SESSION TEN

MONITORING AND EVALUATION

SESSION TEN

Monitoring And Evaluation

10.1 Introduction

This chapter deals with monitoring and evaluation (M&E) of the biogas sector in Nepal. In doing so, a review is made of the existing data base, some relevant indicators and the process adopted. Effort is also made to introduce monitoring tools and relevant theories and processes. By the end of this session, the participants will be able to:

- explain the basic principles of M&E as relevant to the biogas sector in Nepal;
- discuss the M&E system of BSP; and
- explain the logical framework approach in M&E.

10.2 Definitions

Monitoring and evaluation are two different concepts. At times, it becomes difficult to be definite on whether an activity should be taken as monitoring or evaluation. Because of this difficulty, these two technical terms, i.e., monitoring and evaluation, are generally expressed together, M&E in short.

Monitoring is a continuous or periodic review and surveillance by management at every level of the hierarchy of the implementation of an activity. It is more of a feedback system for problem solving during programme and/or project implementation phase.

Evaluation is an intermittent activity in the organizational process which takes a broader view for improving performance guided by the information obtained:

- during implementation (on-going evaluation);
- at completion of an activity {terminal evaluation); and
- after completion of an activity and when it is expected to have some impacts (post evaluation).

The M&E process as an unified system provides basis for decision making through collection, analyses and syntheses of information. A well established data or information system is a pre-requisite for an effective M&E system. Therefore, the following presentation include M&E as a unified system with discussions on data base as they relate to the biogas sector in Nepal.

10.3 Indicators and Data Base

Indicators are the elements or factors that reflect the performance of a programme or an activity which can be measured or quantified for comparison against the desired target or goal. Some of the important performance indicators of the biogas sector in Nepal are presented below.

Government Commitment

Following are some of the important factors that reflect the strong government commitment for biogas development in Nepal.

- Continuation of government subsidy since biogas promotion started in Nepal on a programme basis in 1976. The level or amount of subsidy varied with the availability of subsidy fund from bilateral and multilateral donor agencies except for the year 1976 when the subsidy was provided through government's own resources (Karki, et al., 1993).

- Inclusion of national targets for biogas construction for the first time in Seventh Five Year Plan (1985-1990) and its continuation in the Eighth Five Year Plan (1992-1997).

- Existing provision for government tax exemption on import of biogas appliances and accessories.
- Government decision of mid-1996 to establish AEPC with biogas as an important component.

– Facilitating role that the government has been playing in the initiatives taken by the private sector such as formation of biogas companies and attending training and seminars in and out of country.

– Integration of biogas programme in specific projects.

Number of Biogas User Households

The rate of adoption of the technology at the household level is increasing as was discussed in the previous sessions. However, with the present installation rate of about 10,000 household plants each year, it would take about 130 years to make full use of the present potential.

Performance of Plants Constructed

A comprehensive survey of all GGC model plants constructed between 1979 and 1990 was carried out in 1991. The survey found that 90 percent of the plants were functional. However, only 77 percent of the users had trouble free operating plants.

Distribution

Most of the users belong to the medium and large scale farmers in terms of their land holding, number of servants and livestock.

Reason for Installation

Most important reason for installation of biogas plants are (a) cost effective cooking fuel (55 percent), (b) lighting ease (20 percent), and (c) time saved in firewood collection (16 percent).

Institutional Lending

The percentage of users taking loan for biogas plant installation is decreasing.

Quality of Construction Works

A survey of 1991 showed that 33 percent plants have deviation in outlet volume by more than 10 percent. 34 percent plants deviated in dome volume by 20 percent and 29 percent had a deviation of digester volume by 20 percent.

Extension

The main motivators were the neighbors who had installed biogas plants (36 percent) followed by staff of ADB/N (27 percent) and GGC (27 percent).

After-Sale-Services

29 percent users were not visited by technicians after installation and only 4 percent were visited more than five times a year.

Loan Repayment

53 percent users repaid loan by selling crops, 32 percent by saving on firewood, 7 percent by sale of land, and 1 percent from other income sources such as business and salary.

Perception of User on Profitability of Plants

72 percent users expressed that it was profitable for them to have a plant, while 14 percent did not agree with this.

Quality of Information on O&M

77 percent users were satisfied on the quality of information given to them on O&M of the plant.

Users' Level of Information on Financial Arrangements

Only 31 percent users were aware that they had received subsidy.

Use of Slurry

51 percent users preferred the use of slurry as fertilizer instead of FYM.

In addition to these, many more indicators could be defined to generate specific information on different aspects of performance of biogas technology. The relevance of an indicator and the importance of its accurate measurement depend on the type of decision to be made on the basis of such information.

