Technical Consultation on
Sustainable Small-Scale Livelihood-Oriented Bio-energy Initiatives

Small-Scale Biogas Scheme for Poverty Alleviation-Nepal Experiences

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Background

- Despite improvements in Nepal's economy in the 1990s, it remains one of the poorest countries in the world. Its main environmental challenge is on the sustainable use of natural resources.
- Domestic sector accounts for 95 % of Nepal's total energy use, mostly for cooking and heating. This demand is met through the combustion of firewood (75%) and agricultural residues and dung (20%). This high demand for firewood has depleted forestry reserves, resulting in problems such as soil degradation, erosion, landslides and flooding.
- Despite moves to promote community forestry management, the heavy dependence on fuel wood and increasing population growth continues to put pressure on local forest.

Background Conti…

- For the first two phases of the program, Biogas Support Program (BSP) I and II, program support was provided by Government of Nepal, the Netherlands Development Cooperation in Nepal (SNV/N) and the Netherlands Development Agency (NEDA). With the start of the third phase of the program (BSP III: 1997 - 2002), the German Government, through KFW. Now fourth Phase is running till 2012.

Legend:1.Yellow: 10-15Thou 2.Pink:5-10 thou/ 3.Red 2-5 thou 4. Green:500 -25 00 5:Blue :1-500

Nepal ‘s bio gas cover 69 districts out of 75

Objectives

- To develop a market oriented and commercially viable biogas industry in the country.
- To construct quality biogas plants.
- To ensure the continued operation of all biogas plants constructed under the program.
- To alleviate rural poverty linking through biogas.
- To research on biogas related topics and to develop improved methods and techniques.
- To assure that the slurry, a by-product of biogas plant, is brought to proper use.
- To develop the biogas sector and give it an institutional outlook.

Program Activities

- Promotion of biogas technologies
- Quality improvement and control
- Provision of subsides
- Technical and awareness training courses
- Participatory impact monitoring and evaluation
- Setting of standards and research
- Slurry utilization/diversification of uses.
- Institutional support

Achievements

From the inception of the program implemented by BSP in July 1992 to June 2009;

- Installed 190000 biogas plants.
- 96% of constructed plants are in operation and highly success.
- 60 private biogas companies have been strengthened.
- 15 biogas appliances manufacturing workshops are developed.
- Comprehensive quality standards and quality control system is developed by Government of Nepal.
- First Carbon Trade Project is being implemented as biogas program in Nepal.

Achievements Conti…

- BSP Nepal achieved ISO 9001-2000 certificate for its strong quality management system and subsidy administration.
- The BSP has receipt the two international awards.
- Ash den Award - 2005 amounted 30,000 sterling Pound and
- Global 100 Eco-Tech Award – 2005 amounted 100,000 Japanese Yen, for its outstanding contribution on improving health and welfare for rural Nepalese communities.

Socio-economic Implication of Biogas in Nepal

- Income and employment Generation
  1. Women were saved 3 hour/day for productive work. For instance Ms Kalawati Rijal of Dang using such time to make Incense sticks and Making Candle in her cooperative and earning NRs150-200 /day.
  2. 11,000 persons got employment.
- Social inclusiveness- A total 190000 Bio Gas plants were installed in all types of social group of Nepal.
- Value addition- Farmers were using 80% of bio-slurry as an organic compost fertilizer as a result overall income was increase by 50-100% (Being a organic Product).

