

SESSION SEVEN

FIELD VISIT PROGRAMME

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7.1 Introduction

The previous sessions have enabled participants to understand various aspects of biogas including the level of technology involved, its relevance to the attainment of national development objectives, programme planning and management, financial and economic implications. To build on such understanding developed through class room discussions, this session aims:

- to visit at least two user families representing the success and failure cases;
- to interact with members of user family to understand the technology from users' perspective: and
- to relate the class room discussions of previous sessions with the users and the physical structure of the plants.

7.2 Methodology

Following are the sequential steps for identification of field observation sites.

- (a) Tentatively identify possible areas in a village or town for field visit.
- (b) Obtain a list of biogas plants and report on their operational status from BSP and/or biogas companies operating in the area.
- (c) Visit some of the user households, discuss with them, assess performance status of the plant visited and rank them in order of priority for selection for field visit.
- (d) Select plants in discussion with the related biogas company considering the following,
 - Plants that are nearest to the training centre so that minimum time is spent in travelling.
 - The user family that is willing and able to share experience with the participants.
 - Plants to be visited represent both the success and failure cases.
- (e) Prepare a brief note on each of plants selected for observation tour of the participants.

7.3 Themes for Observation

Before departing for the observation tour, the participants need to be briefly oriented on the four major elements of a biogas plant as shown in Chart 7.1.

Detailed observation on each of the four major elements should include at least the following:

- Alignment of inlet, centre of the dome, outlet and slurry pit (whether they are in a straight line).
- Inlet distance from the cattle shed, kitchen and household waste drainage system, source of water, size of outlet and slurry level in the outlet.
- Height of dome top in relation to the ground, adjacent field, drainage and water drain pipe. Size of slurry pit in relation to the digester size (daily slurry output).
- Slurry application.
- Biogas appliances, their use, maintenance and repair.

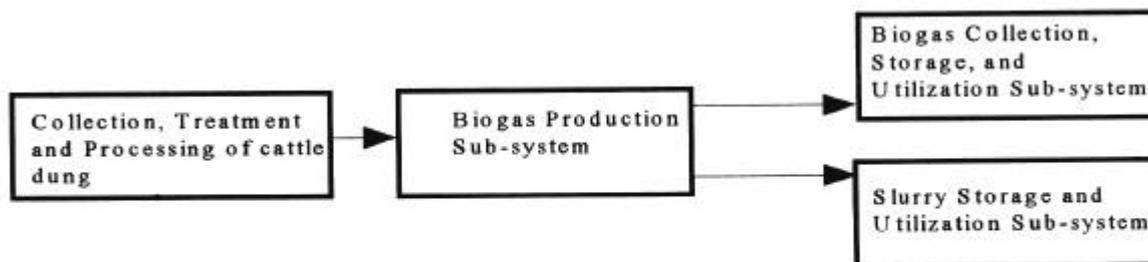


Chart 7.1 Elements of a Family Size Biogas Plant to be Observed During Filed Visit

- Technical support and services for the user.
- Effect on family health.
- Effect on family income.
- General opinion of the user.
- Strengths and weaknesses of the technology as felt by the user.
 - Technical
 - Social
 - Economic
 - Institutional
 - Administrative
 - Others

Trainers intervene in the discussion between the user and the participant only when called upon. Participants can be divided into two groups. One group observes the successful case and the other observes the failure case and take turn.

7.4 Information on Plants Visited in Each of the Five Training

Descriptions of biogas plants identified by the experts/trainers for field visit in Kathmandu and Chitwan are presented in Annexes 7.1 and 7.2, respectively. The plants visited in each of the five training programmes are listed below.

- The First Training in Kathmandu : (a) + (c) + (d) as given in Annex 7.1
- The Second Training in Chitwan : All plants (a to e) as given in Annex 7.2
- The Third Training in Kathmandu : (d) + (f) + (h) as given in Annex 7.1
- The Fourth Training in Kathmandu : (b) + (d) + (h) as given in Annex 7.1
- The Fifth Training in Kathmandu : (b) + (d) + (h) gas given in Annex 7.1

The participants of each training programme organized in Kathmandu were taken to three plants whereas those of Chitwan visited five plants.

