- Difficult to control heat output
- Relatively high emissions to the environment

Box 2: Improved Cook Stoves (ICS)

Modern Cooking Appliances/Devices



Induction stove

Can cook almost all types of food

Advantages

- Heats pot directly, reducing heat loss
- Highly controllable (power levels & timer)
- Easy to clean

Disadvantages

- Cannot bake or grill (except on griddle pan)
- Can only use flat-bottomed steel pots



Hotplate

Can cook a variety of foods

Advantages

- Highly versatile – can work with almost any pot/pan
- Most comparable to charcoal/gas

Disadvantages

- It is inefficient with round bottomed pans
- Energy often lost around the edges of pot/pan if it is not fitting well
- Cannot bake or grill



Kettle

A kettle is used for boiling water

Advantages

- Very quick to boil, so little time for heat to be lost

Disadvantages

- No insulation, so hot water not used immediately quickly cools
- High power



Gas stove

Can cook a variety of foods

Advantages

- Very powerful, so quick to bring water to the boil
- Highly controllable

Disadvantages

- Dependent on price & availability of gas
- LPG and cylinders are imported, foreign currency dependent.
- Safety issues

Box 3: Modern Cooking Appliances/Devices

Modern Highly Efficient Cooking Appliances



Rice cooker

A rice cooker uses electric energy to cook rice and some other low energy foodstuffs like vegetables, porridge, bananas etc

Advantages

- Automatically controlled
- Often insulated

Disadvantages

- Boiling & steaming only
- No control over power



Thermal pot

Thermal pot is an electric appliance used to boil water

Advantages

- Insulation reduces power consumption compared to kettle
- Keeps contents warm ($>50^{\circ}\text{C}$) for up to 5 hours

Disadvantages

- Low power means it is slow for lots of water (5 liters boils in 45 minutes)



Electric pressure cooker (EPC)

An EPC uses electricity as the source of energy. It has high efficiency, saving time and money.

Box 4: Modern highly efficient cooking appliances

THE CHEAPEST & FASTEST WAY TO COOK IS TO USE EPC

Efforts were made to know if anything could beat an Electric Pressure Cooker (EPC) on cost, so we boiled 500g of yellow beans as carefully as we could on charcoal, kerosene LPG, an electric hot plate and on EPC.

All the tricks in the book were applied - lids on the sufarias, turning down to a simmer, just enough water, etc. However, we still couldn't get close to an EPC.

Not only was it thirteen times cheaper than charcoal, but it cooked in half the time without any stirring or topping up of water or fuel.

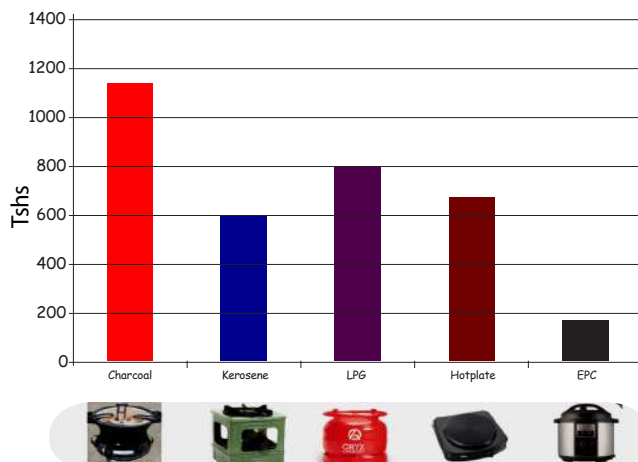


Figure 2; Cooking cost Comparison of different appliances

CHAPTER THREE

COOKING WITH ELECTRICITY



Why use it for cooking

Electricity is generated in the country and once you are connected to the grid, it is readily available in your house. You only need to pay for the bill (no moving around to look for a seller).

It also opens doors to a range of new efficient cooking appliances that can make cooking much easier, as well as **saving a lot of time and money.**

Is it not expensive?

Many people think it is expensive. As you will see, it is not! Most meals (i.e. multiple dishes) can be cooked with less than 1 unit of electricity. Only heavy foods such as beans would ever use as much as 2 units when cooked on a very inefficient device such as a hotplate.

What has changed?

The grid is expanding all the time, connecting new households in both rural and urban areas across Tanzania.

Historically, electricity has been in short supply, but the government has scaled up efforts to generate, distribute and ensure greater access to electricity to more Tanzanians. Also significant efforts to develop mini-grids have been made, more than 100 mini-grids have been developed in Tanzania with capacity of 157. MW (TaTEDO, WRI 2017).

Meanwhile, the Government is encouraging people to move away from polluting fuels like charcoal and kerosene with various restrictions, bans and levies.

We now know that globally more than 4 million people and in Tanzania more

20,000 people die every year from effects of smoke while cooking with inefficient firewood stoves. (WHO, 2010)

Why use it now?

There are **new highly efficient electric cooking appliances entering the market all the time**. Some only cook very specific foods (e.g. toaster), some are mostly used for warming (e.g. microwave), but others can cook almost anything you can think of (e.g. hotplate). Best of all, **some can save you a lot of time, money and effort all at once** (e.g. EPC).

