

Biofuels

Biofuels are liquid or gas fuel made from processed plant material. Bioethanol and biodiesel are common examples. They are used instead of petrol or diesel in cars, trucks, generators, even aeroplanes.

Biofuel is big business in some parts of the world. Large bioreactors use waste from sawmills, waste cooking grease and old cooking and motor engine oils, even crop residue. It is broken down into sugars and fermented into alcohol. Brazil makes 16 billion litres a year. There is a more complicated chemical process that is used to make biofuel from algae. But the simplest method uses sugars like sugarcane and vegetable oils like palm, sunflower, groundnut, soya, corn and coconut. The oils and sugars can be extracted using a hand press like the ones used to extract oil to eat. Then it is fermented, the same as making wine or beer, to produce ethanol, which is the alcohol in wine and beer. Glycerin which is also useful is a by-product. Locally made biofuel can be used in an ordinary diesel engine, in fact it will make your engines last longer!

You may be starting to realise that there are good jobs for people who have studied biology, microbiology and chemistry and lots of opportunities to make more use of the resources around us!

Biochar

Biochar has been central to life on John and Anna's small holding in north western Kenya for more than twenty years. At Spencer's Farm biochar has provided clean energy and clean drinking water for local households, halted deforestation, improved soil and helped fight climate change. Biochar is a fantastic way to use the energy in wood, at no cost and actually reduce CO2 emissions at the same time. What could be better?

Biochar is similar to charcoal, but is actually made while cooking, it is a by-product of a simple model of improved cook stove. Biochar stoves make very little smoke, require only twigs of wood and cook well.

Biochar is wood that has been 'burned' with very little oxygen present. The process is called pyrolysis. The presence of just some oxygen causes the tars and oils in the wood to burn away. As they burn heat and a clean, hot flame is created. A light, brittle structure like charcoal, remains. This is biochar, it is made up of carbon. It can be used to filter water to make it safe for drinking. It is added to compost to reduce odour and to soil to increase productivity, especially poor soils.

i ACTION SHEETS - 68: Solar Lanterns, 60: Solar Cooking, 64: Solar Water Heating, 67: Planting Trees for Fuelwood, 66: Biogas

Watch the films Energy, Biogas and Water Energy

SMALL CHANGES MAKE BIG IMPROVMENTS

The type of cooking stove you use needs to suit you and your family, but its design can affect your health, wealth and happiness too! There are models of stove that use less fuel and produce less smoke. They often reduce cooking time as well.

To be efficient a stove must suit the way fire works! Fire needs air, circulating under and up and through. A grate and a door on the stove help air enter. Walls around your stove contain and shield the fire directing more heat into the cooking pot. In Western Kenya, the Jiko Kisasa stove is built by local potters. It halves the amount of fuelwood needed to cook, and can also be fuelled with straw, sawdust and farm waste. The stoves are so popular that a hundred thousand are now sold every year.

FUEL SAVERS

- Reduce the amount of fuel you need by two thirds! Put a lid on your cooking pot!
- Use a pressure cooker - a special pot which cooks food much faster than a normal pot
- Soak lentils, beans and grains and chop vegetables small to reduce cooking time.

