

Opening Productive Avenues for Rural Women through Improved Water Mills in Nepal

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Mountain women in rural areas of Nepal spend considerable amounts of time managing their daily energy requirements. On average, they spend about four or five hours daily collecting fuelwood and on agro-processing activities. Their basic sources of fuelwood are the nearby forests and their own farmsteads. For agro-processing, they generally use hand-operated stone grinders (for maize, millet and wheat grinding) and either hand or hand and foot operated devices for paddy hulling (de-husking). If there is a traditional water mill (*ghatta*) nearby, they go there to grind the grain but continue with their manually operated devices for paddy hulling. This all adds to the drudgery and hardship of women.

Rural communities in Nepal have been using traditional water mills to grind grain for a considerable period. Formerly, water mills were owned by a community, or a group of people, who jointly bore the cost of its construction and maintenance. Today, most *ghattas* are privately owned and run as business enterprises levying a fee for the services provided. In most cases, the mill owners themselves operate the *ghattas*, but sometimes they hire operators to run the mills on a contractual basis.

There are estimated to be over 25,000 of these water mills operating throughout Nepal. They are typically low efficiency devices and are proving incapable of meeting the increasing processing needs of the communities. The users, generally women, have to wait for long periods, often 2-3 hours, for their turn with the mill. On top of this, they continue to spend about 2-3 hours every two days at home busy with paddy hulling. In response to the demand for milling, diesel mills are entering the rural areas and replacing the local *ghattas*. These diesel mills have increased the dependency of the villages on imported machinery and diesel oil, thus reducing their self-reliance. They also pollute the environment through the emission of exhaust fumes.

Towards Water Mill Improvements

Over the years, there has been a growing realisation of the need for more efficient agro-processing technologies, ones that would reduce the hard labour and drudgery of women involved with food processing. The Centre for Rural Technology, Nepal (CRT/N), a non-governmental organisation established in 1989 to promote appropriate rural technologies, has been involved in initiatives to improve the traditional water mills in Nepal and to help develop efficient energy services to support grain millers as well as local communities, especially women, since the early 1990s. Initially, these activities were carried out under the "Promotion and Dissemination of Improved Water Mills in Nepal" project, initially as a pilot from 1991-1993 and then with a follow-up from 1996-1999, supported by German Technical Cooperation, Nepal (GTZ/N).

It was realised that the traditional water mills could be improved by replacing the wooden runner blades and shaft with metal alternatives that would increase both efficiency and durability. The wooden parts are very susceptible to wear and require regular maintenance or replacement. Improved mills with metal runners last longer and also function more efficiently due to an improved design. With the

exception of the runner, all the traditional components of the water mill, such as the grindstone, water intake and canal and mill housing, remain unchanged in the improved design.

CRT/N took the lead in implementing the programme and carried out a number of activities with local partner organisations. These included:

- Building up the technical and institutional capabilities of partner organisations;
- Orientation and demonstration activities for awareness creation among potential millers and women users;
- Workshops and interactions at the local level to create a common forum for millers and women users to share their problems, issues and experiences;
- Assistance in the supply of metal kit runners through local manufacturers;
- Training the local installers to ensure quality installations, and the mill owners on the repair and maintenance of the improved mills.

Improved Mills – Better Services

By the end of the GTZ/N supported project about 500 mills had been improved, and the promotional activities have continued. These improved *ghattas* have not only benefited the millers by increasing their income through an increase in grinding capacity and a diversification in end uses, they have also brought benefits to the local communities, especially women users, because the more rapid processing of maize, millet and wheat, avoids wasting valuable time queuing at the mill. Each mill can serve 30-50 households. Compared to the traditional mills, the grinding capacity has doubled, and in some cases tripled, with a power output of between 1-3 kW, sufficient to grind 20-50 kg of maize per hour.

Some of the visible effects on the lives of women are:

- Due to the increased processing capacity of the improved mill, the time spent waiting by the users, who are mainly women, has been reduced drastically (40-60%). The time thus saved is used for fodder/fuelwood collection, housecleaning, childcare etc.



Improved water mills for grain grinding saves the time and energy of rural women in Nepal (Photo: CRT, Nepal)

- As the improved mill can be operated with lower water discharge rates, it has extended the availability of the processing facilities by up to two months a year, mainly during the dry season.
- The quality of the finished products from the improved water mills is better than that from diesel mills. The products are more nutritious and keep better. So far, the products are used mainly for home consumption but if the increased throughput allows products to be sold they should command a premium price due to their higher quality.
- With the improved milling services, men's participation in agro-processing activities has increased due to bulk processing taking less time. Now that the traditional workload of women in processing is being shared by men, the women's workloads have decreased.

Continuing the Process of Mill Improvement

Since 2003, the improved water mill promotional activities have been further enhanced under the "National Improved Water Mill Support Programme", supported by the Government of Nepal through the Alternative Energy Promotion Centre (AEPCC) and the Dutch Government through the Netherlands Development Organisation (SNV/N). This programme aims to establish 3200 improved water mill units across sixteen hill districts of Nepal by mid-2007.

By June 2006, more than 2300 traditional water mills had already been improved. These improved units provide services to more than 90,000 households, or more than half a million people. The improved mills have also been of substantial help in limiting the establishment of diesel mills.

