

Floating Islands: a Unique Fish Aggregating Method

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Abstract

A fish aggregating device made of aquatic weeds and grass (*Phoom*) is used in Loktak lake in the northeastern region of India. It has been used successfully in this very productive fishery for centuries. Today, the fishery itself is under pressure from overexploitation, soil erosion leading to siltation and a hydroelectric project that has blocked the migratory route of the fish that used the lake as a breeding ground.

Introduction

Manipur state, situated at the northeastern border of India, has vast aquatic resources suitable for fisheries. Surrounded by blue hills, the Loktak lake is located 45 km. south of the capital Imphal and has a water spread of 300 km². The lake supports many species of fish and aquatic plants and is a major biodiversity reserve. The largest freshwater lake in northeastern India, Loktak is part of a rich folklore and provides an important source

of livelihood for the people of Manipur. It is the most important common property aquatic resource and the largest source of fish production in the state. The main livelihood activity of the people around the lake is fishing and harvesting edible aquatic plants. Capture fishing, accounting for more than 80% of the fish caught from the lake (2 500 t annually), is dominated by a unique, age-old method involving aggregation and capture of fishes from manmade floating islands of aquatic grass and weeds,

locally called *Phoom* or *Phoomdi*. The lake surface is dotted with hundreds of such floating islands. Thousands of fisher folk (*Ngamees*) are engaged in fishing from these islands. Many of them live permanently in huts built on the *Phoom* along the marginal areas of the lake.

Floating Islands or *Phoom*

Phoom or *Phoomdi* are extensive patches of weeds floating on shallow water. The *Phoom* in the Loktak lake are formed by a dense growth of aquatic weeds and grass from the marginal areas of the lake. Major plant components of the *Phoom* are *Zizinia latifolia*, *Lursia hexandra*, *Echinochloa crusgalli*, *colonum*, *Brachiaria mutica*, *Sangitharia sagittifolia*, *Alternanthera philazeroidis*, *Pistia stratiotes*, *Eichhornia* sp. and *Marsilia* sp.

The dense network of roots and shoots of the weeds act as floating platforms, trapping layer upon layer of organic and inorganic debris on top of which the weeds keep growing. The extensive *Phoom* grounds in Loktak are usually between 0.5 to 10 ft. in thickness beneath the water surface and 0.5 to 1 ft. above the water. The thickness of *Phoom* beneath the water



Floating islands and fishers' huts.

depends on their age, the older the thicker. These *Phoom* are compact and buoyant enough for people to walk on and the thicker ones (5 to 8 ft) even support bamboo huts of the fisherfolk. *Phoom* cover about two-thirds of the surface of the lake.

Fish Aggregating Device

Fish aggregating devices (FAD) are natural or artificial objects or structures placed at the bottom, suspended in the water column, or kept afloat on the surface of aquatic bodies to attract, aggregate and regenerate demersal, pelagic, resident and migratory fishes. Fish are attracted to these objects for the shade, shelter, food and breeding grounds they provide. Although modern FAD include huge structures made of concrete modules, vehicle tires, etc., the artisanal fishers around Loktak lake use an old fishing method they have evolved utilizing the natural weed mass as FAD in the form of floating islands. The organic matter released by dead and decaying plant and animal materials in the *Phoom* enrich the surrounding water, supporting a host of aquatic organisms. Several species of fish use these as feeding and breeding grounds.

The construction of floating is-

lands starts early in the winter season (October-November). Suitable *Phoom* (1 to 2 feet thick) are located in the marginal areas of the lake. From these long strips, 5-6 ft in width, are cut out after trimming the grass and dragged to the desired areas of the lake. These strips are then bent to form a circular floating ring. Smaller pieces cut from the *Phoom* are pushed inside the ring to fill the inner area and the two ends are fastened together using bamboo pegs. The length of the strips depends on the desired diameter of the floating island, which usually varies from 10 to 30 m. These artificial islands are then fastened on to several bamboo poles driven into the lake bottom to prevent them floating away. The construction takes 3-5 days. Occasionally, broken rice and rice bran are suspended in porous gunny bags in the weed mass as fish feed. The islands are then left undisturbed for 3-4 months. During this period the weeds grow to form a natural habitat attracting fish and supporting their feeding and breeding needs.

