

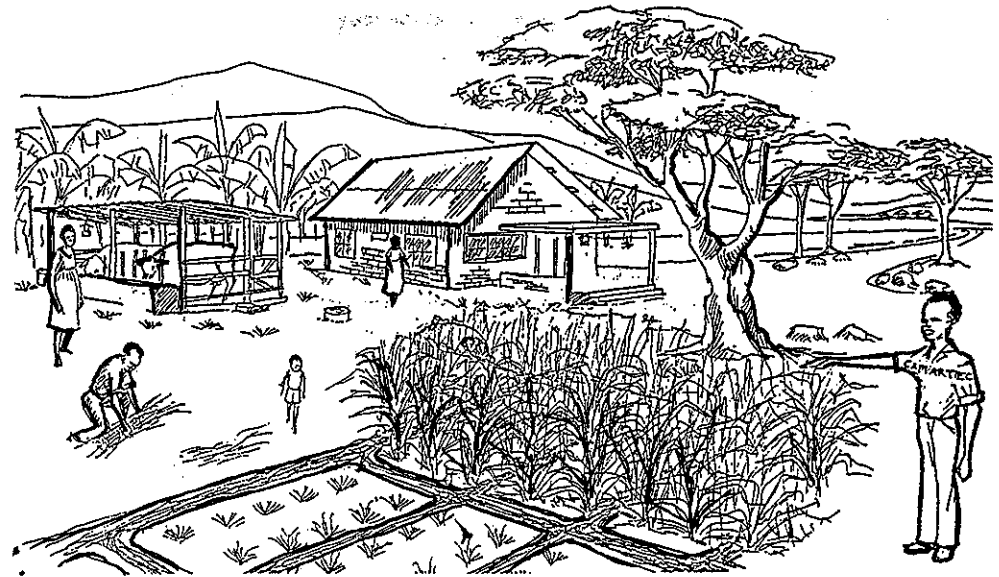
# MY BIOGAS UNIT

*How to handle,  
how to get the most out of it,  
what to do in case of problems*

This manual was prepared by the biogas team of the  
joint GTZ/CAMARTEC - Biogas Extension  
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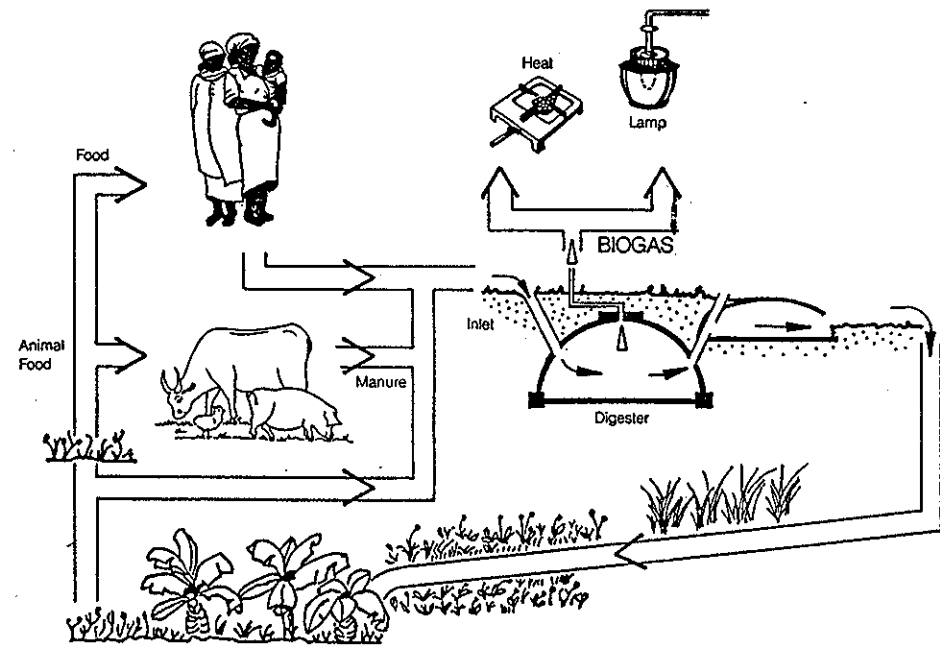
Illustrations by S. Salimini Sile



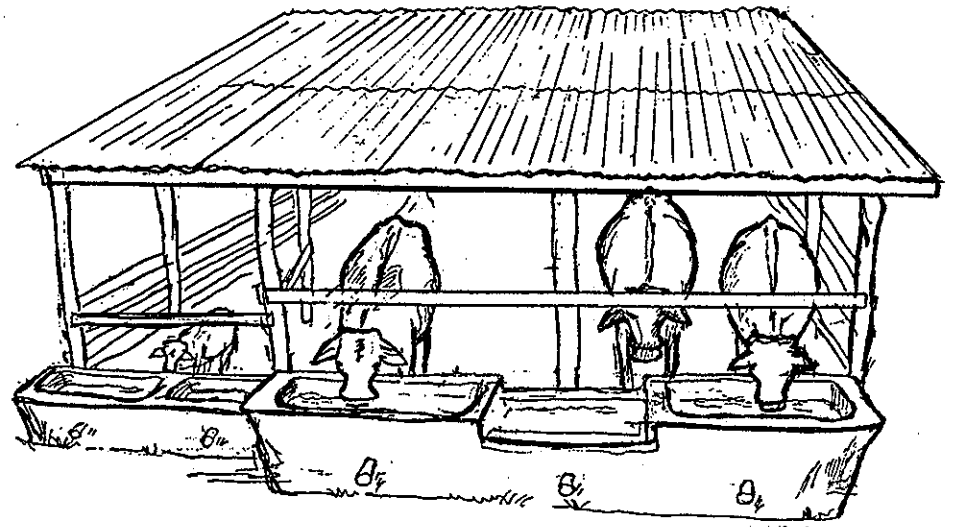
Dear Farmer!

Congratulations for installing a Biogas Unit at your farm!

To get the most out of it, in this manual we want to give you some hints, advice and ideas on how to operate the biogas unit.

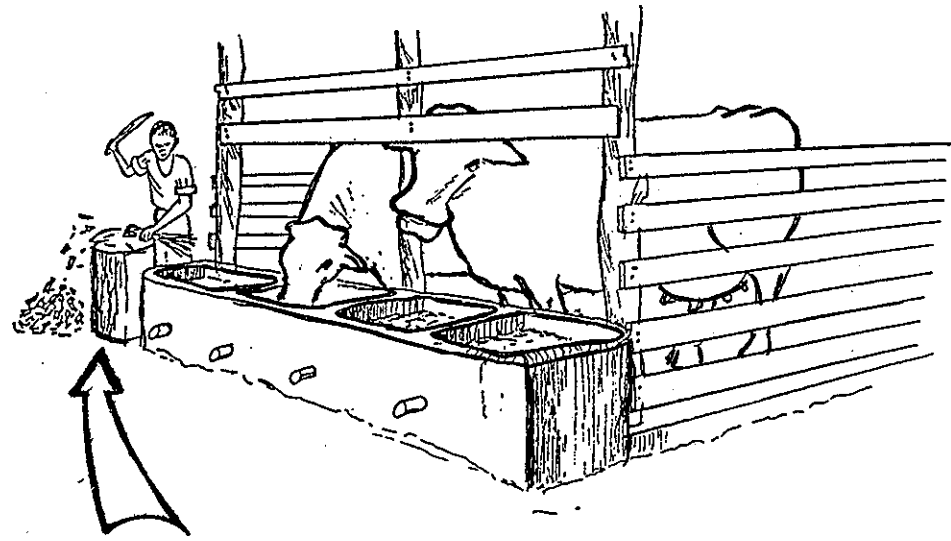


Cow shed, Biogas plant, a gas cooker in the house, gas lamps and effective utilization of the slurry as a fertilizer forming a BIOGAS UNIT.