How safe is it?

All energy sources have risks associated with them, however an electric heating element is a lot safer than deliberately lighting a fire in your own home! The main

risk with electric cooking is burning out thin wiring with dodgy connections that were installed for lower power appliances like lights or phone charging.

If you're in any doubt about whether the wiring in your household is safe for cooking, please consult a local electrician.

Isn't supply unreliable?

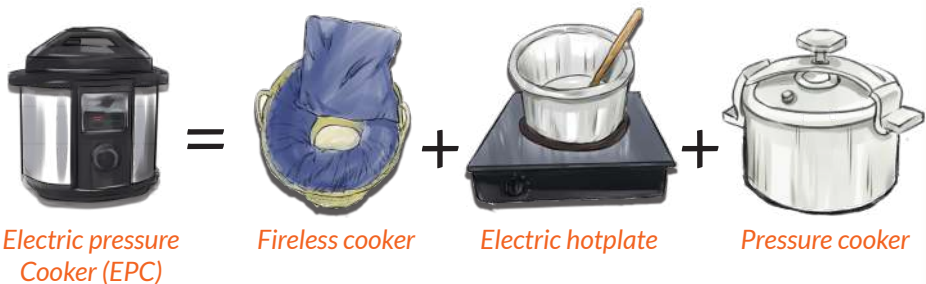
Blackouts and brownouts (voltage dips) before meal times can render electric stoves useless. However reliability has improved significantly in recent years as the grid has grown stronger. Efforts are also ongoing to ensure availability of battery supported EPCs in the future. A battery can be charged when the grid is available and power the cooking appliance when it is not.

3.1 Electric Pressure Cookers (EPCs)

What is an Electric Pressure Cooker?

An electric pressure cooker (multi-cooker) is simply a highly insulated sealed pot which works on a simple principle, steam pressure. The steam enclosed inside builds up high pressure thus helping food to cook faster and stay tasty and nutritious. The timer switch and temperature/pressure sensors switch the power off as soon as it reaches the right point in the cooking cycle. The EPCs can carry out various cooking operations such as frying, boiling, steaming, pressure cooking and baking.

The EPC combines several familiar cooking appliances: fireless cooker (insulator), electric hot plate and pressure cooker.



Parts of Electric Pressure Cooker



How it works;

A pressure cooker is a sealed pot with a valve that controls the steam pressure inside. As the pot heats up, the liquid inside forms steam, that raises the pressure in the pot. This high-pressure steam has two major effects:

1. Raises the boiling point of the water in the pot

When cooking something wet, like beans, the heat of your cooking is limited to the boiling point of water 212°F /100°C but with the steam's pressure the boiling point can get as high as 250°F/122°C. This higher heat helps the food to cook faster.

2. Raises the pressure, forcing liquid into the food

The high pressure also helps force liquid and moisture into the food quickly, which helps it cook faster and also helps certain foods, like tough meat, get very tender very quickly.

Function of the main parts

Housing

This is the exterior pot, the outside of the pressure cooker which contains the electronics, the buttons, and the heating element.

NOTE: Never add ingredients directly to the housing or submerge the housing in water!

Inner pot

This is the one that fits inside the housing where ingredients are put.

Lid/Cover

The lid locks in place on top of the housing.

Pressure Release Valve

This switch controls the steam inside the pot. Switch it closed to build pressure in the pot and open it to release pressure.

Float Valve

This tiny part is a safety feature of electric pressure cookers. As the pressure cooker comes to pressure, the float valve is pushed up until the mini-gasket seals the cooker. When the float valve is up, the lid locks and cannot open. This means the cook cannot hurt themselves by being exposed to high pressure steam.

Sealing Ring

This removable ring is made of tough, food-grade silicone and attaches to the underside of the lid. When the lid is locked in place, this ring creates the airtight seal that lets the pressure cooker come to pressure.

Anti-Block Shield

It prevents food and foam from entering the pressure release switch.

How to Use Electric Pressure Cooker

There are many varieties of electric pressure cookers, but we can classify them by their user interface and control system into two major groups:

Type A

Button Type (Electronic EPC's)

These are models with buttons which are pre-sets for cooking time to cook specific foods.

Button type only starts timing when it reaches pressure.



Button Type EPC

Type B

Rotary type (Mechanical EPC's)

These are models with a rotary timer switch, whereby the user simply selects how long they want to cook for by turning the dial to the appropriate number of minutes.

Rotary dial type starts timing as soon as you let go of the dial, so time depends on how much food is inside. When full, it can take up to 20 mins to get to pressure.



Rotary Dial EPC

Steps on How to Operate an Electric Pressure Cooker

Prepare all ingredients and equipment before starting:

Step 1. Plug in electric socket and turn on the EPC. Check that the pressure cooking pot is in place inside the housing and that the sealing ring and valve are installed correctly.



Step 2. In the cooking pot, stir together the particular food with the recommended amount of water/liquid (*see chapter 4, recipes*).



Step 3. Lock the lid in place, and verify that the pressure release valve is in the sealed position.