Socio-economic Implication of Bio gas in Nepal Conti…

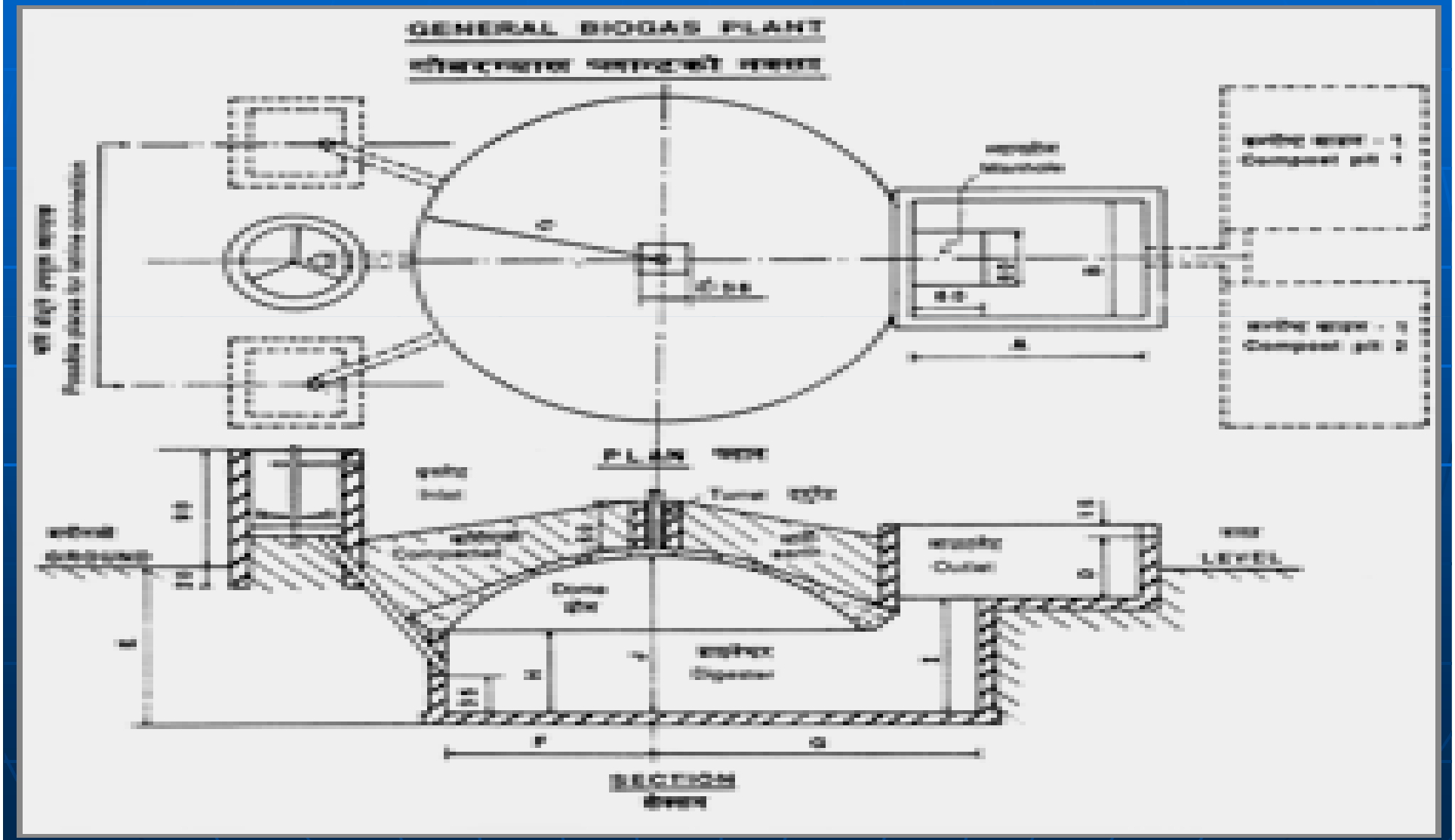
- Environment protection and income generation:
  1. As a whole in the country 465000 trees were protected/year which comes about 2.5 tree /HH were saved as a means of cooking alternatives .Which cost comes around NRs 2.32billions @ NRs 5 thousands/tree.
  2. 7 Mt/household anti greenhouse gas reduced.
  3. 123000 toilets are constructed (motivated for construction) and connected with biogas plants.

- Food security and sustainability-1.75 MT slurry produced for organic farming/HH which could increase productivity.