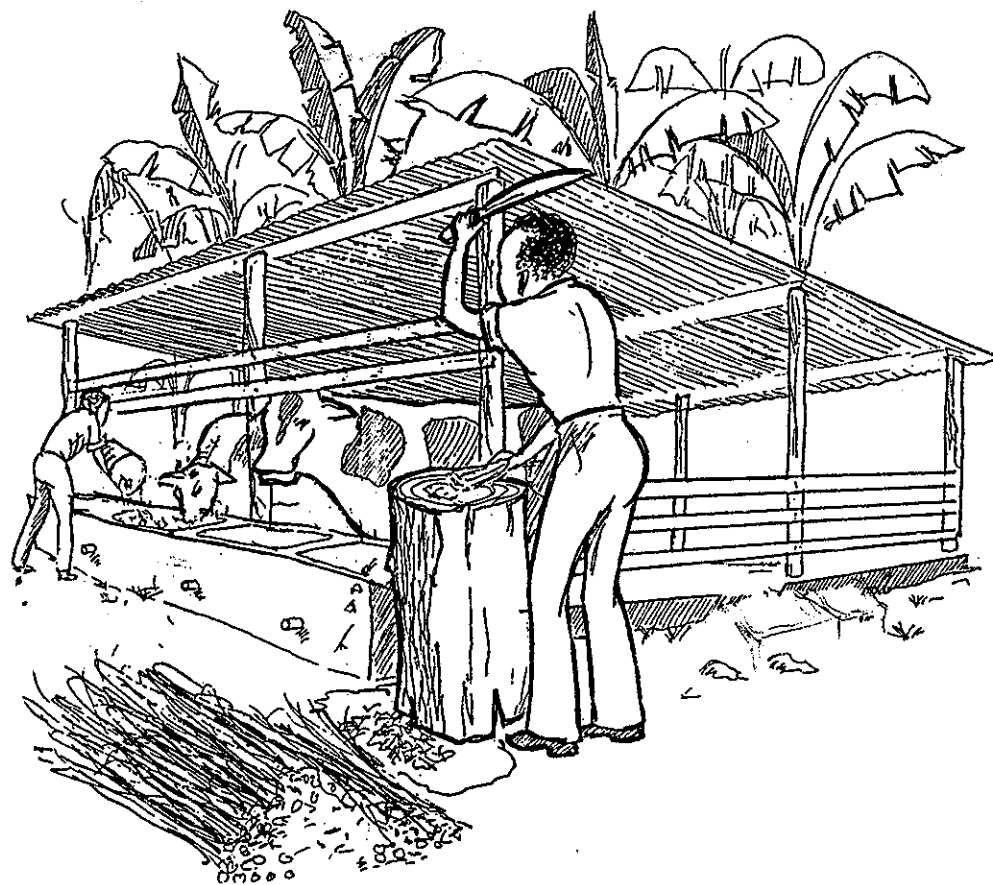


## THE ANIMALS IN YOUR UNIT

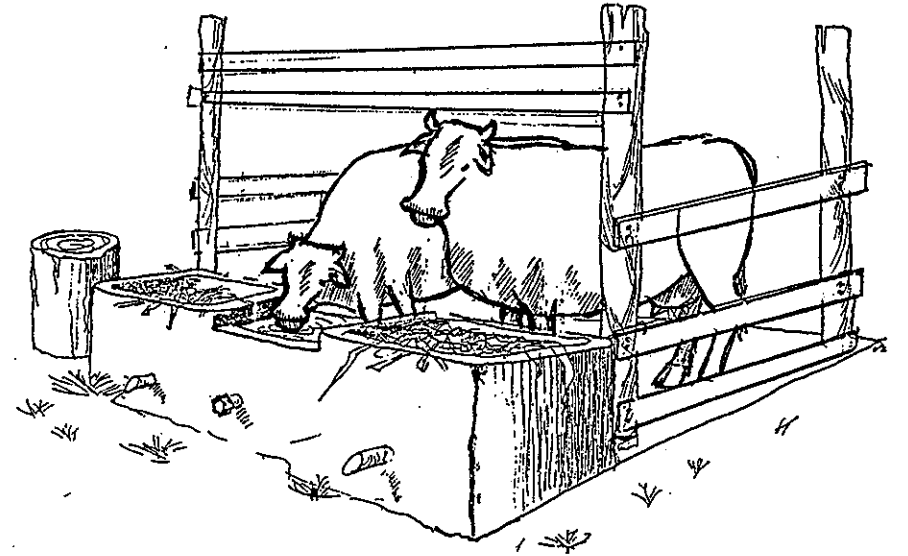
A proper, well arranged cowshed does not only ease your work, but helps you also to keep your animals clean, well fed and healthy.



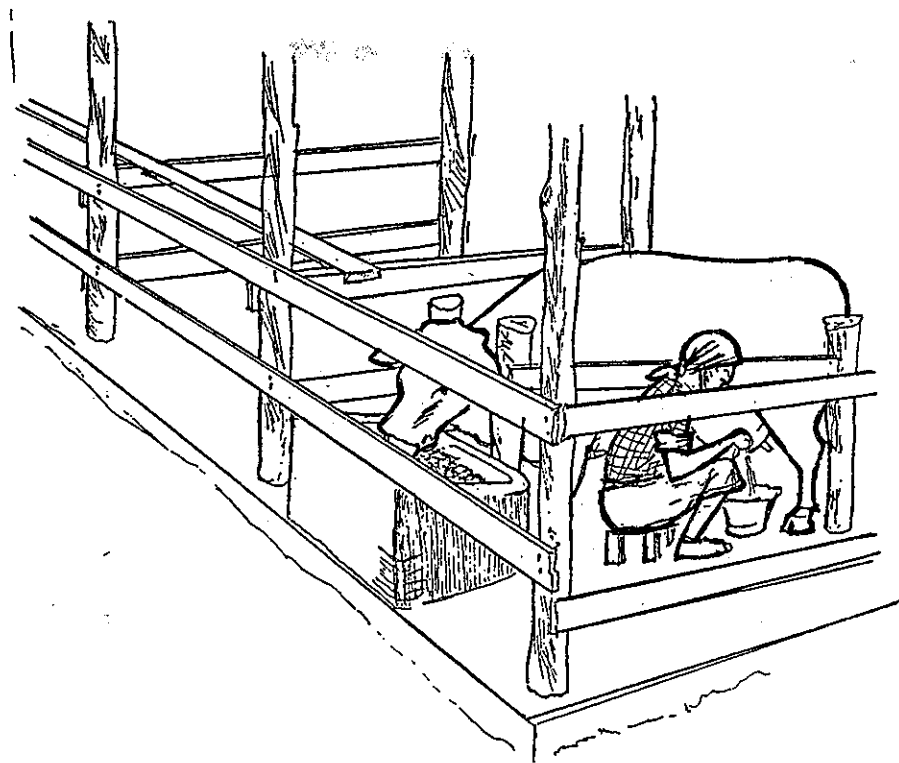
Place your chopping log close to the feeding trough!



Chop each type of fodder into small pieces of not more than two inches. The animals will spill less of it on the stable floor—more earning through less losses of fodder and less work while cleaning the stable.



