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Biogas Plant Desing of Rural Areas Village – Harantekadi, Surgana, Nashik

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Abstract:

The biogas generating method involves filling the digester with cow dung and some house waste and is left to ferment for days: the result of the formation produce biogas in the digester. The compositions of the gases are mainly methane and carbon dioxide. The plant is manually operated and does not require high skilled manpower. It is basically expected to be use in farm house in village settlements.

This will cut down on environmental pollution global warming and reduce the rate of cutting down trees in rural area.

Key Words: (*Biogas, Digester, Fermentation, Biological waste.)*

1.INTRODUCTION

Biogas is combustible mixture of gases produced by micro-organisms when livestocks manure and other biological waste are allowed to ferment in a close system.

Biogas can be produced by fermenting organic materials in absence of air (or oxygen) with the help of bacteria (microorganisms) to break down materials to intermediates such as alcohols and fatty acids and finally to methane, carbon dioxide and water. This process is called anaerobic fermentation and was known to exist from quite long time back. Biogas has also been known as the swamp gas, sewer gas, fuel gas, marsh gas, wet gas, and in India more commonly as gobar gas.

Natural gas is also produced by the action of anaerobic bacteria on plants that grew thousands of years ago. Biogas and natural gas are therefore very similar to one another. The main fuel component in both is methane gas. However, over the years, pressure and temperature of underground rocks have converted part of methane in natural gas to other gases such as ethane, propane, butane and condensate.

To selecting location for the biogas plant Harantekadi Population - Nashik, Maharashtra Harantekadi is a medium size village located in Surgana Taluka of Nashik district, Maharashtra with total 188 families residing. The Harantekadi village has population of 1500 of which 785 are males while 715 are females as per Population Census 2023-2024.

Key Objectives:

1) Waste control.
2) Environmental pollution global warming and reduce the rate of cutting down trees in rural area.
3) Economical and sustainability
4) Long term durability
5) Prevention of indiscriminate cutting of trees as a source of energy.

2.LITERATURE REVIEW

The enormous potential of the smallest living organisms such as bacteria, yeasts and fungi to transform organic wastes into valuable source of fuel and enriched fertiliser through a simple process of anaerobic fermentation has been widely recognised. Anaerobic fermentation is a simple and low-cost process which can be carried out economically in rural areas where organic wastes are generated aplenty which otherwise pollute environment and pose health hazards. Animal and human wastes are excellent feedstock for biomethanation which are available in plenty/abundantly all over. Wastes in large quantities on renewable basis are also available from agricultural crops and residues, fruit and vegetable plants and municipal refuse. The potential for generating gaseous fuel and enriched fertiliser through biomethanation is enormous which can

bring economic and environmental gain to a vast population.

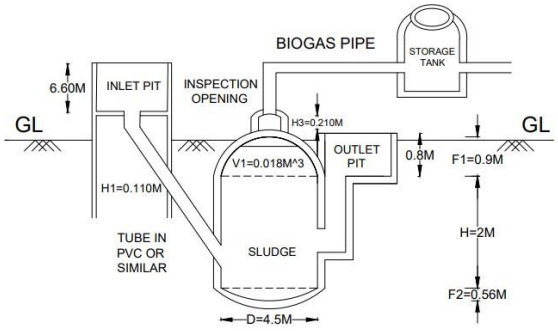
3. METHODOLOGY

Harantekdi is a village in surgana taluka of the Nashik district in Maharashtra. Harantekdi is located almost on the Nashik -Maharashtra. The village consists around 500 families (Population- around 1500).
the rest being considerably far and scattered. Figure shows the satellite map of the village. Biogas are 5 parts divided and each part small scale of capacity.

4. RESULT

To constituents biogas plant classifying particular area categories 5 parts of taken in that rular area.
Ecofriendly biogas fuel create and use the biogas household works such as cooking. Waste in large quantity on renewable basis are also available from agricultural crops and residues, fruit, vegetables plants.

5. PHOTOGRAPHS & STRUCTURE OF BIOGAS



BIOGAS PLANT

Materials and their main components	Yield of Biogas m^3/kg TS	Methane content (%)
Animal barnyard manure	0.260 ~ 0.280	50 ~ 60
Pig manure	0.561	
Horse droppings	0.200 ~ 0.300	
Green grass	0.630	70
Flax straw	0.359	
Wheat straw	0.432	59
Leaves	0.210 ~ 0.294	58
Sludge	0.640	50
Brewery liquid waste	0.300 ~ 0.600	58
Carbohydrate	0.750	49
Liquid	1.440	72
Protein	0.980	50

Favourable temperature, P H value & C/N ratio for good fermentation-

1. Temperature: Mesophilic; 20o c to 35 o c.
2. P H value : Neutral PH and ranges 6.8 to 7.2.
3. C/N ration : Ranges from 20:1 to 30:1.

5. CONCLUSIONS

Biogas provides effective, solution to non-availability of fossil fuels, and environmentally harmful burning of dung-cakes. Biomethanation reduces fuelwood consumption and helps to conserve continually depleting forest resources which if not checked may cause soil-erosion, flash floods, landslides and river-silation in plains. In the context of controlling deforestation, renewable energy sources like biogas assume consi derable significance. In few decades the fluid hydrocarbons, oil and gas will no longer be available in unlimited amount as energy sources. To constituents biogas plant classifying particular area categories 5 parts of taken in that rular area. Biomethanation which is a non-conventional energy technology not only augments energy supplies in energy-deficient rural areas but also saves the environment from degradation.

REFERENCES

Gupta Sujata (2010)"Biogas comes from the cold".

Alexandra Volta (1776) " Biogas comes from decayed vegetables" Hutchinsom dictionary for scientific research. Page 126-137.

Biswas,T.D.,Biogas Technology and Rural development, IARI, New delhi(1979).

United nations guidebook on biogas development, Energy Resources Development series no.21, New York, 1980.