Frequent surveys should be avoided while ensuring that sufficient and updated information are available for decision making. For example, surveys are essential to establish a data base. However, once the data base has been established through surveys, it could be updated through effective systems of record keeping and reporting in the implementation process. This would reduce the need for frequent surveys and make the information readily available at the time of need.

The early 1990s marks the publication of a large number of reports on surveys, evaluations, and need assessments on biogas technology in Nepal. The publication of such reports became more frequent with the initiation of BSP in 1992. This has generated strong baseline information needed for effective M&E of BSP implementation. Some of these reports include the following.

- Survey of GGC Plants, conducted in 1991 and published by GGC in 1994.
- Biogas Users' Survey, by East Consult for BSP, 1994.
- Various Studies on Effects of Biogas on Women's Work Load, by BSP and others.
- Annual Progress Report of GGC, 1992/1993.

10.4 M&E as Integral Part of Program Implementation Process

Until the early 1990s, GGC remained the only major organization for the implementation of all biogas programs in Nepal. It carried out M&E activities as part of its regular institutional activities in the field (M&E of programme implementation) as well as in its research center at Butwal (M&E of performance of the technology). Information generated through these activities were provided to GGC Headquarters through periodic performance reports from the filed offices. The use of such information was limited in the formulation of annual programmes. No efforts were made to create a systematic data base at the Headquarters.

Various programmes run before 1990 did not put much emphasis on establishing a strong baseline information or a data base. Therefore, detailed information on many of the plants constructed in earlier years are not readily available even with GGC.

BSP is the first comprehensive biogas programme of Nepal which is being implemented with long term perspective and wide coverage of subject areas as well as the geography. BSP in its earlier phase carried out various surveys to create a data base which is updated with subsequent surveys and field reports. This is also the first programme with well integrated M&E system in the implementation process. It has computerized detailed information on each of the plants constructed. Its reporting system is so designed that it also continues to receive updated information on the after-sales-services by the biogas companies. This is continuing since last five years. As all on-going biogas development activities are supported by BSP, the country now has a well established data base for effective M&E of the biogas sector.

10.5 M&E at Different Levels

10.5.1 User Level

Users are the key persons to monitor and evaluate the performance of their plants They provide written or verbal information to the concerned biogas companies on operation and quality related problems. If no complaint is received, the plant is considered to be performing satisfactorily. There lies a theoretical possibility of unreported malfunctioning of plant. BSP's mobile team carries out field inspection and verification to address this issue (Lam and van Nes, 1994).

10.5.2 Biogas Company Level

All biogas companies are required to maintain a filing system that corresponds to the filing system of BSP at the central level. This system requires detailed information on each plant constructed in the current year, regular visits made to the plants constructed in previous years for the guarantee period of six years, and plants visited at the request of the users. Such information are submitted in the form of a monthly report to BSP.

Masons or the contact person of the company send the physical progress report on the plants that they construct. The company records the progress on a hard cover register book in which users' name, and address, bank's name, date of coupon, work start and completion dates, mason's name, BSP's file number, etc. are entered.

Similarly, the company headquarters keep records on the plant maintenance progress in a hard cover register book in which users' name and address, plant inspector's name, signature, inspection date, findings of inspection, suggestion made by the inspector and maintenance undertaken, etc. are recorded.

10.5.3 Programme Level

The compilation of monthly and annual reports received from the companies provide the updated information on performance of each plant. The information thus received is validated and supplemented with the monthly field report from the BSP mobile team. In addition, BSP also uses the services of individual consultants and consulting firms for periodic M&E of other activities such as training conducted, impact on workload on women and efficient use of subsidy fund.

BSP has developed forms for collection of information on each of the plants constructed. All companies are required to fill these forms and submit them to BSP on a monthly and annual basis. BSP records such information in a computerized data base and processing system. This enables BSP to generate detailed and updated information on the companies, districts, sizes, masons, etc. Similarly, the maintenance status as reported by the companies is also processed and analyzed. Finally, a monthly report of the progress on the plant construction and maintenance is prepared by BSP. The Job Completion Form and the Plant Maintenance Form developed by BSP are shown in Annexes 10.1 and 10.2, respectively.

The quality control system of BSP is well integrated with the systems for monitoring, on-going evaluation and updating of the data base. The system consists of selecting at least 5 percent of the plants constructed by each company in a year, recording measurements and observations of thus selected plants and comparing the information with the set standards and norms.

Such M&E activities of BSP has led to the identification of training needs of masons, users and that of companies. Accordingly, programmes have been developed and implemented.

