TRIBUTE

An Integrated Vision for Kuttanad

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The "M" in M. S. Swaminathan's name is Monkombu, a small village, once an island, in the southern State of Kerala, India. It is part of a larger region called Kuttanad, today famous for its scenic backwaters and house boats.[1] Kuttanad is also a region that has attracted the attention of agricultural scientists and ecologists for over a century owing to its key agroecological feature, the wetland cultivation of paddy at 1 to 2 metres below sea level. It is not unlike the Dutch polder system, though here the fields were formed by draining delta swamps in brackish waters. The Kuttanad Wetland Ecosystem is recognised by the Food and Agriculture Organisation (FAO) as a Globally Important Agricultural Heritage System (GIAHS). It is also a wetland site designated to be of international importance under the Ramsar Convention.

Although Swaminathan was not born in Monkombu, he had deep familial ties with the region. Members of his paternal family migrated to Monkombu from Kumbakonam in the neighbouring State of Tamil Nadu in the 19th century. Swaminathan's paternal grandfather was a recipient of grants of paddy land and buildings from the Ruler of Ambalapuzha. The family house was called "Kottaram" – a reference to the gift of a "Traveller's Bungalow" to the family from the Ruler (Iyer, Kumar and Iyer, 2002). At the age of 15, Swaminathan shifted from Kumbakonam to Thiruvananthapuram for his studies. While at the University College at Thiruvananthapuram in the early 1940s, he had opportunities to visit the family's house in Monkombu, 150 km away. These visits were his first brushes with the agricultural problems of Kuttanad. His attachment with Kuttanad grew over time, and his academic and personal interest in the region continued till his death in 2023.

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[1] Monkombu is also spelt Moncombu and Moncompu.

The Kuttanad Wetland Ecosystem

In one of their first lectures on soil science, students of agriculture in Kerala are familiarised with the six "problem soils" of the State. Kuttanad soils are placed at the top of the list. Submerged under water for prolonged periods, the soil here is poor in drainage and prone to floods and waterlogging. It is also highly acidic (pH less than 3) with toxic levels of iron, aluminium, and manganese, and low levels of calcium, magnesium, and potassium. Cultivation under such conditions is also highly risky, as heavy rain leads to the regular breach of field bunds. During the once-in-a-century flood of 2018, Kuttanad was acutely affected; more than 50,000 houses in the region were fully or partly submerged.

Spread over about 55,000 ha in 10 taluks (sub-district administrative divisions) across the three districts of Alappuzha, Kottayam and Pathanamthitta, Kuttanad's geography is marked by a deltaic formation that arose out of the confluence of five major rivers, namely, Achancovil, Manimala, Pampa, Meenachil and Muvattupuzha. About half of Kuttanad's area lies 1 m to 2 m below mean sea level. Here rice is cultivated in below-sea-level fields that were reclaimed, with the active encouragement of the rulers of Travancore, from the Vembanad Lake in the 19th and 20th centuries.

In order for us to gain a scientific understanding of the problems of agriculture in Kuttanad in the present day, these problems must be seen in historical perspective. A low-lying region drained by five major rivers is naturally flood-prone. Consequently, before the 1960s, Kuttanad had only one rice crop (*puncha*) grown in the non-monsoon months, and even that was severely affected by saltwater intrusion from the sea. The cropping system was associated with high levels of unemployment and poverty in the region.

The rulers of Travancore tried to address what were identified as the two major constraints to development in the region: the problem of floods during the monsoon, and the problem of saltwater intrusion in the post-monsoon months. If there was a way to better drain the monsoon waters into the Arabian Sea, a second crop would become possible in the monsoon months; and if there was a way to prevent the intrusion of salt water into the Vembanad Lake in the post-monsoon months, the existing *puncha* crop could be cultivated more securely.

For this purpose, three plans were put in place (see Figures 1 and 2). The first of these was the proposed construction of a spillway at Thottappally to drain floodwater from the Pamba, Achankovil, and Manimala rivers into the sea. The second was the construction of a salt water barrage (or a bund) at Thanneermukkam in the north to prevent intrusion of salt water into the Vembanad Lake from the Kochi side. The third was the construction of a road-cum-canal connecting Alappuzha in the west and Changanacherry in the east to drain floodwater from Upper Kuttanad into the Vembanad Lake. Additionally, there were plans to construct permanent bunds