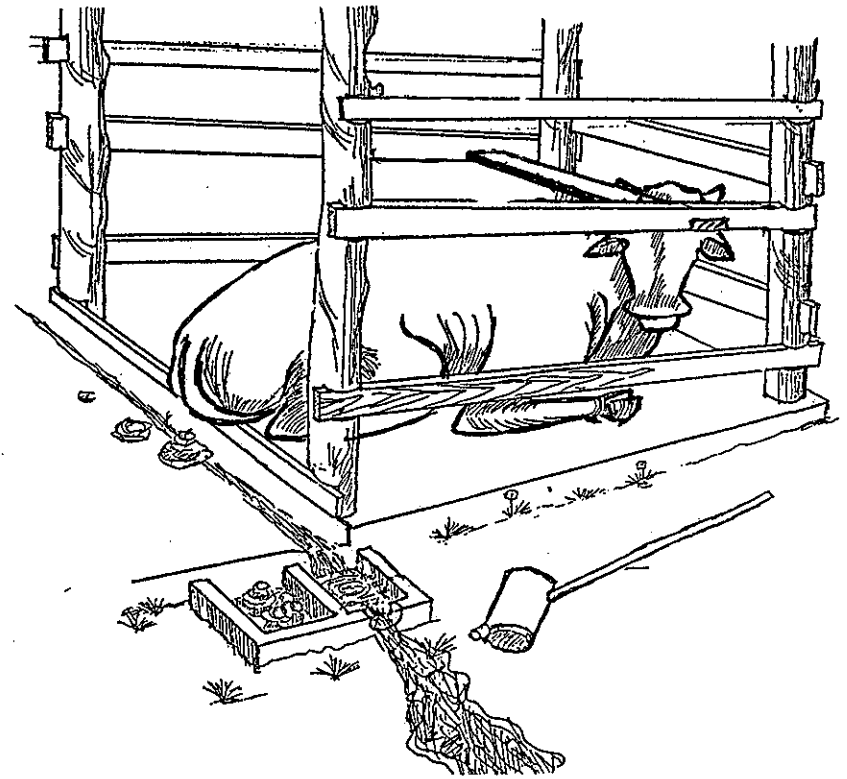
Make sure that your animals always have access to fresh and clean-water it will make your cows stay healthy.



Make a provision for milking your cows in a separate milking stand, which should be designed in a way that makes the milking as easy as possible: have separation bars between milker and cow and milking stool for the milker.

Feed concentrated feed to your cows while milking them—they will love being milked



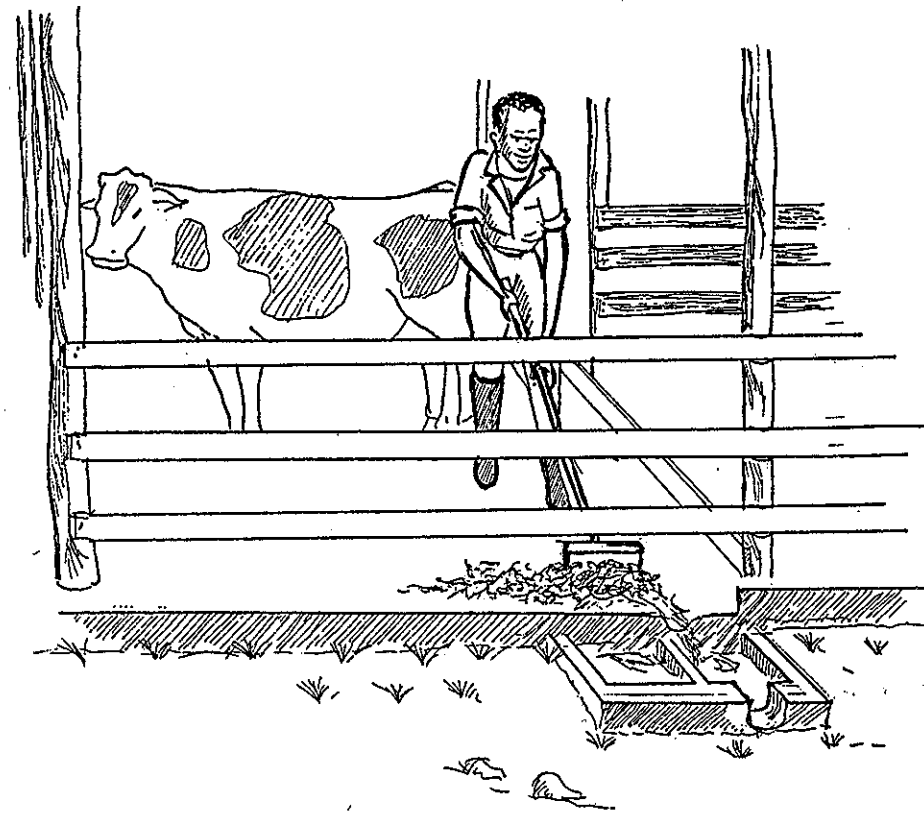


The construction of sleeping boxes helps you to keep your animals clean. The horizontal neck bar is necessary to make the cow dung only in the area outside the sleeping boxes. It will improve the sanitary conditions for your animals.

Therefore: Make sure that the neck bar is always fixed, replacing broken ones immediately.



Before the dung is being pushed into the dung chamber, grasses, trashes and other materials have to be sorted out. The earlier this is done the less tiresome the work is.

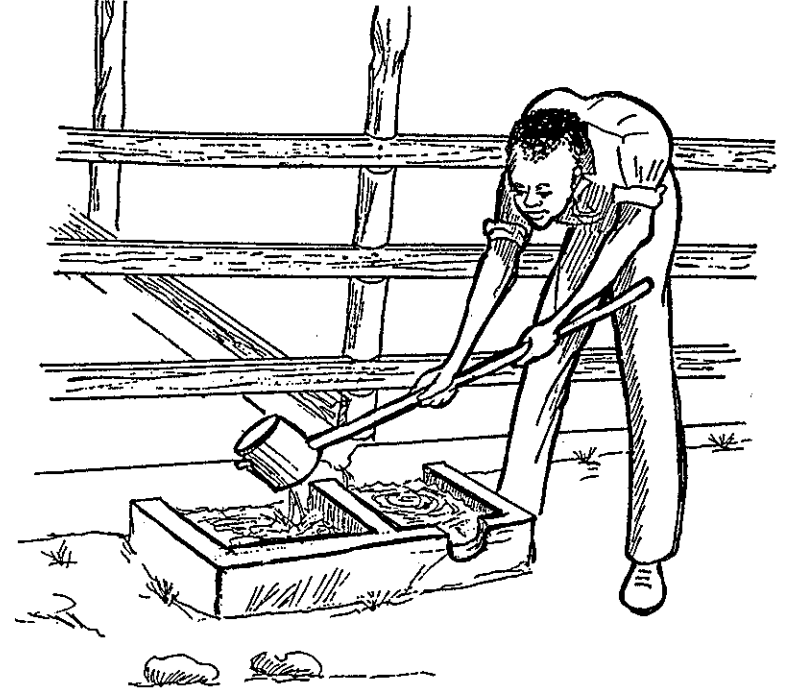


**AFTER SORTING OUT RESTS OF FOODER**

Avail yourself with a squeegee for pushing all dung into the dung chamber.

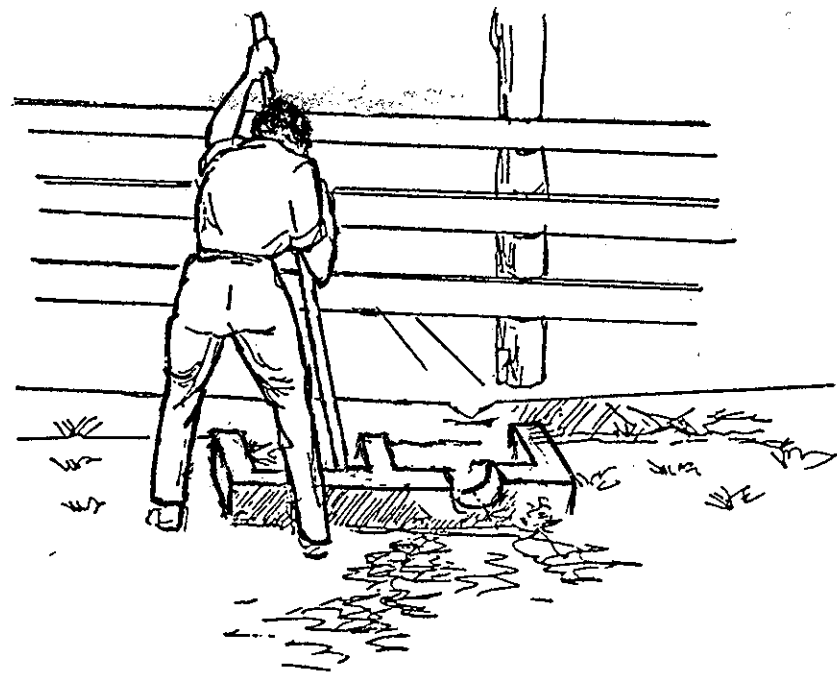


The liquid to dilute the dung should be taken from the urine chamber.  
Using a dipper will ease your work!



