

**50 CUM per day, Biogas project based on night soil plus food waste,
for Primary Tribal Ashramshala at Jebapur, Tal Sakri, Dist. Dhule.**

(Ashramshala run by Sh. Kanhaiyalal Maharasj Trust, Samode)

By: Prof. Ajay Chandak.

This is a small success story of a night soil biogas plant which was introduced in project planning stage. Having heard about PRINCE and our work in renewable energy, Mr. Harshavardhan Dahite, chairman of the school approached us in Mid. Nov. 2009. He wanted to find out the possibility of installing renewable energy applications for the school which was under construction. I visited the site and recommended few options of solar steam cooking, biomass gasifier and night soil based biogas plant. To my surprise school management approved this biogas project. We had our own doubts whether such project will really come up. Using biogas generated from night soil, especially in rural areas may be difficult because of 'Taboo'. We had our own doubts whether they will use this gas in kitchen. To my surprise during my visit using this gas in kitchen nobody was complaining in fact everybody concerned were enthusiastically demonstrating all the systems.



After consent of Mr. Harshavardhan, we designed the biogas and interacted with local mason for getting the civil work as per drawings. Fabrication work was done at our member company Eternal Solutions, and in the month of June 2010 biogas plant installation was completed. School was to start from July so the first charge of cow dung with seeding was done in mid July. Night soil charge also started by the same time, as around 400

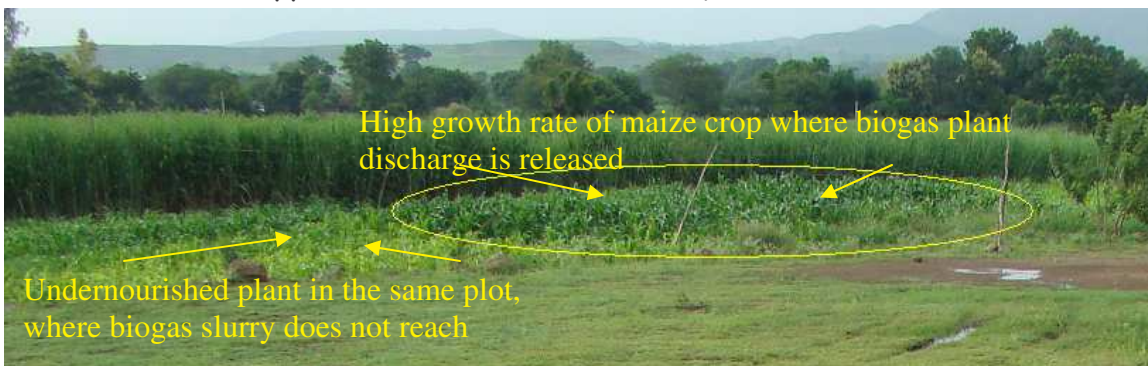
tribal children joined the residential school. Useful biogas production started in first week of August. School authorities completed plumbing as per directives and got four connections for the burners in the kitchen. At present they are using four domestic burners of 0.4 cum per hour capacity. Two commercial burners of 2.5 cum per hour are being installed.



Biogas was yielding good clean blue flame. There are lots of good burners available with auto ignition and similar features. Operating pressure required is 100 mm of water column. Weight of 2.25 tons of the gas holder is adequate to generate this pressure for this project.



We talked to some of the kids, Head master Mr. Arvind Fartade and care taker Mr. Jagannath Bhojar, and noticed that they were feeling pretty proud that they are doing something different. I enthusiastically discussed the project with my wife after I came back from the site and she was about to vomit after hearing of cooking on night soil gas. I am confused now who are tribal? Hats off to these so called "Tribal".



Another interesting observation we noticed about the nutrition value of the biogas plant discharge. Slurry from outlet chamber is fed to adjoining farm through a trench. We observed that part of the maize plantation that received this slurry, had almost double the growth than the other plants in the same plot. Even the color of the leaves was dark green, showing signs of nitrogen rich manure coming from the biogas plant.

At present the feed material for the biogas plant is night soil plus all food waste. Food waste is fed from the inlet chamber. With existing quantity of feed material they are saving around 25% of their total fuel requirement. As the biogas capacity is underutilized we are now planning to add cheaper feed supplements like flour waste from flour mills, non edible oil cakes, non edible fruits & seeds etc. With this addition we will be able to supplement at least 40% of the fuel with biogas.



As this project was incorporated at the planning stage of building, school management did not construct septic tanks and that money was saved. Cost of proposed conventional Septic tanks for the toilets was ₹ 1.50 lakhs. As the school management opted for the biogas project they saved this ₹ 1.50 lakhs. Project cost for the biogas plant was ₹ 3.25 lakhs. School authorities spent additional ₹ 1.75 lakhs over conventional aerobic digestion system to have a permanent anaerobic waste treatment facility plus source of fuel for themselves. We must appreciate efforts of Mr. Vinayak Shinde, Mr. Mahendra Shinde and Mr. Pawan Salunke who really worked hard on behalf of the trust to complete this biogas project.

This project has capacity of 50 CUM per day which means more than 125 tons of CO₂ equivalents can be saved. Even with modest 50% capacity utilization the project can save something like 70 tons of CO₂ equivalent, which converts to 25 full grown trees.

I strongly feel that night soil based biogas plant with supplementary feed material like food waste can be of great value in towns and cities in India. This is a good match. Night soil feed contains higher water content and supplementing with some kind of additional feed will make the slurry denser and will also increase the biogas yield.

This is the first report on this project and will share other findings on this project with all friends in due course of time.

Prof. Ajay Chandak.

Designer and consultant for the project. 30-8-2010

On behalf of PRINCE, Suman Foundation, Dhule.