

”

“Using cookstoves, most households have reduced the time spent on collecting fuel wood by two thirds (from three trips per week to one trip per week), reducing tree felling and saving women and girls considerable time for other productive and educational tasks.”

APT Action on Poverty, Uganda project evaluation, 2014



Reducing Fuel for Cooking

The activities in this section describe some easy and simple ways to reduce the amount of wood or charcoal that is needed to cook food, by improving fires and cooking methods. It will explain how to arrange the rocks around a cooking fire and how to build more fuel-efficient cookstoves from freely available local materials. This section also explains other strategies to reduce the amount of fuel people have to collect, which will help save people's time and reduce the dangerous effects of breathing in smoke from fires.



Photo: Niger © S. Truelove/British Red Cross

Advise people to keep stoves well maintained and use a pot which covers the whole stove.

What does the activity look like?

The volunteers will hold meetings to explain to people some simple methods for reducing the time that food needs to be cooked for.

There are very easy ways to reduce the amount of fuel used for cooking, such as putting the stones closer together around the fire!

Photo: Niger, 2019 © Yuki Sugiura/British Red Cross



Stoves made out of metal cans work well for people who are on the move. The pot should cover the stove and there should be small air holes in the top of the metal can.

Photo: Malawi, 2016 © Mitchell Maher/International Food Policy Institute, Flickr



Encourage local potters to make fuel-efficient clay stoves.

Volunteer(s) will then show people a few different ways they can make their own simple improved stoves. Some people may decide to try and make more complicated stoves, like the one below:

Photo: © Namibia Red Cross

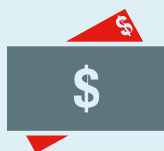


A very fuel-efficient two pot stove with a chimney for indoors or outdoors, also called an 'elephant cookstove'.



Photo: Western Darfur, 2016 © Jose Cendon/FAO

What are the main benefits?



Saves wood and costs - reduces money spent on wood and charcoal, leaving people more time and money to rest or spend on other productive tasks.



Good for the environment - reduces chopping down of trees which helps look after the environment and reduces soil erosion.



Cooks faster – heat is concentrated on the pot and saves cooking time.



Less smoke - reduces health problems from breathing in smoke.



Safer to use - can reduce burn injuries and home fires, if fires are better covered and have chimneys.



Healthy family - the time saved by using fuel efficient stoves can be used for gardening to get more nutritious food or for childcare activities.



“I cannot tell you how much the changes I have made to my cooking have changed my life! I save money on charcoal to send my girls to school, and now that I have my chimney I can breathe when I’m cooking without coughing all the time. The first thing I did was teach my friends to build a stove - it was the best gift I could give them!”

Key messages

01. Always use dry firewood split into pieces. Wet firewood burns with less heat. It also produces a lot of polluting smoke.

02. Always use a saucepan lid to cover food when cooking. This creates cooking pressure leading to faster softening of food and saves fuel.

03. Cut the ingredients into smaller pieces. The technique reduces the amount of energy required to cook.

04. Soak the dry foods (beans, peas, pulses etc) for at least 5 hours, before starting to cook. This cuts down the amount of time and fuel to cook these kinds of food.

05. Avoid using too much water in the cookpot. Water takes a lot of energy to boil it, so too much water wastes fuel.

06. Light the fire after preparing the ingredients for cooking.

07. Put out the fire immediately after cooking to avoid wasting firewood.



Preparations

Timing tips

This activity is likely to take a minimum of 2 months, probably longer to reinforce the ideas and spread the messages and cookstove technologies well.

The activity can be started at any time of year but preferably when people are less busy.

What does the volunteer need to do before the activity can start?

In addition to the usual start-up activities outlined in the 'Essential Guidance' section of the 'Introduction', the volunteer should try to get help and advice from government extension officers, other organisations or people in the community who know how to build more fuel-efficient cooking stoves.

The volunteer could build their own efficient cookstove and use it as an example. You could build different types of cookstoves so you will be better informed to advise others.



Photo: 2017 © Karan Singh Rathore/www.sanji.org

How to implement the activity?

Step 1 Hold a community meeting to see who would like to be involved

Step 2 Explore how people cook now and advise on improving ways of cooking to reduce fuel use

Step 3 Advise on ways of cooking that will help people to cook more quickly

Step 4 Advise how to build a simple improved stove

Step 5 Promote ideas for how to build other basic stove types



Step 1: Hold a community meeting to see who would like to be involved

Make sure that the people from the poorest households are invited, as well as people from displaced communities and households with disabled or chronically sick people. Use the information from the start of this section to describe the activity and how it could benefit them.