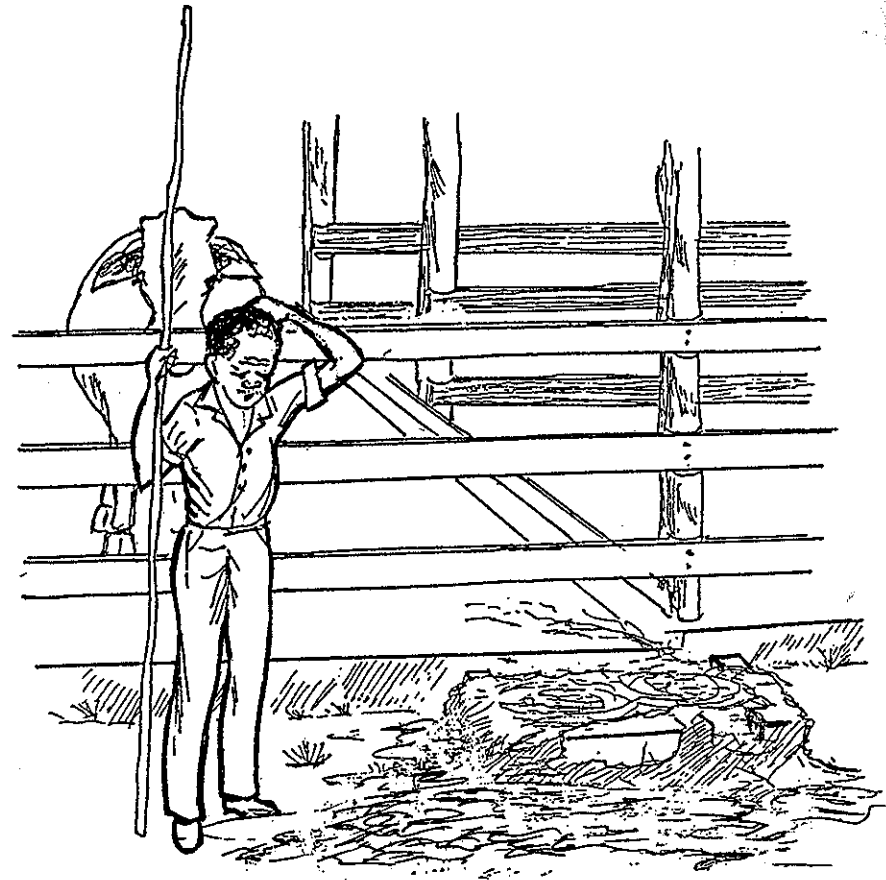
Take as much liquid as you need until you have pasty material that is washed smoothly into the inlet pipe.

Regular feeding (twice a day) does not only keep your stable floor clean, but also increases the biogas production.



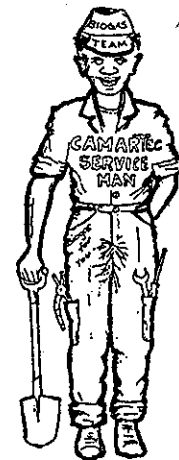
## PROBLEM !

The dung does not enter the inlet pipe. Take a long stick (3m.) and poke in the inlet pipe.



## **BIG PROBLEM !**

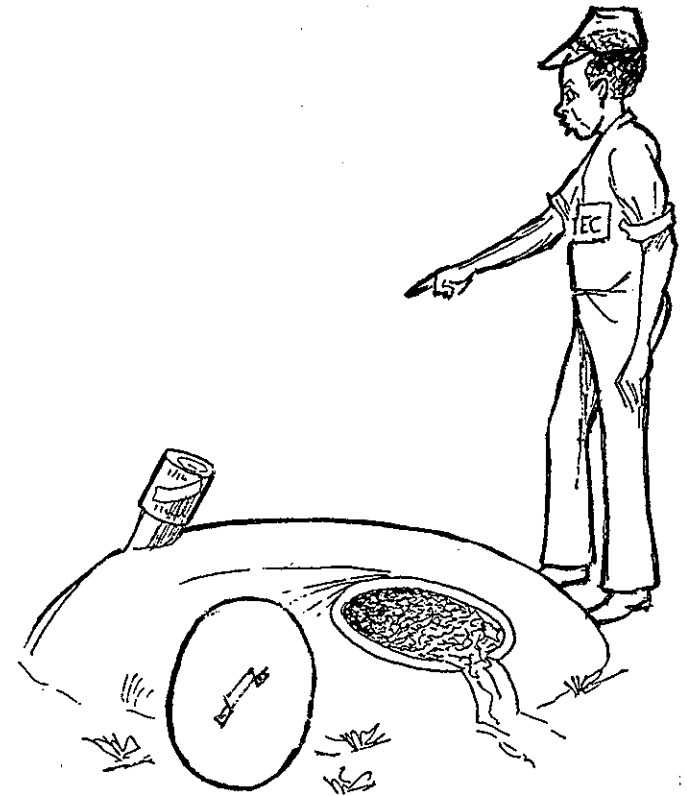
Poking in the inlet does not help anymore the biogas plant pushes the dung out of the inlet pipe. Probably the outlet pipe is blocked.



Take the stick  
and poke in the  
outlet pipe.

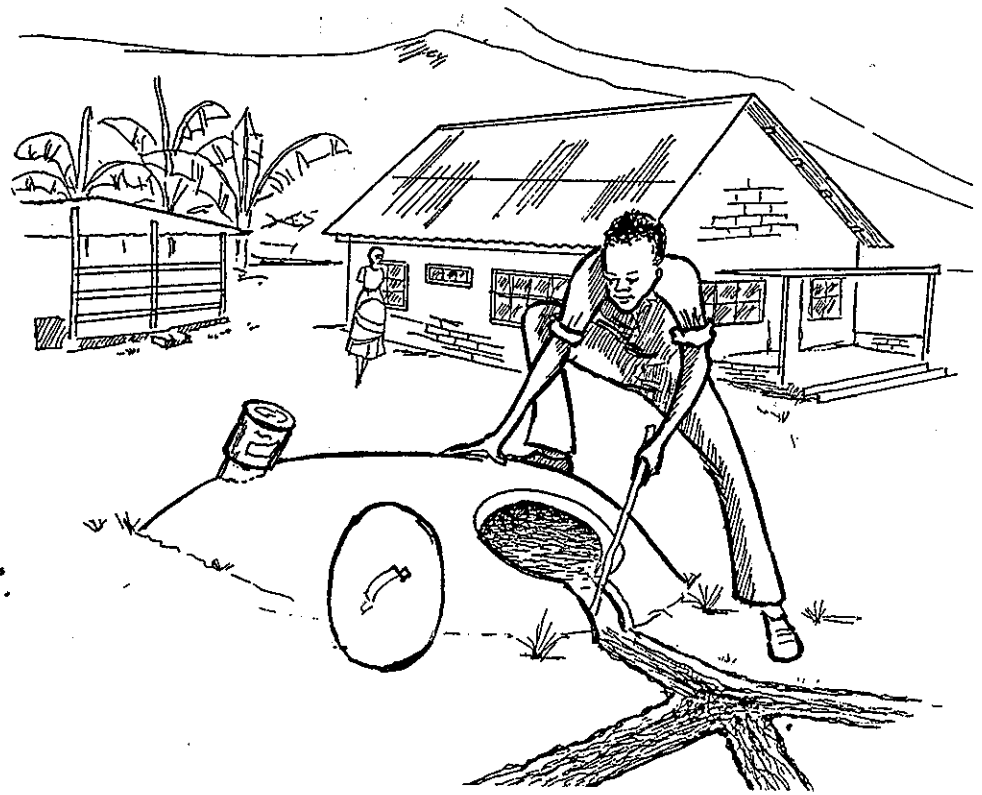
If you still can't fill  
your plant just  
call **BES**