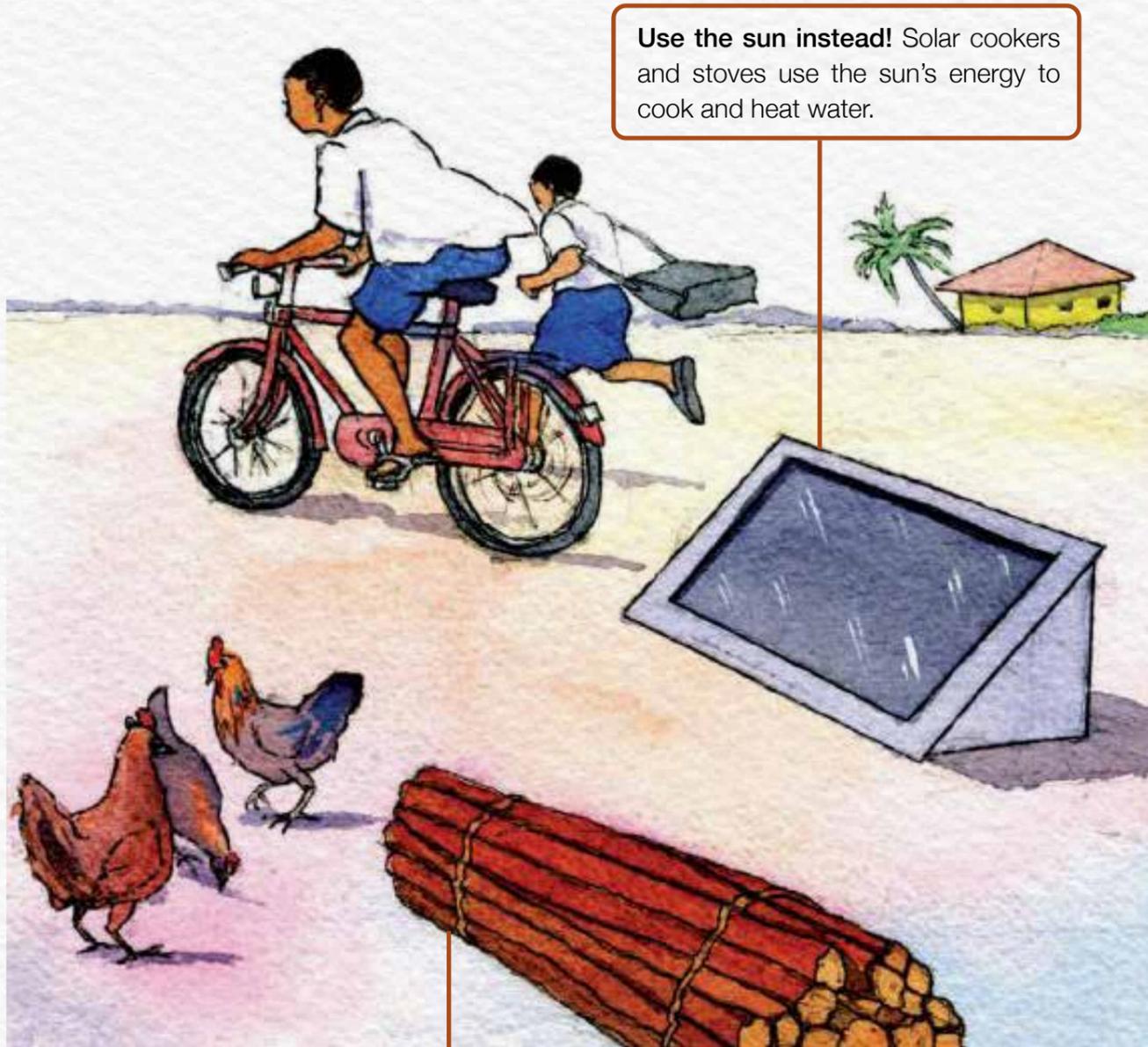
More ideas for cough-free cooking

Houses need to be well insulated but also well ventilated. Insulation keeps the temperatures comfortable, ventilation lets fresh air enter, and lets stale air and smoke get out.

