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Biogas for climate justice: a story of change in Nepal

Switching from a wood-fuelled cooking fire to a biogas flame saves trees and time, reduces greenhouse gas emissions and prevents health problems. Community-based cooperatives in the Terai plains of Nepal are using carbon credits to fund micro-loans for families to install the technology.

Overview

The village of Madhuban lies in the fertile Terai plains of mid-western Nepal, an area covered with agricultural land and forest. As in many villages of Nepal, farming is the traditional occupation. In the past decade or so, villagers have started witnessing changing climatic patterns: the monsoons are later than usual and rainfall is more intense but lasts fewer days. With more climatic variability, Madhuban villagers have begun to see changes in crop productivity and have turned to their existing knowledge of climate variability to adapt.

The situation of Madhuban is typical in Nepal, one of the least developed countries in the world. With 80 per cent of the population¹ and 33 per cent of the GDP² relying on agriculture, climate change threatens food security and underscores problems of hunger and nutrition. The impacts on agriculture in a country where one-third of the population live below the poverty line³ have resulted in a cry for 'climate justice'. It is unjust that farmers in countries like Nepal, who have not contributed substantially to global climate change and its unprecedented risks, have to bear the brunt of the impacts.

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Carbon offset markets are one mechanism for redressing issues of climate justice. Here we present a case study from a WWF programme where communities used revenue from the sale of carbon credits to help finance the installation of biogas energy in Madhuban and other villages. Introducing biogas for household cooking is a pathway to social change. It can empower local people, especially

women farmers, and contributes to food security, sustainable management of forests and mitigation of greenhouse gas emissions.

Initiated after a local stakeholder consultation process, the WWF programme builds on Nepal's long-term biogas programme jointly delivered by the Biogas Sector Partnership Nepal (BSP Nepal), the Alternative Promotion Centre (AEPC), the Government of Nepal, and local NGOs. This alliance has helped Nepali villagers to install more than 200,000 household biogas units since the early 1990s. This case study highlights how community-managed finance can play an integral role in empowering communities to make their own decisions on resource allocation and sustainability, reducing dependence on the external 'project'.

Interventions and impacts

Initial consultation. First, the WWF biogas programme organised participatory processes locally and nationally with civil society and community-based organisations, youth groups, women's groups, government authorities and banks to:

- understand demand for biogas among different groups within local communities;
- seek approval from communities for local implementation, as well as government approval;
- decide on sites, methods for implementation, the monitoring and evaluation system and the financing mechanism for both subsidies and soft loans; and

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- establish a process to empower the local communities in decision making, project implementation, monitoring and governance.

With the green light from the communities and further approval from the government, the project was initiated in 2007 and began installing biogas in villages such as Madhuban. Each biogas unit is attached to a toilet and produces the gas from a mixture of human waste and cattle manure. In the first phase, 7,500 units were installed in 39 VDCs and 2 municipalities across the Terai Arc Landscape region. A VDC is a local administrative unit covering many rural villages.

Financing of biogas units. The cost of a biogas unit – currently about US\$500 – is prohibitive for most farmers. As a solution, the government provides 25 per cent of the cost as subsidy, and for the next 50 per cent the WWF project has helped to set up community-based micro-financing cooperatives that offer soft loans at 8 per cent interest (a rate decided by the communities), repayable in monthly instalments over two years. The loan funds come from sales of carbon credits from the biogas programme, together with other fundraising. And as loans are paid back the communities select new beneficiaries. The remaining 25 per cent of the cost is borne by the communities either in cash or in kind.

Box I. First glimpse of biogas benefits

The first biogas unit in Madhuban sparked a lot of curiosity among the villagers, especially with the women. Thagiya, one of the village's female farmers, left her chores one day to drop by Bikhu's house, where the biogas unit was installed, for a glimpse of the device. This demonstration unit was a starting point that spread biogas installation to other households. Biogas burnt with a blue flame, and Thagiya found it hypnotic. She was amazed at how quickly food cooked over the flame, and surprised at how clean and smoke-free the kitchen and house were. With her wood-fuelled stove she had been spending six-hours-a-day cooking. Firewood cooked food unmanageably, and the smoke emanating from it practically engulfed the entire house, leading to a lot of respiratory and eye illnesses for the family.

To top it all, Thagiya realised that she and her husband no longer had to spend countless hours in the forest in search of firewood to cook their next meal. The other villagers, too, spent several hours per day collecting firewood, mainly through illegal harvesting.



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Extra time saved from collecting wood for fuel is used for income generation

Empowerment through local financial management

management. To ensure good governance, local people hired by the cooperatives have been trained to account for, manage and audit the use of funds. Now the communities do not have to rely on private or government banks for these services. People who take loans are also introduced to an accounting process to make and manage credit payments. In addition, Nepal's Biogas Sector Partnership has worked with communities to coordinate quality control and monitoring of the biogas units, while also training community members and building their capacity.