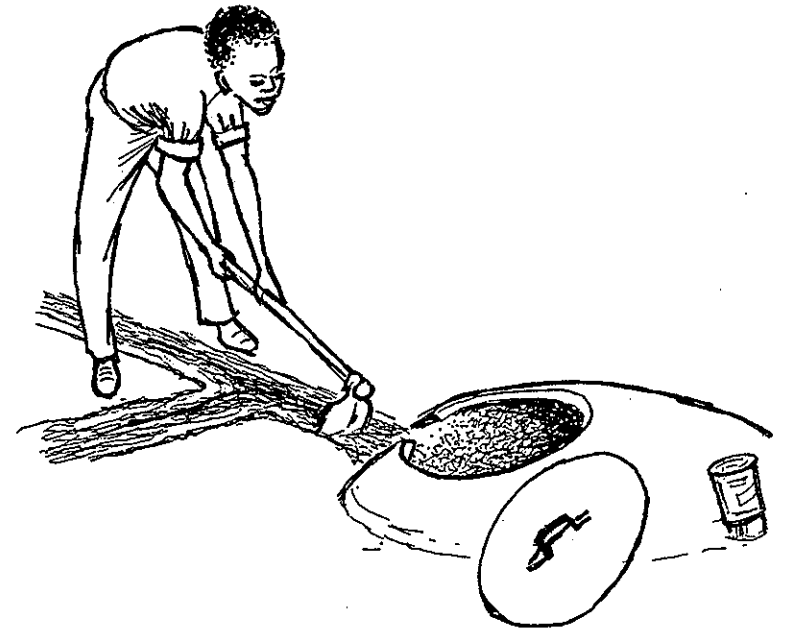
Make sure that the extended outlet pipe is always covered - this is a preventive measure against stones being thrown into the plant.

Make sure the outlet opening is covered as well, reducing the danger of falling in.



It is very important that slurry can flow out of the expansion chamber without being blocked. Please observe for a clean overflow point as a routine job every day.

## Slurry utilization

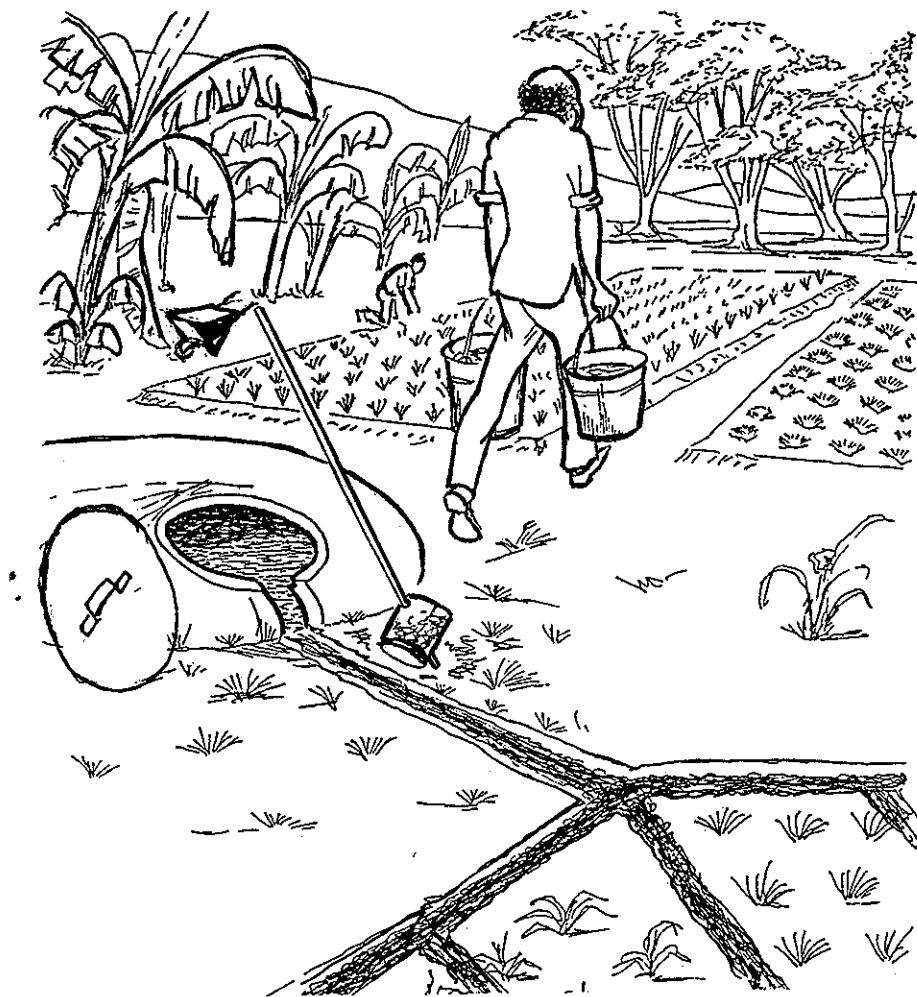


A blocked slurry canal can lead to a blocked overflow point. Make sure that the slurry can flow all the time. Clear and maintain the canals. For good percolation change direction of flow.