Socio-economic Implication of Bio gas in Nepal Conti…

- Access to credit-118 micro finance institutes are mobilized on biogas lending and financed around NRs 2 billions.
- Public good content- 980,000 persons are directly benefited from bio gas.
- Address genuine issues of Poverty i.e. 25 liter kerosene oil is saved/HH/year which economic value is equal to NRs 20.85 millions/year.
- Cross cutting Issues were address i.e. Gender - Social Inclusiveness - Environment

A Common Structure of Nepalese Biogas Plant (A Total life is estimated 20 Years)



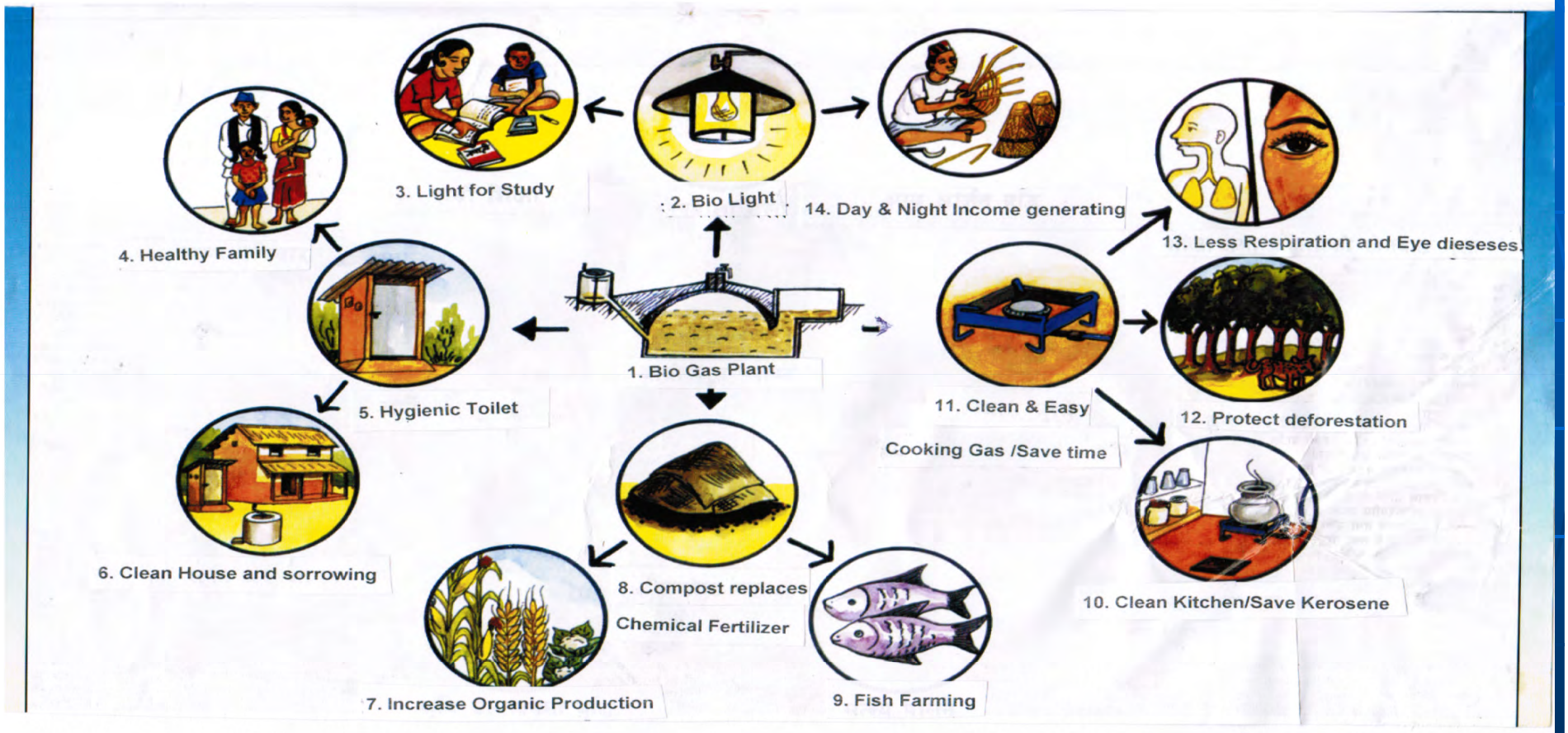
Quantity Necessary of Solid and Water in Different Ecological Zone

