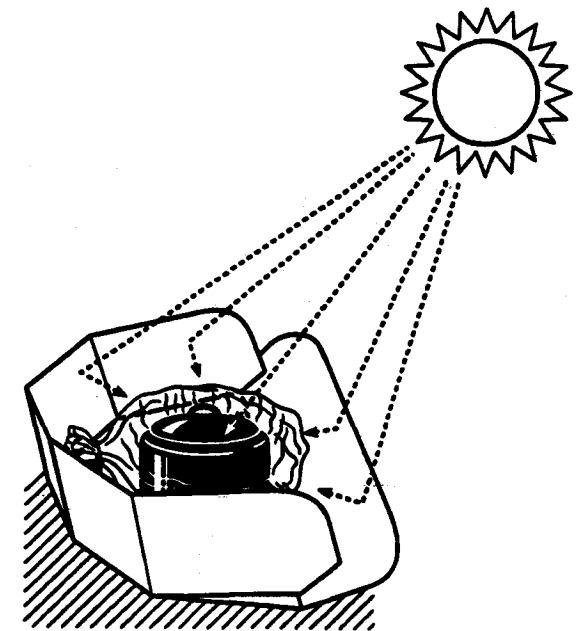


Solar CookKit

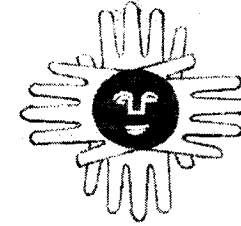


Cooks delicious meals: stews, roasts, bakes and boils tubers. Ugali, githeri, nyoyo (mixture of maize and beans), vegetables, cakes, and groundnuts.

Easy to handle and to use, safe even for children, since it is not hot and does not burn food.

It saves money, time and firewood / Charcoal.

It pasteurises drinking water and kills all the germs that cause disease.



Solar CookKit

(USERS MANUAL)

Compiled by

Margaret C.A. Owino
SCI Regional Representative

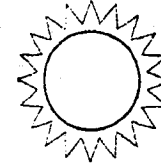
A publication of
Solar Cookers International (EARO), P.O.Box 51190-00200 Nairobi, Kenya.
(Copyright © 2003)

Contents

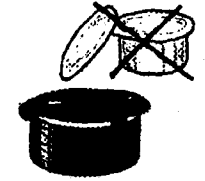
What you should have	1
How solar cookers work	2
Advantages of solar cooking	3
Cooking durations for various foods.....	5
Some basic recipes.....	7
Usage tips	10
Baking bread and cake.....	11
Maintenance of the Cookit and plastic bag.....	13
Limitations of solar Cookit.....	15
The fireless cooker (Hay – basket / box).....	17

WHAT YOU SHOULD HAVE

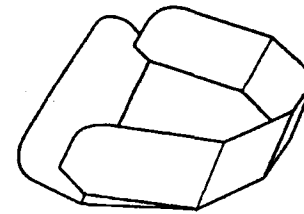
The following are requirements for solar cooking



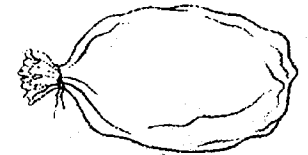
The sun



Black pot



The Solar Cookit



Special plastic bag



Three smooth sticks or stone

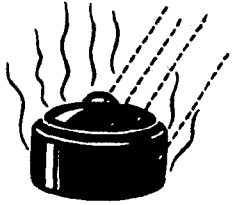


String

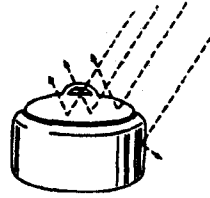
HOW SOLAR COOKERS WORK

Sunlight is fuel. A solar cooker needs an outdoor spot that is sunny for several hours. Solar cookers do not work at night or on cloudy and rainy days.

Black/ dark surfaces absorb the solar energy and become very hot. Food cooks best in black pots with fitting lids painted black on the outside.

