International Journal of Innovative Technology and Exploring Engineering (IJITEE)
ISSN: 2278-3075 (Online), Volume-2 Issue-5, April 2013

Applications Civil Engineering for Socio Economic Amelioration of Below Poverty Line Families

Suvidha Patil, A.C. Attar

Abstract- the application of Civil Engineering For Socio Economic Amelioration of Below Poverty Line Families In Maharashtra State at Amboli village in Kolhapur district near Pethvadgaon during the period of 2010-2012 with main objective is reducing the poverty and socioeconomic development of community. For this purpose Civil Engineering based income generating activity is given to the people. This paper represents the appropriate use of available natural resources and improving the economical status of the people by using the civil engineering application. It is based renewable or non conventional energy source. For this implementation and training programme of compact mini biogas project is given to the people in this village. It reduce the cost of fuel consumption used in domestic appliances and it will be the income generating source by the installation of compact biogas plant.

Keywords: Respondent, Income generating activities.

I. I.INTRODUCTION

In 1976, construction of Chandoli dam was started and along with that displacement of people was also started. So in the beginning agitations were started by the villagers of Chandoli Budruk in 1976, with the demand of First rehabilitation then dam. Initially provision was made only for payment of compensation for land and property. The lack of planning for human problems led eventually to an agitation lasting over several years. Since1976 to 2006 and still there is no remarkable progress in the situation of oustees. The after lot of struggle land was given by Government in different places in Kolhapur & sangli district. A number of rehabilitation steps have been completed, including distribution of residential plots, allotment of drawdown land and construction of infrastructure as per the master plan prepared by government in consultation with the Union of oustees. Then new colonies are formed. Now they have only one sources of income that is agriculture and that is not sufficient to survive. Being as civil engineer responsibility of rehabilitation also lives with us. So the main aim is to improve the socioeconomic growth of migrated people i.e. oustees of dam, for this suggestion and implementation of some resources are carried out by the use of available natural resources to improve the economic growth and level of confidence. To overcome this problem finding out proper way to use of natural resources and to make people self reliable by using their time and space.

Manuscript published on 30 April 2013.
***Correspondence Author(s)**
Mrs Suvidha Patil, M.E.(Construction and Management) student, Rajarambapu Institue of Technology ,Rajaram Nagar ,Sakharale Islampure, Maharashtra, India.
Dr. A.C. Attar Rajarambapu Institue of Technology, Rajaram Nagar, Sakharale Islampure, Maharashtra, India.

This project is carried out application of civil engineering for socioeconomic development of people below poverty line families. For this mini compact biogas was implemented for a selected respondent and improve the living standard of people without disturbing the nature and appropriate use of natural resources.

The objectives of the present study are:

- To identify the problems in targeted village.
- Improving living standard of people below poverty line families using mini compact biogas plant without disturbing the nature and appropriate use of natural resources.
- Conducting training & awareness programmed.

II. SELECTION OF RESPONDENT

Selection of the respondent is done randomly after carrying out the survey of the village. The annual income of this family is 51000/- . Compact Bio Gas Plant is suggested and implemented to the respondent as income generating activity.

TABLE – 1 Selection of Respondent

Sr. No.	Respondent	Income generating activities	Annual Income	Monthly Income
1.	Mr. Patil V. S.	Compact Bio Gas Plant	51000/-	4250/-

III. IMPLEMENTATION OF MINI COMPACT BIOGAS PLANT

The current process of biomethanisation, which uses feedstock's like: cattle dung, human faeces, distillery effluents etc is highly inefficient because the nutritionally available calories and nutritive value of these substances is quite low, as the calories present in the food have already been used by the cattle, humans or fermentation processes.

Nowadays, municipal solid waste (MSW) is also being used as a source of methane. Food rests in the MSW have a relatively high caloric content, but in the current process, called the two phase fermentation system, the waste is first subject to an aerobic fermentation in order to reduce its bulk, and only then, having very few calories left in it, being fed to the anaerobic methane digesters. Such traditional biogas production systems operating on human or animal faeces or with the two-phase fermentation system produce approximately 10 kg of methane per tonne of feedstock in a process completed in 40 days. The duration can be shortened using thermophilic bacteria but the input to output ratio remains unchanged. Further, the use of cattle dung as the feedstock for mechanisation is a main factor limiting the widespread use of domestic methane plants in India for the supply for household fuel: -the present domestic biogas plant requires 40kg cattle dung per day,

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(from 6 to 8 heads of cattle) -because the dung has a retention time of 40 days, the size of the plant is large -the servicing of the plant requires the daily mixing of the dung with water to make it feedstock, filling it into the biogas plant and the disposal of about 80 to 100 liters of effluent slurry, which is a source of complain from the users. Restrictions of space, money, insufficient animals to feed the plant and maintenance problems stop many farmers and households from this technology.

