

## **APPENDICES**

**With the Advice for Terms of Reference for an  
Integrated Environmental Impact Assessment the  
Biogas Support Programme in Nepal**

**(appendices 1 to 8)**

## APPENDIX 1

### Letter from the Alternative Energy Promotion Centre dated 29 August 2000 with request for advice.

To: **De Commissie voor Milieu Effect Rapportage,  
Postbus 2345  
3500GH Utrecht**

Att.: The Director,  
Mr. Jules Scholten

date: concept  
ref.no.: BSP/FtH/2000/241  
Subject: Environmental impact study on the Biogas Support Programme in Nepal /  
Request for assistance

Dear Sir,

The Alternative Energy Promotion Centre (AEPC) is Nepal's Government Agency that promotes and coordinates all small scale renewable energy initiatives in the Country. One of the renewable energy Programmes under AEPC's umbrella is the Biogas Support Programme.

The Biogas Support Programme (BSP) in Nepal is an SNV-Nepal implemented programme under AEPC, in cooperation with major banks and recognized biogas companies, with financial assistance of the Dutch (NEDA), German (KfW) and the Nepalese Government.

The general objective of the programme is to further develop and disseminate biogas as an indigenous and sustainable energy source in rural areas of Nepal. The first phase of the programme started in 1992, and currently --running the third phase from 1997 up to 2002- some 65,000 biogas plants of the model GGC 2047 have been constructed in 64 of Nepal's 75 districts.

The programme is running under an environmental heading, whereby reduction in the consumption of fuelwood and kerosene, and to a lesser extend the reduction of Carbon dioxide, are mentioned as intended benefits. Although the programme gathered over the years reasonable reliable information on the cutback of fuelwood and kerosene resulting from biogas use, a thorough Environmental Impact Assessment on the programme as a whole has not been commissioned.

In view of BSP III nearing its end, the programme therefore feels the need for a scientifically sound Environmental Impact Assessment. The study should, as a justification in retrospect, summarize the merits and demerits of the programme regarding Nepal's environment.

Furthermore, the study might reveal valuable information for improvement of the current programme as well as the development of a follow-up programme for BSP III, post 2002.

Thirdly, with the potential of trading Certified Emission Reduction Units in the future, the study might provide possible entry points and recommendations for us.

For this Environmental Impact Assessment, the programme is looking for expert assistance. Assistance will be needed in the preparation, the development of the Terms of Reference, the execution of the study and final evaluation of the report.

In Nepal this expertise is scarcely, if at all, available. It was my fortune however to meet your Secretary, Mr. Reinoud Post, in Kathmandu. During our brief meeting, Mr. Post pointed at the possibilities of assistance from your office.

For that reason I hereby kindly request MER to consider assistance for the Environmental Impact Assessment of the BSP. I realize that for a proper consideration the MER will need more detailed information on our programme. Most of that may be available, please indicate which information would be required.

Hoping to have informed you properly, I kindly remain,

Yours faithfully,

Dr. M.D. Basnet,  
Executive Director AEPC

Cc.: SNV/BSP, Kathmandu  
Royal Dutch Embassy New Delhi, Ms. Hedda Samson.

## **APPENDIX 2**

### **Project information**

**Proposed activity:** Integrated Environmental Impact Assessment for the Biogas support programme in Nepal.

**Categories:** biogas DAC/CRS code 46000

**Project numbers:** Commission for EIA 041

**Procedural information:**

Request for advice (draft): 26 August 2000

**Significant details:** A joint Nepalese-Netherlands working group of the Commission is requested to prepare an advice for ToR for the execution of an integrated environmental impact assessment. In this study the direct and indirect environmental as well as the socio-economic impacts of the third phase of the Biogas Support Programme will be evaluated and compared with the situation without biogas. The ToR will be drafted in January 2001 in Nepal.

