

## Water Power for Rice Milling, Thailand

### Themes

- ★ Renewable energy
- \* Linkages with other environmental goals
- \* Innovative technology applications
- ❖ Technical capacity development

### PROJECT DATA

**Project Name:** Rice Milling by Water Power for Sustainable Development

**Implementing Organization:** Karen Conservation Group (CBO)

**SGP contribution:** \$10,916

**Start Date:** February 2002

### ENERGY OVERVIEW

**Project Location:** 3 villages in Doi Inthanon National Park, Chomthong District, Chiangmai Province, Thailand

**Energy Resource:** hydraulic power

**Technology:** water powered rice mill

**Application:** milling rice

**Sector:** commercial

**Total capacity:** 300 kg of rice milled in 8 hours

**Number of People Served:** 3 villages, 200 families

### BACKGROUND

In the northern region of Thailand, 200 families live in three villages in a very remote area in the mountainous Doi Inthanon National Park. These mountains are a critical watershed for much of the northern area of Thailand. The three villages are composed of people from the "Karen" minority group, and primarily speak their own dialect, Kareni. They are permitted to live in the park only under strict conditions regarding the impact they may have on their surroundings. The main economic activity is growing rice, but this requires milling services. The nearest mill is 27 km away, a trip that requires significant time and expense, so the community has been relying on manual milling when the trip is not possible.

### PROJECT DESCRIPTION

#### Overview

The project has helped this remote, minority community to install a water powered rice mill. The community has established fees for milling services, which provides a financial return to members of a rice-milling cooperative and also supports a revolving fund for indigent community members.

#### Implementation

The development of this project illustrates the benefits of prior consultation and site visits in the project design process. Initially, the community group had submitted a proposal to the Northern Thailand Research Fund to install a hydroelectric or



**Water power for rice milling (Thailand).**

SGP Thailand National Coordinator Boonsin Sreesangkom

diesel-powered mill in the area. Following this, the SGP National Coordinator in Thailand, Thailand Research Fund staff, and interested university researchers made a site visit in March 2001 to examine the site and assess feasibility. The experience of another SGP-funded project was considered during the site visit. That project developed a manually-powered rice mill which allowed 10 men working alternately over a period of 8 hours to mill 350 kg of rice. Instead of the hydroelectric or diesel options, which would require more labor or might create a greater disturbance in this national park area, the site visit sparked the idea of using the mechanical energy from falling water to power the mill.

The mill is operated by the three community members who have been trained to run it. A March 2003 site visit indicated that additional people should be trained in order to increase the output of the mill. Certain community members involved in the project have organized a cooperative to manage the mill. It has been recently agreed that members participating in the cooperative would receive 30% of the revenues of the mill, and the rest would be placed into a revolving fund to be used to meet the needs of indigent community members. Rice husk is a by-product of the milling process, and will be used as a fertilizer for rice paddies. In addition, there are plans to use the rice husk in cooking to reduce firewood consumption, as has been demonstrated in another SGP project in Thailand. There is also interest in the communities in building a micro-hydro power system to supply electricity for village needs.

#### Technology

The rice mill is powered by mechanical energy from falling water, and can process 300 kg of rice in 8 hours with minimal physical labor. According to the report of a March 2003 site visit, the mill was working correctly, but could produce even more if more community members were trained to use it.

#### Environmental Benefits

**Global:** To mill 300 kg of rice in 8 hours, an estimated 3.3 liters of diesel would be required. Thus, by using mechanical energy

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instead of diesel, the greenhouse gases resulting from burning that amount of diesel fuel are avoided each day.

**Local:** By avoiding the use of diesel fuel, this water-powered rice mill avoids the emission of local pollutants from diesel-burning engines.

### Livelihood Benefits

**Income generation:** The project increases income generation in this community, which otherwise had great difficulty accessing a rice mill. Indigent community members also benefit from the revolving fund, to which 30% of the payments for milling services are paid. Rice husk is also used to improve rice paddy fertility, which may improve rice crop yields.

**Reduced drudgery:** The presence of the rice mill eliminates the drudgery involved in milling rice manually and the need to travel 27 km for mechanized milling.

### Beneficiaries

The project beneficiaries are the 200 households living in the three villages in this area.

### Capacity Development

The project has built the capacity of village members to operate the rice mill and manage a cooperative. Increasing the number of local people with the skill to run the mill was identified as a priority at the evaluation of the project in March 2003.

### Partners

Several have been important to the success of this project:

**SGP:** SGP's participation in an initial field visit to assess the feasibility of the project helped shape the eventual outcome. Instead of pursuing an hydro-power or diesel-powered mill, the experience of another SGP-funded project that used a manually-powered rice mill helped generate the idea to use falling water to power the mill directly.

**Thailand Research Fund:** This entity originally identified these remote communities as sites for work, and also helped to fund the project.

**Chiangmai University:** Members of the Department of Mechanical Engineering participated in the development of this project, and in particular helped to come up with the design for the water powered rice mill. Following the initial site visits, members of the university made a more thorough assessment before proceeding with the proposal to SGP for the project funds.

## LESSONS LEARNED

### Environmental Management

This project illustrates the potential use of hydraulic power to meet development needs. Capturing the mechanical power in

falling water can be a very efficient way to produce energy for agro-processing or other purposes. Particularly in a protected area, this technology requires a minimal intervention to achieve results.

### Barrier Removal

**Technical:** This project helped a remote, minority community access power that makes a great difference in their livelihood capacity. For this community, technical barriers to the introduction of renewable energy alternatives were reduced. This project does not appear to reduce them in a broader sense, although the university's involvement may help transfer lessons from the implementation of this technology in this community to other locations where hydraulic power should be considered as an option for power generation.

**Information/Knowledge:** This project illustrates how SGP projects can contribute to meeting the energy needs of some of the most remote and isolated communities. Most people living here do not speak or write Thai, and all community visits and the project evaluation had to be translated in Kareni for most community members. During the evaluation, one relatively well-educated community member explained the phenomenon of global warming to the others in the Kareni dialect.

### Scaling Up

If the community's experience with hydraulic power is documented by the Chiangmai University staff members and by SGP, through them lessons from this community may be transferred to others seeking to implement other similar small-scale efforts. In an effort to share experiences, SGP invited other current SGP grantees to the project evaluation in March 2003. After all, this project itself benefited from another SGP project's experience elsewhere. In this sense, "scaling up" is occurring through each of these small community efforts.

## SOURCES CONSULTED

- Project Record THA-01-12, SGP Project Database, <http://www.undp.org/sgp>
- Poonsin Sreesangkom, national coordinator; GEF Small Grants Programme Thailand. "Fact Finding Trip: Rice Milling by Water Power." Semi-Annual Report, January-June 2001.
- Poonsin Sreesangkom, national coordinator; GEF Small Grants Programme Thailand. "Rice Milling by Water Power for Sustainable Development." Project Site Visit Report/Evaluation.