Currently the cooperatives are managing more than US\$500,000 sustainably and will be able to invest the money in more biogas units. Communities sell shares in the cooperatives at around US\$1.3 per share to the local beneficiaries, thus creating a broad sense of ownership that prevents loan defaults.

Reaching scale. The sustainable community-based financing mechanism allows for up-scaling biogas installation in more villages. More than 20,000 new units are now being added, which, when added to those reached in the first phase, will bring biogas to a total of 81 VDCs.

Main achievements and challenges

Some 37,500 individuals now have access to clean, renewable energy from the first 7,500 plants installed by the WWF project. Local communities have gained the capacity to govern and manage the micro-financing mechanism, and through this



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sustainable financing model around 40 per cent of households have accessed loans to install biogas units and manage their micro-credit portfolio. In May 2010, the government recognised Madhuban as the third 'biogas model village' in Nepal – a demonstration village and field laboratory where at least 80 per cent of households have biogas units.

In concert with other development activities, biogas use has produced a cascade of additional benefits for families and villages involved in this project.

- A research study looked into the **time saved** on collecting fuelwood, cooking and washing dishes. With biogas, a female child saves up to 59 minutes a day, a female adult saves up to 123 minutes a day, a male child saves up to 25 minutes a day and a male adult saves up to 85 minutes a day.⁴ Spending less time on household chores, villagers find more time for kitchen gardening, commercial vegetable production and other income-generating activities. Diversified crops, sustainable income from agriculture and consumption of safe and nutritious foods has improved the **food security** of farm families in the biogas programme.
- Research results also show that the majority of women have been using the time saved by biogas to undertake various income-generating activities.⁴ Saved time can also be used to attend literacy classes, listen to the radio or watch television, read newspapers, do social work, play

or study. **Women are empowering themselves as a result.** They take part in village meetings and participate in informal women's savings groups that also provide loans for income-generating activities.

- Slurry from the biogas unit can be used as an **organic fertiliser** in agriculture. Slurry manure is a safe product that lets farmers easily cut 25 per cent of their costs for chemical fertilisers.
- **Health issues** associated with firewood were serious in the past. Rural households in Nepal tend to have air pollution in excess of World Health Organization standards.⁵ Farmers can now breathe better, thanks to the smoke-free kitchen. In a survey of users, 95 per cent said that using biogas has reduced indoor air pollution. Almost 76 per cent reported fewer eye infections, 23 per cent noted a drastic reduction in respiratory diseases, 47 per cent reported fewer coughs and 36 per cent reported fewer fire-related injuries.⁴ Although there might be several factors causing a decline in health-related problems, reduced indoor pollution has a significant effect.
- Construction of toilets linked to each household biogas unit has given villagers better **sanitation facilities**, which mean fewer chances of illness. Open defecation was a key health issue in several villages.

The major weakness of the biogas programme

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is affordability. The government subsidy does not cover most of the up-front cost of biogas installation, so the poorest farmers who do not have enough monthly income to pay back soft loans are currently excluded from the scheme. In addition, a family must have land on which to install the unit, and at least one to two cattle to provide the manure input.

In the area of capacity building, helping communities understand the dynamics and technical aspects of carbon markets as a financing source still remains a challenge, but there is a willingness to learn. Advocating for attaching the biogas unit to a toilet was also not an easy task due to social taboos on the use of toilets; however, with time some people appreciated that better sanitation led to better health and lower health-related expenditures. A final challenge is that the technology requires a hot and humid agro-climate and hence its application in the uplands of Nepal is limited.

Lessons

Empowerment and sustainability. A bottom-up approach that empowers local communities to make their own decisions and control finance and outcomes is key to any programme's long-term popularity and success.

Affordability and inclusiveness. Technologies like biogas offer manifold benefits, but the overall impact at community level is limited by the high cost. To spread the rewards and prevent conflict, programme designs need to plan strategies to help cover some costs and ensure inclusiveness.

Carbon finance and climate justice. This project offers an example of how carbon financing can be used for greater climate justice. If carbon-financed projects are scaled up in low-income countries, the funds could help improve the livelihoods of poor communities.



Biogas is used for cooking in place of wood

Notes

- ¹ Shrestha, R, Neupane, R.K., Adhikari N.P. 2011. *Status and future prospects of pulses in Nepal*. Paper presented at Regional Workshop on Pulse Production held at Nepal Agricultural Research Council (NARC), Kathmandu, Nepal from 24-25 October 2011 ■² World Bank. 2011. *Nepal Economic Update*. ■³ Intensive Study and Research Centre. 2010. *District and VDC Profile of Nepal*. Intensive Study and Research Centre, Kathmandu ■⁴ Alternative Energy Promotion Centre and Nepal Environment and Scientific Services 2010. *Annual Biogas User's Survey*. Alternative Energy Promotion Centre, Kathmandu. ■⁵ Ministry of Population and Environment, His Majesty's Government of Nepal. 2003. *State of the Environment Nepal, 2001*.

