

Vanishing wetland

Kuttanad in Kerala, a unique wetland under threat from extreme climate events and ecological destruction, urgently needs a long-term strategy. **BY M. GOPAKUMAR**

KUTTANAD, a unique wetland complex in central Kerala, is under severe ecological threat from both climate change and policy impasse. A land that lies below sea level, it has been studied and debated intensely over the years. Kuttanad is the downstream deltaic formation of five in-flowing rivers that originate in the Western ghats. These rivers debouch into the Vembanad Lake, one of the largest brackish-water lakes in the

country, which flows into the Lakshadweep Sea at Kochi. It thus forms part of the ecological continuum that links the Western ghats and the sea.

The wetland is characterised by intersecting canals below-sea level paddy cultivation and a dense population (700 persons per square kilometre). Kuttanad is part of the larger Vembanad Kol wetland ecosystem, which is a "Ramsar Site". (Under the Convention on Wetlands, adopted in

Ramsar, Iran, in 1971, member-states designate one or more wetlands as "Ramsar Sites".)

A narrow sand ridge that runs parallel to Vembanad Lake with numerous inlets, both seasonal and permanent (known in Malayalam as 'azhi' and 'pozhi'), separates Kuttanad and the Lakshadweep Sea. This unique ecosystem and the resilient community inhabiting it are now on the brink of disaster as a result of



FARMERS IN KUTTANAD try to rebuild an agricultural bund to protect their paddy fields, in September 2018. Kerala witnessed the worst floods in nearly a hundred years that year, and the Kuttanad region, known as the rice bowl of Kerala, suffered severe devastation.

climate change and the danger is exacerbated by a policy stalemate.

DOUBLE WHAMMY

The twin challenges here are flooding caused by extreme precipitation in the upper catchments of the inflowing rivers, and the rise in sea levels caused by global warming. The 2018 Kerala Floods devastated the entire landscape, destroying some 50,000 houses partially or fully, and forcing residents to flee. Some two lakh people were temporarily rehabilitated elsewhere.

The floods also destroyed paddy on 1.5 lakh hectares and uprooted some 10,000 palm trees. Besides, residents suffered major losses of poultry and livestock. Backwater tourism, a staple of the region, came to a standstill.

Initially, the flood was considered a once-in-a-century aberration, reminiscent of the 1924 Devikulam Storm, but subsequent years showed that this was not the case. Unusually extreme rainfall raged over the region in 2019, 2020, and 2022. In 2020 and 2022, the intensity of summer rains destroyed the entire summer paddy crop, the main crop in Kuttanad.

Climate reports have warned that rising sea levels at Kochi will be even more calamitous to the region. While seasonal flooding and saltwater intrusion are an accepted reality in this low-lying belt, the magnitude of the extreme climate events in recent years raises the ques-



THE THANNEERMUKKOM BUND, a barrier constructed in 1974 to prevent saltwater intrusion into the Kuttanad lowlands.

tion of the region's capacity to adapt to the changing situation.

Given these challenges, the formulation of a climate-resilient development strategy that integrates scientific and indigenous knowledge has become immediate and indispensable.

In the past, adaptive practices were fragmented, more in the nature of a reaction to the immediate threats rather than any long-term mitigating strategy. It was top-down in nature and disconnected from grass-roots-level institutions, knowledge, and people. As a result, a cohesive strategy could not be evolved to safeguard the region. Scientific knowledge on various aspects of the ecosystem has not been translated into policy and practical local-level programmes.

STUDIES AND IMPLEMENTATION

There is no dearth of studies on various aspects of the wetland complex, but they are not being translated into long-term cohesive strategies and programmes. After the 2018 floods,

the Central Water Commission's (CWC) report noted the absence of storage reservoirs upstream on the rivers flowing into Kuttanad, the shrinkage of carrying capacity of Vembanad Lake, and the Thottappally Spillway's (TSW) reduced capacity as factors that may have worsened the flooding in Kuttanad.

The report recommended widening the lead channel to the spillway, which was built in the early 1950s to redirect flood waters to the sea before they reached lower Kuttanad and Vembanad, but which never achieved its planned capacity.

Another significant recommendation of the commission was on enhancing the upstream storage of the Pamba and Achankovil basins to moderate floods.

Although desilting of a stretch of the Thottappally lead channel has been attempted, no steps have been taken to widen it up to the confluence point of the Achankovil and Pamba rivers. Since the banks of the lead channel are densely inhabited, land acquisition may be a problem. There may also be considerable opposition

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from the public on enhancing the upstream storage.

But the possibility of building flood-moderating dams could be explored simultaneously. Many studies, including the CWC report, have pointed to the shrinking of the Vembanad Lake as a cause of concern. While restoration of the lake's width may not be possible, the authorities have not even made an attempt to remove the sedimentation brought about by the floods. These are critical interventions, but they have not been carried out or even debated in a meaningful manner.

Another important study is the one done jointly by IIT Madras and the Centre for Water Resource Development & Management (CWRDM), Kozhikode, for the modernisation of the Thanneermukkom Saltwater Barrier (TSB) and the Thottappilly Spillway. (TSB was built to regulate saltwater intrusion into Vembanad.)

The extensive study employed various methodologies, including field surveys, monitoring studies, inspection of hydraulic structures, and analysis of scenarios using numerical models. It proposed three alternatives to solve the flooding issue, in-

A TOWERING APARTMENT being pulled down in Kochi by implosion on January 11, 2020, for violation of coastal zone regulations.

cluding widening of the lead channel and removal of the sand bar at the ocean mouth in Thottappally.