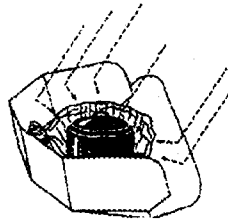
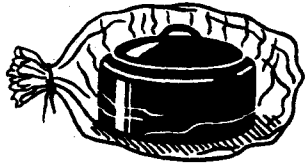


Right colour pot



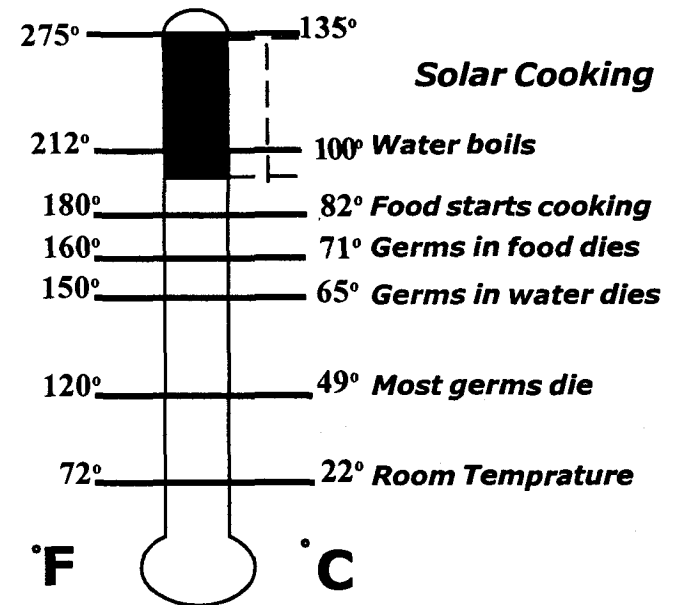
Wrong colour pot

A transparent heat trap (plastic bag) around the pot lets in sunlight, and then holds in the heat, which cooks the food.



The shiny reflectors capture extra sunlight from an area about three times as big as the pot. Sunlight energy is then transformed into heat energy by the dark cooking pots.

The CookKit under normal conditions, can attain temperatures up to 135° degrees Celsius, However, food starts to cook between 82°C - 91°C and onwards. These temperatures are hot enough to cook food, but not so hot to burn or dry out foods or damage healthful nutrients. Drinking water is safe at 65°C since all the germs will have died.



ADVANTAGES OF SOLAR COOKING

HEALTH

- It is hygienic since there is no smoke that cause irritation to the eyes, nose and throat ,neither is there ash or soot that may make the food dirty.
- It is convenient since you can reduce constant foraging for fuel or having to walk long distances and carry heavy loads of firewood.
- It is safe since there is no fire to cause burns or blow out of control – it does not burn food.
- It is used in pasteurising drinking water hence helps in reducing water borne diseases.

IT IS ECONOMICAL

Solar cooking is economical since one does not have to buy firewood, charcoal or paraffin. It saves money.

Note: You should have a stock of firewood, charcoal or other forms of fuel to use during rainy seasons, early in the morning or late in the evening.

ENVIRONMENT- FRIENDLY

- Solar cooking reduces dependence on fuel-wood, hence, it saves trees.
- Trees (forests) attract rain.
- Trees provide shade, recreational facilities and places.
- Trees are a source of wealth; as timber, herbs, fruits etc.
- Forests clean up carbon dioxide from the environment and provide oxygen - clean air for human beings as well as animals.

OTHER ADVANTAGES

- It is unattended cooking thus it frees up time, so the cook can do other chores / duties.
- Food does not burn, so it saves food and lessens the cook's worries.
- Pots and pans are easy to clean
- There is no fire to be continuously fed with sticks / firewood / charcoal.

- It can be used to warm up foods.
- The CookIt is foldable and lightweight, it is easy to transport and store.
- The CookIt is affordable and it is easy to make and maintain

Cooking duration for various foods.

Solar cooking requires one to be time conscious since it depends on the sun. Therefore, prior planning is encouraged. Cooking for lunch must begin in the early hours of the morning while supper should be immediately after lunch.

FAST COOKING FOODS (1-1½ HRS)

