

CHAPTER - VII

CONCLUSIONS AND RECOMMENDATIONS

7.1 Introduction :

Here we present the conclusions of the earlier chapters and give the recommendations regarding source of the problems.

7.2 Conclusions ;

In chapter No. I, we explained what is biogas and what is biogas plants. In this chapter we gave a brief history and growth of biogas plants in India. While reviewing the literature, we explained the pattern of subsidy by central government in connection with the biogas plants. Simultaneously we classified the various biogas plants in India, according to different models. There are KVIC model, Janata model, MCRC design, Gayatri model, Ganesh model, Belurmath model, Manipal model, Jyoti model, Dinbandhu model etc. Then we discussed the history and growth of biogas plants in Maharashtra State, Sangli District and Miraj Taluka.

The biogas plants are found to be of 2,3,4,6,8,10,15,20 and 25 cu.m. capacities.

In chapter No. II, we explained the profile of Arag village which is the centre of our study. In this chapter the area of land in Arag village, cropping pattern of Arag village, population and livestock etc. are discussed in brief. Then we have given the profile of biogas plants in the Arag village. The first biogas plant of KVIC model was set up in 1972 by Shri Ramgonda Dhulappa Patil. This is the pionner plant in Arag village. In March 1988 there were 70 biogas plants in the village Arag. Out of 70 biogas plants 57 plants are actually in working condition and 13 biogas plants are not in working condition. With the help of table, we tried to find out the biogas plants owned by different castes. Out of 70 biogas plants 27 are owned by Maratha caste (41.42 %). We also classified biogas plant holders according to their occupations. Out of 70 biogas plants 53 biogas plants are owned by the **agriculturists**. It means, 72.71% biogas plants are owned by the farmers in the village Arag.

Chapter No. III, covers the methodology of the study. The main objectives of this chapter were to explain the choice of topic for this study and the methodology of the study. The topic of the study is, " Economics of Biogas plants - A case study of Arag village." Here we discussed importance of biogas plants as well as the benefits of biogas plants. In the next stage the scope, objectives

of the study, the area of the study and the reference period of the study are explained in details. Then we came to the methodology of the study. The primary information was collected from the Grampanchayat of Arag village, Panchayat Samiti miraj, Zilla Parishad Sangli and Mantrayala, Government of Maharashtra Bombay. After wards with the help of cyclostyle questionnaire the primary data was collected. In this study the relevent information from all the biogas plant holders during the year 1987-88 was collected for this purpose. The secondary data was collected from the above mentioned offices. The determinant factors of fixed costs and variable costs of biogas plants and the revenue obtainable from the biogas plants of different capacities were considered.

In chapter No. IV, structure of fixed cost, variable cost and structure of total cost and average cost are discussed, while determining the structure of fixed cost we considered bricks, cement, stone chips, sand, G.I. Pipe, paint, labour and measured in terms of rupees. The value of fixed factor of each biogas plant is calculated of that particular year in which the plant is constructed.

While discussing the structure of variable cost we defined the term variable cost. Especially we took into consideration the operational definition of variable cost. The variable or working cost

or operational cost of biogas plant comprise value of dung, painting expenses, labour charges, maintenance cost and water charges.

Chapter No. V, consists of structure of revenue and identification of optimum unit. In this topic, we discussed total revenue and average revenue which is obtainable from the biogas plants. The biogas which is used for cooking and lighting purpose and manure which increases the crop yield are the main components of the revenue obtainable from biogas plants. In this chapter production of biogas and its valuation and production of manure and its valuation are taken into consideration.

The main intention of our study is the identification of optimum unit. We studied different models like Janata model, Shivasadan (KVIC), Dinbandhu and KVIC model. Out of these different models of biogas plants under study, the optimum size of biogas is 3 cu.m. Dinbandhu model. Identification of the optimum unit was taken into consideration with the help of benefit cost- ratios' of different models and capacities. Here we considered total annual cost annual returns, gross returns and net returns of the different models and finally we calculated the benefit cost - ratios. The benefit cost ratios are as follows.

- 1) Dinbandhu model of 3 cu.m. stands most beneficial according to its benefit cost-ratio.
- 2) Janata model of the capacity 6 cu.m. stands second with the same determinant.
- 3) **Dinbandhu model of 4 cu.m. stands 3rd.**

In chapter No. VI, we discussed the social impact of biogas plants i.e. impact on Women's life style and on men.

The women explain the different types of benefits of biogas plants. The most important thing is that they were aware about the benefit without any sacrifice related to dung. They were also aware of the fact that the slurry which comes out from the outlet of the biogas plant is most scientific manure. Higher standard of living, the saving of time. Social prestige cleanliness of the house and better maintenance of the utensils were the benefits emphasized by the biogas plant holders.

7.3:1 Recommendations :

In this discussion first of all let us discuss the weak points observed when the survey was conducted and then we can explain certain remedial measures i.e. recommendations against these weaknesses.

Following weaknesses were observed while conducting the survey.

1) The owner of the biogas plants do not have adequate knowledge of the mechanism of biogas plants. There are different models of biogas plants but they do not know which model is beneficial and economical to them.

2) Even though the biogas plant holders have constructed the biogas plants, some of them are not operating the constructed biogas plants. Nine biogas plants are not in operation. When we asked about this, they stated that the biogas plants were constructed because of availability of government subsidy and not because they were interested in all these things.