0 - < 2100 Masl			
Size in Sq. Meter	Daily required Solid quantity	Daily required water quantity	Hours/Stove
4	2.4 KG	30	3
6	36 KG	45	4.5
8	48 KG	60	6.00

2100-3000 Masl			
Size in Sq. Meter	Daily required Solid quantity	Daily required water quantity	Hours/Stove
4	2.4 KG	24 Liter	2.5
6	36 KG	36 Liter	3.5
8	48 KG	48 Liter	5.00

Source :NBPA –Nepal-2007

Multipurpose Uses of Bio Gas



A Comparative Study Reports of Nutrients Contents of (with and without) Link Toilet (Liquid Slurry, Ordinary Compost)

Major Nutrients (%)	Liquid Slurry		Compost Slurry		Ordinary Compost
	Without Link Toilet	With Link Toilet	Without Link Toilet	With Link Toilet	
Nitrogen	1.89	2.12	1.65	1.76	1.42
Phosphorus	1.84	1.27	1.19	0.89	1.02
Potash	1.85	1.42	0.61	0.52	1.71

Source (NBPA-2007-Nepal

Success Case #1. Healthy environment and income generation

Ghimire's family in Chapagaun VDC of Lalitpur District of Nepal has been using biogas stoves to cook two times meals every day- rice, lentils and vegetables for her family of seven, "I used to spend all day looking for firewood and cleaning pots and pans," says Ghimire. "Those days are now gone!" When her neighbors saw Ghimire had more time for other chores, they were encouraged to install their own biogas plants.

Success case # 2. Biogas can improve food security and productivity

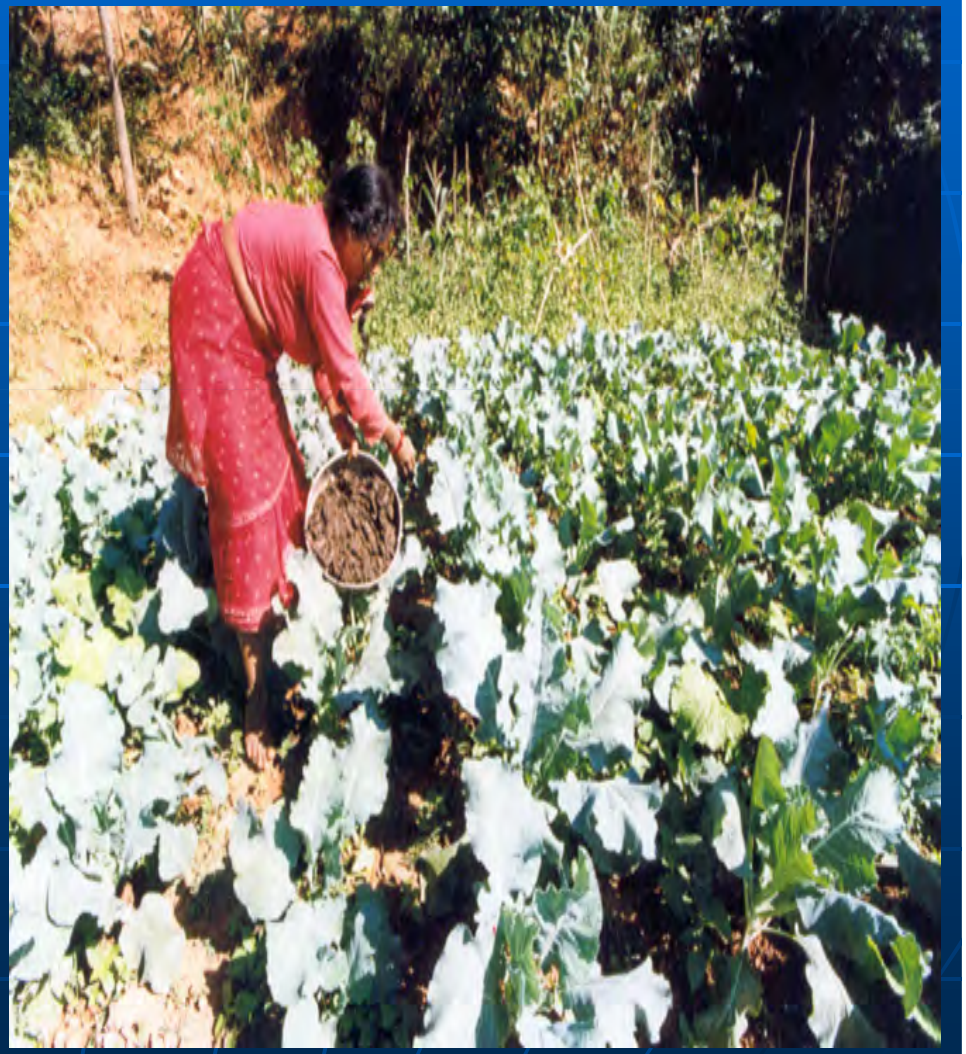
Mahottari, Nepal-Mr. Bharat Bhujel walks on his farm in Patu village of Gauribas VDC, Mahottari district, to observe his crops. "I'm glad I used the slurry, as the production is better this year," says Bhujel, explaining how the digested slurry, discharged from his biogas plant, had proved to be far more effective than the chemical fertilizers he constantly used in the past.