**Members of the working group:**

Mr D. van der Berg  
Mr P. van Ginneken (only first meeting)  
Mr K.B. Karki (local expert)  
Mr P. Laban  
Mr A. Pijpers (chairman)  
Mr A. Pradhan (local expert)  
Mr K. Rijal (local expert)

Secretary of the working group: Mr A.J. Kolhoff

## APPENDIX 3

### Programme site visit

23 January	09.00-10.00	Welcome by Mr Sundar Bajgan and Mr Felix ter Heegde
	10.00-11.00	Acquaintance of the working group members from Nepal and the Netherlands
	11.00-14.00	Visit of a biogas plant
	14.00-15.00	Discussion on the first draft advice
24 January	09.00-10.00	Presentation of BSP by Mr Felix ter Heegde
	10.00-18.00	Meeting of the working group
25 January	09.00-10.00	Meeting of the working group and drafting of the advice
26 January	10.00-14.00	Presentation of the draft advice and discussion in a consultative meeting (the list of participants is presented below)
	14.00-14.30	Debriefing with Mr Jan Brouwers
	14.30-15.30	Meeting with Mr Felix ten Heegde
	15.30-19.00	Final meeting with the working group
27 January	09.00-14.00	Redrafting of the first draft advice

### Consultative Meeting- List of Participants

1 Mr Jan Brouwer	Sector Manager, Biodiversity, SNV/Nepal
2 Mr Prashun Bajracharya	Programme Manager, NBPG
3 Mr Kishor Gyawali	Chairman, PGC
4 Mr Shankar Bahadur Singh	General Manager, GGC
5 Mr Shekhar Aryal	Chairman, RGG
6 Mr Madan B. Basnyat	Executive Director, AEPC
7 Mr Mohan B. Karki	Joint Secretary, MoST
8 Mr Pramod Poudyal	Chief loan Division, ADB/N
9 Mr Deepak Kharal	Environmentalist, WECS
10 Mr Prakash Chandra Ghimire	Executive Director, Dev-Part
11 Mr Bikash Pandey	Director, REPSO
12 Mr Jagannath Shrestha	Director, CES
13 Mr Surendra Lal Shrestha	Under Secretary, NPC
14 Mr Hari Regmi	Under Secretary, MOF
15 Mr Bikash Sharma	CREST
16 Mr Janak Raj Joshi	Joint Secretary, MOPE
17 Mr Govinda Derkota	Universal Consultancy
18 Mr Ram Khadka	Associate Professor, SchEMS

## **APPENDIX 4**

### **Guiding principles for an integrated approach of the study**

On basis of experience<sup>1</sup>, the Commission is of the opinion that the quality of an integrated assessment is predominantly determined by an appropriate coordination of the study.

Guiding principles for the execution of an integrated assessment are:

- a multi disciplinary team should carry out the study;
- experience with implementation of Environmental Impact Assessment is required;
- one coordinator should coordinate the study;
- exchange of information between the different specialists is necessary;
- the terms of reference should be discussed by the study team and in particular it should become clear who is responsible for data gathering and –analysis of the cross cutting issues;
- the results of the assessment should be discussed by the study team;

Exchange of information between the different specialists of the study team is one of the conditions for a qualitative good integrated study. Therefore it is recommended to organise a number of workshops (at least four) at crucial moments in the process:

- workshop 1; discussion about the ToR, set up of the study and division of the themes;
- workshop 2; presentation of and discussion about the secondary data and determination of the primary data to be collected;
- workshop 3; presentation and discussion about the first results of primary data; collection and analysis within the study team by making use of an impact matrix;.
- workshop 4; consultative meeting of the final draft with stakeholders and processing of the information by the study team.

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<sup>1</sup> The experience of the Commission concerning integrated assessment is recorded in the following documents:

- Scholten, J & R. Post: Strengthening the integrated approach for impact assessment in development cooperation. In: Sustainable development and integrated appraisal in a developing world (ed. by N. Lee and C. Kirkpatrick), pp. 23-31; 2000.
- Post, R. A. M. , A. J. Kolhoff and B. J. A. M. Velthuyse: Towards integration of assessments, with reference to integrated water management in third world countries. In: Impact Assessment and Project Appraisal, 19 (1), p.50; 1997.
- Velthuyse B.: Integraal denken integraal doen. Een onderzoek naar de mogelijkheden voor een integrale effectrapportage bij de Commissie voor de m.e.r; 1997.

## APPENDIX 5

### **Suggestions for indicators to measure the impact of the biogas support programme (phase III)**

Indicators are elaborated for each of the main domains of impact (final variables are provided) identified in chapter 5 of the advice on the terms of reference for this Integrated Environmental Impact Assessment study.

