

Alternative fuels

Charlie Forst gives details of two cooking fuels which may be new to some readers. He works with ECHO, 17391 Durrance Road, North Fort Myers, FL 33917-2200, USA.

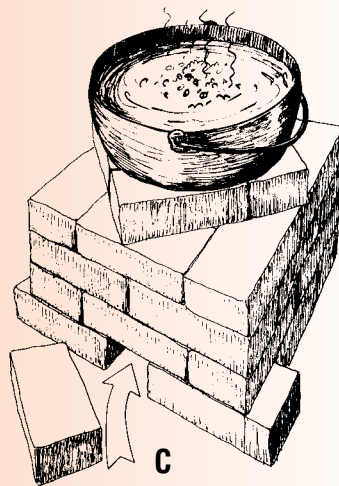
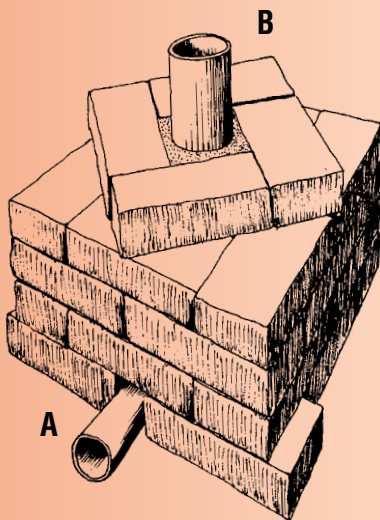
Sawdust stove



Photo: ECHO

This stove is very simple to make and use if there is a good supply of sawdust available. It burns with a high temperature and makes little smoke. This design uses 28 fireproof bricks to make a small square. It could also be made in a large tin or metal bucket. If you have no wood sawdust, try using this idea by putting maize husks through a grinder or mill to obtain powder. Rice husks, wood shavings and other dry organic materials can also be used.

- 1 Fit a narrow bamboo or plastic pipe at the base, going into the centre to act as an air inlet (A). Balance or hold in place a wider bamboo tube or pipe in the centre of the stove and tightly pack sawdust around this until the stove is filled (B). Remove the pipes very carefully by slowly twisting them. Place four bricks on the top to hold a pan. Light the sawdust at the bottom by first dropping in some paper and then a lighted match. If too much air is entering through the air inlet hole and the stove is too hot, partly close the inlet with a brick or stone (C).



- 2 Once lit, the stove will produce a great deal of heat and burn for up to six hours. It may be useful to place a flat piece of metal with a hole cut in it, on top of the sawdust. This metal plate drops down as the sawdust burns and helps to ensure even burning.

Methane digester



Photos: ECHO

Charlie's methane digester will produce enough gas for cooking and lighting for a whole family.