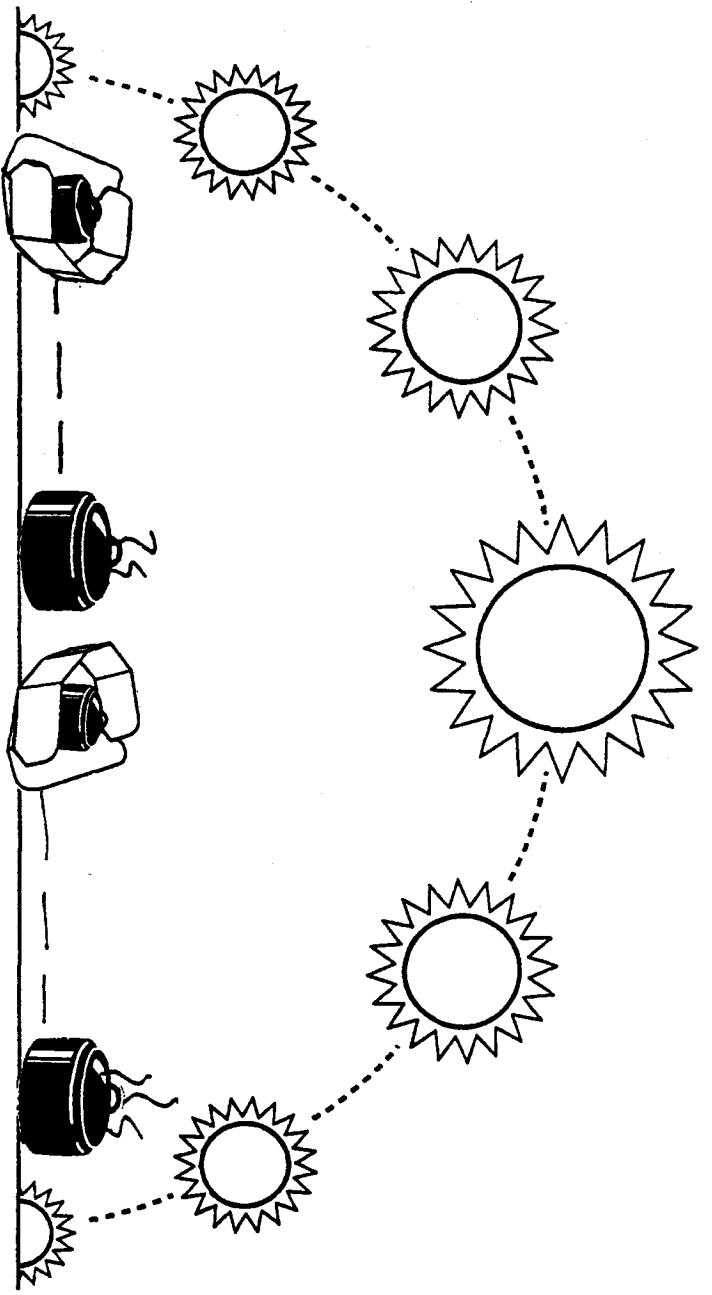
These Include: boiled eggs, fried eggs, omelette, rice, fresh maize on the cob, fish, chicken (broilers), peeled potatoes.

FOODS THAT TAKE (3-4 HOURS)

Potatoes, carrots or yams (not peeled or cut into small pieces), soft beans, roast meat, bread, fried stewed fish.

LONGER COOKING FOODS (5-8 HOURS)

Roast meat (that has not been cut also known as whole steak, chicken (hard), githeri and dry gains(not soaked)



Put the Cookit facing the sun.

SOME COMMON RECIPES

RICE.

The ratio of rice to water is 1:2 (less water) add salt and cooking fat or oil, mix well, cover the pot and place inside a plastic bag.

Make the plastic bag air tight with the thread / string then place on the three stones in the CookIt to cook.

BOILED EGGS *(no water)*

Clean the egg carefully and place inside the pot, cover the pot, place in a plastic bag and make airtight then place on the CookIt to cook.

EGG OMELETTE

Chop all the vegetables (onions, tomatoes, coriander or dania, green pepper and mix well.

Beat the eggs in a separate bowl season with a pinch of salt then add to the first mixture of vegetables, add a little cooking oil or butter. Pour the mixture into a solar cooking pot, cover, place in a plastic bag and proceed to solar cook.

ROAST GROUNDNUTS / PEANUTS *(Do not cover the pot)*

Pick out all the dirt from the groundnuts place in solar cooking pot, wash, drain the excess water then add a little salt. Place the pot inside the bag and then tie it properly and solar cook.

SUKUMA WIKI(kales) CABBAGE , SPINACH

Wash the vegetables, cut it small pieces, add onion, tomatoes etc as desired and put in pot, season with a little salt plus other spices add a little oil / fat or butter , cover the pot and place inside the plastic bag and make air tight - solar cook.