Photo: Western Darfur, 2016 © Jose Cendon/FAO



Basic improved stoves can be made with locally available materials at almost no cost: displaced women in Western Darfur, the Sudan, learn how to make fuel-efficient stoves out of mud.

Step 2: Explore how people cook now and advise on improving ways of cooking to reduce fuel use

Call a meeting to discuss what types of cooking practices people use and find what methods will suit people most.

Some questions to ask:

? Do people cook indoors or outdoors?

- People cooking indoors should:
 - ✓ Make sure there is lots of air flowing through the cooking area (open doors and windows whatever the weather) as the fire needs some air, but not too much!
 - ✓ Always recommend that indoor stoves are fitted with a safe chimney to take toxic smoke out of the cooking area.



Safety Tip: Ventilate cooking areas and use chimneys - all fires use the oxygen which people need to breathe and produce toxic smoke that can damage people's health and can kill them!



Photo: Liberia, 2015 © Dominic Chaves/World Bank

- People who cook outdoors should:
 - ✓ Find a slightly raised area to stop the fire flooding in the rains.
 - ✓ Find a place that is sheltered from the wind, as too much air makes fires burn too fast.
 - ✓ Try to construct a simple cover over the cooking area to keep the rain off the fire, and stop the stove being damaged by rain. Make sure the cover is not made of a material that burns easily!

? Do people want to improve their existing fires to make them more fuel-efficient?

Advise these people to simply use more stones, rocks and bricks (preferably packed with anthill or clay mud) around the fire to reduce the amount of air getting into the fire.

This will make the fuel burn more efficiently and concentrate the heat onto the pot. They can leave one gap in the circle of stones where they can feed wood fuel into the fire. People can use a piece of metal or a removable stone to cover the gap during cooking and keep the stove even more efficient.

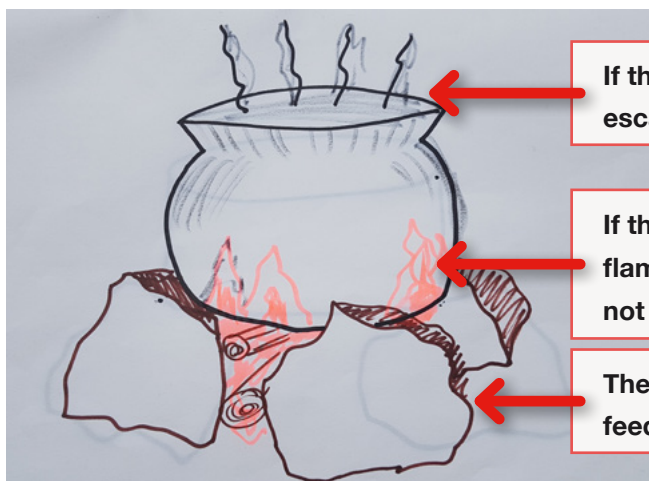
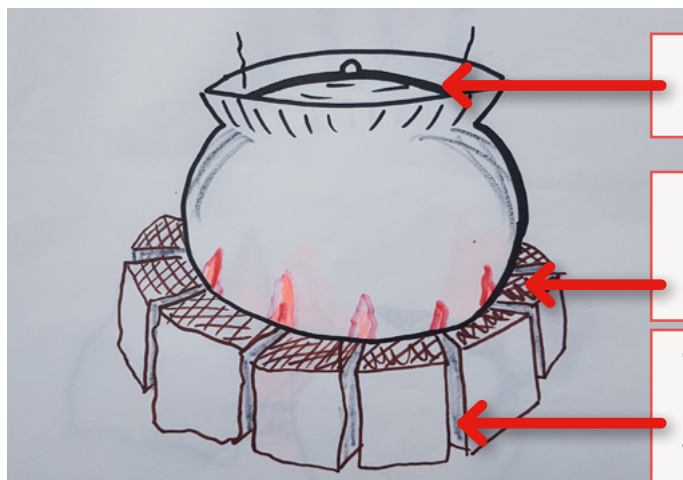


Photo: 2020 © S. Truelove

A traditional cooking method burns fuel very quickly as it allows too much air into the fire.

