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LESSONS LEARNED



Biogas Support Program in Nepal

DEVELOPMENT CHALLENGE

In late 2006, Nepal was recovering from a decade-long conflict and was one of the poorest countries in the world. About 82 percent of its population of around 26 million lived in rural areas and depended almost exclusively on agriculture. Rural households, which accounted for about 90% of total energy use in Nepal, lacked access to modern energy sources and used biomass (a mixture of wood, dung, and agricultural residue) for cooking and heating. The demand for firewood was identified as a contributor to deforestation and indoor air pollution, with average smoke levels in kitchens using biomass fuels about three times higher than levels in those using cleaner fuels (kerosene, liquefied petroleum gas, and biogas). The 10th Five Year Plan of Nepal (2002–2007) outlined the need for strong expansion in renewable energy, especially in rural areas. Under this plan, a long-term program for household biogas plants—the Biogas Support Program IV (BSP IV)—was being implemented using the public-private partnership approach. The Global Partnership on Output-Based Aid (GPOBA) Biogas Support Program in Nepal built on the foundation established by BSP IV.

THE PROJECT AND ITS PARTNERS

In 2006, the government of Nepal requested support from the World Bank and GPOBA to promote biogas plants in rural areas and enhance the sustainability of the energy sector. A GPOBA grant was approved with the objective of increasing the number of households sustainably using biogas plants under the government's existing BSP IV program. Consistent with the output-based aid (OBA) approach, the private sector service providers bore the operational risks—identifying new eligible customers, delivering the biogas plants, and collecting user contributions set at 60–70 percent of costs. Service providers were reimbursed

RESULTS ACHIEVED

The project resulted in the installation of 27,139 biogas plants ('outputs') in low-income households, including more than 16,000 disadvantaged families (Dalits, Janajatis). This figure represents an achievement of 98 percent of the revised target of 27,593. More than 90 percent of the plants were operational at the end of the project. The project effectively targeted low-income beneficiaries by using the remote location of households as the main targeting criteria, combined with a self-targeting method whereby poorer households, which typically own fewer bovines, received higher levels of program subsidy as a percentage of total plant cost. Plant cost varied according to plant size and site location, ranging from \$475–\$3,400 per plant. Only farmers with the financial means to run a biogas plant could participate, and these participants reported positive outcomes. When surveyed, the farmers said that the plants enabled them to save money on energy. They also consistently reported reductions in indoor air pollution and improvements in sanitation. By making the independent verification reports available to all stakeholders, the project promoted transparency about progress and allowed effective course correction, thereby strengthening quality control of the overall Biogas Support Program partnership. Upon successful completion of the project, the Government of Nepal indicated its willingness to use OBA in the renewable energy sector. It requested further support from GPOBA to assess the feasibility of such scale-up through the Central Renewable Energy Fund (CREF) of the National Rural and Renewable Energy Program (NRREP). The government has been able to mobilize substantial resources from development partners through NRREP, which is now implementing the domestic biogas program. Some lessons from the GPOBA-funded project are already being used to design results-oriented approaches for a wider range of renewable technologies.



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the output-based subsidies—the remaining 30–40 percent of costs—upon annual quantitative and qualitative verification of the outputs by an independent verification agent. These companies were responsible for maintenance of the plants for three years after construction. The project was implemented by the Alternative Energy Promotion Center (AEPIC) and the Biogas Sector Partnership Nepal (BSP-N), an NGO that provided training to biogas companies and users and carried out verification of biogas plant installation for AEPIC. The Netherlands' Directorate-General for International Cooperation, Kreditanstalt für Wiederaufbau (KfW), and Stichting Nederlandse Vrijwilligers (SNV) also supported specific technical aspects of the project. One of the most innovative features of this project was the concomitant use of GPOBA and the Community Development Carbon Fund (CDCF), another World Bank-administered trust fund that could purchase Emission Reductions (ERs) resulting from use of household biogas. One finalized transaction (Nepal Biogas Program) helped approve the sale of one million tons of ERs to the CDCF.

Lessons Learned

- 1 Aligning the OBA intervention with a national program capitalized on experience and leveraged coordination; this proved particularly useful in a fragile context.** The OBA project built on earlier phases of the government's biogas program, a public-civil society-private partnership implemented by the NGO, SNV, which used OBA features. Relying on the existing institutional set-up allowed the project to quickly and effectively mobilize all local stakeholders. In particular, the project relied on the same local private companies that for over a decade had stepped in to bridge the gaps in funding and implementation capacity resulting from the weak public sector, and had proven ability to operate in the volatile political environment.
- 2 Sanitation initiatives can harness the potential for co-financing biogas plants.** Since the biogas plant design included capability to link to latrines, most customers also built toilets to link to the plants, thereby benefiting from financing provided by international, national and local sanitation programs implemented at the same time. Customers thus saved themselves the cost of constructing a separate pit for the toilet and could use the money saved to partially finance the biogas plant—a savings that increased the uptake of biogas. This complementarity shows that biogas plants not only result in savings in household energy costs and reduced

adverse health effects from indoor air pollution, but can also provide improved sanitation. It underlines the need, in Nepal and other countries, to establish closer collaboration mechanisms between toilet construction and biogas promotion programs.

- 3 Using geographic criteria is not sufficient to achieve biogas penetration in remote areas.** The project progressed slowly in the initial years. On the demand side, despite significant promotional efforts by AEPIC and the biogas companies, user uptake was slow, especially in the poorer and most remote districts. On the supply side, in targeted districts where distributors were already present and had made investments in building local delivery capacity, and where there was already client demand, distributors performed well. In those districts where they had no supply network, and where there were steep increases in the costs of materials and after-sales service due to relative inaccessibility, their results were far below potential. One key measure taken was the decision by the government in 2010 to revise the official subsidy structure to address the cost increases. It requested that the World Bank increase the subsidy amount per plant, and lower the number of target households to stay within the grant amount approved for the project.
- 4 Innovative technical solutions and further access to credit can increase both penetration in remote areas and user uptake.** By design the project required customers to pay nearly two-thirds of the cost of the biogas plant. Nevertheless, the demand-side issues noted above show that even higher biogas plant sales could be achieved using consumer financing through banks and other financial institutions. To this end, it would be useful to have a comprehensive picture of the both demand and supply needs of credit in the biogas sector in the country, including sources of credit, credit flows, delivery mechanism, reach, and bottlenecks for households to access credit. Currently, the available biogas plant model is very expensive to install and maintain in the hilly villages. The development of alternative designs and materials will bring costs down to make plants more affordable to potential users in these locations. But given the high cost of acquiring customers in remote districts, a key consideration may be the need for greater financial incentives, along with greater support for promotional activities to the private companies working in these areas. These issues are the topic of an ongoing assessment by the International Finance Corporation (IFC), which has joined with GPOBA to support private sector approaches in Nepal's renewable energy sector.