Step 4. For rotary dial EPCs use the rotary knob to set the time as per the particular recipe. Worth noting that whilst these dial type instructions apply to all dial type models, these button type instructions are specific to one particular model. On other button type models different buttons have to be pressed.



Step 5. When the cook time expires, wait for 15-20 minutes for it to totally depressurise naturally then just open the lid or depressurise straight away.



Step 6. Turn the lid to the unlocked position and carefully remove the lid, pointing it away from the face.

Step 7. Serve and enjoy your tasty meal.



Advantages of Using Electric Pressure Cookers

1. **Saves time** - Cook food in a fraction of the time and it still tastes good.
2. Can **boil, fry, steam** and **bake**.
3. **Retains nutrients** – No steam escapes hence nutrients are retained.
4. **The kitchen is cooler** – Since EPCs are insulated retain the heat and steam so that none of it escapes to heat up a kitchen, if allowed to depressurise naturally.
5. **It is very convenient** – An EPC is automated, which means that it is very difficult to burn the food as it switches off the power when the temperature in the pot gets too high. Also, once the time is set everything else is auto-regulated sparing precious time to do some other important things while waiting for delicious the meal.
6. **Cost saving** - Highly energy-efficient, most dishes can be cooked with less than half a unit of electricity.
7. **Better flavors** - Obtained from steam prevented from escaping and locking the flavor inside.
8. **Cooks from frozen** – If you forget to defrost frozen food, just cook directly.
9. **Consistent results** – Once you figure out the time required to cook a certain type of food, you are guaranteed to cook perfect dish every time.
10. **Improved health** – Avoid health problems caused by smoke and other hazardous emissions from combustion of biomass.
11. **Environmental protection** – Saves forests by helping avoid overuse of green natural resource.
12. **Safety** – EPCs have multiple safety features that prevent any unexpected scenarios.

Disadvantages

1. Use only one type of pot.
2. Not suitable for some food like nyama choma, chapatti and deep frying.
3. Not yet available in most Tanzanian stores - but contact TaTEDO.
4. Looks complicated at first.
5. The appliance costs about twice as much as an electric hotplate. Cannot open the pot instantly whilst pressure cooking.

EPC SAFETY FEATURES

Locking pin

Prevents lid from being opened when pressurized

Pressure release valve

Automatically opens when pressure exceeds normal levels

Insulation

The heat source is fully enclosed, so the outside is cool to the touch

Thermal Fuse

Cuts power when temperature rise above expected

Pressure sensor

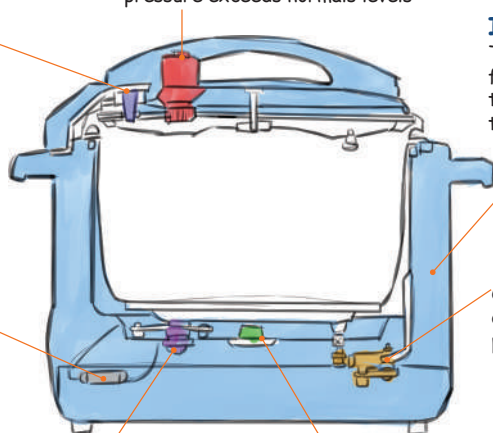
Cuts power when operating pressure reached

Secondary pressure relief valve

If pressure sensor & pressure release valve both fail, this automatically opens to release pressure

Temperature sensor

Cuts power when operating temperature reached



3.2 Adapting to Modern Ways of Cooking

Can it be adopted in Tanzania!?

A cooking diary study which was carried out by TaTEDO in collaboration with Gamos Ltd of UK, to explore the possibility of using electricity for cooking in Tanzania. Twenty households in Dar es Salaam cooked all their food with electric cooking appliances for 1 month whilst recording their electricity consumption. It had positive results in cooking with EPCs and explored the potential of uptake in Tanzania of modern cooking concepts.



"I used to spend 45,000 Tshs. per month on gas and 30,000 Tshs. per month on charcoal and cooking was slow. After transitioning to electricity, we used just 2 units a day, or 60 units a month. This worked out at just 21,000 Tshs, so we saved a lot! Thanks to the EPC, food was cooked faster and was more nutritious and delicious!"

Gilbina Minja Cooking Diaries Participant

Lesson Learnt from the Cooking Diary Study

The transition to modern cooking energy is possible! Preliminary results indicated that cooking with electricity in Tanzania is cheaper, efficient and more convenient compared to other energy sources, if we correctly choose the cooking appliances and if the governments work in hand with other stakeholders to overcome the barriers to adoption of clean cooking.



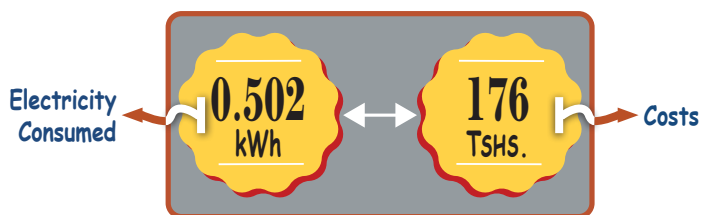
eCook training at TaTEDO premises, different groups practicing using modern electric appliances

CHAPTER FOUR

EPC eRECIPES FOR TANZANIA STAPLE FOODS

Tanzanians cook a variety of foods, in particular starches and proteins like maize, rice, bananas, cassava, potatoes, millet, beans, meat, milk, vegetables, etc. Provided below are some recipes of the foods that are possible to prepare with an EPC. Cooking time (based on rotary type EPC), energy consumed (Electricity) and equivalent costs are indicated for each recipe.