Biogas technology which uses high calorie feedstock, consisting of starchy or sugary material. This high calorie content in the material allows producing 250 kg of methane per tonne of feedstock (on dry weight basis) in a process time of one day. Which means that household needing methane to cook 3 meals a day will need to feed its domestic plant with 2 kg of material per day? The material used can be so varied as: waste grain, seed of any plant species, oilcake of non edible oilseeds, non edible or non marketable fruits (wild species of ficus, overripe mangos and bananas...) food rests, oil rests, even the flour swept from the floor of a flour mill can be used as feedstock for the biogas plant. Because of the small quantities and the speed of the process, size, maintenance and price are drastically reduced:-The gas holder of the plant has a capacity of 750 to 1000 liters which is enough to cook two meals for a family of 5. The user feeds daily the digester with one kilo mashed feedstock mixed with some water in the morning and one kg in the evening, the total daily effluent produced by this system is 10 liters, that can be watered to the garden plants or recycled in the digester. The new biogas plant ranges between Rs. 5000 and Rs. 6000 (112 to 135$, 2007) corresponding to the price of two in another fitting plastic water tanks, a concrete base and the necessary frame and plumbing ware.

IV. CONSTRUCTION PROCEDURE COMPACT BIOGAS PLANT

A. The apparatus itself consists of

Two plastic water tanks sold in sanitary and plumbing ware shops. One should be bigger than the other so that once the top of each tank is cut open, the smaller one can fit in the bigger one and move like a "telescope“. The bigger tank (or drum) serves as a digester, and the smaller, placed upside down in the bigger one serves as the gas holder.

The inlet pipe: a 3cm diameter flexible pipe, a bit longer than the height of the tank, is fitted at the bottom side of the bigger tank. At the free extremity of the pipe, a funnel is fixed to facilitate the pouring of the quite fluid feedstock material. The pipes with the funnel are to be fixed loosely to the top of the tank, in upright position. This pipe will also serve as a purge in case of necessity.

The effluent outlet is fitted to the upper part of the bigger tank and determines the maximum level of matter in the tank. The gas outlet is fitted to the smaller inner tank and directed toward a gas stove. A frame structure is build above the tanks to stop the gas tank to fall open when too filled. It is possible to put a weight on the upper tank to increase gas pressure in the tank.

Methane burns with a blue flame, without producing any smoke or soot. It is therefore an environmentally friendly cooking system. Thus, introduction of the new efficient, compact biogas system would not only help urban households in utilizing their domestic wet waste, but also help prevent millions of premature deaths of women and children in rural households due to indoor air pollution caused by smoke and soot from burning fuel wood in traditional chulhas. This markedly impacts the health of the people in the kitchen (mainly women) positively. Further reductions in pollution and energy use arise from not having to transport LPG cylinders to be re-filled. The small amount of solid residue produced by the biogas plant makes a good fertiliser. Methane, on the contrary of propane, is lighter than air; there is therefore little risk of an accumulation and explosion in case of a leak. In hot regions, the system could be placed in a garden or on an accessible roof terrace, for it needs a relatively warm temperature

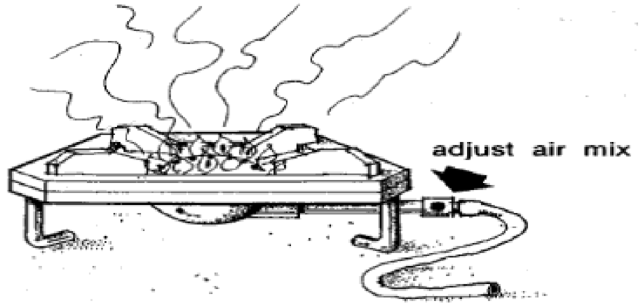

Fig1:Burner of compact Biogas

Adjust the air input to the burner so that the flame is blue and not yellow.

B. How to start the process

The system is first loaded with slurry of about 20 kg of cattle dung, waste flour or starch and water. The bacteria present in the intestine and consequently in the dung of the cattle are the bacteria that will break down the organic material into methane and carbon dioxide. After a waiting time of about 2 weeks, the gas should start to be emitted and the upper tank will raise. Test the gas by burning it: if it is combustible, you can start adding high calorie material.