7.5 General Opinions and Impression about Field Visits

The field visit was an integral part of all the five training programmes. After the field visits, the participants were asked to provide their comments. The response of the participants about the usefulness of the field visit was encouraging.

Over 70 percent of the participants found the field visit to be useful in several ways. It provided them

practical knowledge and enabled them to understand the biogas technology and its different elements including the factors responsible for success or failure of a plant. A summary of reaction of the participants on the field visits conducted in the five training programmes is presented in Table 7.1.

Table 7.1
General Opines and Impressions

S. N.	Topics	No. of
1.	Field visit remained very useful in many ways: particularly to understand the current technology of biogas plants, and the underlying reasons for success and failure cases	23
2.	Insufficient duration for field visit	14
3.	The visited sites should have included all types and models of biogas plants including those in the remote pans of the country	10
4.	The biogas plant attached to a public toilet in Bhaktapur was found unsuccessful probably due to wrong site selection	7
5.	Field visits in some sites (Sinamangal, Balkot, Nakhliu) were interesting	6
6.	Field visit should be conducted to learn about the site selection procedures	5
7.	More interactions/idea sharing with plant owners would be interesting and useful	5
8.	Field visits should include biogas plants under construction	5
9.	Field visit in areas without electricity would be desirable	3
10.	Biogas companies should be made more responsible/accountable towards their clients	3
11.	Post installation services/supports for biogas users seem inadequate	2
12.	Biogas plants should also be targeted to small farmers	1
13.	Biogas plants should be promoted as a national campaign	1
	Total	85

7.6 Review Questions

- What factors helped the users to adopt the technology?
- What factors discouraged the users to adopt the technology?
- What is the importance of field visit?
- To what extent did the field visit enhanced your practical knowledge?

Description of Biodigesters Identified for Field Visit in Kathmandu

(a) Night Soil Plant at Prabhat English School

- Location of the plant: Prabhat English School, Bhaktapur Besi
- Capacity of the plant: 20 m
- Inputs: Human wastes from Public Toilet and School Latrines are fed to the biogas plant
- Problems as stated by the plant owner: Leakage of water from the foundation of digester
- Present status of the plant: The plant was commissioned about 10 to 12 months ago. The public toilets are neglected and are not maintained at all. Human excreta are scattered haphazardly around the biogas plants and in the surrounding area of the public latrines. Because of the obnoxious smell produced from human faeces, it is difficult to stand even for five minutes in that area. Latrines are not cleaned. In brief, this is an example of failure project simply because of poor management system. If the management is not improved, there is every reason to believe that some epidemic could spread in the future.
- Use of gas: One stove is in use. The gas is burning with very weak pressure and is left burning even when there is no need for the gas. This is a sheer wastage of energy.
- Utilisation of digested slurry: Not practised.

(b) Biogas Plant Installed at Balkot

- Location of the plant: Balkot
- Name of the owner: Moti Bhakta Shrestha
- Capacity of the plant: 15 m³
- Inputs: Dung from two cows and two calves are used to feed the biogas plant.
- Problems as stated by the plant owner: None
- Present status of the plant: The plant was commissioned four years ago and is functioning excellently. The owner is highly satisfied with the performance of his plant.
- Use of gas: Two stoves are in use. The gas burns with good flame. The visiting team tasted tea prepared on biogas by the sister of the plant owner.
- Utilisation of digested slurry: The farmer stores the digested slurry in a pit from where it is used to fertilise the vegetable plants. At the time of visit, it was observed that the slurry was applied to chilly seedlings.