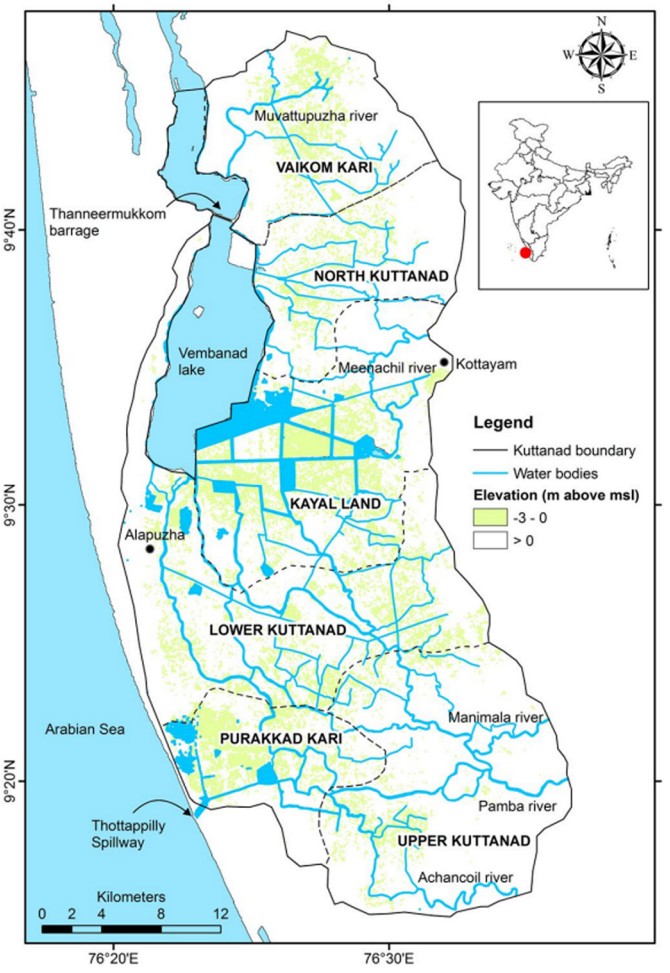

Figure 1 *Map of Kuttanad region with the major landmarks and cropping systems*
Source: Sreeja, Madhusoodhanan and Eldho (2015)

around all the *padasekharam*s (a *padasekharam* is a collection of fields suitable for a common cultivation programme or common agricultural operations), the rationale being that if a monsoon crop was to become possible, field bunds needed the strength to withstand strong floodwater flows.

The construction of the Thottappally Spillway was completed in 1958. The first phase of the Thanneermukkam Bund was completed in 1965, and the second phase in 1975. The third phase was completed only in 2018. Work on the Alappuzha-Changanacherry Road (the AC Road) was completed by the 1990s. The AC Canal, which was to run parallel to the AC Road, remains incomplete to this day.

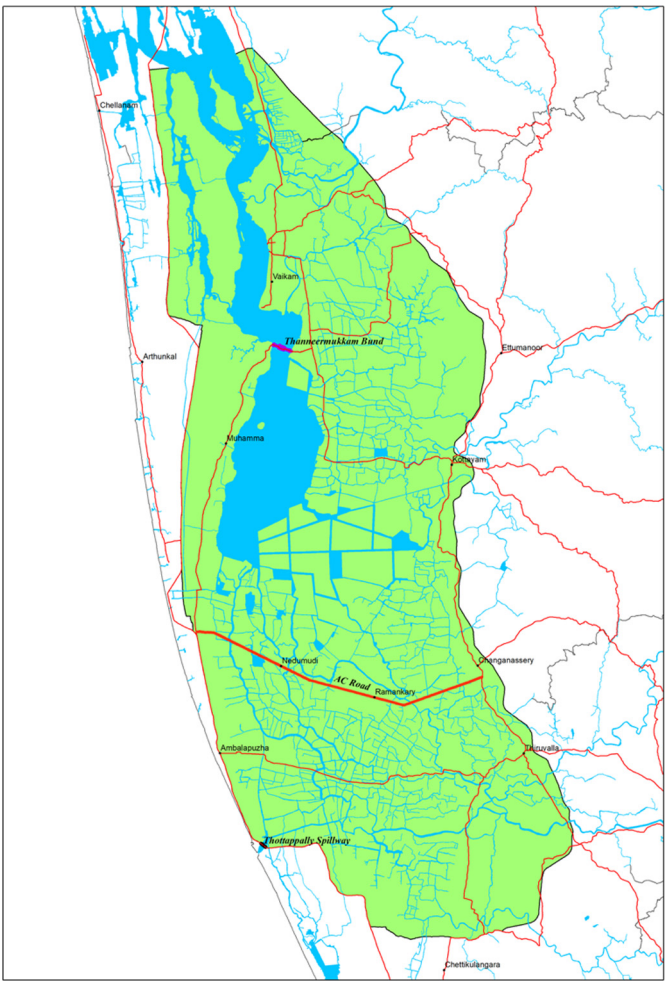

Figure 2 *Map of Kuttanad region with the Alappuzha to Changanassery (AC) Road marked*
Source: Kerala State Land Use Board

The Swaminathan Commission

The Thottappally Spillway and the Thanneermukkam Bund were partially successful in draining monsoon water out of Kuttanad and preventing saltwater intrusion into the region. There were problems with their design and operation that reduced their efficacy, and these remain a matter of debate even today. By the 2000s, there was much written on how government policy had failed the region and its people.