An attractive part of the programme is its approach towards achieving sustainability through local capability development. Although CRT/N plays the lead implementing role, the required support services to millers and women users are imparted through local service providers such as service centres, manufacturers and financing institutions. There is also support in the form of a direct subsidy through the programme – about 50% of the improvement costs – made available to the millers to support the reduction of drudgery and time saving for local communities, especially women. Other important aspects of the programme include institutionalisation of the millers at the district level and the active involvement of women in the programme.

Intensification and Diversification of End Uses

Demand from the users, especially women, for diversified services from improved water mills continues to grow. Diversification also helps the millers to increase their income. As such, a number of orientation and demonstration activities with end uses such as paddy hulling, oil expelling, saw milling and electricity generation that make better and more versatile use of the increased amount of energy have been undertaken. Although such end-use adaptations often require a substantial investment, which can prove prohibitive, several millers have adapted their mills and provide extra services.

Out of the 2300 units so far improved, about 185 units (8 %) provide additional services such as those outlined above. Of these, paddy hulling is by far the most popular. The hullers, which require at least 2 kW of power, process about 50-70 kg of paddy per hour. The attachment of paddy hullers to the improved water mills has provided an increased income to the millers and enhanced the processing services available to local women users, thus reducing their drudgery substantially. The low take-up of new end uses is mainly due to the investment required. The programme is now looking for ways to integrate micro-financing support at the local level in order to overcome this barrier.

The electrification of rural communities is another potentially important end use of the improved water mill. Although there is a high demand for such a service, only about 15 improved water mills have been



Agro-processing activities using manually-operated equipment take up a good deal of women's time and energy (Photo: CRT, Nepal)

adapted to produce electricity; the main reason being that it requires a comparatively high level of investment to purchase a generator and the other equipment required. As an example of such a facility, the improved water mill owned by a family in *Pipaltar* village in Kavre district generates 2 kW of electricity which is distributed to 53 families. Each family contributes NRs. 30 per month (about US\$ 0.45) for which they gain a 30-watt bulb, and the money collected is used for operation and maintenance of the system. Replacing hazardous kerosene wick lamps with electric lighting has improved the living conditions of the families, created income options such as shopkeeping and poultry raising, and enabled children to study longer in the evenings.

Further Support to Mill Owners

Although local mill owners are actively participating in the improvement of their traditional water mills, they face a number of barriers including a lack of local management skills, sourcing the improved runner kit locally, water rights determination, financing and ensuring the quality of the installation. Creating an institutional base for the mill owners was seen as a way of addressing these issues. This idea was initially tried within the "Support for Institutionalization of the Water Mills" project implemented with support from the International Centre for Integrated Mountain Development (ICIMOD). Mill owners were assisted in organising themselves into *Ghatta* Owners Groups (GOGs) at the river basin level and into a *Ghatta* Owners Association (GOA) at the district level.

There are now eight GOAs registered with the local government administration. Some of the GOAs, especially those in Kavre and Makawanpur districts, have been very active and played an instrumental role in the process of intensifying the water mill improvement activities. They are providing services to their members

and advocating for the rights of the water mill owners as necessary. Some of the GOAs, as in Kavre district, have been recognised as district level service centres with responsibility for providing technical services to other water millers. Some women are already responsible for the management of mill operation, and as such they are also active GOA members, and others are also part of working committees.

Role of Women in the Programme

The water mill improvement programme considers women as important stakeholders and has sought their active participation. Women have been motivated because they are aware that the improved technology addresses their needs. They have been exerting pressure on mill owners to improve their mills and to provide more productive end-use services that will be of direct benefit to them. The local women users are also actively involved in major repair and maintenance work as they want the mills to operate efficiently and provide them with timely services. Women are also motivated to take on the operation of improved mills as they generate an attractive income. For instance, Ms Bhagawati Adhikari from Thaprek village in Nuwakot district owns a paddy de-husking and rice-polishing mill. She is a successful business entrepreneur and has increased her income by about NRs. 5,000 per month and so is able to repay the loan taken out for the mill improvements in instalments.

Although less than 10% of GOA members are women, women do play an active role in the association meetings, in working committee meetings and also in mill operation. The programme is working towards increasing the roles and responsibilities of women - not just as mill users, but also as operators, decision-makers in GOAs and as owners. Gender-disaggregated information regarding the operation of traditional water mills and related agro-processing activities, gathered through a baseline study undertaken by the Gender, Energy and Water Network (GEWNet) managed by CRT/N, is being used for this purpose.

Integrating Energy and Other Income-Generating Services

Although water mill improvement activities have substantially helped to meet the agro-processing needs of local women users, energy for other activities such as cooking food, heating water, drying farm produce and farm irrigation are also important. To address these issues, CRT/N has initiated pilot projects in Charangiphedi village in Kavre district and in Kharanitar village in Nuwakot district that integrate water mill improvements with other renewable energy technologies such as



Paddy hullers attached to improved water mills are helping to reduce drudgery (Photo: CRT, Nepal)

improved cooking stoves, beehive briquettes, biogas plants, solar cookers and solar dryers. These initiatives have helped the local rural women to further reduce their drudgery and the time spent on repetitive tasks, and opened up the way for other productive activities.

CRT/N is now looking at ways to motivate women to mobilise their savings or join micro-credit schemes in order to get involved in local water harvesting systems, drip irrigation systems, improved agricultural practices and product marketing etc. in an integrated manner so as to not only meet their energy needs but also to enhance their livelihoods. The outcomes and lessons learnt from these pilots will be utilised in setting up similar initiatives in other areas of Nepal. ■

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