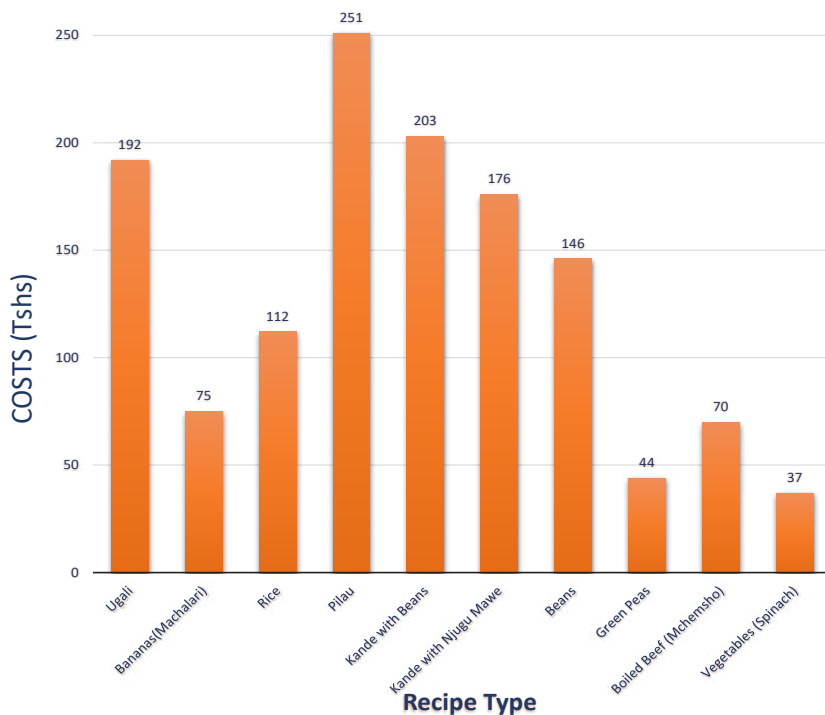
Electricity is measured in kilowatt hours (kWh), which is equivalent to using a 1kW appliance on full power for 1 hour. The price of 1kWh from TANESCO depends upon how much you consume each month. According to the current tariff rates (2020), the first 75kWh each month are sold at 100Tshs./kWh, whilst all additional domestic units are sold at 350Tshs. The boxes on each recipe show both the kWh consumed to cook that dish in an EPC and the equivalent cost (assuming that it is paid out of the upper monthly consumption tariff rate of 350Tshs./kWh). See illustration below.



Electricity consumption and cost example

Energy for each recipe depends on the amount of food, cooking time and how one cooks. For instance, cooking pilau involves lots of frying with the lid off hence more energy is consumed. However, rice is cooked with the lid on and takes less energy. The graph below displays the recipes in this chapter, with their corresponding energy consumption.

RECIPES ENERGY COMPARISON

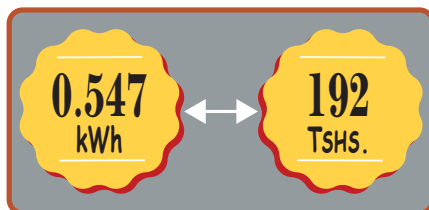


Ugali

Ugali is a basic food consumed in most countries throughout Sub-Saharan Africa, where its name can vary according to the country or region. It is the most common staple food in Tanzania due to its ease of cooking and affordability. It can easily be cooked with an EPC and does not require using the pressure cooking function as it already cooks quickly.

Ingredients

- ½ kg maize flour
- Water



Preparing ugali with vegetables using an EPC

Procedures

- Bring the water to boiling point in the cooking pot
- Ratio of water to flour:

Amount of maize flour (kg)	¼	½	¾	1	1¼
Cooking time (minutes)	15	30	30	35	35
Amount of water (cups)	4	8	12	16	20

Note; the ratios may differ depending on:

- i. The type of flour (dona, sembe, cassava flour, cassava-maize mixed flour etc.)
- ii. Preferable stiffness by those to be served. For instance Sukuma people like ugali which is very stiff
 - Add some flour like ½cup in a bowl, mix with little cold water and stir well with a wooden spoon
 - Pour the solution in the boiling water and stir well
 - Let the porridge cook for 5 minutes. (The cooking pot may be covered partially with its cover if the porridge is less than or half filled)
 - Add the rest of the flour required for the desired portion size and stir well until it becomes firm (add in small quantities as you may need not to put all the flour depending on the stiffness desired)
 - Continue to mix and press it against the walls of the cooking pot until all flour is mixed in and mash all the lumps to get a smooth dough
 - Cover the cooking pot and let it cook for 10 minutes
 - Open the pot and serve with a desirable sauce. Popular accompaniments include beans and vegetables or meat etc.