NB; Using a cooking stick/spoon mix the vegetables after half of an hour).

GITHERI (MAIZE AND BEANS MIXED) / DRY GRAINS

Pick out all the dirt from the grains, wash the grains clean and soak for 4 hours. Mix the maize and beans in the final water that you soaked them in, add onions, tomatoes etc, oil and salt, over the pot and proceed to solar cook.

Note: Do not soak fresh maize or beans, just wash well, season, mix well and proceed to solar cook covering your pot with a fitting lid, inside an airtight plastic bag and on the CookIt.

FRESH FISH / DEEP FRIED THEN STEWED

Cut up all the onions, tomatoes etc, place in pot, add spices, oil and season with a little salt. Wash fish well and cut into small pieces as desired. Place in the pot mixture and add very little water. Cover pot, place inside a plastic bag and proceed to solar cook.

ROAST BEEF / MEAT *(Do not cover the pot)*

Spread out the meat into a thin layer of ½ inch, marinade as desired or just add a little salt, place inside the pot, place pot inside a plastic bag and proceed to solar cook.

BEEF / CHICKEN STEW

Cut meat into small pieces, wash and put into solar cooking pot. Add chopped onions, tomatoes etc and mix well, add salt and spices and a little oil, and do not add in any water. Cover the pot, place inside a plastic bag and proceed to cook. (You can enrich your stew with carrots and potatoes cut into small pieces and mixed well before the salt etc)

ARROW ROOTS (NDUMA) SWEET / IRISH POTATOES

Peel, chop into small pieces and wash potatoes / arrowroots. Place in a solar cooking pot and add half a cup of water only.

Cover pot and place inside a plastic bag then proceed to solar cook.(You can season as desired)

UGALI

Clean the solar cooking pot, add cold water and flour at a 1:1 ratio, mix well and ensure there are no flour pockets or lumps, cover pot with fitting lid, place inside a plastic bag and proceed to solar cook.

SWEET POTATOES IN PEANUT SAUCE

Peel potatoes and cut into small pieces, wash and put into the solar cooking pot. In a separate bowl, mix roasted ground peanut paste (peanut butter)with salt, and a little water. Pour the peanut mixture onto the potatoes evenly, cover the pot and place inside a plastic bag then proceed to solar cook.

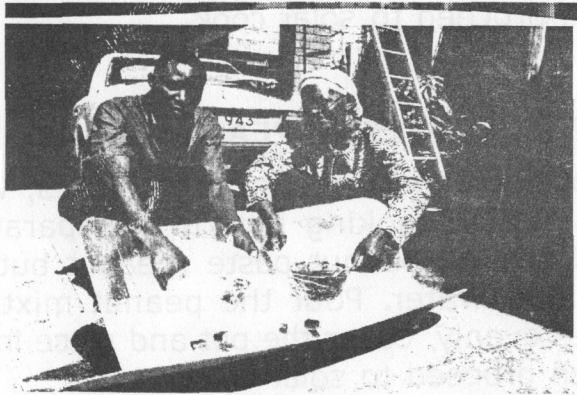
TEA / CHAI/ COFFEE

Wash the solar cooking pot. Add water, a little tea / coffee, a little sugar, cover the pot and place inside a plastic bag.(If tea with milk, add the milk into the water before the tea / coffee.) ENJOY YOU TEA OR COFFEE.

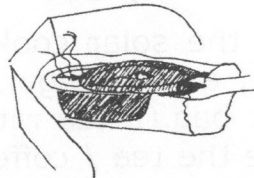
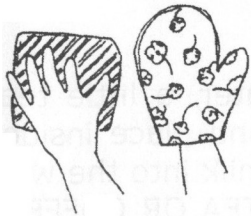
Usage tips



When setting up the CookIt, putting in or removing food from the CookIt, ensure you are in front of the CookIt and your shadow should fall on the CookIt to reduce the glare on your eyes.



One CookIt can accommodate two small pots.



Warning! Use a dishcloth or oven gloves when removing food or the lid from inside the plastic bag.

BAKING

Cakes

Ingredients

2 cups of self rising flour (for non self rising flour, mix with 1 teaspoon of baking powder), 4 eggs, 1 cup of sugar, ½ cup of milk, 4 tablespoons of margarine/butter, 1 teaspoon of vanilla or grated lemon rind.