#### **1. Impacts on energy use**

##### Substitution of biomass fuel and kerosene

- number of operational biogas plants
- gas production (number of hours for cooking – seasonal variation)
- quantity of available dung (feeding in the plant)
- average size of biogasplants
- feeding capacity of biogas plants
- increased/reduced use of fuelwood
- increased/reduced use of agricultural residues as fuel/fodder
- increased/reduced use of dung as fuel/fertilizer
- change in amount of kerosene /LPG used
- change in cooking efficiency (of induced device)
- change in energy services (useful / secondary energy)

#### **2. Impact on the health situation**

##### Diseases

- incidence of Acute Respiratory Infections (ARI)
- incidence of eye infection (smoke related)
- exposure to indoor air pollution
- incidence of Gastro-Intestinal (GI) diseases
- incidence of malaria and other mosquito induced diseases
- level of pathogens in slurry
- accidents (fire accidents, burning)

#### **3. Impacts on sustainable land use**

##### Forest regeneration and degeneration

- increased/reduced fuelwood collection
- increased/decreased use of types of wood (parts of the tree; dead/living wood)
- increased/reduced use of NFTP's (for medicines, utensils, food and spices)

##### Deforestation

- encroachment by agriculture (ha /year)
- irreversible damage of forest by forest fires (ha/yr)
- encroachment due to urbanisation and road building (ha / yr)
- conversion of fuelwood and timber (tonnes / yr)

#### Soil fertility

- increased/decreased use (quantity)of different fertilizers (manure, compost and chemical fertilizers)
- increased/decreased crop yields
- increased/reduced incidence of crop pests and diseases (crop health)
- increased/decreased use of crop residues (as soil cover; to make compost or as fuel-wood)
- increased/decreased use of surface water

#### Cropping patterns

- changes in cropping intensity (crop rotation, crops/yr, mixed or monocrops)
- changes in types of crops (cash, staple, fodder, vegetable, fruit crops)
- change in land use patterns

#### Livestock production

- increased/decreased numbers and breed of dairy and other animals
- increased/decreased fodder availability (distance, type)
- changes in fodder cultivation
- changes from free grazing to stall feeding
- increased/decreased use of water for animal husbandry (feeding and fodder cultivation)

### **4. Impacts on climate change**

#### Emissions of greenhouse gasses

- change in carbon dioxide emissions
- change in methane emissions
- change in N<sub>2</sub>O -emissions

### **5. Impacts on socio-economic conditions**

N.B. 1. Especially the items mentioned here need to be differentiated according to gender and income categories.

N.B.2. Outcomes of investigations on issues mentioned below need to be analysed also for increasing/decreasing gaps between biogas owners and non-biogas owners, as well as related different income categories.

#### Saving of time and money

- fuelwood collection
- fodder collection
- water collection
- feeding of biogas plants
- cattle feeding
- use and processing of slurry/compost (including transport and application)
- cultivation practices
- milking
- trading of milk and other agricultural products
- cooking and cleaning of kitchen and utensils

### Social status

- changes in daily habits
- social recognition of men and women
- changes in roles between men and women
- changes in educational status (men and women)
- increased education and exposure of women
- degree of involvement in community organization and 'politics'

### Social spending (in terms of time and money)

- pilgrims and festivals
- improved schooling
- social organization (services and donations)
- quality of light
- gambling, idle time

### Health conditions

- breast feeding practices
- time devoted to look after the children
- change in consumption of nutritious food
- change in medicine use
- change in alcohol consumption

### Economic changes (improvement or marginalization)

- changing gap in incomes between hh with and without a plant
- change in control and access to natural resources (dung, agr. residues, water, fodder) of landless and poorest farm-households
- changes in income (negative/positive) through alternative use of time and increased soil fertility)
- changes in money spending patterns (e.g. medicines, education and food)
- change in milk production
- Increased/decreased gambling
- increase in household assets (e.g. furniture and t.v.)
- increased use of modern technologies
- increased direct financial benefits of biogas plants (sale of dungcakes, manure and/or compost produced from slurry ; sales of excess crop yields due to slurry induced higher soil fertility
- decreased access to free dungcakes and manure for landless and poorest households
- credit worthiness

### Employment

- number of companies
- number of people involved in construction
- number of people involved in promotion and extension activities
- indirect employment due to the construction of plants (secondary activities : e.g cement industry)

## APPENDIX 6

### Strategic impact assessment study for rural energy supply

This strategic study is **not** meant to be implemented together with the integrated environmental impact assessment of energy use for cooking. In the preparatory phase of the drafting of this advice for guidelines representatives of MOSTE and the National Planning Commission have expressed their interest in the execution of a strategic impact assessment study for the rural energy supply. The results of the proposed study could become an important input for such a strategic study at national level in the near future.