Note:

- Make sure to hold the cooking pot with gloves/ piece of cloth so that it does not move when you're stirring.
- The same procedures can also be adopted with a rice cooker.

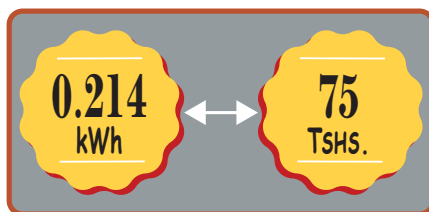


Cooked Ugali with meat mixed with vegetables

Bananas with Meat (Machalari)

Ingredients

- 10 unripe bananas
- 4 sizable potatoes
- 1 large onion
- 1 carrot
- 1 bell pepper
- Salt to taste
- 3 cups water
- 1 tablespoon vegetable oil
- Ginger (optional)
- ½ kg meat (beef/chicken)
- 1 cup coconut milk (optional)



Bananas



Peeled bananas with all ingredients



Cooked bananas (machalari)

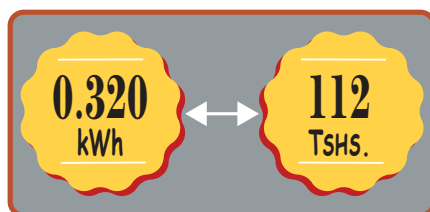
Procedure

- Oil your hands with some cooking oil
- Add some water in a large bowl
- Peel the bananas and potatoes, put them in the bowl with water
- Wash the bananas
- Cut the meat into desirable sizes
- Mix the sliced meat with the ginger paste and add 2 cups of water in the cooking pot. Boil for 20 minutes
- While the meat is boiling prepare all ingredients (onion, carrot, bell pepper)
- Release pressure following the procedures for operating an EPC
- Add all ingredients along with the peeled bananas and potatoes, and cook for 10 minutes
- Food is ready, serve and enjoy!

Rice

Ingredients

- 1 kg (8 cups) rice
- 6 cups of water
- 3 tablespoons vegetable oil
- 1 teaspoon salt





Rice cooking using EPC during training at Saranda village, Singida

Procedure

- Prepare rice and wash it
- Mix together all ingredients in the cooking pot (rice, salt, oil and water)
- Cook under pressure for 25 minutes
- Release the remaining pressure 10 minutes after the cooking time as per procedure
- It's ready, you may serve with meat, beans, pea, spinach etc. as preferred

See the table below for more information on rice: water ratios and cooking times.

Amount of rice (cups)	2	4	6	8	10
Time(second)	15	20	20	25	30
Amount of water(cups)	1½	3	5	7	9

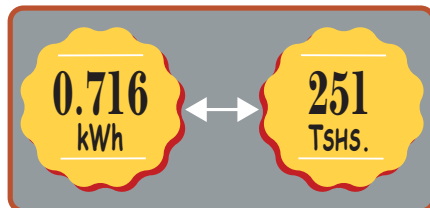
NB: Make sure to follow the ratio of water and cooking time, though rice might differ depending on the supplier

Pilau with Meat/Chicken

Pilau is a common food in Tanzania and around East Africa, usually served on special occasions. Depending on the recipe, it may be prepared with meat, chicken, fish, vegetables or dried fruits.

Ingredients

- 1kg rice
- $\frac{3}{4}$ kg beef
- $\frac{1}{2}$ teaspoon pilau masala
- 5 medium onions
- $\frac{1}{2}$ teaspoon ginger paste
- 1 teaspoon garlic paste
- Salt to taste
- 1 medium carrot
- $\frac{1}{2}$ cup cooking oil
- 7 cups water



Procedure

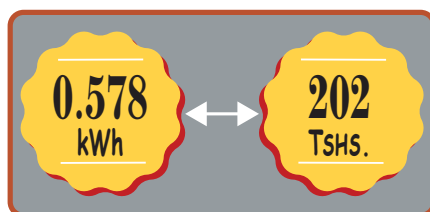
- In the cooking pot add the sliced beef with ginger paste and 1 cup of water, pressure cook for 20 minutes
- Meanwhile prepare all ingredients and the rice
- Release pressure as per procedures and transfer the beef to another pot
- In the cooking pot, add the cooking oil and fry the onions to golden brown (the browner the onion, the darker the pilau rice will be)
- Add beef and fry for about 7 minutes until it turns brown
- Add pilau masala and garlic, then continue to fry for about 3 minutes
- Add rice, carrot and salt to taste, fry for five minutes
- Add the remaining 6 cups of water and the soup then pressure cook for 30 minutes
- Your pilau is ready. Good to serve with kachumbari/salad

NB: Remember to stir well when frying

Kande (Pounded Maize with Beans)

Ingredients

- $\frac{3}{4}$ kg pounded maize
- $\frac{1}{2}$ kg beans
- 1 large carrot
- 1 large onion
- 1 bell pepper
- 1 cup coconut milk
- 4 tablespoons vegetable oil
- Salt
- 13 Cups Water