(c) Night Soil Biogas Plant Installed at Balkot

- Location of the plant: Balkot.
- Name of the owner: Chakra Lal Shrestha
- Capacity of the plant:
- Inputs: Human waste from three latrines (one at the top floor and two at the ground floor) are used to feed the biogas plant.
- Problems as stated by the plant owner: None
- Present status of the plant: The plant was commissioned four years ago and is functioning well. The owner is highly satisfied with the performance of his plant.
- Use of gas: One stove is in use. The gas is burning well. The owner utilises the gas in preparing tea. They are satisfied with their plant.
- Utilisation of digested slurry: The digested slurry is led to a pit for storage and subsequent use.

(d) Biogas Plant Installed at Shree Prakash Sanyas Ashram

- Location of the plant: Sinamangal, Kalimati Dolt
- Capacity of the plant: 20 m³
- Inputs: Dung from 6 cows is used to feed the biogas plant.
- Problems as stated by the plant owner: Less gas in winter
- Present status of the plant: The plant, commissioned about one year ago, is functioning very satisfactorily.
- Use of gas: Three stoves are in use. The gas is burning well. The gas is used for cooking food for 10 to 25 people. There is a significant saving due to biogas installation since three LPG cylinders were used before commissioning of the biogas plant. The net saving is about Rs 1,000 per month.
- Utilisation of digested slurry: The digested slurry is led to a cemented pit for storage and is used to fertilise crop and vegetable plants. At the time of site visit, it was observed that the slurry was applied to the maize crop.

(e) Fibre Dome Biogas Plant Installed at Bhimsen Gola

- Location of the plant Bhimsen Gola, Baneshwar
- Capacity of the plant: 6 m³ with dome constructed with fibre glass and rest as per GGC design
- Inputs: Dung from a cow and a calf is used to feed the biogas plant.
- Problems as stated by the plant owner: Less gas in winter
- Present status of the plant: The plant is well maintained and is functioning very satisfactorily.
- Use of gas: The gas is used for cooking food for three people.
- Utilisation of digested slurry: The digested slurry is used to fertilise vegetables and lower plants.

(f) Biogas Plant Installed at Anamnagar

- Location of the plant: Anamnagar. Baneshwar
- Name of the owner: Ms Bhadra Ghale
- Capacity of the plant: Two plants are constructed - one plant of 20 m³ and the other of 50 m³
- Inputs: The owner possesses 24 to 25 cows and 100 to 125 pigs, only cow dung is fed into the biogas plant.
- Problems as stated by the plant owner: Biogas tamps are not available. Gas production is less.
- Present status of the plant: The plants were commissioned five years ago. The surrounding is very dirty and unhealthy and die plant is poorly managed. The owner possesses 5 to 6 Ropani of land (0.3 ha) and fruit saplings like plum, peaches, pears are also planted. A fish pond has also been constructed. Proper management is required to improve the performances of the system.
- Use of gas: Only one stove seems to be in use and the gas production visualised for cooking food for 20-25 people is insufficient.
- Utilisation of digested slurry: The digested slurry is used to fertilise vegetables and fruit plants.

(g) Night Soil Biogas Plant Installed at Nakhu Jail

- Objective: The first objective is to provide illumination which is especially required during the load shedding periods. Secondly, the biogas project has been initiated to keep the environment clean and healthy.
- Location of the plant: Nakhu, Lalitpur
- Capacity of the plant: 20 m³

- Inputs; The plant is fed with human faeces of 150 to 200 prisoners.
- Problems as stated by the plant owner: Biogas lamps are not available. Gas production is less.
- Present status of the plant: The construction of the plant has been completed and the wastes from latrines (14 latrines) are connected to the plant. Gas production is expected but it remains to be tested yet.
- Use of gas: The gas will be used to provide illumination, i.e., seven biogas lamps are already installed.
- Utilisation of digested slurry: The digested slurry is used to fertilise vegetables and fruit plants.