The existing energy situation in rural Nepal indicates that fuelwood, agricultural residues, dung cakes and biogas is being used for cooking purposes. The multi-power application is primarily provided by grid electricity, mini/ macro small hydropower and diesel engines. The lighting energy requirements in rural areas made by kerosene extension or grid electricity by micro hydropower, Solar Photo Voltaic (SPV) and biogas. All possible sources of energy supply to meet the different types of energy services, need to be included in a strategic impact assessment with regard to rural energy supply, taking into consideration the impacts on local, regional and global environment. In case this strategic study will be implemented later on, one could think of the following dimensions / starting points:

- Composition of energy profiles of the different energy user groups (the present and the future energy demand) specified for all distinguished geographical zones in Nepal.
- Supply of energy in the present situation as starting point and development of scenarios for future energy supply. It is expected that electricity will become an important energy source for all kind of activities (such as milling, pumping for irrigation, radio / TV and lighting) Electricity will become supplementary to energy sources used for cooking such as fuelwood and biogas. Therefore an alternative could/should be elaborated aiming at an increase of the rural electricity demand. Electricity can be generated by different sources, concerning the building blocks for scenarios one could think of:
  - electrification by a central grid (energy supply generated primarily by hydropower).
  - electrification by a local grid (biomass, gasifiers, mini and micro hydropower, wind turbines and diesel generators) or stand alone SPV.

## APPENDIX 7

### List of key documents

- APROSC, June 1988, Impact evaluation on the Asian Development Bank Assistance at farm level in Nepal.
- Asian Development bank/Nepal Impact study on biogas installation in Nepal, June 1986
- Britt, C. The effects of biogas on women's workloads in nepal: An overview of studies conducted for the Biogas Support Programme, May 1994
- BSP; Biogas Support Programme-Slurry Extension Programme 1997-1998, January 1997
- BSP; Biogas Support programme-Slurry Extension programme 1998-2001. August 1998
- Centre for Economic development & Administration , Study on the Effective Demand for Biogas in Nepal, Kathmandu, June 1998
- DevPart Consult Nepal; Biogas Users Survey 1997-1998, June 1998
- HMG Ministry of Agriculture, Winrock International, B.B. Silwal, Biogas plants in Nepal: An economic analysis. October 1991
- Kanel, Nav. R.; Draft Report; An Evaluation of the BSP Subsidy Scheme for Biogas Plants, March 1999
- Lam, J. and W.J. van Nes, Enforcement of quality standards upon biogas plants in Nepal. BSP, March 1994
- National Planning Commission, Perspective Energy Plan for Nepal, NPC, 1995
- New Era, Biogas plants in Nepal. An evaluative study. July 1985
- Perspective Energy Plan. Supporting Document on Alternative Energy Technologies, 1995/1996
- Pokharel, R.K. and Yadav, R.P. Application of biogas technology in Nepal: Problems and prospects. ICIMOD. MIT Series No. 11. June 1991
- Post, R. A. M. , A. J. Kolhoff and B. J. A. M. Velthuyse: Towards integration of assessments, with reference to integrated water management in third world countries. In: Impact Assessment and Project Appraisal, 19 (1), p.50; 1997.
- Scholten, J & R. Post: Strengthening the integrated approach for impact assessment in development cooperation. In: Sustainable development and integrated appraisal in a developing world (ed. by N.Lee and C. Kirkpatrick), pp. 23-31; 2000.
- SNV/N: Final Report on the Biogas Support Programme – Phase I and II. Development through the market, June 1997.
- Velthuyse B.: Integraal denken integraal doen. Een onderzoek naar de mogelijkheden voor een integrale effectrapportage bij de Commissie voor de m.e.r; 1997.
- WECS, Energy Synopsis Report.