

## 5.1 General

The key to the proper operation of biogas plant is the timely feeding of feedstock in right proportions with water, frequent draining of condensed water in the pipeline through the water outlet, cleaning of overflow outlet, checking of gas leakage through pipe joints and gas valves, and adding of organic materials to slurry pits. As long as these tasks are carried out reliably and carefully the plant will function properly.

The developer/installer or company involved in the installation of the plants should provide the maintenance services and improve their products based on the feedback received from the user community. There should be a provision in the agreement between the implementing agency (GP/district/state) and the developer, so that the developer would not run away after installation of the plant, causing inconvenience to the user later, when any issue relating to Operation & Maintenance (O&M) arises.

The developer/installer or company should make periodic inspections of the plant to solve the problems related to O&M.

## 5.2 Annual O&M Cost Required to Run the Technology

The O&M cost to operate the biogas technology is very low i.e. almost negligible. Further, it varies according to the design capacity of the plant. The biogas plants are feasible under all soil conditions. No modification is required in most of the soils. However, minor modification (to take care of shrinkage forces) is required to construct a biogas plant digester in the case of black cotton soil. Usually, sand filling around the digester works well for the same. The technology mentioned is feasible under all the terrain conditions.

In the case of very cold regions, the insulation of the plant is required to reduce the heat loss around the biogas plant digester. The temperature of the biogas plant can be suitably maintained by using a solar water heating system coupled with the biogas plant.

In the case of the moderate and hot region, the technology works well without any problem. This technology is feasible under all levels of groundwater conditions. Under the high water table (0–5 m) condition the dimensions of the plants have to be modified to take care of water seepage. There is no issue with other levels of groundwater. The technology is feasible under all rainfall conditions. There is no modification required for different rainfall conditions.

## Do's



- ◆ Select the size of biogas plant depending on the quantity of dung available with the beneficiaries.
- ◆ Install the biogas plant at a place near the kitchen to save the cost of delivery gas pipe.
- ◆ Ensure that the plant is installed in an open space, and gets plenty of sunlight for the whole day, all round the year.
- ◆ Feed the biogas plant with cattle dung and water mixture in the right proportion (1:1 ratio) to make a homogeneous mixture.
- ◆ Ensure that the slurry (mixture of dung and water) is free from soil, straw, etc.
- ◆ Cover the top of the inlet and outlet tank opening with wooden, stone or RCC cover, to avoid accidental falling of cattle and children.

## Don'ts



- ◆ Do not install a bigger size of biogas plant if you don't have sufficient cattle dung or any other feedstock to be used for gas production.
- ◆ Do not install the biogas plant at a long distance from the point of gas utilization to save the cost of pipeline.
- ◆ Do not install the plant under a tree or under shade.
- ◆ Do not fill soil loosely around the plant; otherwise it may get damaged.
- ◆ Do not add more than the required quantity of either dung or water. Doing so might affect the efficient production of gas.
- ◆ Do not allow soil or sand particles to enter into the digester.
- ◆ Do not allow the scum to form in the digester; otherwise the production of gas might stop.
- ◆ Do not burn the gas directly, i.e. from the gas outlet pipe even for the testing purpose as it can be dangerous.
- ◆ Do not let any water accumulate in the gas pipeline; otherwise the required pressure of gas will not be maintained and the flame will sputter.
- ◆ Do not make digested slurry pit more than 1.0 m deep otherwise slurry will not dry fast.
- ◆ Do not hurry to get gas after initial loading of slurry, as it may take 10–15 days for gas production in freshly loaded plants.

## 5.3 Technical Skills Required to Operate and Maintain the Technology

Any person can operate the biogas plant with basic information availed from the skilled workers or the technical staff workers visiting the plants or through users (awareness) camps.

## 5.4 Type of Operation and Maintenance Required to Run the Technology

### Feeding of cattle dung

- ◆ Feeding to the plant should be done as per the size of the plant.

#### (a) Daily feeding

- Feed the plant daily.
- Fill the plant with cow dung and water in the ratio of 1:1.
- Care should be taken that no sand, gravel, and straw is allowed to enter into the gas plant.

#### (b) Underfeeding

- Feeding less than the recommended quantity of dung is termed underfeeding.
- Gas production will decrease gradually, because of scum formation and a quicker sedimentation process.
- Scum formation depends upon the climate and the feeding pattern.
- Scum formation takes place faster if the slurry does not come out from the outlet tank, because of insufficient gas pressure.

#### (c) Precautionary measures

- Do not use old or dried cow dung for feeding the plant.
- It is advisable to feed the new plant with the slurry of a nearby working biogas plant.
- Check whether an equal amount of input comes from the outlet tank.
- After the complete use of gas, the slurry level should come up to the first step.
- However, it may not happen due to improper feeding in the biogas plant.
- If the liquid content is more in the slurry, then it can be tested by using a stick.
- Dip the stick in the outlet tank slurry.
- If the solid content of the mixture does not stick to the stick properly, then it can be concluded that water is more and the dung is less.