Success case # 3. Biogas can increase production and productivity

- Mr Ram Bista claims that since he started using slurry as fertilizer, it has even helped to fertilizer the infertile farms covered with rocks and sand. He now produces about 80 baskets of Potato in his small part of his farm, which he had considered to be useless for farming. Today, Bista not only has improved farm production but also has managed to save a lot of expenses due to the slurry. He used to buy nearly 120 kg of Urea in addition to DAP and other chemical fertilizers every year and spent over Rs 10,000 on all them. Today, all he needs is his effort to carry the slurry available for free and can use any amount to last for a year.

Success Case # 4. Biogas can address gender and social inclusiveness

Ms Manita Thapa ,She explained that in her village, the local men and women share their work equally to ensure that neither the male or female members are burdened with work. The local biogas users groups have already increased huge membership with an equal number of men and women.



SWOT Analysis
Farmer diversified their product to High Value Crop

Strength

1. Nine categories of Government subsidy to farmers.
2. Easily available loans from banks.
3. Operation and maintenance training.
4. Guarantees accompanying the plant and maintenance services.
5. Quality assurance.
6. 2500 Dairy Cooperative
7. Government policy to produce HVCs organic Product.

Off seasonal Cabbage farming using Slurry in Basantpur and SCR Training Session

(Every HH has Biogas at Musankhel Village)

Community Biogas at Birtamod Vegetable Wholesale Market

100% BG in Mushangkhel Village of Basantpur of Therhathum District

- Ms Nirmala Subedi of Mushankhel Village says since she has BG there were no affect of Eye burned dieses. and easy to cook.
- Since government has been announced several kinds of subsidy to BG there were competition to install Bg in Mushangkhel Village as a result 100% HH has installed BG.
- Deforestation were stop and Healthy and Hygienic environment were seen in the Village .It is quite inclusive. says Bir Bhadur Biswakarma (Untouched cast)
- Mr Chitra Karki says no Insect's larva ,Caterpillar, Red ants and other insects were seen in the soil slurry. Now our village is become enough food and soil fertility, productivity was increased.
- Further more Children's pass rate in School was increased by 50% and all HH has habit to used toilet.