Slurry is a good fertilizer for all types of plants

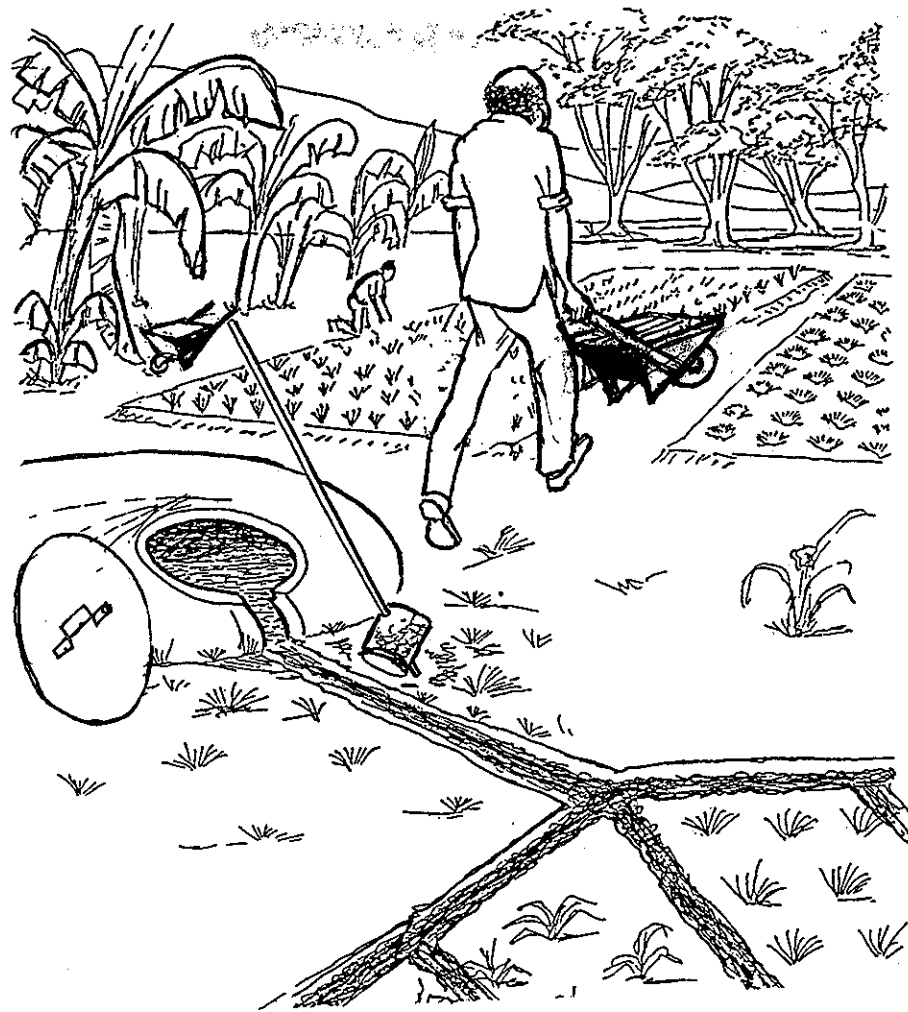


Slurry flows out of your Biogas plant mainly during night hours. Therefore prepare the slurry canals in the afternoon hours.



The slurry is a good fertilizer for your vegetable garden.

Whenever possible it should be distributed by gravity. If the farming land is uphill, use buckets or a wheelbarrow.



The modified wheelbarrow (with a lid) helps you to transport the slurry even to distant fodder grass plantations.



Slurry is a good fertilizer for your coffee and banana trees. But if distributed uncontrolled to your farm you do not only waste it; it also poses the danger for your plants are because it will not get enough air through the excessive liquid.

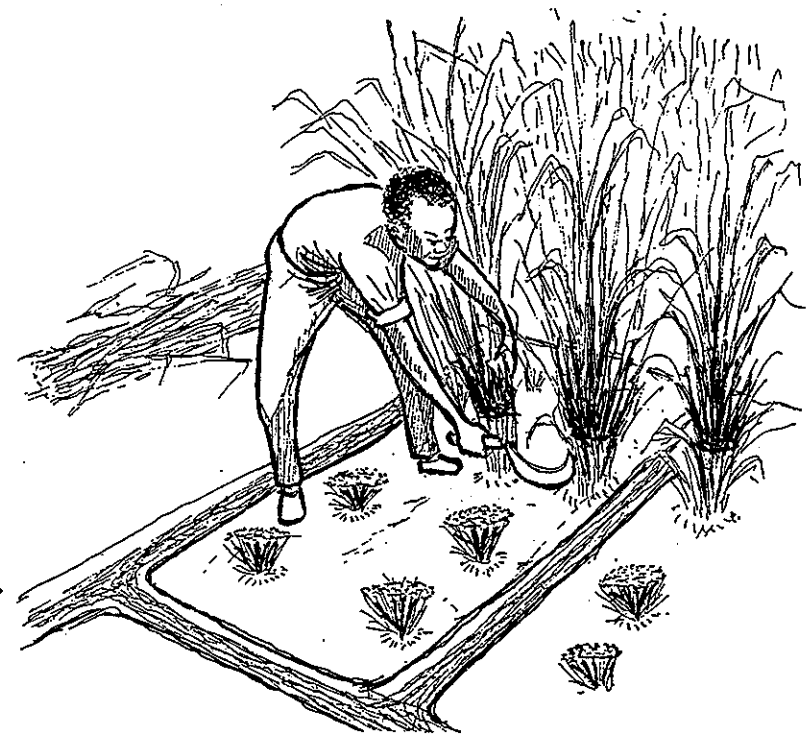


To generate highest income out of upgraded dairy cows you should keep them under zero grazing conditions, i.e. keep them in the stable for 24 hours a day and bring all required feed and water to the stable.

The slurry is an ideal fertilizer for fodder grass.

You get most of it if you plant it systematically; a well managed fodder plantation provides you with sufficient feed for your animals all year through.





Best time for harvesting the fodder grass is before it has reached the height of one meter.

Make sure that after harvesting the slurry canals are not blocked.



Sometimes there is not enough farm land close to the Biogas plant where the slurry can be used in liquid form. In these cases partly drying the slurry in drying pits can be a solution.

Grow trees around the pits to provide shade; otherwise the sun will harm the fertilizing quality of the slurry.



Another solution is the setting of compost heaps.

Pile up any organic residues from your farm and household and scoop the slurry in between and on top of it. This will give you an excellent compost soil. After a few months it should be turned, you will have an easy transportable organic fertilizer with all its nutrients.



## **THE BIOGAS IN THE HOUSEHOLD**

When you are ready for cooking open gas valve a little bit and light the burner.

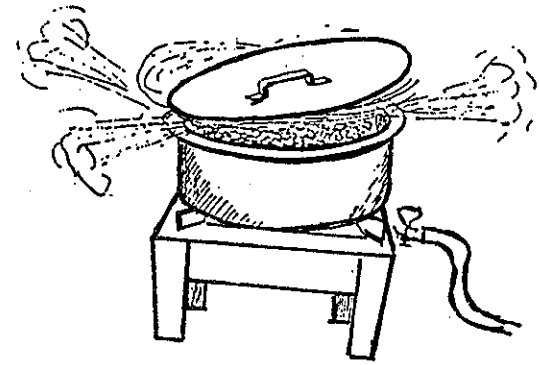
Make sure that there are always matches close to the burner.  
And put a lid on your pot!



Put the pot on the burner  
immediately after lighting it.



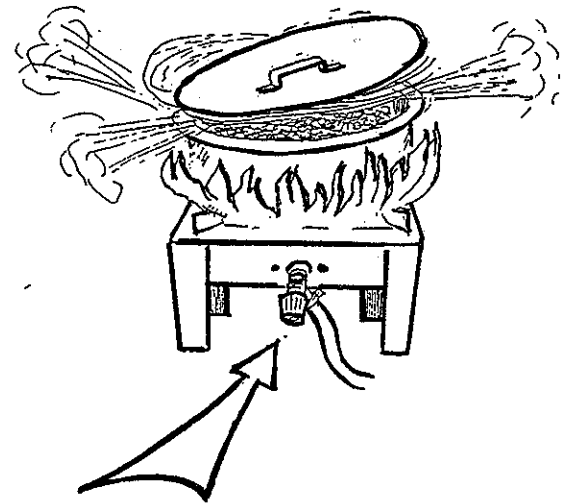
The size of the flame can be adjusted as required by careful opening and closing of the valve. The flame should only burn under the pot and not around.



If food or water has started boiling a very small flame can keep it simmering.  
**This will save gas.**

**Therefore:** Reduce the flame by adjusting your valve!

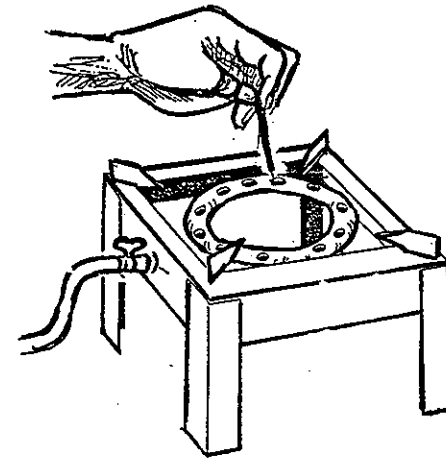
## DANGER



The gas valve has been opened too much, you waste your valuable gas and might even burn yourself or your children. And cooking will not be any faster!