Method

1. In the mixing bowl, mix sugar and margarine into a smooth paste, add egg yolk and mix all these thoroughly.
2. Sieve the flour, then add a little flour to the sugar mixture alternating with a little milk until all the flour is finished. The cake mixture should be thick enough to flow slowly from a wooden mixing spoon
3. Add vanilla essence or a teaspoon of grated lemon rind – mix well. Fold in the egg whites well beaten
4. Rub the baking pot with a little margarine on the bottom and the sides, flour the baking dish.
5. Pour in the cake mix until it is half full.
6. Cover the pot with a lid, put in the plastic bag, tie it properly then place it in the CookIt.

It takes 1½ -2 hours to bake.

NOTE: Fruit or vegetable cakes take longer to cook and you have to add ¼ teaspoon of bicarbonate soda for every cup of flour at the point of sieving the flour.

To Bake Bread / Sweet Rolls

Ingredients

4 cups of wheat flour, 2 teaspoons of yeast, 1/4 teaspoon salt, 2 tablespoons of butter or margarine, 3 - 4 tablespoons of sugar, 2 cups of warm water or water mixed with milk.

Method

1. In a bowl mix the sugar, warm water and the yeast and leave this for about 20 minutes covered with a clean dishcloth. Add the margarine / oil to this mixture.
2. In a separate bowl, mix the flour and salt thoroughly then gradually add this mixture to the first one until all the flour is finished kneading the dough well.
3. Cover this with a clean cloth and let be in a warm place until the dough becomes twice as big.
4. Continue with kneading while adding a dash of flour until the dough is firm but soft.
5. Cut it into reasonable sizes and shape as desired (loaf or rolls). Put these in the solar cooking pot that has been smeared with margarine.
6. Cover the pot, put in the plastic bag and place it in the CookIt. Bake for 3-4 hours or until it is golden brown.

Tip - You can add eggs, more sugar or milk if you need scones or sweet rolls you can also add colouring or raisins (zabibu)

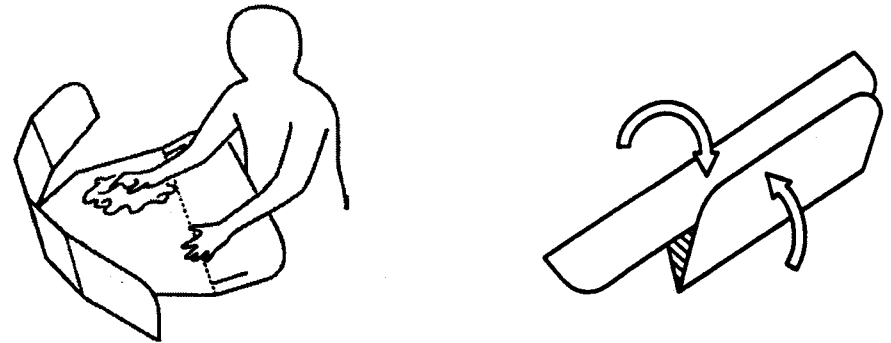


MAINTAINANCE OF SOLAR COOKITS AND PLASTIC BAGS.

Careful handling and maintenance will enhance the durability of the Cookit and plastic bags for a longer period of time. Here below are some tips:

SOLAR COOKIT

After cooking, ensure there are no water drops or food drops on the Cookit. In case there are drops, use a soft cloth (that does not scratch the shiny surface) to wipe the Cookit well, fold it and keep in a safe place.



Always place the Cookit on a table, mat or rug or a dish rack where domestic animals etc cannot interfere with the Cookit or the food while cooking.

Do not leave your Cookit in the rain or in a dump place.

PLASTIC BAG

While solar cooking is going on, hot moisture accumulates and condenses into water on opening the bag. The COOK must take care not to spill the water onto the food or on the Cookit when removing the pot.

After removing the pot, you should shake out all the water from the plastic bag then use a dry soft cloth to dry any other water / dampness. You can also turn the plastic bag inside out and hang it on a cloth line with a peg to dry. Once dry fold it well then keep it in safe a place.

If the bag is not air tight (i.e. in case of a small hole), you can tie the hole with thread and continue using it to cook. (In places like Turkana (very hot and sunny), one can use a bag for up to 8-10 days or even more.)



Use big rocks / stones or wooden planks to hold your Cookit so that it is not is not blown away or overturned by wind.

