DEMAND ORIENTED BIOGAS TECHNOLOGY EXTENSION IN LESOTHO

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Biogas Technology in Lesotho is a technological package where wastewater and other organic matter are treated biologically in a bio-digester producing gas as an energy source and water as fertilizer or sludge as soil conditioner or fertilizer.

The technology follows the concept of DEWATS (DEcentralised WAstewater Treatment Systems) as developed by BORDA (Bremen Overseas Research Development Association). The system is found appropriate for the capital Maseru as many households and institutions have serious problems and cost with the disposal of their sewage.
Biogas Technology does not only save the cost for emptying the septic tank but also leads to economising the use of water as the treated water is suddenly available for the garden. Particularly in the dry winter period this allows to operate a vegetable garden the whole year round.

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Introduction:

Lesotho is a mountainous country, which is landlocked by South Africa. The landscape is extremely eroded due to overgrazing, wind erosion, heavy rainfall, deforestation and drought of the past years.

Although Lesotho is exporting water to South Africa, the capital Maseru gets its drinking water from the catchment area surrounded by pit latrines and septic tanks. Because of the congestion of pit latrines and poorly constructed septic tanks around the catchment area, one can conclude that the drinking water from this catchment area is highly contaminated.

The centralised sewage treatment plant is under-utilised because only a small percentage of the Maseru city houses are connected to the main sewer line. Even that small percentage does not reach the sewage treatment plant due to technical and topographic problems, high maintenance costs and high operational costs. Because of these problems most modern houses are forced to have a septic tank instead of being connected to the main sewer line. There are however many problems associated with having a septic tank such as few cesspool emptiers available in relation to the number of people being served; high costs of emptying, headache of no space for the emptier to get into the premise; headaches of having to wait for the emptier due to their scarcity etc.

Biogas Technology:

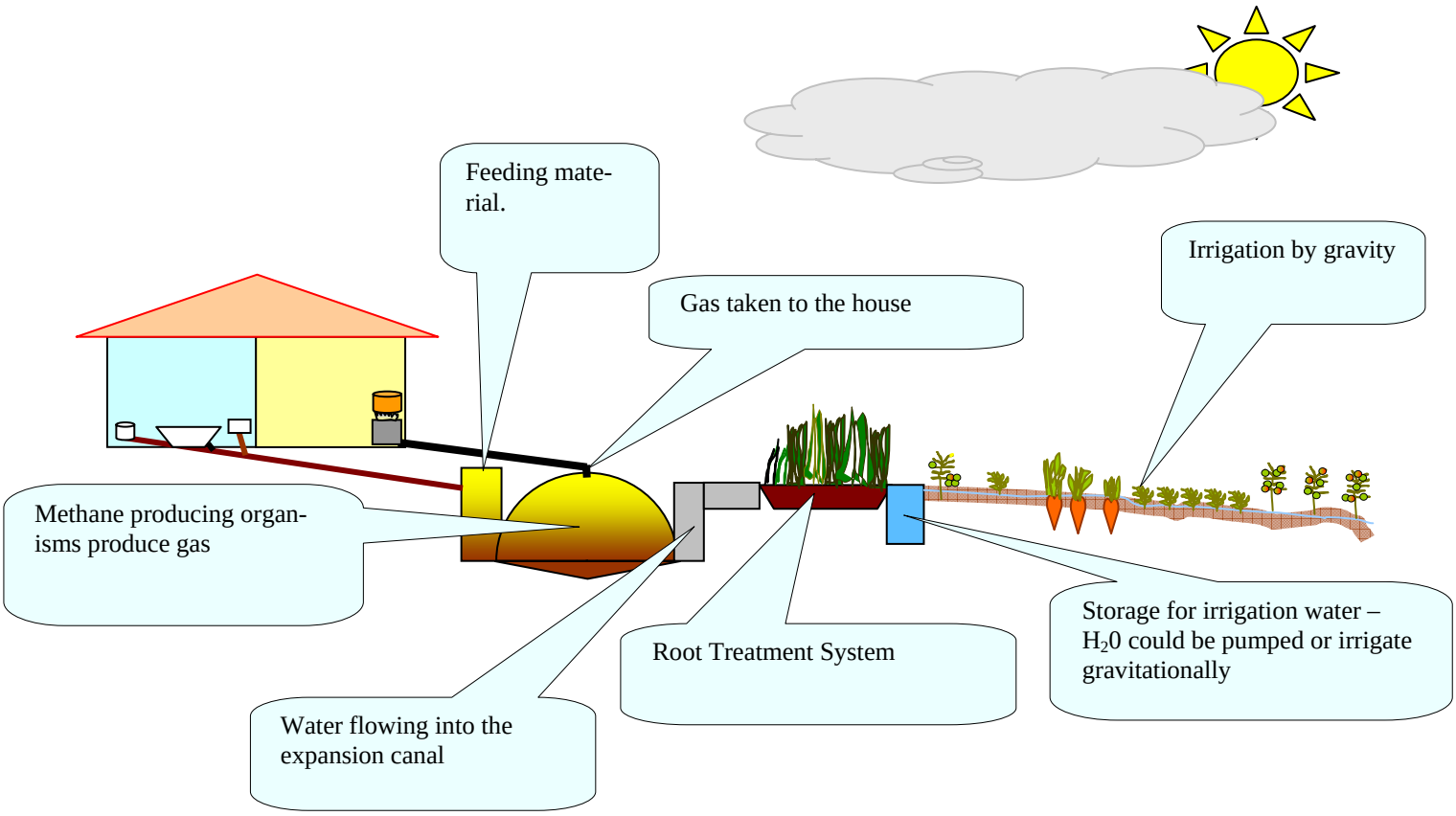
This method of changing organic matter into gas and fertilizer has had a very sad history in Lesotho in the past twenty years to an extend that biogas technology was rated to zero functioning technology that can in no way be recommended for dissemination in Lesotho. Some of the reasons for this failure have been:

- The technology (Chinese design) used at the time required good skill and supervision for reliable operation, which the beneficiaries lacked.
- The daily labour input for its operation was demanding (it required physi cal mixing of cow dung collection with water).
- The technology was imposed on people hence to them the benefits were not worth the effort.

Since 2003, a design that has undergone adaptation over the past 20 years in African countries under the umbrella of GTZ (German Technical Cooperation) and DED (Deutcsher Entwicklungsdienst) has been implemented in Lesotho by a newly launched NGO, Technologies for Economic Development (TED) and this has proven reports of consultants wrong that Biogas Technology cannot work in Lesotho.

With TED's design, Biogas Technology solves the most pressing problems of lack of water and degradation of soils in Lesotho and creates jobs for those who get around the construction team in different stages of biogas plants construction for wastewater treatment as well as associated jobs such as collection of waste plastic bottles used in the expansion channel to provide surface for bacteria that clean water. We fill our root treatment systems with pumice stone that the textile factories dump as waste. This is used for the aerobic treatment of water in which water plants are grown for further treatment of water before it is used for irrigation.

Components of a Bio-digester



Sketch of biodigester replacing a septic tank. Wastewater as well as kitchen and garden waste enter the digester and are broken down to biogas and fertile water.

The advantages: No more emptying of septic tank. Reuse of all water in the garden. Less cost on cooking energy.

A Bio-digester:
This functions as a settler. The digester is fed with organic waste including human excreta, animal manure, kitchen waste, garden waste and waste paper. Because water is required for the operation of a digester, grey water in the case of households and animal urine/animal washing water in the case of farms can be used. The contents of the digester settle to the bottom and bacteria from the fermentation slurry produce biogas in the digester. The water discharged is partially treated so it has to go through another treatment step.

Expansion Channel:
This structure acts as a displacement tank. It is in case of sewage treatment filled with shredded plastic bottles. The plastics provide surface on which bacteria that clean water settle. This channel also stores water that displaces the gas produced in the digester.

Root treatment:
This is a post-treatment structure filled normally with gravel and TED uses pumice stone from textile factories. The root treatment is planted with water plants for further treatment of water.

Water fetching chamber:
This is a chamber from which water can be fetched with a bucket to irrigate the garden. From this water can also be guided to the garden with farrows if there is gravity. A pump can also be used to pump water to irrigate the garden or the lawn.

Business Approach:

Advertisement:
TED advertises with all means available within the daily context and not expensive. This is mainly through pamphlets and matchboxes with some information and the telephone number.

Demonstration:
Interested individuals and groups frequently visit the first site where a biogas plant is constructed. Since its establishment, 1045 people have visited the site. Most of the **demand** is created by these exposures.

Target Group:
There was never a definition of a target group from the “green table”. The interested customers are those who feel they have a problem especially with their sewage.

Benefits:

1. Gas for cooking
2. No need for septic tank/No cost on emptying.
3. Irrigation water containing nutrients needed by plants
4. Saves drinking water
5. Creates work places

Conclusion:

The success of TED in extending Biogas Technology by recycling excreta and wastewater into energy and fertiliser is based on a number of principles:

1. The core of the technology is mature.
2. The execution of the work gives high priority to quality.
3. The technological set-up offered solves a problem that the people really feel and has impacted on their pocket.
4. A customer has to actively demand the technology.
5. Potential customers see an example of the technology in the negotiation phase.
6. Many avenues are used for advertisement

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