Procedure

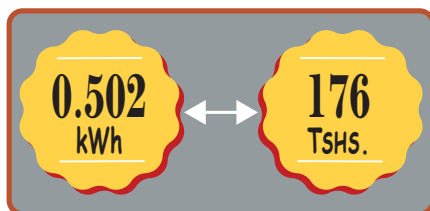
- Prepare your pounded maize and wash it well
- In the cooking pot add pounded maize and water. (You may also add 200g ground nuts for more nutrients and flavour.)
- Pressure cook for 30 minutes
- Release pressure and add the beans and water if necessary (remember to pick up all unwanted materials in the beans and wash them well)
- Pressure cook for 30 minutes longer
- Release pressure and add all ingredients (carrot, bell pepper, onion, oil, salt to taste) and pressure cook for 10 minute. Release pressure, add the coconut milk and cook without pressure for 5 minutes
- Your food is ready. You may serve as it is or with meat, fish, avocado or salad.

Kande with Njugu Mawe

Ingredients

- $\frac{3}{4}$ kg pounded maize
- $\frac{1}{2}$ kg bambara groundnuts (jugu mawe)
- 1 large carrot
- 1 large onion
- 1 bell pepper
- 1 cup coconut milk

- 4 tablespoons vegetable oil
- Salt
- 13 Cups Water



Procedure

- Prepare your pounded maize and njugu mawe by removing all unwanted particles and wash them well
- Mix pounded maize with njugu mawe in the cooking pot; add water and pressure cook for 60 minutes
- Release pressure and add all ingredients (carrot, bell pepper, onion, oil, salt to taste) and pressure cook for 10 minute
- Release pressure, add the coconut milk and cook without pressure for 5 minutes
- Your food is ready. You may serve as it is or with meat, fish, avocado or salad.

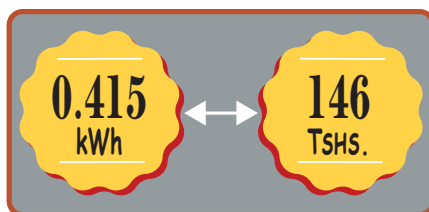
Amount of cereals in total (kg)	¼	½	¾	1	1¼
Cooking time (minutes)	60	60	70	75	75
Amount of water (cups)	5	10	13	17	20

Amounts of water and time required to cook makande

Beans

Ingredients

- 500g yellow beans
- 1 large onion
- 1 carrot
- ½ bell pepper
- 2 African aubergine (optional)
- 1 cup coconut milk
- 2 tablespoons vegetable oil
- Salt
- 8 cups water



Procedures

- Prepare beans and wash them well
- Add beans and water to the cooking pot and pressure cook for 45 minutes
- Release pressure, add all ingredients and pressure cook again for 10 minutes
- Then add the coconut milk and cook without pressure for 5 minutes

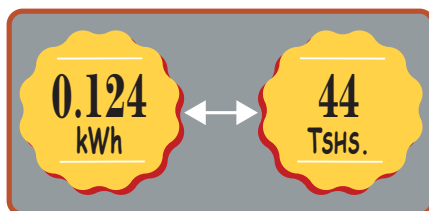
- The beans are ready. They may be taken with rice, ugali, chapatti, mandazi or any other food as preferred.

Amount of beans (kg)	¼	½	¾	1	1¼
Cooking time (minutes)	45	60	60	60	75
Amount of water (cups)	5	7	10	14	15

Green Peas

Ingredients

- 500g green peas
- 1 carrot
- ½ bell pepper
- 1 onion
- 1 tablespoon vegetable oil
- ½ cup coconut milk
- 2 cups of water
- Salt to taste



Procedure

- Prepare the peas and wash them
- Prepare all ingredients and add these, along with the peas, to the cooking pot
- Add 2 cups of water and pressure cook for 15 minutes
- Release pressure, add the coconut milk and cook without pressure for 5 minutes
- The peas are ready. These may be served with the food of your choice, but they are frequently served with rice

Boiled Beef/Chicken with Potatoes (Mchemsho)

Ingredients

- 1 kg beef/chicken
- 1 carrot
- 1 bell pepper
- 1 large onion
- 5 potatoes
- 2 heads of broccoli
- Spaghetti (optional)
- Green beans (optional)
- Green peas (optional)
- Salt to taste
- 8 cups water





Procedure

- Prepare the beef/chicken, and cut into desirable sizes
- To the cooking pot, add water and the beef/chicken, then pressure cook for 20 minutes
- Meanwhile prepare all ingredients as shown in the photo
- Release pressure, add all ingredients and pressure cook again for 7 minutes (check the amount of water is sufficient as per your requirement)
- Serve your healthy meal while still hot and enjoy

Vegetables (Spinach)

Ingredients

- 500 g spinach
- 1 onion
- 1 carrot (optional)
- 1 tablespoon vegetable oil
- Salt to taste



Procedures

- Prepare the spinach by removing/reducing the stems from the spinach and wash the leaves with running water
- Cut the spinach and onion into desirable sizes and grind the carrot
- Mix together the spinach, with all the other ingredients and cook for 5 minutes
- You may also start by frying the onion and then add other ingredients as preferred
- The spinach is ready, and may be served with any dish like ugali, rice, bananas etc



Demonstration of eCook at a rural setting for Mtwara villagers

CHAPTER FIVE

ENERGY EFFICIENT KITCHEN PRACTICES

The cooking appliances we choose and how we conduct ourselves in the kitchen affects the **time**, **energy** and **money** we use for preparing our meals. We can make a big difference to our cooking expenditure if we adhere to the following tips.

