

Module 9 /// Innovative Activity Profile 4

Philippines: Community-based Micro-Hydro Project in Kalinga¹

One rural infrastructure project that has met with success in incorporating gender-sensitive practices is a project in the Philippines to provide off-grid power to several villages through the construction of a small-scale hydroelectric (micro-hydro) facility. The objective of the project was to provide electricity to the two villages of Tulgao and the adjacent village of Danamao, in Kalinga municipality, north of the Cordillera Mountain Region in northern Luzon. These villages were chosen for the project because of their remoteness from the national electricity grid and from the area of intervention of rural electrification cooperatives. Two rural electrification cooperatives, MOPRECO and KAELCO, were potential candidates to electrify the villages, but the closest points of their respective grid infrastructure were 30 and 70 kilometers away. In 1996, they deemed it would not be possible to electrify these villages for another 15 to 20 years. MOPRECO and KAELCO estimated that, given the mountainous topography of the region, the installation costs for the transmission lines would be quite high (about 450,000 Philippine pesos per kilometer), and therefore quite difficult to finance.

What is innovative?

Women participated to a large extent or fully in all phases of the project, including planning, construction, and management. As a result, women shared in many of the benefits brought about by the environmentally friendly project.

Before the installation of the micro-hydro plant, energy consumption in the communities was

¹ This Innovative Activity Profile was prepared by Dominique Lallement (World Bank), and reviewed by Catherine Ragasa (Consultant) and Eija Pehu (World Bank). This IAP was largely drawn from Lumampao et al. (2006).

primarily for lighting and cooking, with some residents using battery-powered flashlights and transistor radios. Only one in five households had a radio. There were typically one or two kerosene lamps per household, but fewer than 40 percent of the households used kerosene regularly due to its high cost and the difficulty of transporting it from the markets. On average, households spent 117 pesos per month: 38 pesos on kerosene, and 79 pesos on the local fuelwood, *saleng*.² In these predominantly rice-growing communities, all the postharvest activities were performed manually by women and children. Women's role in decision making was largely confined to household matters and school and church concerns, while men's decision making was more in the political domain.

The project consisted of two main parts. The first was the construction of a 33-kilowatt micro-hydro plant on Bunog Creek by diverting the flow to a site where it drops 40 meters to the turbine; the powerhouse is approximately 1.5 kilometers from Tulgao and 1.2 kilometers from Danamao. The second was the planting of pine seedlings to protect the watershed. The total investment was estimated at 2.6 million pesos, and the community's contribution of labor and materials was valued at 300,000 pesos. The project was initiated by the Episcopal Diocese of the Northern Philippines (EDNP) and funded by KEEP³ of Japan. SIBAT⁴, a local NGO, provided the technical assistance. The surveys for the micro-hydro project were done in 1997, the feasibility studies in 1998, and the construction and commissioning of the plant and distribution system in 1999.

The project provides enough electricity for lighting and small appliances in over 300 households, as well as community buildings such as the church, school, and health clinic. Although the capacity of the system is 30 kilowatts, only 4 to 5 kilowatts are currently being used. Two rice mills

² *Saleng* is the Filipino name for *Pinus insularis*.

³ The Kiyosato Educational Experiment Project (KEEP) is an organization dedicated to education, outreach, and service to others.

⁴ The Sibol ng Agham at Teknolohiya (SIBAT, Inc.), or Wellspring of Science and Technology, is an NGO engaged in the promotion and development of appropriate technology (AT) in the Philippines since 1984.

were installed in 2002 followed by a sugarcane press in 2003.

Gender Strategy

Project planning. A needs assessment yielded the community's desire for better lighting, with emphasis on the high cost of kerosene and the dirty soot it produced in the houses. Power for a rice mill was also identified as a valuable option for reducing the workload of women and children. Both women and men consulted at the planning stage, with the particularity that although the women had not been present during the planning meetings, the men had consulted with their wives at home and brought their views into the discussions.⁵ The women expected that the project would extend their available hours for household chores, and the men thought they would have more time to repair farm tools and the children would have better lighting for studying. The community was looking forward to the project enabling families to be together while listening to their favorite radio or TV shows.

Project construction. Despite the traditionally predominant role of men in waterworks, women contributed substantially to the project during the construction phase. Men and women shared the work, with men doing the heaviest tasks and women hauling sand from the river, fetching water, and preparing food for the workers. Widows, in particular, spent long hours in the work camp. If the husbands were away, wives participated in the construction work.

Project management. The micro-hydro project is managed by a board of directors, and there is a manager responsible for day-to-day operations. The board of directors is composed of three women, all well educated, and four men. One woman is a teacher, the second a municipal employee, and the third is the local midwife. The manager is the pastor of the Episcopal church. The project has a staff consisting of one cashier/bookkeeper, three fee collectors, and two operators. Men are involved in the technical troubleshooting and repairs, while the women take care of the administrative matters (bookkeeping and fee collection).

⁵ Findings of the evaluation team through focus groups.

Income-earning opportunities. Lighting was seen as providing an opportunity for increased productivity on women's household chores (e.g., preparation of sweet potatoes) and longer work hours for both women and men, respectively involved in layering abaca twine and basket weaving. The rice mills and sugarcane press were specifically intended to save women's time and drudgery and generate additional income-earning opportunities.