Photo: 2020 © S. Truelove



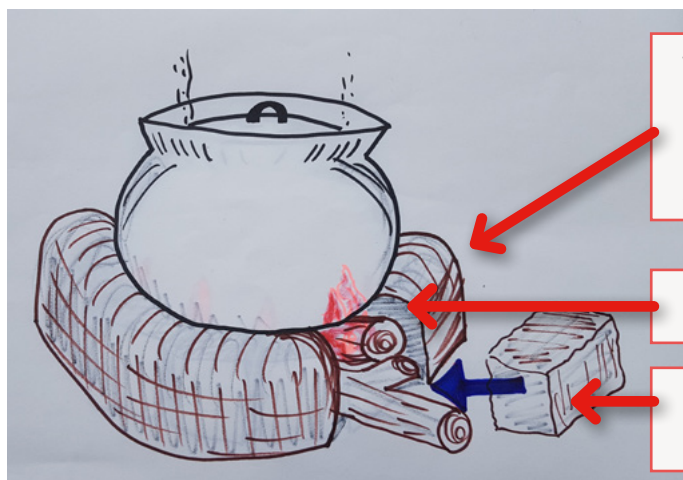
Using a lid on the pot keeps the food hotter so it cooks more efficiently

Using a pot that overlaps the edges of the stove concentrates the heat from the fire onto the pot and speeds up the cooking time

The smaller gaps between the rocks allow less air to feed the fire, making it burn the fuel more slowly and direct the heat onto the pot so it heats more quickly

By placing rocks closer together the fuel burns more slowly and cooking speed is increased.

Photo: 2020 © S. Truelove



When a clay mixture is used to cover the rocks it stops the air feeding the fire so it burns very efficiently (see instructions in step 4)

Leave a gap where fuel can be added

Use a rock or a piece of metal to cover the gap during cooking

By covering the rocks with a clay mixture, the amount of fuel saved is even greater and cooking times can be reduced even more.

Photo: Zimbabwe, 2018 © British Red Cross



Always use a chimney for indoor stoves to reduce fires and lung disease from smoke.



? **Do people want to build their own small stove or something more complicated?**

Advise that it is usually better to try a small change first and move to something more complicated later. See detailed steps for simple and more complicated stove construction.

? **What size and number of pots do people use?**

People need to build the fire or stove to fit the size of and number of pots they use.

? **What fuel options are available?**

What type of fuel do people use now and want to continue using (wood, charcoal, dung, others)?

? **Are the materials needed to build stoves locally available?**



Safety tips to keep repeating: In cases where the stove is built inside the house, ensure free circulation of air in the house and **always make sure a safe chimney is fitted.**

Beware of fire! In homes with a grass or thatch roof, chimneys should vent through walls and be shielded from setting thatch grasses on fire with something like a metal sheet.



Photo: Niger, 2019 © Yuki Sugiura/BRC

Using a small pot on a large stove, allows in too much air so the fire burns too much wood.

Step 3: Advise on ways of cooking that will help people to cook more quickly

This advice can be helpful to everybody, but especially to households with limited capacity for collecting firewood (female headed households, elderly, chronically sick, people with HIV/AIDS, people who have been displaced, people living in camps, or when collecting fuel is unsafe).

Cook less often

Cooking a large amount doesn't use much more fuel than cooking for a small number of people. Advise people to try:

- ✓ **Cooking once a day** and eating the second meal cold or reheated.
- ✓ **Taking it in turns to cook** one big meal with a friend or neighbour, so you only have to cook half as often!
- ✓ **Community cooking** – cooking for large numbers of community members can be fun and uses a lot less fuel.

**Make sure:**

- **Food is always covered, stored safely and reheated thoroughly, especially for people vulnerable to illness such as young children, the elderly, the chronically sick and people with HIV/AIDS.**
- **Keep hot pots and hot food out of reach of children that may get burnt and out of reach from animals that might steal it!**

Fuel-efficient cooking methods

Certain foods take much more cooking time and fuel to cook. Advise people to try these methods:

- ✓ **Beans, peas and pulses soaked overnight** take much less time to cook. Try cooking a very large amount of beans all at once (or share cooking with friends/neighbours), cover and use slowly in different meals for several days.
- ✓ **Cook and then cover** – cooking is quicker if pots are kept covered. Try cooking food until boiling and then remove the pot from the fire and wrap in a thick cover or blanket. Some people dig a pot-sized hole in the ground and place the wrapped pot in the hole, and cover with other materials to insulate the pot (wool, crop residues, soil, stones etc.). The food will cook in its own heat for a long time and can always be returned to full temperature later.



Remember to keep repeating the key messages so that people do not forget them.