In addition to on-going M&E activities, BSP also has been conducting periodic evaluation of the program as a whole. The mid-term evaluation of BSP programme for the period of 1992 to 1997 was carried out in 1994. Some of the main findings and recommendations of this evaluation included the following (de Castro, et al., 1994):

Successful

- BSP has been successful in making biogas more attractive to small formers in the hills. Under BSP. the plants constructed in the hills cover 60 percent while this was 40 percent in 1992, i.e., before BSP implementation
- The average size of plants has decreased from 13.7 m^3 in 1992 (before BSP) to 9.6 m^3 in 1994. Approximately 90 percent of BSP fund has reached the target group in the form of subsidy while 10 percent covered the cost of staff salary, training, research, consultancy services and the overheads.

Shortcomings

- The need of improvements in the information and skill level of the users for proper O&M of plants.
- Poor after-sale-services.

Recommendations

- Activities to improve coordination with banks, private sector companies and NGOs. Certification of trained masons, users and extension workers.

BSP has also made several other studies on the impact of biogas on users, privatization, and subsidy review. These study reports form part of the quantitative data base on impact of the biogas programme.

BSP Phase in has been formulated with due considerations to the findings and recommendations of the mid-term evaluation (BSP, 1996). The objectives and corresponding indicators for M&E of this phase are presented below in Table 10.1

Table 10.1

Indicators for BSP Phase III Objectives

Specific Objectives	Corresponding Indicators
Biogas industry	
- Commercially viable	- Max. 25 percent loss in the total number of companies - 360 persons trained in management
- Market oriented	- 360 persons trained in marketing
Installed Biogas Plants	
- 100,000 plants	- Min. achievement of 75 percent
- Average plant size	- Max. 8.0 m^3
- Percentage of construction defaults,	- Max. 10 percent
O&M	
- Failure rate (no biogas use)	- Max. 10 percent
- Utilization of plant capacity	- Max. 85 percent
- Female user training	- Min. 75 percent achievement
Development of Appliance	
- Valve, tap and lamp	- Entirely produced in Nepal
Maximization of Benefits	
- Improved sanitation	- Min. 60 percent users attach toilets
- Saving on fuel wood	- Min. 1,700 kg/year for average user household
- Saving on agricultural waste	- Min. 720 kg/year for average user household
- Saving on dung cakes	- Min. 400 kg/year for average user household
- Saving on kerosene	- Min. 50 lit/year for average user household
- Reduction in work load	- Min. 2.8 hours per day for average user household
- Better use of slurry	- Min. SO percent of user household have two compost pits in use within 1.5 years after plant construction
Institutional Development	
- NBPG	- Coordinate activities in biogas sector
- Apex organization	- Responsible to oversee the development of biogas sector in Nepal

M&E of BSP against the above set target and indicators will be undertaken by independent research institutes, biogas companies or consulting firms. While monitoring is included as a part of regular implementation process, evaluation is planned towards the completion of the programme period with one mid-term evaluation during implementation.

10.5.4 National Level

The decision for the establishment of AEPC has already been taken, but it has not started functioning yet. In the absence of any specific government agency (ministry or department) to oversee the performance of biogas sector as a whole on a functional basis, the government has to rely on the M&E of BSP. WECS and ADB/N have been occasionally involved in M&E of biogas programmes in the country. The ADB/N's M&E on biogas programme is limited to information on disbursement of loan and its recovery.

ADB/N branch offices report the progress of biogas plant construction and the amount of loan taken by the users in a monthly basis. The ADB/N central office completes the physical and financial progress reports in a monthly basis based on the information on cumulative progress on plant construction, the loan amount provided to the users and the status of payback of loan as reported by its branch offices. BSP coordinates with ADB/N to cross check and verify the data collected.

10.6 The Logical Framework

Discussion on Logical Framework is included here as a comprehensive method for effective M&E of any development program including that of biogas.

The Logical Framework is defined as a tool which provides a structure for specifying the components of an activity and the logical linkages between a set of means and a set of ends. It places a project in its larger framework of objectives within the programme. It serves as a useful tool for defining inputs, time tables, assumptions for success, outputs and indicators for monitoring and evaluating performance.

The Logical Framework approach involves first analyzing the situation (identifying the key problems, constraints and opportunities), developing objectives from the key problems, assessing alternative interventions, choosing a strategy and finally taking decisions based on the findings of the analysis. The output of this approach is the Logical Framework Matrix (hereafter simply called Logframe). The Logframe is as an aid for decision making. The logframe for a hypothetical biogas development project has been illustrated in Annex 10 3.

