Coastal Livelihoods Adaptation Project (CLAP)

Community-Managed Irrigation Scheme at Purbo Rajopara

The village of Purbo Rajopara in the coastal district of Patuakhali is situated only 28 kilometres from the Bay of Bengal, where it is experiencing the full impact of climate change. Increased frequency and intensity of tropical cyclones, the destruction of coastal embankments, sea-level rise, encroaching salinity, fresh water shortages, and erratic rainfall patterns are undermining the livelihoods of its people.

Purbo Rajopara borders the Badurtoli Khal canal, which supplies fresh water to the village during the monsoon season when the downstream water flow is heavy. However, during the rest of the year, when the water level is low, the stream is contaminated by the saline sea water that washes upstream with each high tide. The saline also creeps into the dry soil of the farmland and into the groundwater. For this reason and also because the silty clay in the upper soil strata makes it difficult to extract groundwater where it is sweet, groundwater irrigation is practically non-existent in Patuakhali. [Master Plan for Agricultural Development in the Southern Region of Bangladesh 2013-2021, Ministry of Agriculture, Government of Bangladesh, Executive Summary, p.xx.]

Most farmers in the district of Patuakhali therefore typically plant only one crop a year. They transplant aman rice to the monsoon-flooded fields in the rainy season and then harvest it in November/December. The farmland is left uncultivated during the rest of the year. However, in 2013, a group of 25 farmers in the village of Purbo Rajopara got together to construct a surface water irrigation system that allows them, for the first time, to plant crops outside the rainy season.

Because small farmers in Bangladesh are generally unorganized, they have difficulties obtaining services from government agencies or getting a good price for their crops in the market. As part of CLAP’s intervention, Wave Foundation therefore canvassed the area and found 25 farmers interested in meeting once a month to discuss the issues that concern them and attempting to find solutions. The topics discussed in these meetings ranged widely, from ways to obtain current market price information and circumvent middlemen who keep much of the profit for themselves, to backward and forward linkages, adaptation to climate change, and disaster preparedness.

Of particular interest to the farmers was the question of saline-tolerant varieties of rice. Over the last decades, the Bangladesh Rice Research Institute (BRRI) has in fact developed varieties of rice that can tolerate a low level of salinity, but that information has not always reached the farmers in marginalized areas of Patuakhali. Wave Foundation therefore invited officers from the Department of Agricultural Extension to meet with the farmers in Purbo Rajopara to discuss the options.

After considering various factors, including the level of saline intrusion into the farmers’ land, and potential yields from various varieties, members of the farmers’ group decided to plant BRRI’s Dhan-47 rice. They obtained the seeds from the local office of the Bangladesh Agricultural Development Corporation. Two years on, they are satisfied with the results and other farmers in the area are also switching their fields over to the saline-tolerant variety.

Farmers in their sunflower field
Bigger plans

However, the group began to envision even bigger changes. As Manik, the group’s leader explains, he and several other farmers were in another part of the district when they saw large fields of boro rice growing in the dry, winter season thanks to a surface irrigation scheme. They were intrigued, and went to talk to the local farmers to learn exactly how the irrigation scheme worked.

On the same trip, they also spoke to farmers who were using surface water irrigation to grow sunflowers, a plant that is slightly saline tolerant and requires little water. Local mills press the seed into sunflower oil, a very valuable product in a country that imports most of its edible oil. The men were convinced that they could do something similar in their village.

Upon returning to Purbo Rajopara, Manik quickly assembled the farmers’ group, and the men explained to the others what they had learned. Wave Foundation agreed to support the venture. Plans were drawn up, other groups in the village were contacted, and the project soon involved the entire community.

A site was chosen for the shallow water pump that would extract water from the canal, and the route for an earthen approach road to the site was planned. The community asked for additional approach roads that would connect the village to the school and the mosque and also allow them to transport their crops to a local market.

A number of ponds that serve as reservoirs for rainwater were re-excavated to provide the clay soil for the approach roads. The ponds were later stocked with fish and their banks were planted with vegetables such as bitter gourd, ginger, spinach, and beans.

A group of poor local women, many of whom had never before had paid employment, were contracted to construct some of the new approach roads and rehabilitate a number of old ones under a cash for work programme that paid BDT 150 (about EUR 1.5) a day for six hours of work. In addition, much of the construction work was done by the villagers themselves on a volunteer basis. The union parishad (local government) obtained funds from the Ministry of Disaster Relief to build a culvert over one of the planned water channels, as complementary support to CLAP’s initiative.

In the meantime, the farmers’ group had managed to close the badly damaged sluice gate on the Badurtoli Khal canal, downstream from the site they had chosen for their pump. Many of the sluice gates in the district have fallen into disrepair and cannot be properly operated. Furthermore, they are often the site of conflict: farmers want the gates closed to prevent saline incursion, while fishermen want them open. The farmers’ group in Purbo Rajopara took the matter in hand and, with the support of the local union parishad, now manages the sluice gates year round for the entire village. They also employ an operator for the pump.

The Wave Foundation engineer drew up plans for the pumping station and a series of irrigation channels. A cement base was poured for the station, and a shed was constructed over the base. The ACI Regulator China motor that operates the shallow water pump has a 12 horse power diesel engine and can pump 260-280 litres of water per minute. Total cost of the pump was BDT 45,000 (EUR 450). The farmers collected BDT 7,000 (EUR 70) from their members; CLAP paid the rest.

Brick and concrete channels, 175 metres long, 60 cm wide, and 90 cm high, were constructed to distribute the precious sweet water to the fields. The farmers can plug or unplug small holes in the concrete, which allow each of them to control the flow of water onto his land. Another 280 metres of earthen drains extend the system even further. The irrigation system serves 70 farmers: the group now has 30 members who pay BDT 100 an hour for water; 40 farmers in adjoining plots pay BDT 120 an hour.

The water fees cover the cost of diesel, the salary of the pump operator, and the costs of engine maintenance. The entire system, including the pump, was constructed for BDT 624,000 (roughly EUR 5900, of which CLAP paid EUR 5300), a price tag about 25% lower than comparable systems built by government agencies – thanks to the employment of local labour, direct community oversight of the construction work, no overheads, and of course the contributions of German development cooperation.

During the first dry season after construction, various farmers planted winter boro rice, groundnut, sweet potato, and maize, much of which was sold in the local market. In 2014, a number of the farmers planted sunflowers, which were then processed at a local mill to produce oil for their own cooking needs or sold as seed.

An investment of roughly EUR 5900 into a simple, but effective water-management technology has allowed 70 farmers in the poor, climate-threatened district of Patuakhali to double or triple their annual crop production, diversify their cropping patterns and food sources, and strengthen their climate resilience. This is precisely the type of innovation called for by the Bangladesh Ministry of Agriculture’s Master Plan for Agricultural Development in the Southern Region of Bangladesh 2013-2021.

And the impact does not end with the farmers in Purbo Rajopara. In the same way as they saw and emulated what farmers in others villages were doing, today farmers in neighbouring villages are coming to Purbo Rajopara to see what has been done and to ask Manik and his farmers’ group how they did it.

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