Step 4: Advise how to build a simple improved stove

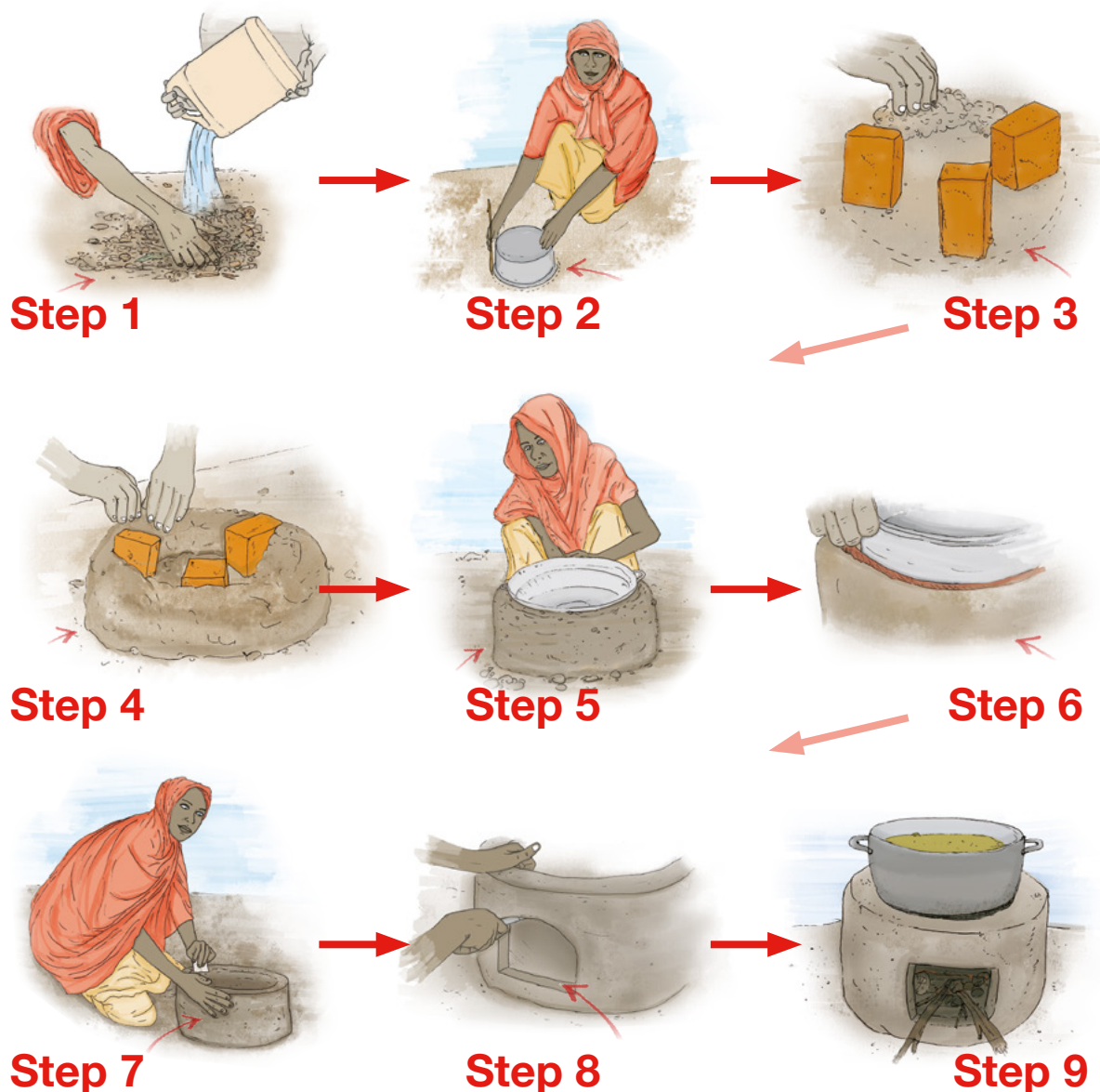
Below are the basic instructions for how to build any stove. The next step describes how to use these same principles for making more complicated stoves.

Prepare:

- **Choose a site for the stove** – the site should be compacted, made firm and level and preferably be slightly raised to stop it being flooded when it rains. Choose a well-ventilated place with lots of air that is protected from any strong winds.
- **Gather the construction materials at least a day before stove construction.**

Construct:

- **Make the clay mixture:**
 - Gather clay – use either clay soil or anthill clay crushed into small pieces or grains and remove any stones, sticks or other unwanted materials.
 - Gather manure/dung - If you do not have enough you can substitute small amounts of sawdust, chopped grass, wood shavings or sorghum husks.
 - Mix equal amounts of the manure and clay in a ratio 1:1 (1 bucket of manure to 1 bucket of clay).
 - Slowly add just enough water to the mix so it is easy to mould.
 - Blend the mixture using hands or feet like the way it is locally done when preparing mud for brick making.