10.7 Session Plan

Activity No.	Topic and Area of Discussion	Time (min.)	Methods of Training	Teaching Aids
1.	Introduction and highlight of the objectives of session	2	Lecture cum discussion	O/H projector, screen and flip chart
2.	Definitions	3	Lecture cum discussion	O/H projector, screen and flip chart
3.	Indicators and data base	10	Lecture cum discussion	O/H projector, screen and flip chart
4.	M&E as Integral part of programme implementation process	5	Lecture cum discussion	O/H projector, screen and flip chart
5.	M&E at different levels	10	Lecture cum discussion	O/H projector, screen and flip chart
6.	The Logical Framework	**5**	Lecture cum discussion	O/H projector, flip chart
7.	General discussion	**15**	Discussion	
Total Time		**50**		

10.8 Review Questions

- What is programme monitoring?
- What is programme evaluation?
- What is a logical framework approach?
- Explain the monitoring and recording system of Agricultural Development Bank.
- How do the biogas construction companies monitor the performance of plants that they construct?
- Explain BSP's biogas plant construction monitoring system.
- Explain BSP's biogas plant maintenance monitoring system.
- What are the three main findings of the Mid-term evaluation of biogas Phase I & II programmes?

10.9 References

APROSC (1988) Impact Evaluation of the Asian Development Bank Assistance at Farm Level in Nepal. A case study on Biogas Plants. Submitted to Asian Development Bank, Manila.

BSP (1992) Implementation Document. ADB/N, GGC and SNV/N.

BSP (1996) Proposal Biogas Support Programme Phase III, HMG/N, SNV/N, Kathmandu, Nepal.

Carruthers, I. D. and E. S. Clayton (1977) Ex-post Evaluation of Agricultural Projects: Its Implication for Planning, Journal of Agricultural Economics, Vol. 28.

Casley, D. J and K. Kumar (1987) Project Monitoring and Evaluation in Agriculture. A World Bank Publication.

Clayton, E (1983) Some Experiences of Project Monitoring. In Agriculture Poverty and Freedom, Macmillan Press.

Clayton. E. and F. Petry (1989) Monitoring System for Agricultural and Rural Development Projects - Volumes 1 & 2. FAO Economic and Social Development Paper 12, Rev. 1, FAO, UN Publication.

de Castro, J. F. M, A. K. Dhusha, J. H. M Opdam and B. B. Silwal (1994) Mid-term Evaluation of the Biogas Support Programme. Final Report. DG1S.

Gobar Gas Sahayog - Gobar Gas Plant ko Gunastar Niyantran (1994) Biogas Support Programme (A working document on quality control 1994).

Karki, A. B., K. M. Gautam and S. R Joshi (1993) Present Structure of Biogas Sector in Nepal. Consolidated Management Services Nepal (P) Ltd.

La,, J. and . J. van Nes (1994) Enforcement of Quality Standards Upon Biogas Plants in Nepal. Biogas Forum. Vol, No. 57.

Mercado, C. M. (1989) Monitoring and Evaluation in Project Management. UNDP/DTCP, Manila.

Methotra, R. C. (1985) Monitoring and Evaluation Guiding Principles. IFAD Publication.

Silwal, B. B. and R. K. Pokharel (1995) Evaluation of Subsidy Scheme for Biogas Plants. Consortium of Development Expert, Kathmandu, Nepal.

Job Completion Form of Gobar Gas Plant - 1995/96

(To be filled in Nepali Script Before and After Plant Installation)

Company code No :	BSP file No : .....
Office address :	
Plant owner's name :	Name of plant construction technician : .....
Address : Ward No…….. VDC/Municjpalit	Date of work completion : .....
District :	Plant capacity : ..... m^3
No. of cattle (Above one year) :	Total investment (except toilet) Rs : .....
Total production of dung : ..... Kg/d»y	Grand amount Rs. : .....
Water source distance : ..... Waiting minute	Investment : credit/cash
If gas plant attached to toilet ? : ..... Yes/No	Name of Bank : ADB.'NBL/RBB not any
Construction of toilet . Yes/Not yet/ Not planned	Address of Bank : .....
Family members of a Kitchen :..... Persons	Bank coupen dispatch No : .....
Type of round wall : Stone/brick	Total quantity of cement used (except toilet) : ..... sac
No. of installed stove :.....	Brand of stove : .....
No. of installed light :.....	Brand of light :.....
Brand of gas pipe :	Brand of main gas valve : .....
Brand of gas tap :.....	Brand of water outlet machine:.....
Type of gas pipe :	Quality standard of gas pipe: .....
Dung mixing machine :Yes/No	Type of dung mixing machine; .....
Type of dung mixing machine : Horizontal/vertical	Galvanised dung mixing machine:…….Yes/No
Compost pit ; Not constructed/one/two	Material used to join the pipe: ..... Teflon tape/zinc putting/jute and enamel/others if any .....
Users Manual provided : Yes/No	Guarantee card provided : ……. Yes/No
Name of Form Filler :	Port : .....
Signature :	Office stamp :