C. Feedstock

Daily 1 kg to 1,5 kg mashed feedstock mixed with 10 to 15 litres water in the morning and the same in the evening. The feed can be waste flour, vegetable residues, waste food, waste oil, fruit peelings and rotten fruit. Oil cake, left over from oil-pressing, is another useful feedstock. Even rhizomes of banana, canna, nutgrass, non-edible seeds (e.g. Leucaena, Sesbania, tamarind, mango kernels) and spoilt grain serve as excellent feedstock material. Feedstock with large lumps (more than 20 mm) should be broken up with a food blender. Hand and pedal powered food blenders are being developed, for when electricity is not available. The digester should provides a steady supply of gas, typically 250 g of gas per day from 1 kg (dry matter) of feed.

D. Training programme of installation of Compact biogas kit in Amboli village.

The main objective of providing training programme is to train the people in installation of compact biogas and get some extra earnings from the installation in other places. From this the the respondent will get atleast Rs.1000 / month by one installation. In Initial phase it is assume that there will be one installation per month. Therefore The Extra net earnings of the respondent will Rs. 12000/ month.

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Fig2 :Training of compact Biogas

Fig3 :Installation of compact Biogas

A compact biogas plant which uses waste food rather than dung/manure as feedstock, to supply biogas for cooking. The plant is sufficiently compact to be used by urban households.

V. COST OF COMPACT BIOGAS PLANT

The approximate budget for Biogas unit capacity 1m³ for treating 1-2 kg food waste and gas for 1 to 2 hours per day for single burner is as follows:

Table - 2
Cost of Compact Biogas Plant

Sr. No.	Particulars	Unit	Amount in Rs.
1	Biogas Digester	1000 ltr	3000
2	Biogas Gas Holder	750 ltr	2200
3	Pre-digester	300 ltr	1500
4	Plumbing material PVC, SWR GI Plumbing	1 set	1900
5	Cow dung	0.25 brass	100
6.	Support for inlet–in civil sand + bricks cement		300
7.	Installation Charges		1000
		Total Cost	Rs.10000

VI. COMPARISON WITH CONVENTIONAL BIOGAS PLANTS

Table -3
Comparison with Conventional Biogas Plants

Parameters	Conventional Biogas Systems	Compact Biogas system
Amount of required feedstock	40 kg + 40 lit water	1-1.5 kg + 15 lit water
Nature of required feedstock	Dung	Any starchy material
Amount and Nature of slurry to be disposed of	80 lit, sludge	15 lit, watery
Reaction Time for full utilization of feedstock	40 days	48-72 hours
Standard size for household	4000 lit	1000-1500 lit
Capital Investment per unit including stove	INR 20,000	INR 10,000

VII. SUMMARY AND CONCLUSION

A. SUMMARY

The findings of the present investigation are presented under following information.

Table -4
i. Financial Capital Category of Before Involving In Income Generating Activities

Sr. No	Respondent	Income generating activities	Annual Income	Monthly Income	Monthly Expenditure on fuel
1.	Mr. Patil V.S.	Compact Bio Gas Plant	Rs 51000/-	Rs 4250/-	Rs 400/-

Table -5
ii. After implementation of mini compact bio gas.

Sr.No	Respondent	Income generating activities	Per annum Net saving after implementation of biogas	Per annum extra earning from the installation charges of biogas.
1.	Mr. Patil V.S.	Implementation Of Mini Compact Bio Gas Plant	Rs.4800/-	Rs.12000/-

- Net Annual Income -51,000/-
- Monthly Income-4250/-
- Monthly saving from bio gas plant Rs.400 /-
- After implementation of Mini Compact Bio gas Plant monthly saving of this family is Rs.400/- per month.
- Yearly net saving of 4800 rupees.
- Per Annum Extra Income from the installation charges of biogas are 12000/ Month.
- total Extra Net saving of respondent is- 4800

B. CONCLUSIONS

1. After implementation of compact biogas it is found that the total annual saving of rupees on fuel required to the respondent (Selected family) is Rs. 4800.
2. By giving the training of compact biogas the net earnings of the respondent is Rs. 12000 / year.
3. Appropriate use of locally available natural resources.
4. Socio economic growth of selected families by application of civil engineering in the form of compact biogas.

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