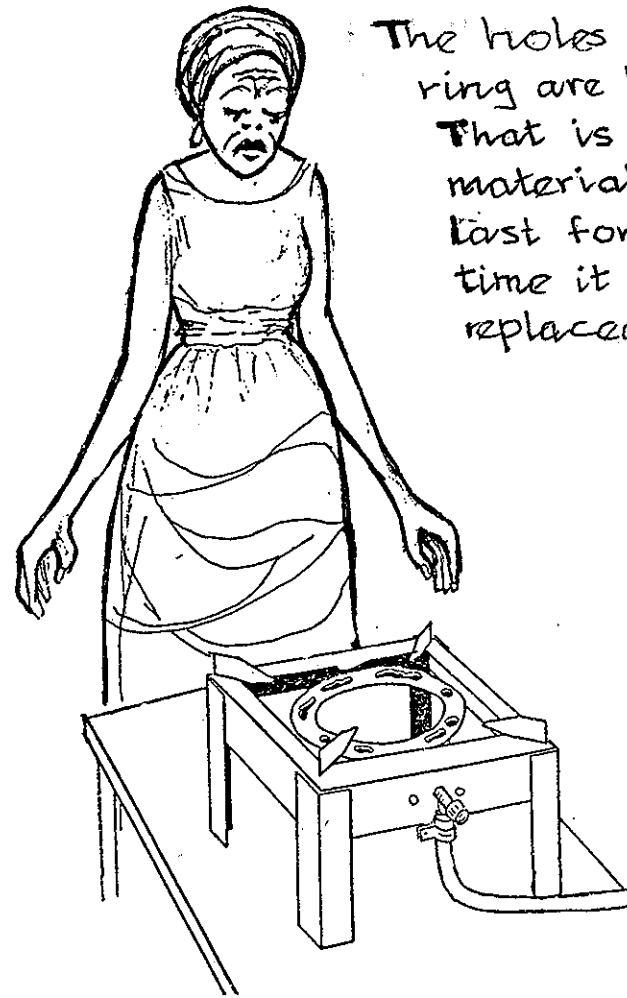
Make sure that after cooking the gas valve is always closed.



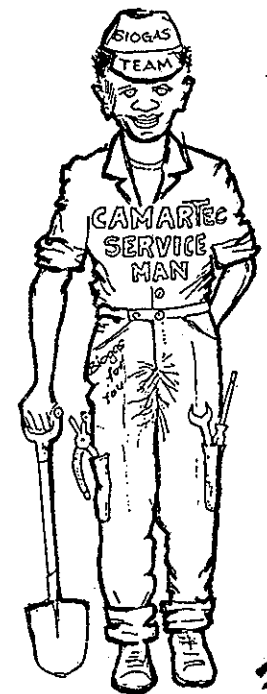


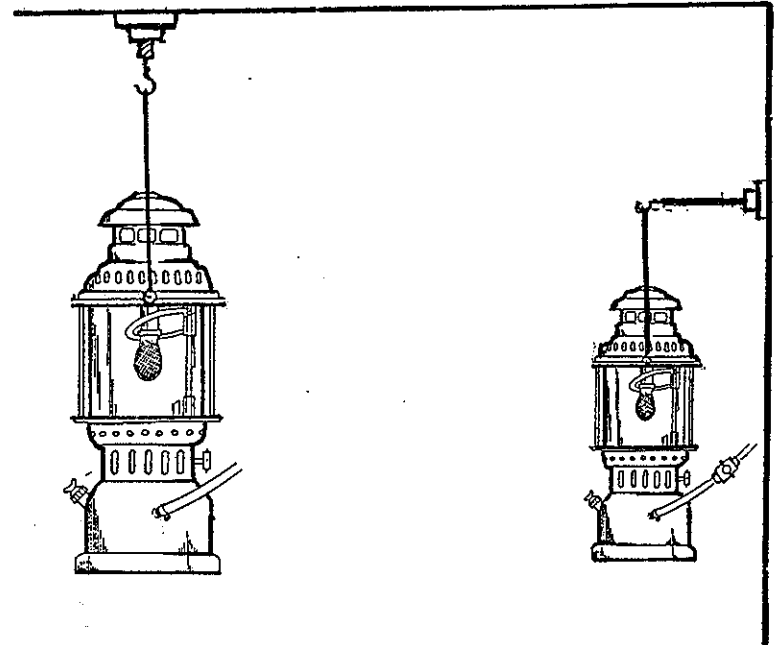
From time to time the holes of the burner ring have to be cleaned. Use a match stick for cleaning the holes.

The holes of the burner ring are burnt out.  
That is because the material does not last forever, after some time it has to be replaced.

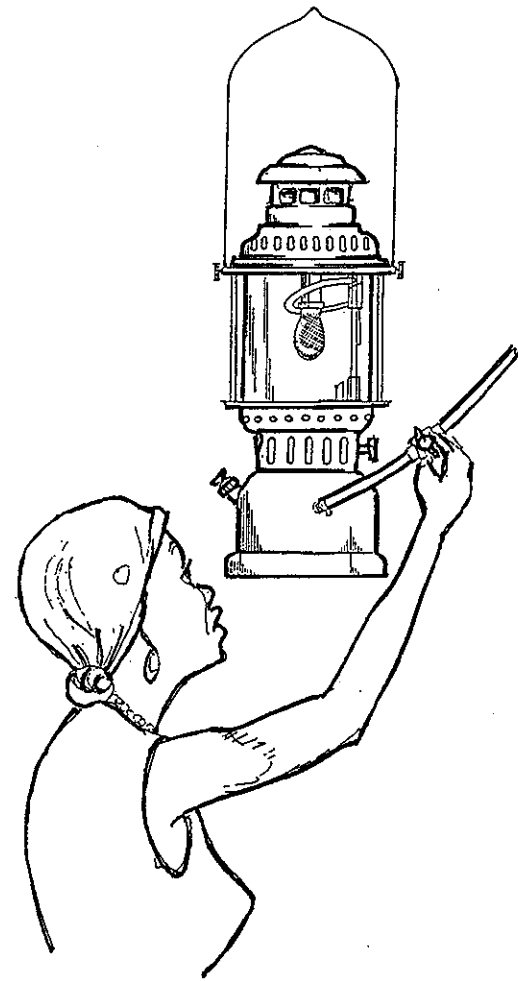


Contact **BES**

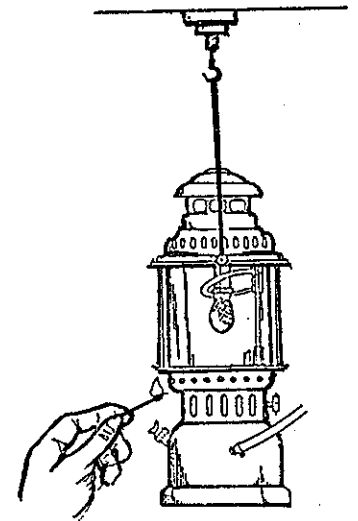
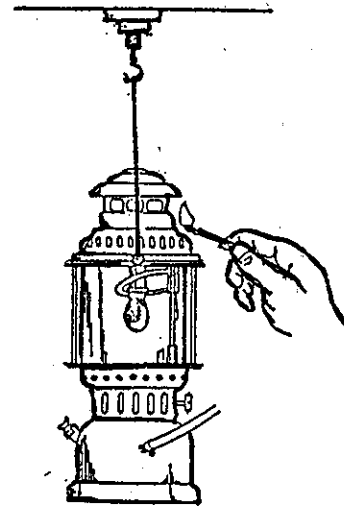