Use Energy Efficient Appliances

An efficient appliance like an EPC can save you a lot of time & money. Combined with other energy saving tips, you could save over 90% of the cost & 75% of the time versus cooking inefficiently on a simple hotplate. However, if you don't have an efficient appliance, the rest of these tips apply to just about any stove using any fuel.



Soaking Dried Foods (Beans, Maize) and Marinating Foods Like Meat and Fish

Soaking dried foods until they have absorbed the water they lost when they were dried can reduce boiling times by half. Usually several hours is enough, or with beans, until the wrinkles have



disappeared. Older cereals will have had more time to dry out, so are likely to benefit most from soaking.

Marinating; soaking food like meat in a marinade (you can just mix up ginger, garlic and lemon to make your marinade) before cooking will make it tender and hence reduce time for cooking

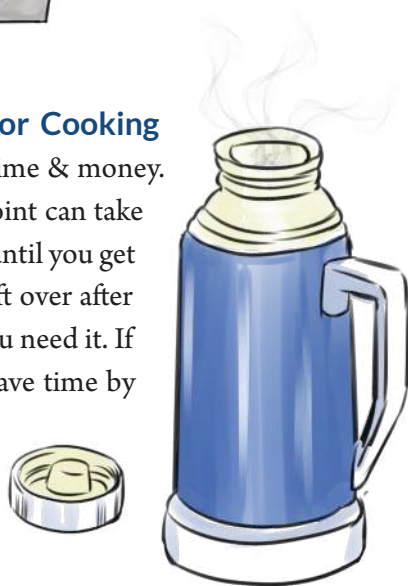
Simmer with a Lid on

Steam escaping is energy & money escaping. Trapping it inside with a lid makes cooking cheaper, but you'll only save money if you also turn the power down and simmer. You'll use less water too.



Use Leftover Hot/Warm Water For Cooking

Use leftover hot or warm water to save time & money. Getting water from cold up to boiling point can take up to 20 minutes. Cooking doesn't start until you get close to boiling. If you have hot water left over after making tea, keep it in a Thermos until you need it. If you don't have any left over hot water, save time by heating water with a kettle or solar water heater.



Cut All Ingredients Into Small Pieces

Smaller pieces cook faster as they have a larger surface area to absorb heat & water. Cutting up ingredients like onions into smaller pieces can also speed up cooking, in particular, the energy-intensive frying stage.

In fact, frying uses full power constantly, whilst pressure cooking only uses full power at the beginning to get up to pressure, so is much more energy efficient.



Prepare All Requirements Before Switching on the Cooking Appliance

Plan your kitchen tasks and **prepare** all cooking requirements in advance as per given recipe before switching on the cooking appliance to avoid a waste of energy and damage to the appliance.

Cooking is also an art. Preparation will guarantee a good cooking output at low cost and in short time.





Participants of eCook training practicing using EPC in groups

CHAPTER SIX

THE VOICES OF ELECTRIC PRESSURE COOKER USERS

Everyone who got an opportunity to use EPC had something positive to say about its convenience.

- **For entrepreneurs** who are very busy and skip their meals, Mr. Sabas (Mangi) is saying *"Its possible! Celebrate all your meals with EPC at very short time"*



'Mangi' is cooking bananas at his shop while everything else is moving on well

- **For pregnant women** who lose their appetite while cooking due to smell and feel that its tedious for them to prepare food in the kitchen, Mrs. Sekunda after making her mchemsho is advising them to try EPCs *“The kitchen is cool, no smell of food and it is simple to get nutritious and delicious food in your own kitchen”*



Mrs. Sekunda making mchemsho using EPC

- **For men who rarely venture into the kitchen**, Mr. Benson offers some frank advice:
- *“It is no longer a taboo to assist your wife, things are very easy in the kitchen with EPC”*
- **For people in rural areas** with thoughts that we cannot use



Mr. Benson assisting his wife to cook ugali at home

electricity for cooking, it is difficult to leave our traditional ways and can't get the appliances - here are Londoni people at Singida, the users of mini-grid electricity pointing out after training and acquiring their appliances *"EPC is the savior. It will save us from quarrels we get from husbands in serving the meals late as it cooks faster. It is not much difficult to use as we thought before. It is possible to change our mindset and exalt"*



Londoni villagers at Singida acquiring EPC after eCook training, villagers should be assisted to shift to modern cooking

CHAPTER SEVEN

ECOOK POLICY RECOMMENDATIONS

Background

The eCook study partners consisting of TaTEDO, Loughborough University, University of Surrey, Gamos Ltd, Innovative UK and the MECS programme have confirmed that there is a strong market for efficient electric cooking appliances (eCook) and services in Tanzania. Electrification and clean cooking are currently seen as two separate domains; however eCook has the potential to unite the two. To date, progress in electrification has been relatively rapid, whilst clean cooking has lagged behind. Tanzania has a regional leading mini-grid sector and the market for solar home systems is developing rapidly. eCook presents a transformative opportunity to leverage this encouraging progress to drive forward the goal of ensuring universal access to clean cooking by 2030, in line with the SDGs.