Source: Mr. Karki Chandra Kantipur National Daily 3rd Oct, 2009

Weakness

❖But despite all the efforts, most of the biogas users have failed to make maximum use of the slurry due to several reasons. Among the main reasons were that the toilets were connected to most of the plants

❖So, the farmers usually dry up the slurry as it causes them difficulty to carry the wet form of slurry. While in liquid form, high contents of nutrients composed once the slurry is dried, the nutrient value reduces.

❖There are of course criticisms also that the biogas technology has not altogether reduced the work burden of the women, since they continue to do more work than their male counterparts in maintaining the biogas plants. Women are the ones who carry the cow dung to fill in the tanks. In addition, they still have to carry water, which is needed to process the biogas. In places where water is scarce, the women and girls still have to walk a long way and could consume a lot of their time. . and over produces gas may cause damage.

Opportunity

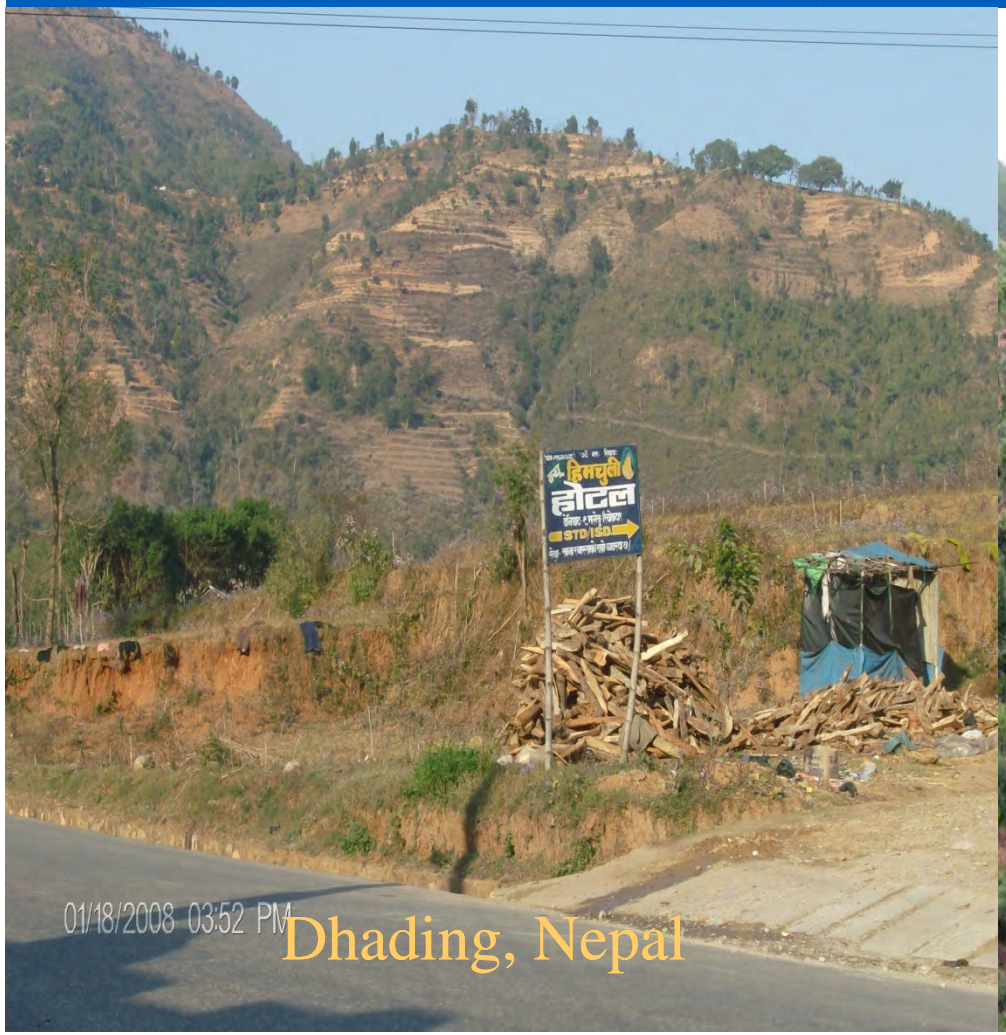
The technical potential of dung-based household biogas plants in Nepal is estimated to be 1.9 million out of which 600,000 is considered economically potential . Agriculture is the main occupation for about 86% of the population living in rural areas. Most of the rural farmers have one or more cow and buffalo. According to estimation, some 121,000 tons of dung is available per day from the cows and buffaloes. As playing with dung is culturally acceptable, the rural farmers are the most potential users of dung-fed biogas plants in Nepal.

