

Treadle pumps transform rural life in Nepal Terai

Nepalese families living in the lowland areas bordering India, (The Terai), have only been able to grow rain-fed rice. Growing vegetables to balance the diet has been difficult, so families have had to rely on vegetables bought in from India. That is now changing, writes *Bhawana Upadhyay*, as people with the smallest pieces of land have been able to acquire treadle pumps.

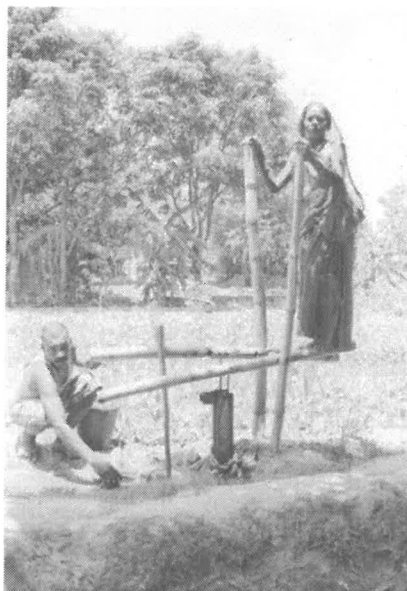
"We grow, cauliflower, tomato, ladies finger, coriander, chilli, spinach, brinjal, cucumber, bitter guard, beans, peas, etc., as they are good cash crops," says Sita Devi Yadav, a treadle pump user in Phulkakatti village of Siraha district, Nepal. "Last year, we spent about NRs. 4,500 (US\$ 60.00) on farm inputs such as seeds, fertilizers, pesticides, etc and were able to sell vegetables worth NRs. 23,500 (US\$ 312.00)."

"When the treadle pump was not there, we used to concentrate only on paddy cultivation and not much attention was given to vegetables. We only used to sparingly cultivate some chillies, pumpkins, and white guard in the homestead using water extracted from a well. Then, vegetables were never part of our regular meal, we ate them only occasionally. Now, we have them in all three meals daily."

Treadle pump

The treadle pump (TP) is a simple human powered device basically intended for small-scale irrigation and is particularly ideal for fragmented land common in developing countries. It operates as a suction pump to lift groundwater from shallow aquifers. It consists of a couple of pistons that are placed inside two cylinders. Once the operator stands on the treadles and thereby presses the pistons up and down in a rhythmic motion, water gets lifted up to the pump and gets discharged. In Nepal, currently a pump costs about NRs. 1,500 (approximately equivalent to US\$ 20.00).

Tps were first developed in Bangladesh in the 1980s and were known as "tapak-tapak" or TT pumps. They were constructed predominantly from bamboo and would cost around US\$ 8. Later, the International Rice Research Institute (IRRI) introduced an improved version with a price of US\$ 25. Various models with different sized cylinders ranging from 76 mm to



Mrs. Yadav treadles while her husband helps
Credit: B. Upadhyay

178 mm diameter, were simultaneously developed and tested in Bangladesh in the late eighties. The test results concluded that the output from the pump depended on a host of factors, such as, suction lift, cylinder diameter, filter hardness, installation efficiency, weight and agility of the operator, etc.

A 76 mm pump is capable of delivering one litre per second from a maximum depth of 8.5 m. Pumping for 20 minutes and resting for next 10 minutes would allow a healthy person to pump comfortably for 5-6 hours a day, which means that up to 14 m³ of water could be pumped in a day.

Family pumping

Sita Devi Yadav, who is 32, says she and her husband use the treadle pump to irrigate about 0.169 hectares which they use to grow vegetables. They gave a larger piece of land, on which they grew rice, to their son. "I and my husband take turns in using the pump. In the early morning, my husband uses the pump, when I am busy doing domestic work and tending our only cow. As soon as I am free, I do the

treadling for about an hour. If I attempt to do this for a longer period without a break, I feel tired and my legs and back start aching."

"I came to realize this based on our past experience when the pump was new and we used to treadle it for 2-3 hours continuously. So, we have made a rule that we will do it for half an hour at a stretch, maximum. If the irrigation need persists beyond an hour, we take rest for about 20 minutes and continue again. But, an hour of treadling from each of us in the morning is sufficient for most of the vegetable crops we grow, and we follow the same routine in the evening. So, both of us treadle for a couple of hours every day. Ever since we started following this routine, we don't feel tired or any body pain. So, I think this is an ideal treadling time."