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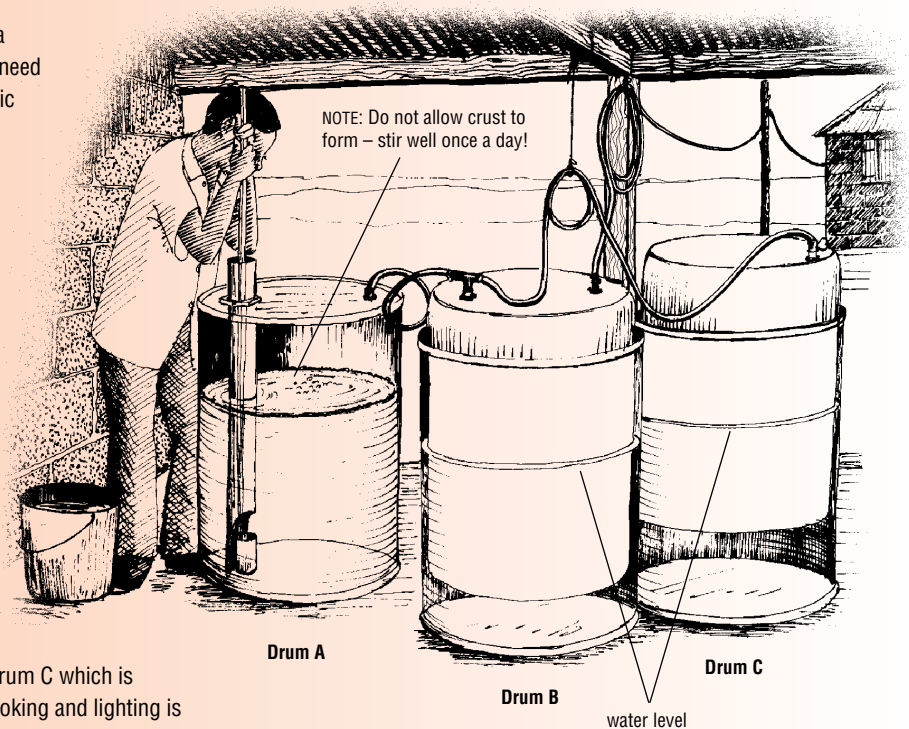
Many *Footsteps* readers have asked for information about methane digesters over the years. Until now we have not been able to pass on much useful information for small-scale digesters. However, this design by Charlie Forst of ECHO is for a simple household unit that requires the manure from three or four cows or buffaloes or six goats and will produce enough gas for cooking and lighting for a whole family.

The idea behind the use of methane digesters is to capture the methane gas released from animal manure so that it can be used for household gas – for cooking or light. All kinds of plans have been designed, but the world is full of failed methane digesters. This idea is simple and practical but the digesters do need daily attention for them to work successfully. After use in the digester, the manure makes excellent fertiliser.



1 You need to obtain five large drums (44 gallons or 80 litres in volume). Plastic drums are best, but if only metal drums are available, a coat of paint on the insides will help prevent holes developing (pour paint inside Drum A and roll it around to ensure an adequate covering). Two of the drums must be a little smaller so that they fit well inside the outer drums with room to move up and down freely.

2 Drum A – the digester – needs a tight-fitting lid (which does not need to be removed). Fit a large plastic tube or bamboo pipe into the digester, reaching into the base of the drum, with the side cut away to aid mixing the manure. Fit a tight-fitting plastic tube into the lid of the digester, ideally with a tap to control the flow of gas. Seal all connections with tar.



Fit an upturned empty plastic drum into Drum B. No lid is needed for either of these drums, as water is used to form a seal. The tube with gas enters the top of the upturned drum and is fitted with a double connector. Gas initially enters Drum B, but as this fills up, so gas enters into Drum C which is made in just the same way as Drum B. The methane gas for cooking and lighting is removed from another plastic tube from Drum B. This tube carries the gas into the kitchen. Use bricks or stones as weights on drums B and C to build up pressure.

4 When setting up the digester, only cow manure should be used, in order to build up the right culture. Goat or buffalo manure will not work! Once established, collect all the fresh manure from the animals in a bucket each day. Remove about 2% of the slurry (a mixture of manure and water) from the digester each day. Allow this to settle. Remove the liquid and mix it into the fresh manure. You may need to add a little water to get a runny mix. Add this carefully into the digester through the large tube and stir very well. It is essential to stir the digester really well once a day. Otherwise a crust develops and the digester will not work. You cannot go away for a few days and forget a methane digester!

5 The old manure can now be used as fertiliser. However, it is very strong and may burn plants unless diluted or mixed into compost.

6 Methane gas is potentially dangerous. Don't smoke near the digester. Place it well away from the cooking area.



Charlie attaches an old tin can to a stick and uses this for removing, mixing and pouring the slurry. For effective mixing of the slurry in the digester, he adapts this tool and adds a simple valve. He removes the base of the can and hinges it at one side with wire, and uses a larger wire loop as a stop on the other side. This enables him to 'pull' up slurry from the base of the drum and mix it well.