Kanel, N. R. **An Evaluation of BSP Subsidy Scheme for Biogas Plants**. **Final Report**. July 1999. 93p. BSP Lib Temp No. 41.

Objectives
The general objective of this study is to evaluate the proposed subsidy scheme for biogas plants and to recommend a scheme to be applied for 1999/2000 and onwards.

Rational for Study
The Biogas Support Programme (BSP) is a national programme and has successfully installed biogas plants in 61 out of 75 districts of Nepal. The total number of biogas plants constructed in Nepal reached 57,842 by the end of June 1999, while the number of plants installed under this programme was 45,908. The remaining 11,916 plants are non-BSP.

The involvement of BSP is divided into three phases. The first phase period was from July 1992 to July 1994, while the second phase covered a period of three years beginning July 1994 until February 1997. The major objectives of these two phases were to construct 7,000 biogas plants during the first phase and 13,200 biogas plants (including 200 gift plants) during the second phase. BSP is currently running in its third phase started from March 1997. The overall objective of the third phase is to further develop and disseminate biogas about 100,000 plants by July 2002 when the third phase terminates. The BSP Phase III implementation document foresees a decrease in the subsidy amount by NRs. 1,000 across the board to be applied for the fiscal year 1999/2000 and onwards. Final decision on this issue is pending subject to the recommendations of the Mid-Term Evaluation of the programme.

Approach and Methodology
To achieve the general objective, this study has adopted the methodology to assess the consequences of a reduction of the study rates as proposed in the implementation document of the BSP. Cost-benefit analyses of biogas plants are conducted and the financial and economic rate of return are calculated for this purpose. Data were collected from various institutions and organisations, while the parameters required for this study were taken from study reports and published sources. Data were generated from the established parameters and collected new data. Microsoft Excel computer package was used to calculate the financial and economic rate of return. Subsidy on kerosene and urea are also considered while calculating the economic rate of return. While calculating the financial and economic rates of return, three scenarios–subsidy and NPK excluded, subsidy included but NPK excluded, and subsidy and NPK both included – have been analysed.

Various alternative options regarding the recommendation of new subsidy scheme have been considered in the study. But the detailed study of only two options – reduce the subsidy amount by NRs. 1,000 per plant across the board, and propose new subsidy rates according to geographical division and the size of the plants – has been conducted to measure the efficiency of biogas plants with these options. The method of internal rate of return (IRR) has been used to measure the efficiency of biogas plants. Financial and economic internal rates of returns are calculated for this purpose.

Main Findings
The study shows that installation of biogas plants is very profitable in Nepal. This is known by high internal rates of return, both financial and economic, even with a decline on the on-going subsidy rates by a flat amount of NRs. 1,000 per plant. A study on the IRR values with different subsidy rates for an $8m^3$ plant also shows that biogas plants are profitable in Nepal. This is mainly due to high kerosene and firewood prices prevailing in the market.

The IRR of a plant is very high when we include the increased NPK in the slurry of a biogas plant. So the farmers should be reminded of the fact that the installation of a biogas plant is also, to some extent, a substitution for the use of chemical fertilisers. The economic returns are higher than the financial returns because of the incorporation of subsidies in kerosene and urea in the

calculations of rates of return. If we allow for higher 'real prices' of firewood, the economic rates of return will be still higher.

Two assumptions are made regarding the life span of a biogas plant: 10 years and 20 years. Biogas plants yield higher rates of return with longer life span as compared to shorter life span. Besides, the rates of return increase with the size of a plant. This is mainly because the returns increase proportionately with the size of the plant, whereas the costs increase less than proportionately.

The rates of return with the proposed subsidy rates and the inclusion of increased nutrients available in biogas slurry are always, irrespective of the life span of a plant, geographical division, and the private or the social profitability, higher than 16 percent, which is the highest interest rate charged on biogas loan. This interest rate is also higher than the interest rate paid by the commercial banks on time deposits. This suggests that biogas technology is very profitable in Nepal. Another reason for high profitability of biogas plants is the high fertiliser price in the market and the presence of increased nutrients in the biogas slurry. This is the indirect cause that many farmers may not think about.

Currently, there are three banks – Agricultural Development Bank (ADB/N), Nepal Bank Limited (NBL) and Rastriya Banijya Bank (RBB) – involved in providing loans to the biogas sector. Although the interest rate of ADB/N is higher than that of the two other commercial banks, many farmers prefer to borrow money from ADB/N because they feel more comfortable in dealing with ADB/N rather than with the other two banks.

There seem some problems with the current subsidy channeling procedure. According to the existing arrangements, a farmer (biogas plant owner) can take double subsidy with the same biogas plant. This is because the subsidy amount is to be channeled through the biogas construction company if the plant owner has installed the biogas plant on cash basis. The company is to provide BSP with a cash receipt signed by the buyer of the plant acknowledging the subsidy amount being received. On the other hand, the plant owner gets the subsidy amount from the bank from where it gets the loan in the case of loan plants. The problem may occur when a farmer installs a biogas plant on cash and claims the subsidy amount from BSP as a cash plant, and the same farmer later goes to a bank requesting for a biogas loan for which the bank will also provide him with the subsidy amount. Claiming double subsidy amount is similar, in a sense, to claiming subsidy for a non-extant plant.

Farmers become reluctant to install biogas plants if the costs increase rapidly. Farmers look only into the direct financial benefits and they do not envisage the indirect benefits generated from biogas plants. Therefore, subsidy is still required to entice the prospective farmers to installing biogas plants.

According to the BSP Phase III Implementation Document, the subsidy will have to be reduced across the board by NRs. 1,000 to be applied for the F/Y 1999/2000 and onwards. The findings from financial and economic rates of return of this study do not detect any problem with that proposal. Besides, this study has also considered about another option – suggesting new subsidy rates according to geographical division and size of plants – and this study recommends following option.

Plant Size	Terai	Hills	Remote Hills
4 m^3	7,000	10,000	12,000
6 m^3	6,000	9,000	11,000
8 m^3	5,000	8,000	10,000
10 m^3	3,000	6,000	8,000
15 m^3	----	----	----
20 m^3	----	----	----

The salient features of the proposed scheme are: (i) no change on the on-going subsidy rates for 4 m^3 plants; (ii) a reduction of NRs. 1000, 2000 and 4000 for the plants of sizes 6, 8 and 10 m^3, respectively; (iii) no subsidy to the plants size 15 and 20 m^3; and (iv) constant difference between the Terai, hills and remote hill subsidy amounts.