



FLOATING GARDENS IN BANGLADESH

A floating garden is built using aquatic weeds as a base on which vegetables can be grown. This approach can extend the growing capabilities of rural communities where land would otherwise be unavailable. It is cheap and sustainable.

Introduction

Bangladesh is one of the world's poorest countries, criss-crossed by more than 230 of the world's most unstable rivers. For poor families living in rural Bangladesh land is a scarce commodity and people have to make use of whatever space is available. Each year the situation is exasperated by flooding which restricts the time that crops can be grown. Floods affect over one million people in the country and more than 100,000 women, men and children are forced to move as villages and livelihoods are literally washed away. In recent years flooding has intensified and lasted longer and now the fields can be submerged for far longer than the traditional two months. During the monsoon season, much of the farm land in the Gaibandha district is covered by water, making it impossible to grow crops. Even when the floods recede the land remains waterlogged restricting people's ability to cultivate vegetables to feed themselves and to generate an income, particularly when land is flooded and other cultivation options are unavailable.

Taking practical action

Floating gardens are amongst the many options developed and promoted to address the needs of poor farmers in Bangladesh combining to make a real difference to production levels in the Gaibandha district. Training on the construction and use of floating gardens was provided by Practical Action, formally Intermediate Technology



Figure 1: Laying bamboo across the water hyacinth. Photo credit: Practical Action Bangladesh

Development Group (ITDG) and Gono Unnayan Kendro (GUK), a local NGO and have now become popular in the area.

Although floating gardens have been successful for many people there are some who cannot make use of this farming technique. Some of the landless poor do not have access to areas where the gardens could be set up. Even when areas of



Figure 2: Collecting and stacking the water hyacinth. Photo credit Practical Action Bangladesh

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water are available they can be some distance away from the household. Another difficulty that can arise is that the raw materials to make the raft may not be available.

Gardens are relatively inexpensive to make requiring a small investment in fertiliser and seeds as well as the labour needed to construct them. Other materials such as the aquatic weed for the base of the raft can be obtained locally at no cost.

The base of the raft is often made from water hyacinth, which is a common weed in many parts of the world where it clogs up water systems and damages the ecosystems and aquaculture within ponds. It is better to use mature water hyacinth as green water hyacinth will decompose too quickly and the raft will not survive the growing season. If water hyacinth is not available other materials can be used such as paddy straw, nalkhagra – a freshwater wetland tree, and any available organic materials such as azola, coconut straw, bamboo, and old rope.

There is no fixed size of raft. Commonly, the rafts are around 8m long and 2m wide and are around 0.6 to 1m deep. The size of the raft can be made to suit the circumstances of the user. If there is a lack of space or if raw materials are in short supply then the rafts can be made smaller.

Creating a floating garden

The first step to making a floating raft is to collect the water hyacinth. Floating water hyacinth is overlaid with bamboo poles of appropriate length to the size of the raft being constructed and this mass of plant matter is taken to one bank to be worked on.

Additional water hyacinth is collected with stick hooks and placed onto the bamboo layer and the thickness of the raft is built up. It is then woven into a buoyant raft.

Once the raft's basic structure has been created the bamboo poles can be pulled out.

After around 7 to 10 days more water hyacinth is added to top up the existing structure then a mulch can be added on to the water hyacinth base. Soil, compost and cow dung are added to cover the base of the raft to a depth of around 25cm. The compost is made up from *azola*, a good nitrogen fixing plant, and other readily available organic matter.

Seeds can then be sown. The technique used to improve the seeds' early development is to create round balls of compost comprising of decomposed water hyacinth and an



Figure 3: The garden begins to take shape. Photo credit: Practical Action Bangladesh.



Figure 4: The floating garden with its earth layer. Photo credit: Practical Action Bangladesh.

organic fertilizer known locally as *Tema*. A couple of seeds are planted into each ball and kept in a shaded area while germination takes place. Once the seedlings have begun to grow they can be planted out onto the raft.

Although rafts don't last indefinitely they can be reused, and hauled to a shadier or sunnier spot or on to a more protected canal to optimise the growing conditions.

Crops that can be produced include Kang Kong (leafy vegetables), okra (lady's finger), gourd, brinjal (aubergine), pumpkin, and onions. Eventually the raft will decay and cannot be used any longer. The rafts are then broken up and used as compost, usually at the end of the growing season and a new raft is prepared for the next crop.

Ducks, rats and other animals are attracted to the crops on the raft and may need some form of protection. Fencing can be set up around the perimeter of the raft using whatever materials are available. Broken fishing nets or sticks can be effective barriers.



Figure 5: Protecting the crop from predators with a fence made from sticks. Photo credit: Practical Action Bangladesh.

Using a floating Garden

The gardens should not be used on areas of water that are affected by tides or currents where they would be vulnerable to erosion and at risk of disintegrating. Flooded land or small ponds can be used. The floating gardens are kept in position by tethering them to poles.

Harvesting

In some circumstances the raft can be accessed on foot, or by using a raft or boat if the garden is in deeper water.

The rafts can be used for summer and winter crops. Vegetables are harvested two or three times a week or when there is particularly high demand. The produce is sold either through direct selling in the local market or through an intermediary whole seller.

What it has meant to Tara Begum

Tara Begum and her family are not affected by *monga* (famine-like situation). Once destitute, they have changed their lot by raising floating vegetable gardens on the Brahmaputra waters.



Tara lives with her husband and son in a small compound in Shingria, 15km from Gaibandha town. She has been displaced by the river erosion seven times, and now lives on the government flood embankment. The family own 0.2 acres of land (approximately 800m²), but this is very sandy and infertile so Tara struggles to grow food during the dry season, and during the monsoons her land is covered by water.

Figure 6: Tare Begum - "This has made a great difference to my life. Now I have enough food in the floods and I can give some to help my relatives as well". Photo credit: Practical Action Bangladesh.

In June 2005, Practical Action provided Tara with training on vegetable production and, alongside a local NGO partner (GUK), showed her how to make a floating vegetable garden - costing only T500 to build. During the last monsoon, Tara was able to grow red onions, Kang Kong (leafy vegetable), okra and sweet pumpkin. She also grew seedlings for gourd, which she transplanted once the flood had died down. During the last flood, Tara had enough food for her family. She even managed to sell the extra vegetables that she produced, and so far has made a total of T4000 since her training. There is little food in the markets during the monsoon, as few people can grow crops, so her vegetables are in great demand. And by



Figure 7: A working garden: Photo credit: Practical Action Bangladesh

cultivating seedlings in the floating garden, she was able to plant them earlier in the year and therefore get a better harvest. After the end of the monsoon season, Tara used the old raft as compost to grow crops in the dry season.

Tara was the only person in the village who received this training but, following its success, Tara's neighbours started copying the idea and are now making their own floating gardens.

Conclusion

The floating garden is just one approach that can be used to improve the food resources of people living and working in Bangladesh and small water bodies can play a major role in this. Such approaches include small-scale fish farming, pigeon rearing, and duck rearing. Farming methods have to be suitable for small-scale farmers without the need for large financial investment.

References and further reading

Water Hyacinth Technical Brief Practical Action

Small-scale Fish Farming in Bangladesh Technical Brief Practical Action

For Further information

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technical brief