

ROLE OF BIOGAS IN EASING ECOLOGICAL STRESS

A STUDY FROM BUFFER ZONES OF SHUKLAPHANTA WILDLIFE RESERVE



A Dissertation Submitted to

**Central Department of Environmental Science
Institute of Science and Technology
Tribhuvan University
Kirtipur, Kathmandu
Nepal**

(For Partial Fulfillment of Master's of Science in Environmental Science)

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Letter of Recommendation

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Acknowledgement

I would like to express my sincere gratitude and appreciation to my supervisor Dr. Kedar Rijal, Associate Professor and Head of Department, Central Department of Environmental Science, Tribhuvan University, Kathmandu, Nepal and co-supervisor Mr. Ramesh Sapkota for their excellent encouragement during my research. Without their remarkable guidance, suggestions and comments, it would not have seen the light of the day.

I am highly thankful to Rufford Small Grants Foundation, UK and New Era Pvt. Ltd, Nepal for providing me financial support to conduct this research and AEPC, BSP-Nepal and Go Green Nepal for technical support. My sincere gratitude goes to the members of BZMC, CFUGs, school teachers and all the locals of the buffer zones of SWR. My special thanks go to Mr. Pramod Subedi and all other staffs of SCP/NTNC and my friends of Central Department of Environmental Science, Tribhuvan University, Kirtipur whose ever presence and needful help made this thesis a possible. Also, I should express my thankfulness to all who have directly or indirectly helped while undergoing the task of completing my thesis.

Last but not the least, I would like to thank my family whose constant reminder to complete this thesis helped it to come in time. Their strong support, constant encouragement and ever willing helping hands had really made me come to this far.

Thank you.

Sunil Thapa

December, 2011

Abstract

Promotion of alternative energy has been a major component of biodiversity conservation, as it reduces human pressure in the park and buffer zone forests for fuelwood collection. The study was carried out within the buffer zones of Shuklaphanta Wildlife Reserve to assess the role of biogas use in easing ecological. The information was collected using semi structured questionnaire, focus group discussion and key informant survey. Altogether 192 households were interviewed for the study, among which 96 households were having biogas plants. The average use of fuelwood among households without biogas was 3006.81 ± 338.50 kg/HH/year whereas with biogas was 1265.62 ± 191.53 kg/HH/year, which showed significant reduction ($Z= 43.86$, $p < 0.0001$) in fire wood consumption as source of energy. Furthermore, usage of kerosene was also significantly reduced by almost 39.81 % from 21.20 ± 1.56 lt/HH/year to 13.25 ± 1.17 lt/HH/year ($Z= 39.94$, $p < 0.0001$). The another factor, chemical fertilizer, analyzed as one of the indicators of ecological stress was more among households with biogas (144.08 ± 6.33 kg/ha/year) compared to households without biogas (127.82 ± 6.05 kg/ha/year). Similarly, from the estimated fuel wood reduction, the equivalent protection of forest area was calculated as 0.053 ha per plant per year. And the total number of trees saved per year was calculated as 1113.6. The average number of cattle (4.39) in households with biogas was more than households without biogas (3.75). There is high potential for installation of biogas plants in households without biogas, which would reduce the pressure on reserve forest exerted by such households through fuelwood collection. The results were comparable to various other studies and showed that the alternative energy technology, especially biogas, has been able to reduce ecological pressure in terms of reduction of fuelwood and kerosene consumption. So, there is a need to minimize use or supplement traditional energy supply systems installed in household level by alternative forms of renewable energy like biogas to further conserve ecology of buffer zones.

Key Words: biodiversity conservation, alternative energy, fuelwood, biogas, ecological stress

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List of Abbreviations

°C	:	Degree Celsius
AEPC	:	Alternative Energy Promotion Center
ADB	:	Asian Development Bank
BC	:	Before Christ
BSP	:	Biogas Support Program
BZMCs	:	Buffer Zone Management Committees
CDM	:	Clean Development Mechanism
CF	:	Community Forest
CFUGs	:	Community Forest Users Groups
CH ₄	:	Methane
CMS	:	Consolidated Management Services
CO ₂	:	Carbon Dioxide
Cu.m	:	Cubic Meter
DHM	:	Department of Hydrology and Meteorology
DNPWC	:	Department of National Parks and Wildlife Reserve
E	:	East
Equi.	:	Equivalent
FGD	:	Focus Group Discussion
GHGs	:	Green House Gases
GJ	:	Giga Joule
GMP	:	Global Warming Mitigation Potential
GON	:	Government of Nepal
GWP	:	Global Warming Potential
Ha	:	Hectare
HH	:	Household
ICIMOD	:	International Center of Integrated Mountain Development
ICS	:	Improved Cooking Stoves
IUCN	:	World Conservation Union
K	:	Potassium
Kg	:	Kilogram
Lt	:	Litre
m ³	:	Metercube

mm	:	Millimeter
M.Nagar	:	Mahendra Nagar
MoEST	:	Ministry of Environment, Science and Technology
MoF	:	Ministry of Finance
MoFSC	:	Ministry of Forest and Soil Conservation
MS	:	Microsoft
MW	:	Mega Watt
N	:	Nitrogen
N ₂ O	:	Nitrous Oxide
NTNC	:	National Trust for Nature Conservation
P	:	Phosphorous
PA	:	Protected Area
PCP	:	Participatory Conservation Program
RETs	:	Renewable Energy Technologies
RF	:	Reserve Forest
SWR	:	Shuklaphanta Wildlife Reserve
UN	:	United Nations
UNDP	:	United Nations Development Program
UNFCC	:	United Nations Framework for Climate Change
VDC	:	Village Development Committee
WECS	:	Water and Energy Commission Secretariat
WWF	:	World Wildlife Fund
Yr	:	Year