Free Fuel for Remote Locations: Construction of a Biodigester

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During visits to EARTH University in Costa Rica, UF/IFAS Extension faculty observed sustainable solutions to natural resource problems. Most use simple technology.

In March 2012, eight UF/IFAS Extension faculty assisted in the construction of a biodigester in La Argentina de Pocora, a rural community in NE Costa Rica.

EARTH University Professor Botero: “We estimate that there are currently 2000 family biodigester units and 100 industrial units currently operating in Costa Rica, promoted in-part by EARTH University.”

Biodigester in Operation

Construction

The size of the trench is based on the expected volume of material that is to be treated. Notice the soils in Costa Rica are unlike those in Florida!

Gasket

Used 5 gallon buckets have the bottom cut off. They will form the rigid sleeve for the intake and exit ports on either end of the digestion bag. The screening is a used feed bag, held in place by a bicycle inner tube.

This shows the outside seal assembly before it is installed into the top of the bag. Teflon tape is used to seal the fitting. To make the hole in the plastic to accommodate the gasket, a heated metal dibble is used to melt the sheeting rather than risk a cut which may rupture the seal.

Bio bag plastic is carefully folded. Note that the methane collar is on the outside edge. Bucket filter is slipped over the end of the poly bag. Poly bag is then opened up, the end of the bag is rolled back and tied in place with another bicycle inner tube.

An old (damaged) bag is tied temporarily over the intake end of the new biodigester bag. It will serve as the “bellows” to inflate the new bag. The new bag is walked into place into the pit. Bag in place, its time to cement the outer part of the methane valve in place with PVC glue. Notice the pipe assembly leads to the emergency gas release valve, which will be hung on a canopy support pole.

The bellows is flung up and down to add air to the old bag. It is rapidly closed off and rolled up to force air into the new bag. Process is repeated numerous times! Add waste and start cooking!

Bio-digesters can:
• Keep animal waste out of water supplies
• Capture methane and nitrous oxide and prevent release of hydrogen sulfide and ammonia – responsible for acid rain
• A bio-digester is a practical investment: A small installation typically costs a rural Costa Rican family $200
• Methane can be used as cooking fuel, saving about $20 per month
• Remaining compost enriches soil

By treating the equivalent of 2 cows’ fresh manure per day, enough biogas is consistently produced to allow a family of five to cover all of its daily cooking needs, providing a full return on investment within 6 months.

For More Information
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