Fishing

The floating islands are fished at intervals of 1-2 months. Fishing is carried out by encircling the is-

land with nets extending from the surface to the bottom. The nets are operated either from canoes or from the island itself. They entrap the fish that have congregated beneath the island. The smaller weed mass encircled by the ring is then slowly pushed out through an opening in the ring. The sediment on the lake bottom, beneath the island and in shallow areas, is churned out using bamboo poles. The fish are caught with scoop nets as they come gasping to the surface. In deeper areas, another net is cast along the inner edge of the ring and the fish are caught by closing the net. These operations are carried out by 5-8 people, including women and children. Fishing is completed in a day or in parts, depending on the demand. Once the fishing is completed, the smaller weed mass is again pushed inside the ring and necessary mending is done to leave the island intact for the next fishing. *Cyprinus carpio* (introduced in the lake during the late 1960s), *Ctenopharyngodon idella*, *Cirrhinus mrigala*, *Catla catla*, *Labeo rohita*, *L. bata*, *Osteobrama balengeri*, *Puntius* sp., *Channa striatus*, *C. punctatus*, *Clarias batrachus*, *Heteropneustes fossilis* and *Anabas testudineus* are the major species caught. Depending on the size, the catch from an island varies between 300 and 1 000 kg/yr. A portion of the catch is disposed off locally and the rest is transported, mostly by women, to the markets in the capital where it fetches a higher price. Annual earnings from a floating island vary between Rs.10 000 and 30 000¹. An island can be fished for several years until it becomes unmanageably thick.

Ownership Structure

Although the lake is a common property resource and there is no restriction on fishing, there are



Construction of floating islands.

¹ US\$1 = Rs.43.

certain territorial rules followed by the people. As the fishing activity has traditionally been carried out by a particular group of people (*Ngamees*), it is socially accepted as their right. Thousands of *Ngamees* and their families are permanent dwellers in huts on the *Phoom* floating along the banks of the lake. They communally own the *Phoom* grounds in their territory and construct their own islands or sell the *Phoom* for about Rs.75 to 100 per 1 000 sq ft. Some areas of the lake have become floating villages with more than 50 huts each. Fisherfolk also keep pens of fowls and ducks on the *Phoom* adjacent to their huts. The floating islands are operated by single or joint owners. Group farming and cooperative movements also exist. Several groups (*Ngayok Marup*) are engaged in jointly collecting *Phoom*, constructing islands, watch and ward activities and fishing. The members of the group share the catch.

Problems

The idyllic environs of the Loktak lake are no exception to human abuse. The shifting cultivation (*Jhum*) on the surrounding hills and farming activity along the banks cause soil erosion and siltation in the lake. The water level in the lake has gone up after the construction of the Loktak hydroelectric project, forcing fishers to use poisons to catch fish from the islands as their nets no longer reach



Floating island being fished.

the bottom. *Osteobrama balengeri* is the most relished fish in the area and formed about 30% of the catch from the floating islands. After the construction of the Ithai barrage for the hydroelectric project, it is becoming increasingly rare due to the blockage of its migratory route from the Chindwin river (Myanmar) to the wetlands and *Phoom* grounds of the lake for breeding. Overfishing has also affected several species of carps and air breathing fishes. As the demand and price of fish increased, the number of floating islands also multiplied. Increased demand for *Phoom* to build huts and floating islands causes considerable pressure on untouched *Phoom* grounds. The environmental consequences of the booming *Phoom* fishery, the number of floating islands the lake can sustain, as

well as the stock and recruitment of fishes in the lake, are not known. As it takes several years for the formation and regeneration of *Phoom* grounds, regulation of the fishery and control on human modification of the environment is required.

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