The following presents a list of recommendations for policy actors and other key decision makers to incentivize the development of a market for eCook products and services in Tanzania.

Promote EPCs in areas with access to reliable grid electricity.

Begin by encouraging suppliers to import quality efficient electrical cooking appliances

- Reduce the import tariff and VAT as is applied to LPG.
- Bring in financing to support private sector actors, for example through a results-based financing programme.
- Test and certify the best quality products.
 - » Price, durability, energy-efficiency, service delivery models.
 - » Obtain support from Tanzania Bureau of Standards (TBS).

Once the market has developed, incentivize local manufacture

- Begin with assembly, building up to manufacture.
- Encourage energy service companies to incubate start-ups, e.g. TaTEDO social enterprise, SESCOM, etc.

Support the establishment of service networks

- Spare parts and expertise for repairs must be available locally.
- Package electric pressure cookers with spare parts such as rubber sealing rings.
- Encourage energy service providers (utilities and mini-grid developers) to prioritise delivering cooking services to their customers.
- Develop on-bill financing mechanisms that can enable customers to repay the high upfront cost each time they top up their electricity units.
- Use local offices as distribution channels to sell and support EPCs.

Support consumers to break down high upfront cost into affordable repayments

- Longer and more flexible repayment schemes with low interest to reach poorer households
- Create repayment plans aligned with how people currently pay for charcoal, firewood and kerosene (i.e. daily or even per meal)

Support consumers to understand the benefits and lower behavioural change barriers:

- Package (or repackage international models) with:
 - » Advice on how to cook local foods e.g. stickers on appliance indicating cooking time for maharage, makande, wali, etc.
 - » Advice on energy efficient cooking practices. e.g. recipe book, community cooking demonstrations
- Include electricity (in particular efficient electrical cooking appliances) in clean cooking social marketing, focusing on:
 - » How to save even more time and money by cooking efficiently
 - » Cost – cheaper than charcoal and even gas
 - » Convenience – more time to do other things

Carry out piloting of battery-supported EPCs in weak- and off-grid regions

Widen access to consumers in weak-grid (frequent blackouts & unstable voltage) and off-grid regions by supporting the import of lithium ion batteries and piloting of battery-supported electric cooking systems”:

- Reduce the import tariff and VAT on lithium ion batteries sized for cooking (0.1-3kWh).
- Offering grants to carry out prototyping and piloting of battery-supported cooking systems..
- Test and certify best quality products.

For clean cooking solutions to succeed, Government commitment and strong leadership through effective and progressive policies is required

CHAPTER EIGHT

WHERE TO GET ELECTRIC PRESSURE COOKERS?

Varieties of EPCs are now available online and in some Tanzanian stores with different technology and efficiency. The existence of many substandard cooking appliances in the market is still a challenge. Various studies have been carried out to test a number of EPCs and find information on what efficient, cost-effective and suitable EPCs are available. Such studies among others include; the Global LEAP Awards for EPCs: <https://globalleapawards.org/electric-pressure-cookers>. The output of this will be a buyer's guide highlighting the best quality, safest, most durable, most user friendly and most affordable EPCs



TaTEDO eCook instructors sharing knowledge with a group of Chang'ombe villagers (Kiteto-Mnyara) on how to identify efficient EPCs

Several eCook trainings have been conducted on how to use EPCs which intends to promote and raise awareness so that more households will switch from biomass to clean cooking. Hence, for the companies, organizations, small community groups, entrepreneur or individuals who wish to be trained on how to use EPCs and link this technology to their actual behavior and cooking preferences they can seek more information on below address;

For support services i.e. awareness raising and training activities contact:

TaTEDO, Mbezi Juu, Mpakani Road,
P.O. Box 32794, Dar es Salaam, Tanzania
Tel: (+255) 738-201498,
Fax: (+255) 22 2774400
E-mail: energy@tatedo.or.tz,
Website: www.tatedo.or

On how to get the EPCs contact:

Sustainable Energy Services Company (SESCOM) Limited
P.O. Box 31935, Dar es Salaam, Tanzania
Phone: +255738201498
E-Mails: energy@sescom.co.tz, sescomtanzania@gmail.com
Website: www.sescom.co.tz

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Did you know that using electricity for cooking is possible, and is safe and cheaper than other fuels? Are you one of those hesitating to acquire electric cooking appliances because you are not conversant and not sure which one to buy? Are you wondering which types of these appliances are available in Tanzania?

This **ECOOKBOOK** will provide you with basics to clear out your doubts, coach you with electric pressure cooker recipes for some of Tanzania staple foods and offer energy saving tips (cooking practices) which will help you save money, time, trees and life.



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