LIMITATIONS OF A SOLAR COOKIT.

The Cookit cannot work in the following conditions:

- a) When it is raining.
- b) When it is too windy
- c) At night
- d) When it is cloudy

Due to the conditions listed above, a solar cook is advised to have a stock of firewood/ charcoal and to use Upesi jiko or KCJ stove / jiko as these technologies use very little charcoal or wood.

To further save your firewood, it is advisable to use the fireless cooker to finish your cooking. This is also a clean and convenient way of cooking that retains the warmth in the food and there is no worry of food getting burnt.

A good cook should therefore have three types of cooking technologies:

- 1) Solar Cookit
- 2) Upesi jiko
- 3) Fireless cooker

The more you use the solar Cookit the more you become an expert solar cook.

WHAT YOU SHOULD KNOW BEFORE YOU START COOKING

FOOD COOKS FASTER

FOOD COOKS SLOWER

When the sun is right overhead and is intense



Weak sunshine, morning hours or evening hours.



In the absence of clouds



Clouds covering the sun



When the wind is calm



In the event that it is too windy (or just windy conditions)



If the pot has a lid (and is it is therefore covered)



If the pot is not covered



If you use a small light pot



When you use a heavy pot



Cooking in a black painted pot



Cooking in a unpainted pot



Small amount of food



Too much food



When the food is cut into small pieces



Foods that have been cut into big pieces



If water is not added at all or a small amount of water is added



Water is added or too much water is added to food



THE FIRELESS COOKER

What is it? The peace basket!

This is an insulated basket / container/ box that is specially designed to complete the cooking that has been done partially on conventional cooking technologies. E.g. open fire or charcoal stove. It is also a food warmer as it keeps the food hot for up to 8 hours after cooking.

Benefits / Advantages of a fireless cooker.

- It is convenient for the family cook who may have to heat up the food every other time.
- Family members can serve the food hot when they come home for meals whatever the time.
- It does not burn food.
- The cook can also bring the food to a boiling point in the Cookit then put in the basket and use the same Cookit to cook other food
- Fireless cooker can be made from locally available materials.



IMPORTANCE OF FIRELESS COOKER

- It helps in conserving firewood / charcoal / gas.
- It keeps the food hot for 8 hours.
- It is easy to make from local materials and can last for many years if well taken care of.
- It is unattended cooking hence one can perform other duties while the food cooks without any worries since the food can never get burnt.
- Food retains its taste and nutrients since it is slow cooking.
- Reduces exposure to dangers of open fire cooking e.g. accidental fires that burn children etc.
- It is clean cooking – no smoke, no eye or throat irritation and no sweat. It is healthy cooking.
- It can be a source of income i.e. making and selling fireless cookers.
- Saves time for the cook.

HOW DOES IT WORK?

The fireless cooker cooks through heat retention. The heat that the food stored during partial cooking, is trapped by the insulation and continues to cook the food.

Fireless cookers can cook a variety of foodstuffs and can even bake. However, the more one uses it the more you become an expert in cooking using this type of cooker.

PROCEDURE

1. Cook the food in the usual way (covered) and bring it to boil.
2. Leave the food on fire for some time (as indicated) i.e. so that it simmers.

3. Bring the fireless cooker near the stove that is cooking the food, and then transfer the food very quickly from the stove to the fireless cooker.
4. Place the insulated cover over the pot of food and tuck it in well.
5. Leave the food to cook for the durations indicated on the table below:

COOKING DURATIONS WHEN USING THE FIRELESS COOKER.

FOOD TYPE	SIMMERING PERIOD	TIME IT TAKES IN THE FIRELESS COOKER
Rice	5 minutes	25 - 30 minutes
Githeri (soaked maize and beans)	Half an hour	3 - 4 hrs
Meat stew	10 minutes	1 - 1 1/2 hrs
Vegetables (sukumawiki, cabbages, spinach)	Fry for 3 minutes	10 minutes
Green grams	10 minutes	2 hrs
Matumbo	20 minutes	3 hrs
Potatoes	10 minutes	1/2 hrs
Boiled eggs	2 minutes	10 minutes
Fried fish	5 minutes	1 hr
White fish / dagaa (omena)	30 minutes	2 - 3 hrs

NOTE: You should start cooking your food normally. The only difference is that the cooking finishes in the basket / box cooker

HOW TO MAKE A BASKET FIRELESS COOKER

The materials should be available:

1. A basket that is big enough to accommodate the pots that you use often.
2. 3 metres of cloth preferably black. (Cooking on open fire makes pots dirty)
3. Cotton, wool, blanket waste, wood shavings or waste pieces of clothes common at any tailor's shop crumpled old newspapers.
4. 1½, meter of strong polythene sheet – more for a bigger basket.
5. A strong big needle (e.g. sack needle)
6. A strong yarn or any strong black thread.