Benefits and Impacts

Extensive benefits for the whole community. The output from the micro-hydro plant is primarily used for lighting and some small appliances. It is also used for processing farm produce with a rice mill and sugarcane press, blacksmithing, and making farm implements. The system generally operates from 4:40 p.m. to 7 a.m. (based on an agreed policy), and during daytime if needed for the school or the clinic. Each household pays a monthly tariff of 25 pesos for its first 10-watt lightbulb and an additional 5 pesos for each extra bulb. For appliances, a household pays an additional 30 pesos per month per appliance. This is less than the previous monthly expenditures of the families for kerosene lighting, and they have a new service: power. The micro-hydro project was able to reach around 80 percent of the population of the three communities (the number of households that benefited from the project changes depending on the extent of migration of some families to other places). Most of the households have one or two lightbulbs in their houses linked to the system. About 10 percent of families invested in appliances (rice cookers and blenders for the kitchen; televisions and video/CD players; a few washing and sewing machines). Aside from personal entertainment and information, the video and CD players and televisions are used as additional sources of income, in particular for children to watch videos. Payment is one log or piece of wood from a pine tree (to be used for fuel) per show. The rice mill is community owned. The earnings from the rice mill are divided in three equal parts, going to the operators, the church, and the micro-hydro project itself, as a way to pay for the electricity. Another benefit to the community is the increase in the number of retail stores, from 10 to 15,

providing additional income to both men and women.

Women's social empowerment. The participation of women on the board of the micro-hydro project is not typical of projects in that area. It probably reflects the predominant role of the church in the project, and the active role of women in the church. This is an interesting extension on how empowerment gained through an informal community activity can extend into an economic activity that benefits the whole community.

Women's economic empowerment and increased household incomes. The project is a good illustration of the economic value of time, in particular for women. A major gain for women in the community is the time saved on rice milling, about one hour a day, and other household chores. The value of time is reflected in their willingness to pay for milling. The charge for milling is 15 pesos per 18 kilograms if the client has provided labor or materials during the construction of the rice mill; if no such input was made, the milling charge is 20 pesos per 18 kilograms. The time saved by milling and more-productive household chores is "reinvested" into farmwork or other economic activities. With electricity, women can work early in the morning to prepare food. One woman started a tailoring business. With the availability of electricity, she purchased a high-speed sewing machine in 2002. She does tailoring jobs for customers from the community and nearby villages, generating an average monthly income of 150 pesos.

Men's activities and incomes have also increased with the availability of electricity. Men weave baskets at night. Producing five more baskets a month generates additional household incomes of 750 to 1000 pesos. The availability of some savings and increased incomes, no matter how small, improves the sense of stability for cash-strapped households, especially for women, who are mainly in charge of budgeting and covering daily expenses.

Sociopolitical benefits. The two predominant tribes in these villages, the Tulgao and Danamao, had a tradition of using violence to resolve their conflicts. Since the establishment of the micro-hydro project, all conflicts are now solved through peaceful means. Electrification also permits

meetings to be held in the evening and community festivities to be extended. The project is deemed to have improved socialization and increased the participation of women in community affairs, largely from the time saved in household chores.

Lessons Learned and Issues for Wider Applicability

Despite the overall success of the project, some problematic issues remain, including the following three points:

Women were left out of technical training. Women have not participated in any of the technical training provided for operators or other technical activities related to repairs and maintenance. The lack of involvement in the technical matters limits their knowledge of the technical workings of the micro-hydro project.

Income distribution disparities in the community. The purchasing of appliances highlighted the wide range of economic capacities of families within the community. Most of the families able to afford appliances had income from outside employment, such as teachers and government employees. These families benefit most from such rural electrification and also gain the possibility of earning extra income from these appliances, further widening the income gap with the poorer members of the community. An option to offset these issues would be to provide microcredit for the purchase of such equipment for income-earning opportunities.

Video programming. The commercial use of video players to show films has at times affected children negatively, exposing them to adult movies, onscreen violence, and foul language, which they try to imitate. Some children have resorted to stealing to get the entrance fee. These problems were being discussed in community meetings.

The following items are the most important lessons to be drawn from the project:

- **Including gender equity within the project planning and management** was the single most important factor that enabled the inclusion of economic activities that would benefit women and that fostered fairly

gender-equitable participation in and benefits from the project.

- **Including women in the technical aspects** of the project can increase their empowerment.
- **Gender-sensitive NGOs** can be effective agent of change.
- **An infrastructure project** can be a catalyst of community mobilization and peacebuilding.

Reference

Lumampao, F., V. Lopez, and L. Go (APPROTECH Asia). 2006. "Gender and Renewable Energy in the Philippines: A Community-based Micro-hydro Project in Kalinga and a PV-Battery Charging Station in Southern Leyte." The report was an output of the Collaborative Research Group on Gender and Energy (CRGGE) with support from the ENERGIA International Network on Gender and Sustainable Energy and the United Kingdom Department of International Development (DFID) under KaR research project R8346 on "Gender as a Key Variable in Energy Interventions. For more information see <http://www.energia.org/resources/dfidstudy.html>.