(Fill up the measurements of main parts of plant as shown in back of this page)

Gobar Gas Plant Maintenance Report
(To be filled annually)

Company Code No	.....	BSP file no	……
Supervisor's owner name	.....	Office address	……
Capacity of plant	.....	Date of supervision	……
Date of installation	.....	Address : Ward no	….. VDC/municipality …….
Relation with plant owner	.....	District	……
		Name of respondent	……
		Signature of respondent	……

Do the user has felt any problem : (If yes, specify)

……

……

……

Number of cattles of above one year old

Total using time of …… Hour/day Stove

Total lighting lime …… Hour/day

Supervision

Detail	*Condition*		
I. Inlet :	Good/poor	12. Leakage in main gas pipe line :	Yes/No
2, Dung mixing machine :	Not installed/good/ poor	13. Leakage in main gas valve :	Yes/No
3. Regularity of gobar feeding :	Yes/No	14. Leakage in pipe joint:	Yes/No
4. Outlet :	Good/poor	15. Soil filled above possible places of pipeline:	Yes/No
5. Cover of outlet:	Good/poor	16. Water outlet pit:	Good/poor
6. Slurry-from outlet:	Diluted/optimum/thick	17. Water discharge equipment:	Good/poor
7. Numbers of compost pit:	0/1/2/3	18. Leakage in gas tap :	1. Yes/No 2. Yes/No
8. Other organic material mixed in compost pit:	Yes/No	19. Rubber hose pipe :	1. Good/poor 2. Good/poor
9. Use of slurry :	Yes/No	20. Condition of gas stove used	1. Good/poor 2. Good/poor
10. Dome covered with soil :	Good/poor	21. Condition of gas light used :	1. Good/poor 2. Good/poor
11. Turret:	Good/poor	22. Regularity of gas use :	Yes/No

Repaired works done during regular supervision :

……

……

Works to be done immediately after supervision :

……

……

Signature of Office Chief: ..... Post... ..... Office Stamp

Narrative Summary	Verifiable Indicators	Mean of Verification	Assumptions
GOAL			
To improve the quality of life of people	- Increased Irving standards - Increased sanitation and health of general people	- Socio economic survey report - Health and sanitation survey report	- Government continues to provide subsidy to farmers for Biogas development
OBJECTIVES			
To save forest (environment) To improve the health of rural People To increase the production of Agricultural crops	- Decreased rate of deforestation - Decreased environmental problems - Decreased rate of eyes and lungs problem - Increased agricultural production	- Forest survey - Land inventory - Hospital record of sick person - Crop yield survey	- Forest areas are not changed to other types of landuse - No significant eyes and lungs diseases - Occurs due to other causes
OUTPUTS & ACTIVITIES			
OUTPUTS			
Biogas Slurry	- Amount of biogas produced (tons) - Amount of slurry produced (tons)	- Household survey report of biogas - Household survey report of biogas	
ACTIVITIES			
Construction of biogas plants Operation of Biogas plants Training of masons & users	- No. of biogas plants constructed - No. of biogas plants in construction - No. of persons trained	- Physical progress report - Occasional household survey report - Farmers complains (Proxy progress report on training	- Subsidy is continued - Adequate and timely supply of inputs
NPUTS			
Input cost schedule	- Expenditure made according to input cost schedule	- Monthly financial report	
MANPOWER			
- Project staffs - Masons - Farmers	- Project staff recruited and used in time - Masons hired and used in time - Farmers willing to establish and operate the plants	- Monthly financial report - The staff attendance book - Administrative record of hiring and progress report - Loan sanction record	- Timely release of budget, etc. - Adequate budget appropriations are made - Procurement and recruitment procedures are effectively managed - Suitable staff are available

Narrative Summary	Verifiable Indicators	Mean of Verification	Assumptions
MATERIALS -Brick - Cement - Iron rods - Rock - Pipe & fittings -Paint -etc. **EQUIPMENTS** - Project equipment (vehicles) - Gas stoves - Masons equipment -etc.	- Sufficient biogas plants construction - Materials supplied - Equipment's purchased and used	- Farmer application for biogas plants - Biogas construction companies complains - Store record	