Potential Commercial Use of Biogas in High Value Crop Produced in Nepal

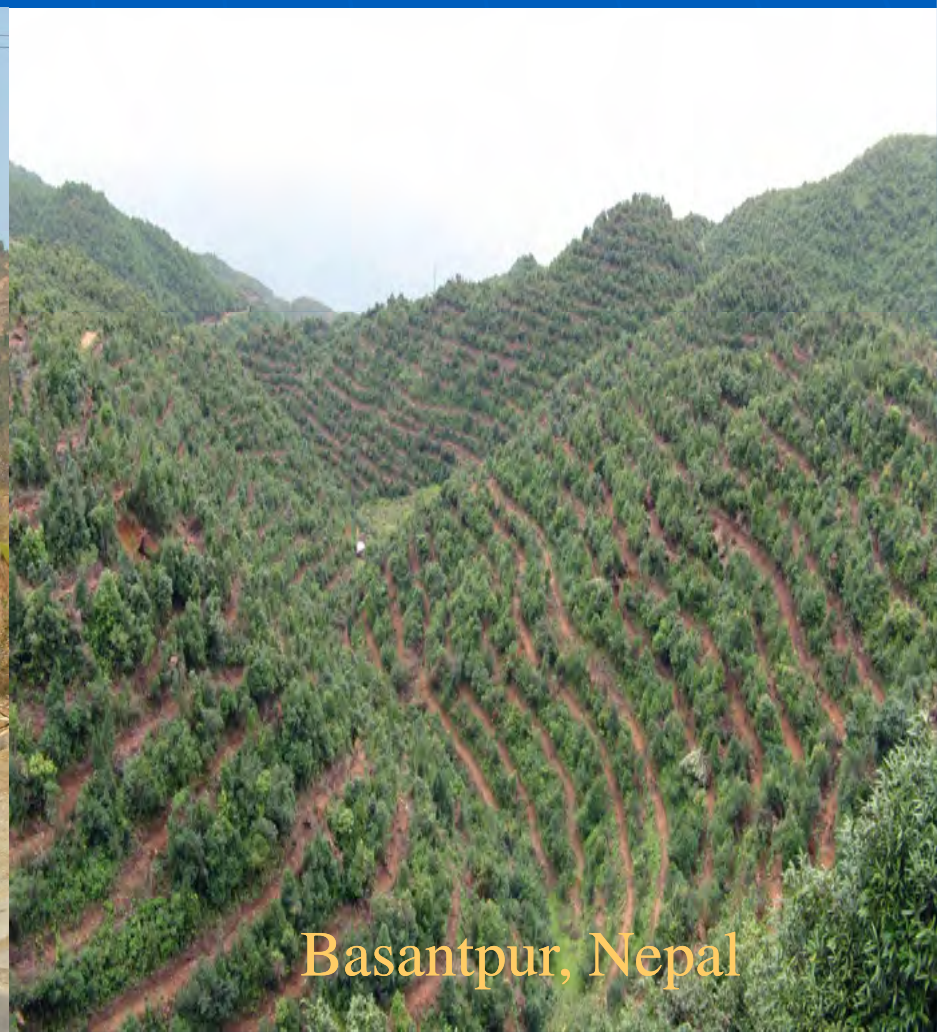
SN	Commodity	Household	Area in Ha.	Production in Mt.
1.	Tea	10000	16520	15168
2.	Cardamom	70000	13237	8000
3.	Ginger	200 Thou	5900	2 million
4.	Turmeric	100 Thou	2000	1 million
5.	Coffee	5000	1500	500

Source- DOA/CADP-FBC Ilam /ADB/Grant 006-Nepal -2009.