i ACTION SHEETS - 62: Cook stoves, 69: Energy Efficient houses

Watch the films Fuel Efficient Stoves



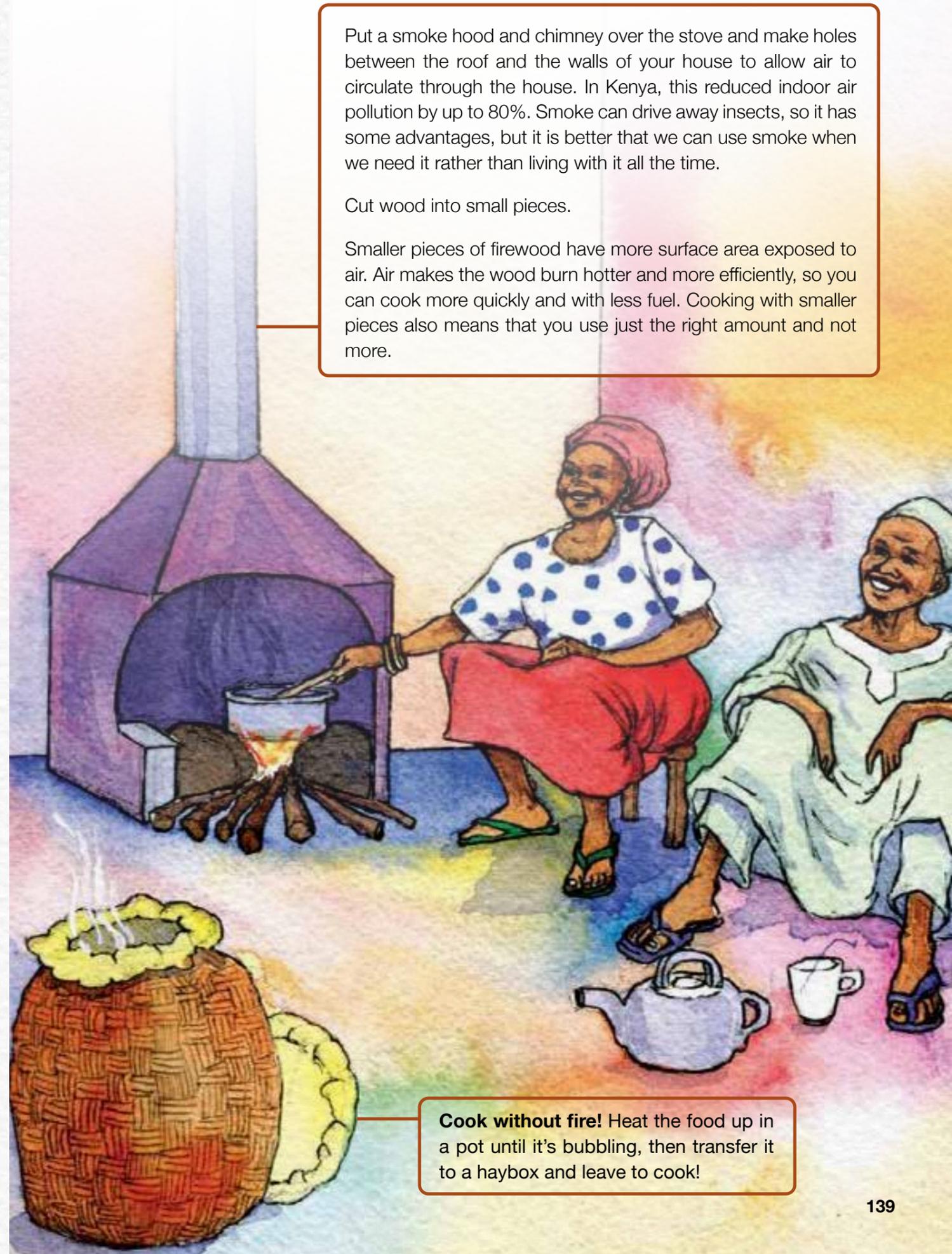


Use the sun instead! Solar cookers and stoves use the sun's energy to cook and heat water.

Dry wood is crucial! Wet wood, like green grass or damp paper, contains moisture. The fire has to work hard to drive away the water. Less heat energy is produced, so food takes longer to cook. Try the fuelwood experiment, Energy activities page 145.

i ACTION SHEETS - 63: Smoke Hoods, 59: Make a Fireless Haybox Cooker, 61: Make your own Solar Cooker

🎬 Watch the film Energy: Solar Energy - Solar Cookers



Put a smoke hood and chimney over the stove and make holes between the roof and the walls of your house to allow air to circulate through the house. In Kenya, this reduced indoor air pollution by up to 80%. Smoke can drive away insects, so it has some advantages, but it is better that we can use smoke when we need it rather than living with it all the time.

Cut wood into small pieces.

Smaller pieces of firewood have more surface area exposed to air. Air makes the wood burn hotter and more efficiently, so you can cook more quickly and with less fuel. Cooking with smaller pieces also means that you use just the right amount and not more.

Cook without fire! Heat the food up in a pot until it's bubbling, then transfer it to a haybox and leave to cook!