

Fish ring microhabitats: Resilience in rice field fisheries



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ABOUT FISH RING MICROHABITATS

A habitat is the environment where species such as fish live, feed and breed. A small, specialized area of a habitat—a microhabitat—can be created and managed as a way to attract and encourage a species to use the environment. These microhabitats help maintain the biodiversity of ecosystems, which in turn support livelihood activities and the production of food.

The monsoon season in Bangladesh brings extremely variable weather conditions and tidal flows. Fish enter rice fields from nearby rivers and canals during flooding, but they can be trapped in depressions when floodwaters recede. They may also die in the rice fields due to drought, high temperatures or low levels of dissolved oxygen in the shallow waters that remain on the floodplain.

The timing of the annual monsoon is important because the season coincides with the spawning period for most of the fish species that inhabit the floodplain. If a fish ring microhabitat is maintained in the rice fields at the onset of the monsoon season, it can ensure that fish survive long after floodwaters have receded. The result is that more fish are available for food and to help restock fish populations when the floodwater returns. When used in this way, the fish ring microhabitats do not act as fish traps, but support ongoing supplies of fish to thrive and breed for the future.



Fish ring microhabitat with identification flag at Jagannathpur rice field.

DEVELOPMENT OF FISH RING MICROHABITATS

The fish ring microhabitat developed by WorldFish in Jhalokhati District consisted of three small cement rings (approximately 76 centimeters across and 1 meter deep) partially buried in the rice field prior to the onset of flooding.

When the rice fields flooded during the monsoon period (May–October), fish naturally gathered in the deeper, cooler water provided by the cement ring. In this way, the cement ring acted as a microhabitat and provided a sanctuary where fish thrived and bred.

By the end of the monsoon season, the rings contained many fish and juveniles for consumption, income or stocking in household ponds, providing the farmers with a secondary livelihood opportunity. The fish ring microhabitats also allowed farmers to catch and consume nutritious fish even at times when flooding destroyed rice crops.



Prepared fish rings (left); farmer installing fish ring (right).

BENEFITS OF FISH RING MICROHABITATS

WorldFish studies suggest that there is an increase in the number of fish in the rice fields where fish ring microhabitats have been installed, with no negative effect on rice yield. Farmers that participated in the study also claimed that they had a greater diversity of indigenous fish, such as *taki*, *puti*, *baila*, *baim*, *shol*, *koi* and *shing*.

Current WorldFish studies on these fish ring microhabitats indicate a 92% survival rate of fish compared to only about 0% in areas with no microhabitats. Studies also show that farmers who have installed fish ring microhabitats have more fish for consumption and income, as well as for stocking in their household ponds.

Farmers found that 89% of all fish caught in the fish ring microhabitats were small, nutritious fish species, 57% of which were *chingri* and 16% of which were *puti*.

Farmers also reported lower use of pesticides on their rice crops, since the fish ate a proportion of pests and insects.

Fish ring microhabitats provided cooler water temperatures and ideal levels of dissolved oxygen, which promoted fish health and growth. The microhabitats also protected fish from tidal flows and allowed them to survive and breed.

The benefits of fish ring microhabitats throughout the year are demonstrated below:

Use	Months	Species	Approximate amount
Consumption	<i>Boishak, Joistha, Asshin, Kartik, Agrahayan</i>	<i>Taki, puti, baila, baim, shol, koi, shing</i>	0.5–1.5 kilograms (kg) per household
Income	<i>Do</i>	<i>Shol, shing, koi, taki, baim</i>	1.5–2 kg per fisher
Stocking	<i>Asshin, Kartik, Agrahayan</i>	<i>Shing, koi</i>	30–200 individuals per pond



A fish ring.

CONSTRUCTING A FISH RING MICROHABITAT

The fish ring microhabitat is made up of three small cement rings, which are easily bought from surrounding markets at a price of BDT 300 per ring (for a total of BDT 900).

Steps

- Observe whether fish come into the rice field during the flooding months (May–July). Some floodplains have more linkages to rivers and canals, which will bring more fish into the fields.
- Identify low-lying locations in the rice field where water is likely to flow and remain after the floods have receded. Fish will gather in these pools if they cannot get back to the river. These are ideal sites for positioning a fish ring microhabitat. Some farmers may have better locations in their rice field than others.
- Once you have identified a good location for your fish ring microhabitat, dig a hole as soon as the first rains fall. The hole should be approximately 1–1.5 meters deep. Place two or three rings on top of each other in the hole so that the top ring protrudes a little way above ground level. Place a bamboo pole with a flag to mark the rings so that the rings do not become a hazard.
- Do not use the fish ring microhabitats as fish traps. It is important that fish be allowed to thrive and breed, so at the end of the monsoon season there will be more fish in the microhabitat and the surrounding rice fields.



Fish ring transportation.

MAINTAINING A MICROHABITAT

Since rice fields are shared by landowners, farmers and sharecroppers, farmers and communities should create a community-based management scheme that can protect the microhabitats and prevent poaching from outside.



Farmers installing a fish ring microhabitat in a rice field.



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Contact Details:
WorldFish, PO Box 500 GPO,
10670 Penang, MALAYSIA
www.worldfishcenter.org

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