(h) Biogas Plant Installed at Sainju Bhainsepati

- Location of the plant: Nakhu. Sainju Bhainsepati VDC. Nayabasti
- Name of the owner: Rom Bahadur Thapa. This is a joint venture in which 3 to 4 families are united to implement the project named as *Bharseli Pasupalan Udyog*.
- Land holding : Total area consists of about 11 Ropani (0.55 ha) owned by 3 to 4 families. Capacity of the plant: A plant of 20 m³. A latrine is also attached to the plant.
- Inputs: The owner possesses 80 pigs (big and small) and 4,000 to 4,500 poultry birds (broilers). At the present, the plant is run only with poultry excreta. Pig excrement is not used.
- Problems as stated by the plant owner: None
- Present status of the plant: The plant is working excellently and the owner is highly satisfied. Use of gas: Biogas burners with two mouths are burning excellently. The gas is used to cook food for about 5 to 6 people.
- Utilisation of digested slurry: Since there is sufficient land, the digested slurry is used to fertilise vegetables and fruit plants.

Description of Biodigesters Identified for Field Visit in Chitwan

The original plan required to visit at least two biogas plants representing both the success and failure stories. However, in the process of identifying sites for field visits, it was felt desirable to take participants to the following five biogas plants located at Panchkanya VDC of Chitwan district. It was remarkable to note that in this area almost every household has installed a biogas plant.

- (a) The first plant was a 20 m³ biodigester fed with cattle dung (6 cows and 4 calves). It was installed at the house of a farmer, Mr. Kamal P. Sapkota. The plant was constructed by GGC four years ago. The farmer possesses 0.4 ha of land where he grows rice, maize, mustard and vegetables. He applies biogas slurry to fertilize his crops and vegetables. He pumps water into the slurry pit so that the diluted slurry overflows automatically into irrigation channel.

Although the farmer is feeding his plant every alternate day, he has sufficient gas to cook food for his the six members of his family. The plant is functioning well and the family has enough gas even in winter.

- (b) The second plant was a 10 m³ biodigester fed with buffalo dung without any latrine attachment. It was installed three years ago at the house of a farmer Mr. Prem B. Paudel. The dung obtained from six buffaloes is more than sufficient to feed his digester. He has sufficient gas to cook food for his family of five members. He is satisfied with the performance of his digester. He uses biogas slurry to fertilize his crops and vegetables.

- (c) The third plant belongs to a farmer named Mr Dhrub P. Sapkota. It is a 10 m³ biodigester fed with the dung of eight cattle (big and small) without latrine attachment. The biodigester installed two years ago is working excellently and sufficient gas is produced from this plant in order to meet the cooking requirement for eight family members. Biogas slurry is used to fertilize crops and vegetables grown by the farmer.

- (d) The fourth plant was a 10 m³ biodigester fed with cattle dung (1 buffalo and 2 oxen). It was attached with a family latrine at the house of a School Headmaster Mr. Laxmi Kanta. The plant was constructed by GGC six years ago. The plant owner applies biogas slurry to fertilize his crops and vegetables. He also makes compost with the slurry.

He has sufficient gas to cook food for his family of eight members but the gas is not sufficient for cooking during winter.

A few months ago, he had a problem with the plant. After proper diagnosis, it was discovered that the inlet pipe made up of cement was damaged and as such, materials fed though inlet could not enter into the digester. Recently, he solved this problem by replacing the damaged portion of cement pipe with a polythene pipe.

- (e) The fifth situ was a 10 m³ plant attached with a family latrine. It was installed three years ago by Rastriya Gobar Gas Company at the house of a farmer, Mrs. Radha D. Borha. Since the beginning, her plant has been working only for 15 to 30 minutes, although she has been using dung from two buffalo. Because of the mal-functioning of the plant, she is compelled to revert to firewood and kerosene for cooking. In fact, with two buffalo, at least the gas should have burnt for more than two hours. The plant owner is aware that in her neighbourhood, another farmer is meeting his all requirements of cooking with his plant with same number of animals and same size of plant. Complains were lodged several times to the company but her problem

remains unsolved as yet.

Once some technician from the company visited her plant. Assuming that the plant was overfed, he advised to empty some portion of slurry from the digester. This did not improve the performance of the plant. The owner was so frustrated with her plant and biogas technology that she now advises people not to install one.