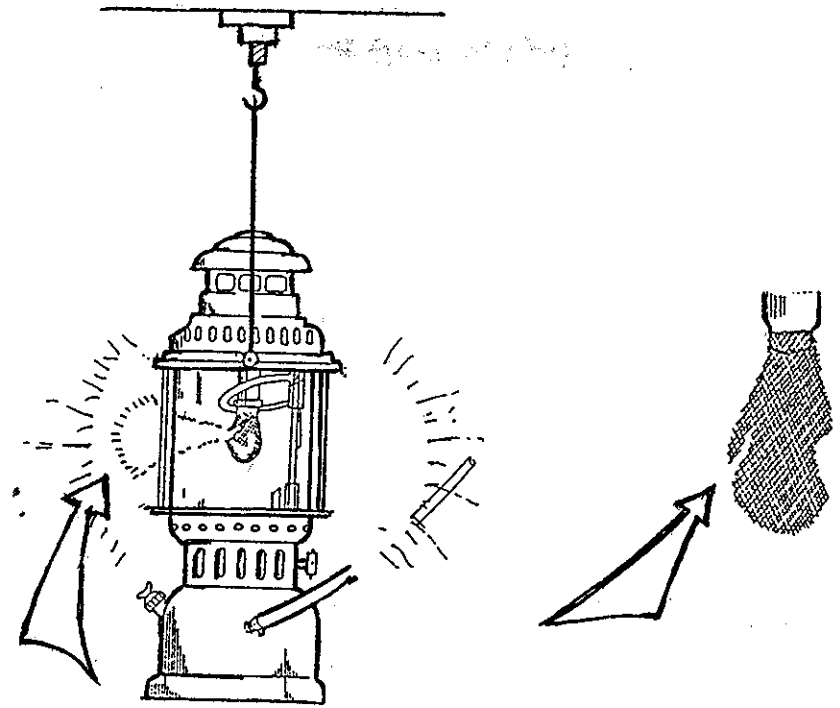
The biogas lamp is either placed on a wall or under the ceiling of your house according to your wish and your convenience.



To light your biogas lamp open the gas valve first.

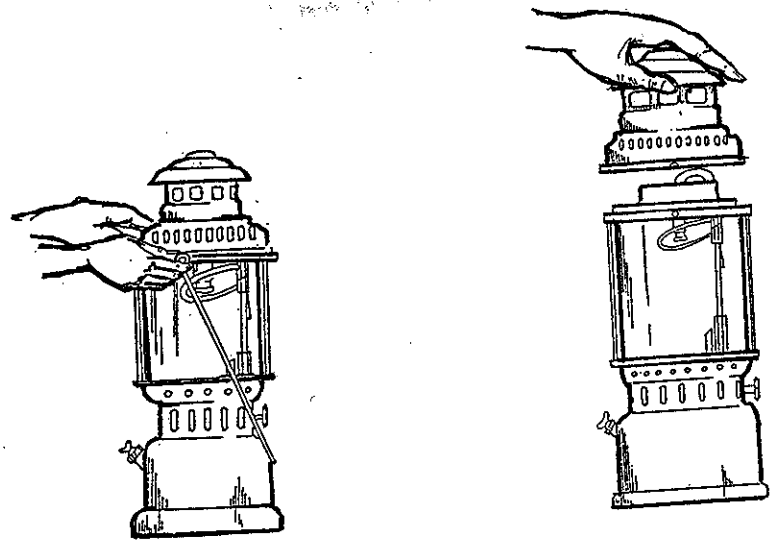


With a match you can either light the lamp through the big holes on top or the small holes at the bottom of the lamp.



## PROBLEM! DANGER!

The mantle of your gas lamp is broken, the flame does not burn regularly, but shoots out of the mantle hole like a flame-thrower. After a very short time the glass will burst.



The mantle has to be exchanged

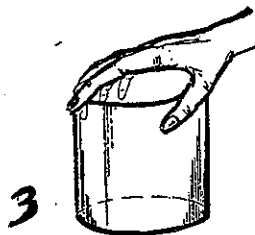
STEP NO. 1 and 2:

Take the cover of the lamp off.

Take the inner upper part of the lamp.

STEP No. 3:

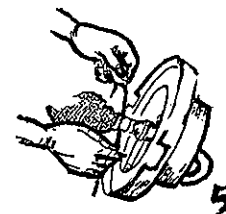
Having dismantled your lamp you might just as well clean it. Remove the glass, clean it with a cloth. Get rid of the dust and dirt inside the lamp by wiping it off.



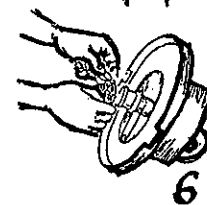
3



4



5



6

STEP No. 4: Take a new mantle and widen the opening.

STEP No. 5: Put the mantle on the mantle holder and fix it properly by tying the two



**Problem:** No gas reaches consumption points.

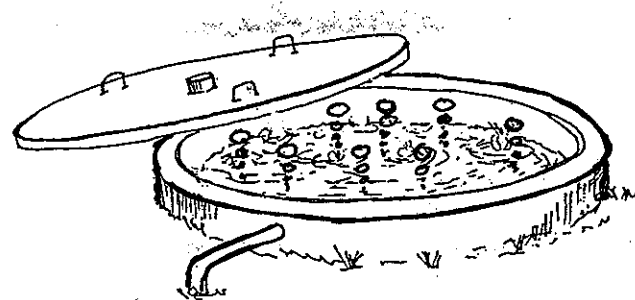
What to do?



Gas escape through the water trap, which has blown empty. You can smell the gas when you come close to it.



Pour water in the opening of the water trap till it overflow, but not more than one litre.



Gas escape through the seal of the lid, it is not gastight anymore. You can see the gas bubbles on the water that covers the lid.

Call **BES** to seal the lid again!

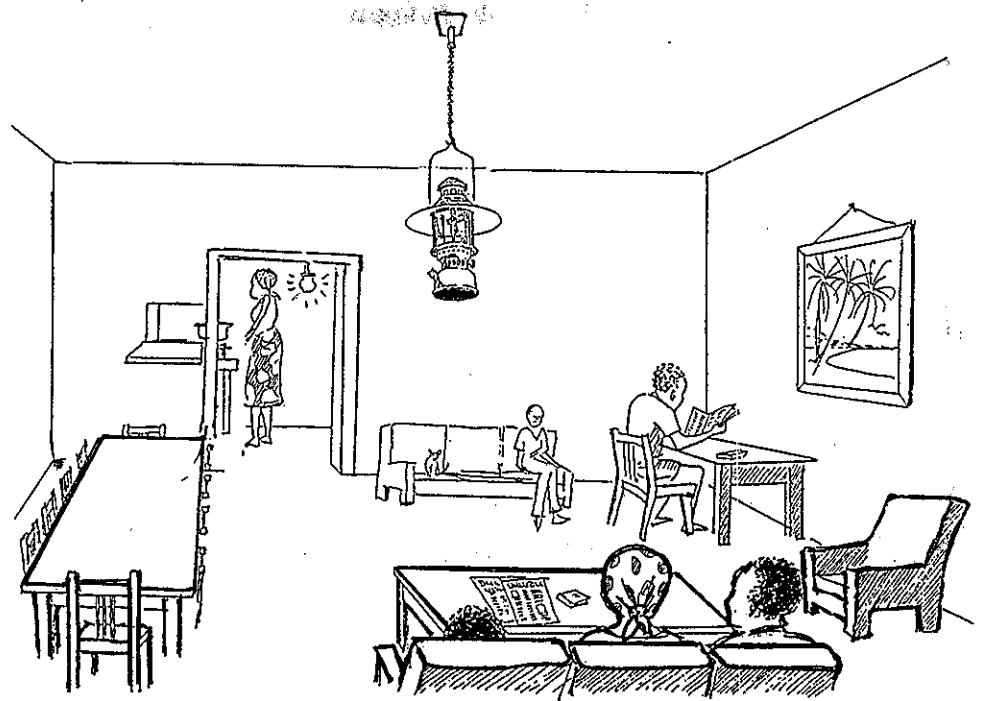




The clay seal must remain moist,  
therefore from time to time add  
water and



waste oil  
through the opening of the lid.



If you use your plant well according to this booklet you will enjoy your Biogas Unit for many years.



**NOW**  
Your Biogas Unit will contribute to a better life for your family, your own and the country's economy.