

A Study of Biogas Energy in Relation to Environment Conservation and Rural Development

[A Case Study of Chhoprak VDC in Gorkha District]

**A Project Work Report
Submitted To:**

**Central Department of Rural Development
Faculty of Humanities and Social Sciences**

(In Partial Fulfillment of the Requirement for
the Degree of Master of Arts in Rural Development)

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RECOMMENDATION

This project work report entitled **A Study of Biogas Energy in Relation to Environment Conservation and Rural Development : A Case Study of Chhoprak VDC in Gorkha District** is Prepared by Mr. Suman Pokharel under my supervision for the partial fulfillment of the requirements for the Degree of Master's of Arts in Rural Development. Thus, I here by recommend this project work report for approval.

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This project work report entitled **A Study of Biogas Energy in Relation to Environment Conservation and Rural Development : A Case Study of Chhoprak VDC in Gorkha District** Submitted to Central Department of Rural Development under the Faculty of Humanities and Social Sciences, Tribhuvan University in the prescribed format by Mr. Suman Pokharel has been approved by the evaluation committee.

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Finally, I am alone responsible for errors of judgement or of analysis, if exists any.

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ABBREVIATIONS/ACRONYMS

ADB/N	=	Agricultural Development Bank / Nepal
AEPC	=	Alternative Energy promotion Centre
BSP	=	Biogas Supported Programme
CBS	=	Central Bureau of Statistics
CDM	=	Clean Development Mechanism
CES	=	Centre for Energy studies
CO₂	=	Carbon Dioxide
ERDG	=	Energy Research and Development Group
GGC	=	Gobar Gas Company
GO	=	Government Organization
HH	=	Household
INGO	=	International Non-government Organization
KVIC	=	Khadi and Village Industry Commission
LPG	=	Liquefied Petroleum Gas
NBDC	=	Nepal Biogas Development Committee
NBL	=	Nepal Bank Limited
NFC	=	Nepal Fuel Corporation
NGO	=	Non-government Organization
NPC	=	Nepal Planning Commission
RBB	=	Rastriya Banijya Bank
Rs	=	Rupees (Nepali Currency)
SNV	=	Netherlands Development Organization
TU	=	Tribhuvan University
UMN	=	United Mission to Nepal
VDC	=	Village Development Committee
WECS	=	Water and Energy Commission Secretariat

EXECUTIVE SUMMARY

For many years fuel-wood remains to be a pre-dominant fuel for cooking in rural areas of Nepal. This total dependence on fuel wood as the source of energy for cooking has resulted in the deterioration of the quality and the quantity of forests. The pressure on forest resources for energy fulfillment is growing. To minimize this dependency, various attempts have been made from individuals and organizations. In order to solve the growing rural energy scarcity and minimize the negative impacts of traditional biomass fuel on environment as well as personal health; wider and speedy extension of biogas technology has been realized to be one of the best options.

Due to collaboration efforts of various agencies such as Biogas Support Programme, Banks, Biogas Companies etc, some 1,40,457 biogas plants have been installed in the country till the end of July, 2005 (BSP, 2005). Keeping in view the total number of households in Nepal with animals 2.7 million in 2001 and their locations, there is a potential of 1937015 biogas plants in the country. This indicates that there is still a lot to be done in the sector. Users' satisfaction is realizing the main attraction in Biogas technology. This study was carried out through a survey of 25 randomly sampled households during July 2006 in Gorkha district at Chhoprak VDC. Moreover, Gorkha is among the few districts in Nepal where, considerable numbers of biogas plants have been constructed and two biogas companies are involved to construct plants. The main objective of the study is to assess the social impacts of biogas on users. Hence, the study tried to document the benefits of biogas produced by harnessing the more popular and appropriate renewable energy sources – cattle dung, and assess the immediate impacts of biogas on the respective users.

The socio-economic indicators such average land holding 14.50 ropani, average livestock ownership 3.12, literacy level 73.64 and income from secondary sources other than agriculture still shows that the owners are well off.

The impacts of biogas on time allocation to biogas related activities were found to be positive in the sense that there is saving of time because of plant installation. The study revealed that a family saved on average 2.66 hrs per day after the installation of biogas plant. Time saving was

observed in cooking, cleaning of cooking pots, and collection of firewood. Those who experienced time saving replied that the time saved was used in number of ways such as: social work, household works, income generating activities, child caring etc. The study suggests that rural women rarely have an opportunity to decide themselves what to do with the saved time.

All of the users allocated first priority to cooking as regards the use of produced biogas. When asked if they are satisfied with biogas cooking, 84% replied that they are fully satisfied, 8% replied that they are partially satisfied and the remaining 8% told that they are not satisfied. As regard the food cooked in biogas in comparison to that cooked in firewood, 92% of the total respondents said that it is same and 8% of them told that it is less tasty. All the respondents who replied in favors of the biogas cooking expressed great satisfaction with cooking aspects of biogas. According to them, the main benefit of cooking in biogas is easy and comfort, and there were visible implications on personal health and general sanitary condition of the surrounding after the installation of biogas plants. Women interviewed mentioned that they coughed much less, had less fewer incidences of headache and dizziness, suffered from fewer eye infections and felt greater ease in respiration. Social impacts of biogas are mostly intangible and these need to be assessed from users' perception, which is not very easy to assess. However, the outcome of the study showed that there were some positive impacts of biogas that influenced the social aspects of beneficiary households directly.

Though, the environmental impacts of biogas are difficult to assess in household level, it is clear evident that biogas helps in the reduction of CO₂ emission. Installation of biogas has helped in protecting the environment by checking forest depletion. The study also revealed that the installation has helped in employment generation in the rural areas.

Bad smell due to leakage of gas, health hazard to mix dung and water increase in the incidence of mosquito and other insects(100%), tension due to loans (80%), additional time required to collect water; were some of the negative things responded by users. However, the percentage of users who pointed out negative impacts is very insignificant. Biogas has the potential for increasing the attractiveness of life in rural areas. The study findings reflect it and support those arguments. Finally, the following recommendations are suggested which may help in achieving better performance of installed plants:

-) *In order to maximize the social benefits of the plant, one needs to emphasis on the importance of social awareness programmes.*
-) *To penetrate small and marginal farmers more in-depth and to make biogas technology more affordable, long term financing to spread loan payments over a longer period of time, thereby reducing the size of each payment should be introduced.*
-) *To maintain the reliability and efficiency of biogas plant, concerned authorities should strictly monitor the construction and operation and maintenance works so that the set quality standards are followed and adhered.*