- Step 1** – Mix animal dung with mud. Add water gradually to ensure soft mixture, stirring until the whole mixture has the same consistency. Cover the mixture and leave to sit for a day.
- Step 2** – Draw a line in the sand or dirt around the cooking pot that is most frequently used in the kitchen.
- Step 3** – Get 3 brick pieces, stick clay under them, and place them equally around the inside edge of the circle.
- Step 4** – Fill the circle completely with clay to a height of 4 cm. The bricks should be embedded in the clay. Smooth this clay. You now have the base of your stove.
- Step 5** – Build a 4 cm thick clay wall around the bricks until level with the top of bricks. The outer side of the bricks will be to be slightly embedded into the wall.
- Step 6** – Place the cooking pot on top of the bricks. Build the wall up until just under the rim of the pot. Keep a finger-sized gap between pot and wall.
- Step 7** – Remove cooking pot. Use scraper to smooth out surface of stove.
- Step 8** – Cut a 10 cm width hole in the side of the stove. The hole is to allow in air for the fire and to insert firewood, briquettes or other natural material to fuel the fire.
- Step 9** – Leave stove to dry in sun for 5 days before use.

Step 5: Promote ideas for how to build other basic stove types

Photo: Kenya © S. Otieno/UNHCR



This is a simple steel pot cook stove.

Photo: Niger, 2019 © Y. Sugiura/British Red Cross



This is a simple metal can stove for people who keep moving from place to place. Take care to use smaller pots so the tin does not tip over and surround the tin with stones to make it more stable.

Photo: 2014 © S. Truelove/Action on Poverty



This is a simple one pot stove with a chimney.

Photo: Zimbabwe, 2018 © British Red Cross



This is a simple 2 pot stove.

Photo: 2009 © Flickr.com



Here is a simple stove constructed from bricks.

Photo: Western Darfur, 2016 © Jose Cendon/FAO



This is a stove being built with clay using old metal tins as moulds.



Things to watch out for

Volunteers should follow-up and keep reminding people to:

- ⚠ Always inspect stoves for any repairs needed when they are cold!
- ⚠ Make sure chimneys are fitted on all indoor stoves and check for faults or damage.
- ⚠ Make sure grass or thatched roofs are protected from sparks or fire from stoves.
- ⚠ Check the stove fire chamber and cookpot support area for cracks and damage and encourage maintenance to maximise safe and efficient use.
- ⚠ Ensure ashes from the stove are composted to return nutrients to the soil (see Section 2).

Top tips

- ✓ Advise people to start with a basic stove design and try more complicated designs later, or when there is an experienced person available to share their knowledge.
- ✓ Ensure the stove is protected from the rain.
- ✓ Ensure the stove air vent faces to the direction of the wind or draught to help the fire burn well.
- ✓ In cases where the stove is built inside the house, ensure good circulation of air in the house.
- ✓ Encourage people to pass on the gift of their knowledge on cookstoves to neighbours and neighbouring communities.

Links to other sections in this handbook



Section 1

Gardens



Section 2

Compost



Section 8

Safe Water, Sanitation & Hygiene



Section 9

Nutrition Awareness

Resources and skills needed



What resources are needed to run the activity?

1. Tools required when building the energy-efficient stoves:

Tool	Purpose
Hoe	Digging and mixing ingredients
Shovel or spade	Mixing ingredients
Water container	Fetching water
Trowel	Smoothing plaster
Wheelbarrow (optional)	Carrying construction materials to the stove construction site

2. Materials used in stove construction and their alternatives:

Materials	Alternative Options
Anthill soil or clay	
Dung or manure	Sawdust, wood shavings, chopped grass, sorghum husks, ground nuts shells, any dry leaves
Stones or rocks	Cured earth bricks (optional)
Water	



Approximate costs

All the materials should be freely available, but the tools for building the more complicated energy-efficient stoves might need to be borrowed or purchased.



What skills or knowledge do volunteers need?

No specialist skills but it helps to get advice from people experienced in stove construction, pottery or brick making.



What skills do participants need?

No specialist skills needed.



What needs to be monitored or followed-up?

It is important to follow-up on the safety features:

- Keeping indoor fire/stoves well ventilated.
- Safe fitting of chimneys and avoiding fires on grass/thatch roofs.



References/resources

Clean Cooking Catalog (<http://catalog.cleancookstoves.org/stoves/149>)