



**Polluted to the gills** Volunteers for the Vembanad Fish Count collect water samples for testing at Muhamma in Alappuzha district. KARTHIC SS

# 1,2,3,4,5... Once I caught a fish alive

Every May, as hordes of tourists luxuriate in Kerala's famed backwaters, volunteers arrive in droves for the annual fish count in the Vembanad Lake

At 6 am on May 27, the backwaters of Alappuzha, Kerala, were soundless. Swanky houseboats were still tied to the shores, bobbing in the water; the palatial resorts were yet to open their gates. Suddenly the silence was broken as a few dozen people assembled, carrying an assortment of objects — buckets, fishing nets, laboratory beakers, bottles — and boarded a boat before finally disappearing into the backwaters.

On one day every May, the tourist drill in the Kerala backwaters — book resort, hire houseboat, open beer, laze — is broken by a unique volunteer-driven activity that looks, quite literally, at several underlying factors.

The Vembanad Fish Count gets underway in the saline waters of the Vembanad Lake, which forms the heart of India's favourite backwaters. A "Wetland of International Importance" under the global Ramsar Convention and the largest such site in India, the Vembanad also ranks among the world's most polluted lakes, as sewage, plastics, chemicals and mismanagement have muddied its waters, especially in its southern sector.

The Fish Count takes the next step by asking, "What happens to the fish?"

In its tenth year now, the count is organised by the Ashoka Trust for Research in Ecology

and the Environment (ATREE), in collaboration with the Samyuktha Vembanad Kayal Samrakshana Samithi (Federation of Vembanad Lake Protection Forums), a collective of traditional fishermen and several government departments including the Kerala State Biodiversity Board.

## The survey

The volunteers gather a day ahead for an orientation session that familiarises them with the method used for the counting.

Since it is impossible to count every fish in the lake, unlike in a census of human population, an 'experimental fishing' method is used instead.

On the day of the count, three boats — each with around 40 volunteers and two fishermen of the Samithi — set off into three different regions of the lake: west bank, east bank and the riverine parts. Over the day, each boat visits five survey locations marked out by ATREE scientists in consultation with fishermen. For reasons described later, the count is carried out only in the southern sector of the lake.

At each location, fish is caught in three kinds of nets: gill nets — large rectangular nets

suspended vertically in the water to trap passing fish; cast nets — circular nets that are thrown into the water and immediately pulled out; and scoop nets — quite simply, badminton racquets with a fishing net to scoop out fish.

The caught fish are identified with the help of a field handbook, and then counted. Five samples of each species are preserved in jars for future analysis.

The volunteers also draw water samples from these locations — by dipping bottles to an arm's length below the water — to measure temperature, acidity, salinity and oxygen levels.

## Worsening crisis

This rather straightforward method of survey has gathered alarming evidence on odd patterns in fish population.

The most striking finding is that of 'missing' species. While the last major study of fish populations in Vembanad during 1985-89 identified around 60 species, 28 of them were missing during the subsequent fish counts. Intriguingly, 24 new species were identified, on the other hand. While the older studies indicated that the lake had predominantly more marine spe-

The number of herbivorous fish showed a decline





**Go to Pisces** A field handbook is used to identify the caught fish before they are counted. **NIHAR GOKHALE;** (below) a streaked spinefish found in kayyipuram. **KARTHIC SS**

cies, the fish counts found fewer such species.

In fact, of the missing species, 86 per cent were marine migrants, while among the newly identified species 75 per cent were non-migrants. Many of the commonly harvested marine fish, such as mullets and sea bass, were rarely found during the counts.

The counts also point to a general decline in species. The 2017 count has reported just 49 species, and only 10 of these were widely distributed — meaning that they were found in all 15 locations examined. As many as 23 species were found in only one of the three focus regions, while 16 species were found in only one location. There has been an observable decline in larva-eating fish and frogs, which has increased mosquitoes in the region.

Alarmingly, the number of herbivorous fish showed a decline, while the carnivorous and omnivorous fish increased in number. “This is not a good sign,” said Anu Radhakrishnan, ATREE’s research associate handling the fish count. Although only a detailed analysis can confirm this trend, if true then it could lead to a collapse in fish population, he warned.

#### Multiple causes

The most basic requirement for fish to survive is water with stable levels of oxygen, acidity and salt. But the samples collected during the counts are anything but stable. In the last 10 years, dissolved oxygen has fluctuated between 22 per cent and 87 per cent, salinity between zero and 8 per cent, while acidity has swung between between pH 5 (acidic) and pH 9 (basic). Potable water is pH 7.

“This shows a massive disturbance in the lake,” Radhakrishnan said.