Comparative Picture of Biogas Slurry Used Farming and Desert Mountain in Same Topography



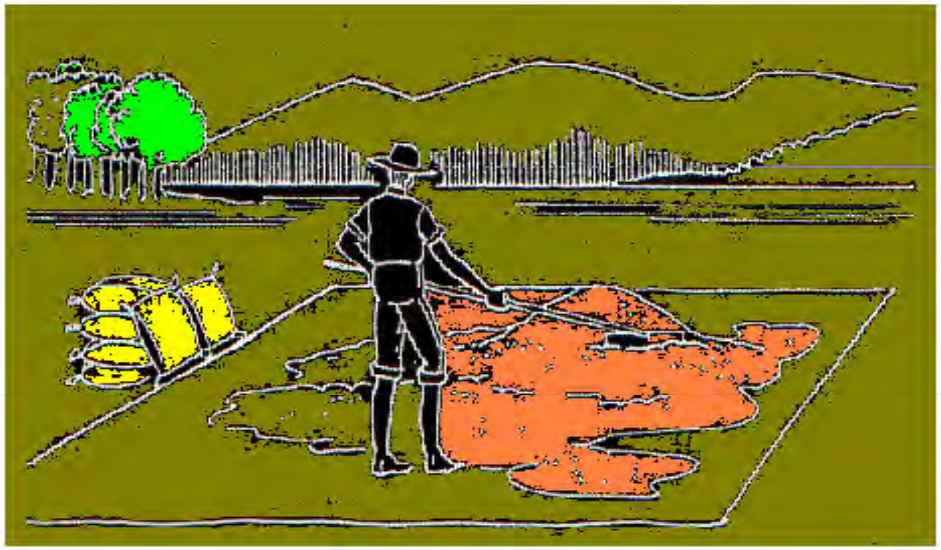
Dhading, Nepal

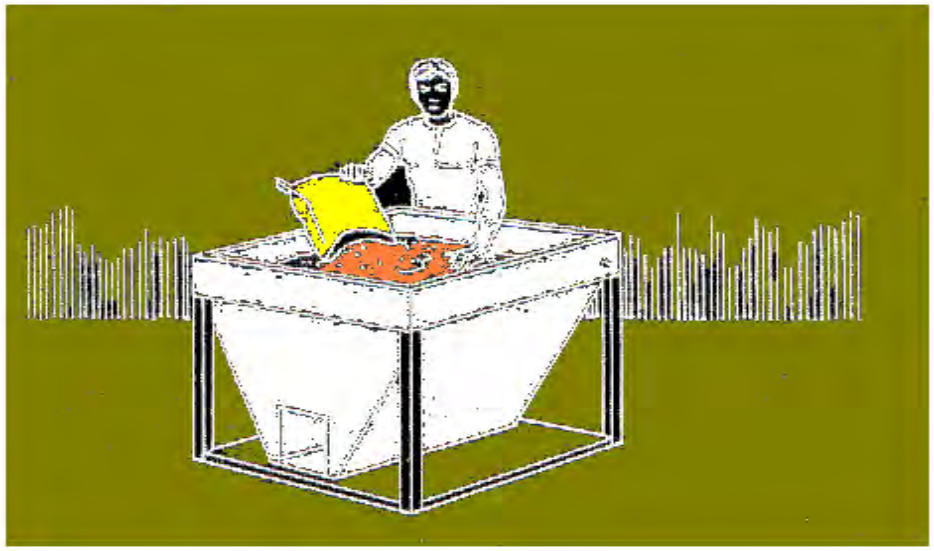


Basantpur, Nepal

Potential Use of BG to Dry Nepali Paper

Biogas Pilot Site to Dry HVC in Nepal





Threats

- Political instability /Conflict in the country effect the Government policy.
- Subsidy Policy
- More Dependent on donors Support
- Continue quality support from Private Company.

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Any Questions? Any Quarries ?

Thank You