Making the (basket) fireless cooker

1. Start by spreading the newspapers inside the basket.
2. Place the insulation materials inside the basket beginning from at the bottom of the basket.
3. Place the polythene sheet on top of the insulation. In between the plastic sheet and the newspaper fill in the insulation until you reach the top of the basket. Ensure the polythene is long enough to be able to tuck into the newspaper side
4. To help it form a hollow shape, put a round bucket or water jerrican full of water and let it stay overnight.
5. Remove the bucket / jerrican then put the black cloth inside the basket. It should fit so well that covers both

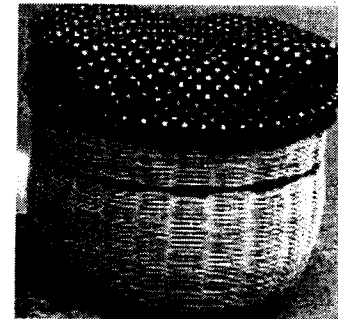
the inner polytherie and the newspaper cover of the basket.

6. Sew the cloth on at different intervals to secure the insulation onto the basket so that it is intact.
7. Cut a round polythene sheet and sew the edges (as in making a round pillow) leave a small opening for filling in the insulation.
8. Cut cloth in a similar fashion and insert the polythene bag inside the cloth. Fill up the bag with insulation material then sew up the small opening. You can use a button or just sew a notch at the centre of the pillow to secure the insulation.
9. Decorate you basket as desired with laces / ribbons etc.

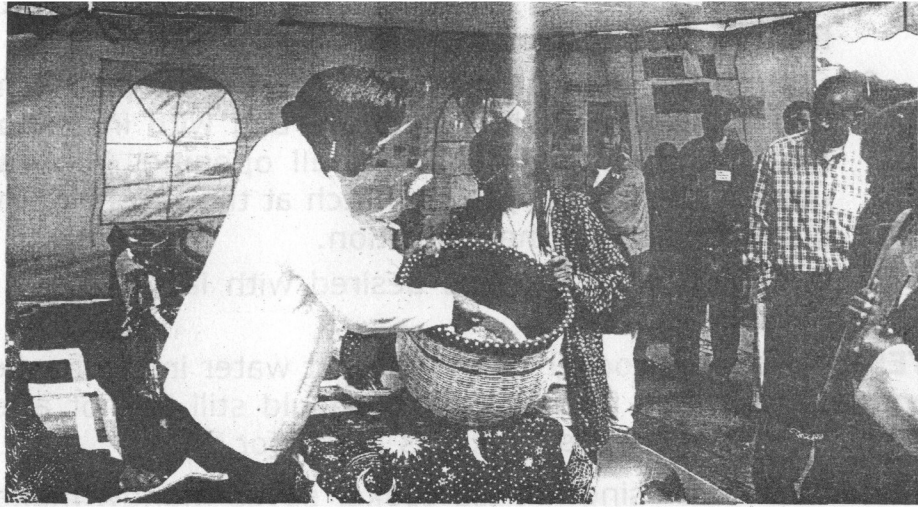
TEST the basket cooker by putting hot water in the basket and letting it stay for 8 hours. It should still be hot after 8 hours – your fireless cooker is ready for use!.

Remember that using fireless cooker saves money, makes you use less firewood and charcoal, and you are always peaceful since you only cook once and keep the food in it. Whenever the food is served within the 8 hours it will be hot.

Removable pillows can be made and used in (a basin, basket, bucket or carton box) this becomes your fireless cookers as and when required. You will need three pillows, for the top and bottom and a long coil for the sides.



**TIP: REMOVE THE FOOD AFTER THE HOURS INDICATED
- OTHERWISE IT OVERCOOKS!**



***DO NOT LEAVE FOOD IN THE COOKER BEYOND 8 HOURS AS
BACTERIA WILL START GROWING.***