Among the likely causes he listed are pollution from plastics and sewage from houseboats and settlements near the backwaters. Microplastics — tiny beads used in certain cosmetics — can enter the fish food chain, a recent study by the German collective Litterbase has warned. The disturbing amount of faecal bacteria found in the water has been blamed on houseboats that don’t use septic tanks and instead let out waste water into the lake.

During the Sabarimala pilgrimage season, the faecal bacteria levels shoot up as the Pampa river, which flows by the temple town, drains into Vembanad.

#### Paddy versus fish

But ask the fishermen and they blame everything on just one factor: the Thanner-mukkom Barrage.

At Vembanad Lake, salt water is fed from the northern sector, which connects to the sea near Kochi. The southern part, near Alappuzha, is fed by several rivers that bring in freshwater, creating a unique brackish water ecosystem.

But that has sparked an unlikely fight between two of our oldest occupations. While the lake was historically used for fishing, the demand for paddy picked up in the 19th century, after the newly introduced coir industry pushed up living standards. Paddy fields came up in the marshes surrounding the backwaters, which were then channelled by bunds to keep away the salty water.

After Independence, as the importance of paddy as a food crop increased, the barrage was built in 1976 to block salt water from the north.

Although the barrage is still incomplete, it has successfully reduced salinity — at a huge cost to fishermen.

The way was blocked for migrating marine species, and the reduced salinity affected their survival — this is most likely why they went ‘missing’ in the fish counts. As it happens, these are high-value species like prawns.

“Before the barrage was built, we caught more than 400 tonnes of giant prawns every six months. Now we catch barely 26 tonnes,” said KM Poovu, secretary of the fishermen Samithi that partners the fish count.

“The prawn larvae need two weeks of saline water to survive. But the bund doesn’t allow that,” he said.

Moreover, to rid their land of the salinity brought in by the backwaters, farmers regularly drain the water back into the lake. This, in turn, contaminates the lake with the chemicals found in pesticides and fertilisers, as ATREE’s samples have shown.

The sluice gates of the barrage are opened regularly in the interest of the fishermen. But they complain that the opening is often delayed due to lobbying by paddy farmers.

Now the fishermen have taken matters in their own hand. Trained by ATREE, they measure the salinity of the lake on their own; and when it’s too low, they shoot off letters and press releases, forcing the district administration to take note.

#### Lack of accountability

Nevertheless, it is not always that simple. Vembanad Lake, much like other wetlands in the country, is an administrative nightmare. At any point in time, the following departments have different, often overlapping, jurisdiction: state revenue department (landlord), state irrigation (bunds, dredging), state water transport (runs ferries), Inland Waterways Authority of India (National Waterways 3, 8, and 9 use the lake), tourism, fisheries, Central Wetland Regulatory Authority (controls all uses of the lake) and State Pollution Control Board. Additionally, as a Ramsar site, the lake comes under the purview of the International Ramsar Convention.

“We have nobody to point fingers at. When we go to one department, they send us to the next. What we need is one authority that looks after everything,” said Priyadarsan Dharma Rajan, senior fellow at ATREE.

Despite the limitations, voluntary fish counts are the only source of information on the lake’s ecosystem.

“The count is insufficient as it does not study at night, when a lot of fish come near the water surface. Perhaps that is why no large-sized fish have been found in the count,” said KA Verghese of the All Kerala River Protection Council, who attended the 2017 count. “But the effort is in the right direction. The purpose of getting young enthusiastic people to volunteer is well served.”

As ATREE’s Rajan too says, the count is more a “charismatic event” to draw attention to the lake and the need to give back to fishermen their traditional control over it.



**Fishing is a difficult job... our youth is not interested**

#### Fewer fishermen

Thousands of volunteers have participated in the count since its inception. Most of them are students of fisheries from Kerala. At the 2017 count, nearly half the volunteers were from the Kerala University of Fisheries and Ocean Sciences.

Arjunan VM, a doctoral student at KUFOS, and three-time attendee said that unlike the field trips for his research, the count exposes him to fishermen and their traditional methods. “We don’t know how to use cast nets as it requires a lot of skill and practice. It’s nice to learn these from the fishermen.”

In the thick of the paddy-fish tussle, Poovu too considers the fish count as principally a way to draw attention to the crisis faced by fish and fishermen, and reach out to youngsters. But there’s also a hard irony.

“When I started fishing, there was so much fish here. Fishing is a difficult job... our youth is not interested as they see very little returns. Today you will find that 10 per cent of the fishermen here are young, while 90 per cent are aged over 50 like me,” Poovu said.

“Our youngsters now prefer being carpenters and painters.”