3) The biogas plant holders in Arag village are not aware of the sanitation facilities. 51.43 % of the biogas plant holders have not attached latrines, to the biogas plants. It means either they do not feel it necessary due to their psychological feelings and traditional approach or they do not want to spend more amount for the construction of latrines.

4) The biogas plants which are in operation in the village Arag are not operated properly except few biogas plants. The plant

holders do not feed the plant daily and properly because of their laziness. Due to this the use of biogas as fuel was not done by them adequately. It was due to their ignorance regarding the mechanism of the biogas plants.

5) The plant holders were not processing the slurry which comes out from the outlet of plant to increase the , even though they know that if the slurry is mixed with other waste materials like agricultural residues, the quantity of manure increases but they do not try for that.

6) A few biogas plant holders feel that the fertility of the manure is less than farm-yard manure. So they do not feed the biogas plant properly. Instead of feeding the plant they throw the dung in farmyard.

7) When the survey was conducted, we came to know that the construction of few biogas plants was defective. These plants are not in operation. There is no provision or special scheme for repair of these biogas plants by either Zilla Parishad or by Khadi and Village Industries Board. There is a meagre provision of Rs. 500/- as a subsidy for the repair of the biogas plants by Zilla Parishad.

8) There is no provision regarding the supervision and maintenance of biogas plants by either Zilla Parishad or by Khadi and village Industries Board.

9) Due to illiteracy and ignorance regarding the techniques and benefits of biogas plants, spread of construction of biogas plants in the rural areas has not taken place to the expected extent.

10) As there is availability of different types of sources of fuel for cooking, the rural people do not prepare themselves to invest money in such items like biogas plants, though the government is providing subsidy for it.

7.3:2

So far we have seen the weaknesses and deficiencies regarding the use of biogas plants in the rural area like village Arag. We feel it necessary to give some guidelines to minimise the defects in the use of biogas plants. We also feel it necessary that the tendency regarding the use of biogas plants should be changed and as far as possible there must be maximum use of biogas plants in the rural areas. There is increase in standard of living and also there are some social benefits of the use of biogas plants. If the following suggestions are taken into consideration, the defects will be minimised and more and more people acquainted with the biogas plants.

1) It is necessary to give adequate knowledge about the whole mechanism of biogas plants to the biogas plant holders. Zilla parishad, Panchayat Samiti, Khadi and village Industries Board and other non-governmental agencies which are trying to accelerate the biogas programme in rural area have to educate people about the type of plant which is most beneficial and economical. There should be uniformity about type of biogas plant and that should be popularised and installed.

2) Most of them have constructed the biogas plants because of the availability of government subsidy. This attitude of biogas plant holders should be discouraged. There are several benefits of biogas plant which should be effectively conveyed to the people.

3) Importance and benefits of latrines to the plant holders should be explained by which they can connect the latrines to the plants and they can use them. Their psychological feeling and traditional approach regarding the latrines should be wiped out. They should know that if they use latrines, then the quantity of biogas and quality of manure increases.

4) Biogas plants should be fed daily and properly. They should know the importance of daily feeding of biogas plants.

5) The slurry which comes out from the outlet of biogas plants after fermentation should be mixed with agricultural residues or agricultural wastes so as to increase the quantity of manure.

6) The fertility of biomanure is more than the farmyard manure. This should be proved by repeated demonstrations in villages.

7) There should be special scheme for provision of repairs of biogas plant which are suffering from defective construction; either by Zilla Parishad or Khadi and village Industries Board .

8) There should be provision for the supervisor and maintenance of biogas plants either by Zilla Parishad or by Khadi and village Industries Board or by any non-governmental voluntary agencies which are interested in it.

9) Eradication of illiteracy and ignorance regarding the techniques of benefits of biogas plants should be done by the various institutions which are implementing the biogas programme in rural areas.

10) Biogas plants prevent deforestation. So as to maintain the environmental balance spread of biogas plants is essential. Biogas plant is a mini fertilizer factory which provides gas for modern cooking and manures to farms which increases crop yields. Educating rural population in these respects is very important.

11) The existing plant owners are the important source of advice to potential customers. They are not only in a position to provide practical guidance but also have high credibility because of their first hand experience and knowledge. Steps have to be taken to renew contacts with them so as to use them as advocates for the scheme.

12) Research and development efforts are urgently needed to make improvements in the plant and process technology. Some of important specific maintenance aspects which need immediate attention are :

- a) The accumulation of water in the pipeline which connects kitchen appliances to gas holder.
- b) Leakage of gas from the gas holder and pipeline joints.
- c) Low production of gas during winter.
- d) Excessive accumulation of water during rainy season, and
- e) Provision of cheap burners of approved quality.

13) Since maintenance of plant is as crucial as owning a plant, the government should publish a Bio-gas plant news bulletin giving technical information about the plants and covering recent developments in the technology.

14) Since ultimate users of the biogas plants are the womenfolk, educational programmes for them will brighten the changes of obtaining their approval and giving a momentum to the scheme.

15) To promote biogas scheme in the rural areas the rate of interest on the loans need to be reduced substantially.

16) The supervisory staff of all the agencies associated with the scheme need practical training and field experience. The visit of this staff to the construction site and to the plants also need to be regulated and monitored.

17) Follow up programme after the installation of plants needs to be built within the framework of organisational strategy.