Marketing

Sita Devi Yadav used to work elsewhere in the village, but now she makes more money selling the excess vegetables. She uses the bus to go to local



Rushing to market with the fresh pick
Credit: B. Upadhyay

markets twice a week with the pick of the crop. Harvesting and cleaning of vegetables is done by herself, her husband and small daughter. "Sometimes, my husband goes to the market, but I prefer going myself as he loiters around with friends and returns late and not always with all the cash generated from the sales. On my way back from the market, I purchase household supplies."

Mrs. Yadav says the treadle pump has brought new hope to her family. She finds the pump doesn't need a lot of maintenance, as long as they don't use it continuously.

Treadle pump users, like Mrs. Yadav, is one of our respondents of an ongoing study on micro-irrigation technology. As her story implies, vegetable farming is becoming the mainstay of many rural households of Nepal *terai*.

Agency-led initiatives

Several international non-government organisations (INGOs), non-government organisations (NGOs) and voluntary organisations are promoting TPs in the Nepal *terai*. For example, IDE has been in Siraha and Saptari districts, in central Nepal, where it promotes TP along with creating a supply chain network of manufacturers, dealers, and installers. Further east, innovative TP-based programmes are run by Forum for Rural Welfare and Agricultural Reform for Development (FORWARD) and Local Initiative for Biodiversity Research and Development (Li-BIRD), in collaboration with PLAN International, in Morang and Sunsari districts. They organise landless people in groups. One group consisting of 14-18 landless households have been motivated to cultivate vegetables commercially. Then, a huge chunk of land is leased for five years and each household is allocated two *kathas* (0.0676 ha) of land for their share of cultivation. In the first year, all input costs are shouldered by the programme, and this support goes down by 25 per cent every succeeding year. Land rental is treated in the same way. Given the higher rate of return, the programme should be sustainable so that in five years the



A FORWARD programme participant is busy weeding

Credit: B. Upadhyay

households will have enough savings to lease the land on their own, install the pump, and continue with the farming. Pay back period has been less than one growing season.

Gender issues

As the technology is gender-neutral, it has become popular among women members of households. It has notably helped women become productive and take a leading role in household management. Considering the fact that male members of these communities increasingly prefer to out-migrate to Indian cities for work, the pump has given women access to a comprehensible technology which has opened up avenues for income generation from

familiar ventures. Even when men are around, women play a more dominant part in TP-based vegetable farming.

These rural women, who are generally confined to their households in patriarchal communities, now have an opportunity to come out in the marketplace and transact business. The field observation shows that while patriarchal sentiments may tend to regulate the use of technologies, technology use in turn might lead to a shift in gender power relation, particularly if the technology is not gender biased. For example, in any of these rural households, it was men who participated in promotional activities of intervening agencies and took a unilateral decision of installing the technology. Once the technology got



Women waiting for buyers in a weekly local market

Credit: B. Upadhyay

installed, women became the primary users and men's roles remained to that of mere facilitators.

Lessons learned

The treadle pump is suitable for smallholder farmers of Nepal terai and regions with similar geographical and hydrological characteristics that have shallow groundwater tables. The very low cost of installation and maintenance makes it affordable for poor farmers. Diversification of crops, focus on cash crops and a larger cropped area have improved the nutrition of the family. Participants in Focus group discussions (FGD) have reported that using TPs has made irrigation enjoyable and less strenuous.

Treadle pumps in Nepal *terai* have somewhat transformed rural communities. We observed that even smallholder households were into commercial vegetable cultivation. It has boosted production, thereby reducing the reliance on imported vegetables from India. It was revealed in the FGDs that



The study village, Nepal

some of the villagers had begun taking vegetables to Indian markets along the border, as it gives them a better deal due to favorable currency conversion rates.

Authorities in Nepal are still struggling to bring electricity to rural areas, so there is no chance to have an electric pump. Diesel pumps are far more expensive than treadle pumps. Hence,

the TP has given smallholders ownership of water at a reasonable cost and has apparently taken the label of appropriate technology for themselves.

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