The study identified inadequate drainage of rainwater in low-lying areas as the reason for the flooding, and pointed out that many drainage channels were blocked due to weed infestation and dumping of garbage. It recommended that cleaning the channels regularly would significantly alleviate the flooding problem, and mapped the channels that urgently required improvement.

Given this, it is surprising, and saddening, that something as simple as removing garbage and weeds that clog the channels is not being done.

MALADAPTATION

Several experts now believe that many major infrastructure developments in the region were maladapted. A number of discussions have been held on the efficacy of and unforeseen consequences caused by structures such as the TSB, the TSW, and the Alappuzha-Changanassery State Highway that passes through Kuttanad.

The TSB warrants a mention in this context. When the CWC gave conditional clearance to the TSB, it was made clear that it was built to regulate salinity and not to prevent saltwater entry into Vembanad. So, the commission insisted that the bund should be kept open always, except between December and March, to ensure the entry of saltwater into the lake for facilitating fish migration and mussel breeding and to enable natural flushing of the lake through the tidal cycle.

With the passage of time, however, the TSB has become a preventive structure, and the shutters are downed for more than six months during the critical summer period. Several studies have observed that the lake south of the barrier has become a stagnant pool. Over the years, the fish and mussel populations have declined drastically, making life miserable for the fishing communities.

Experts have suggested that during the summer paddy season, when the salinity level reaches 1 ppt (parts per thousand), which is the tolerance

level of the paddy grown in Kuttanad, shutters may be downed. Even during the December-March period, shutters need not be down all the time. When the salinity is less than 0.9 ppt, and considering the tidal level at the Kochi mouth as well, the shutters may be opened.

ACTION NEEDED

The deterioration in the aquatic environment of Vembanad Lake and the weed growth in the drainage channels have been debated for more than three decades now.

A concrete study has been done and its recommendations are in public domain. They require implementation. And all this requires an effort from all the stakeholders. A wide range of people depend on Vem-

banad, and each group has a vested interest in the lake. Paddy needs fresh water, fisherfolk require brackish water, the tourism sector wants a pristine environment to market.

What does commons indicate? Does no one own the commons or is it owned by all? In reality, commons are at the disposal of the dominant group. Reining in their interests and preventing ecological havoc is the responsibility of environmental governance. The absence of such a framework is the root cause of the imbalances in the ecosystem and the resultant woes.

For instance, roads in the wetland have significantly improved mobility and opened up livelihood choices. This is reflected in the upward mobility of the community,

evident in all indicators. But roads without a proper drainage system in such an ecosystem cause water-logging and aggravate flooding, which in turn make the landscape uninhabitable. This happens in the absence of a specific, community-linked environmental governance framework and implementing mechanism.

At Chilavannoor in Kochi and in Cherthala, south of Kochi, both of which fall within the Vembanad ecosystem, apartments and hotels were demolished after the authorities found that these structures were in serious violation of the coastal zone regulations. The fact that these structures were allowed to come up reflects the failure of all tiers of governance, from local governments up to the judiciary.



A structural shift is taking place in agriculture in Kuttanad with the re-emergence of lease-based farming.

Experts in soil and water for environment works





OFFICIALS RESCUE villagers out of a flooded area near Kochi on August 15, 2018.

Summer rain in May 2020 and April 2022 lashed the region, destroying thousands of hectares of the "puncha" paddy crop. In 2007, the M.S. Swaminathan Research Foundation submitted a report titled 'Measures to mitigate agrarian distress in Alappuzha and Kuttanad Wetland Ecosystem', in which it suggested a host of measures to address the various issues faced by the landscape.

A key proposal involved a revised crop calendar to regulate paddy cultivation in the region. In 2019, the State Planning Board revisited the report and proposed a detailed calendar for various agro-ecological zones of Kuttanad.

The report suggested that agricultural operations be carried out in such a manner that the "puncha" crop is harvested by March-end and the second crop by September. Implementation of the crop calendar in discussion with farmers would have helped the region in many ways: the "puncha" crop could have been rescued from the summer rain to a great extent, while the TSB could have

been opened, which would have resulted in natural tidal flushing and fish migration.

A structural shift is taking place in farming in Kuttanad with the re-emergence of lease-based farming. Vast stretches of paddy fields are being leased out, bypassing existing ceiling limits. This is a post-1990s phenomenon that started off in a small way but has now expanded enormously.

This structural shift, which makes a mockery of regulations and restrictions, also impedes the formulation of a climate-resilient development framework for the region.

RESILIENT KUTTANAD

Kuttanad has shown amazing resilience and adaptation through its development history. Annual cropping instead of cultivation in alternate years began in the 1940s. With the commissioning of the TMB and TSB, it became popular to cultivate a second crop.

In the 1960s, the entire region shifted to high-yielding varieties, starting with IR-8 procured from the

International Rice Research Organisation.

In the late 1970s, the Rice Research Station at Mancombu developed a new strain, 'Bhadra', that was resistant to brown hopper attacks. Kuttanad swiftly shifted to Bhadra and now it has moved on to Uma, a popular variety developed by the regional station of Kerala Agricultural University with a productivity of 6-6.5 tonnes per hectare.

The region also witnessed a sudden shift from highly polluting organo chloride pesticides to non-accumulating organo phosphates. All scientific research has shown that pesticide usage has come down drastically.

The manner in which Kuttanad recovered after the 2018 floods was encouraging. It recorded a bumper harvest in the following season. However, it is saddening that a specific, long-term strategy has not yet been evolved to protect the region and its residents from the fallout of climate change. □

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