Fundamentally, the divergent views on Kuttanad were rooted in the very nature of the region as well as the conflicting pulls of various socio-economic sections residing in the region. I shall cite only two examples.

First, Kuttanad is a water-centric ecosystem. It has a complex system of five rivers opening into several bowl-shaped islands with a web of larger and smaller canals. While these features made the region highly flood-prone, policy efforts over time placed emphasis on expanding paddy cultivation in the region. But paddy cultivation would be viable only if the polders were made flood-proof. The gushing monsoon waters between June and August breached bunds and destroyed standing crops. The spillway was an effort to drain out excess water, but its capacity remained unutilised. Even if the spillway had worked well, any effort to eliminate flood threats in Kuttanad were likely to fall short.

Secondly, the conflict between agriculture and fisheries remained central to policy challenges in Kuttanad. Any effort to promote paddy would require that water be made less saline. Doing this would adversely affect the cultivation of marine and brackish fish species. Although a balance across saline and non-saline phases could be achieved theoretically by using a schedule for damming water at and releasing water from the Thanneermukkam Bund, variations in the weather could disrupt these schedules, causing conflicts between farmers dependent on rice cultivation and fish workers dependent on fishing.

This was the context in which the M. S. Swaminathan Research Foundation (MSSRF) was asked by the Government of India to prepare a report on the economic and ecological problems of the Kuttanad Wetland Ecosystem in 2005. Swaminathan was to head the Commission. Although the specific mandate was to suggest measures to address agrarian distress among farmers in Kuttanad, the report grew into a master plan for the eco-restoration of the whole Kuttanad region (see MSSRF, 2007).

The MSSRF report, popularly known as the "Swaminathan Commission Report," was an important landmark in public policy engagement with the problems of Kuttanad. Its recommendations gave birth to the Kuttanad Package, with funding from the Union and State governments. The Report shaped much of the policy discourse on Kuttanad after 2007. The remaining part of this note will focus on the approach and contents of the report.

A Scientific Approach to Kuttanad's Problems

The Commission studied all earlier reports on Kuttanad and had detailed discussions with farmers, government officials, academics, civil society groups, journalists, and individuals with expertise on the region. Some of the authors of the earlier studies and reports were co-opted by the Commission as experts. The Commission received oral recommendations from more than 1,300 persons and about 503 memoranda and proposals. An interim report was submitted in February 2007 and the final report was presented to the Government of India in June 2007.

As a scientist, Swaminathan had no sympathy for the overly romantic notions on Kuttanad's development, such as the advocacy of a return to traditional ways of living and farming, that have had some currency in Kerala's public domain. He did not hold previous infrastructure-centred interventions in Kuttanad responsible for the contemporary problems of the region. Indeed, he recognised the value of these interventions, and the evidence of their contributions to increasing and stabilising agricultural production in Kuttanad. Where these interventions had had negative consequences, such consequences were to be addressed through new and innovative scientific interventions.

Thus, in his foreword to the MSSRF report, Swaminathan described the report as offering "a malady-remedy analysis of the problems and potential solutions." He laid out the major objectives of the report as follows:

> The…*restoration of the ecology and natural assets* to bring back vibrancy in agriculture, income generation, and enhanced livelihood options to the vast number of small farmers, landless labourers, and fishermen. Apart from eco-restoration, forward movement in *productivity, profitability, and sustainability* in small farm conditions are issues of high priority to the region for mitigating the distress in medium and long-term perspectives . . . This will imply that the *livelihood security* of the farm, fisher and other families living in this area must be strengthened through *better infrastructure* and multiple avenues of *market-driven income-earning opportunities*" (pp. i, 8; emphasis added).

Here was an appreciation that the problems of Kuttanad were multidimensional and that the solutions to the problems required "synergy and convergence among the numerous government, non-government, civil society, and other agencies." There was a need to move away from departmental compartmentalisation, and towards a "Kuttanad regeneration symphony" with "a well-coordinated orchestration of all implementing agencies."

A Summary of Recommendations

The MSSRF report of 2007 contained a detailed analysis of the historical and contemporary problems that plagued the Kuttanad wetland ecosystem. It structured its recommendations under five heads. These were (a) strengthening ecological security; (b) agriculture-based livelihoods; (c) inland fisheries-based livelihoods; (d) water tourism; and (e) the implementation mechanism. I do not wish to detail each recommendation – see Figure 3 for a list – but shall limit myself to a brief introduction to the broad approach of the report.

First, the report suggested a master plan for the restoration of the Vembanad Lake, whose flood carrying capacity had shrunk by about 78 per cent over a century. Though much of the monsoon water could be stored in the lake in earlier years, its subsequent shrinkage had intensified the risk of flooding in Kuttanad. The lake had

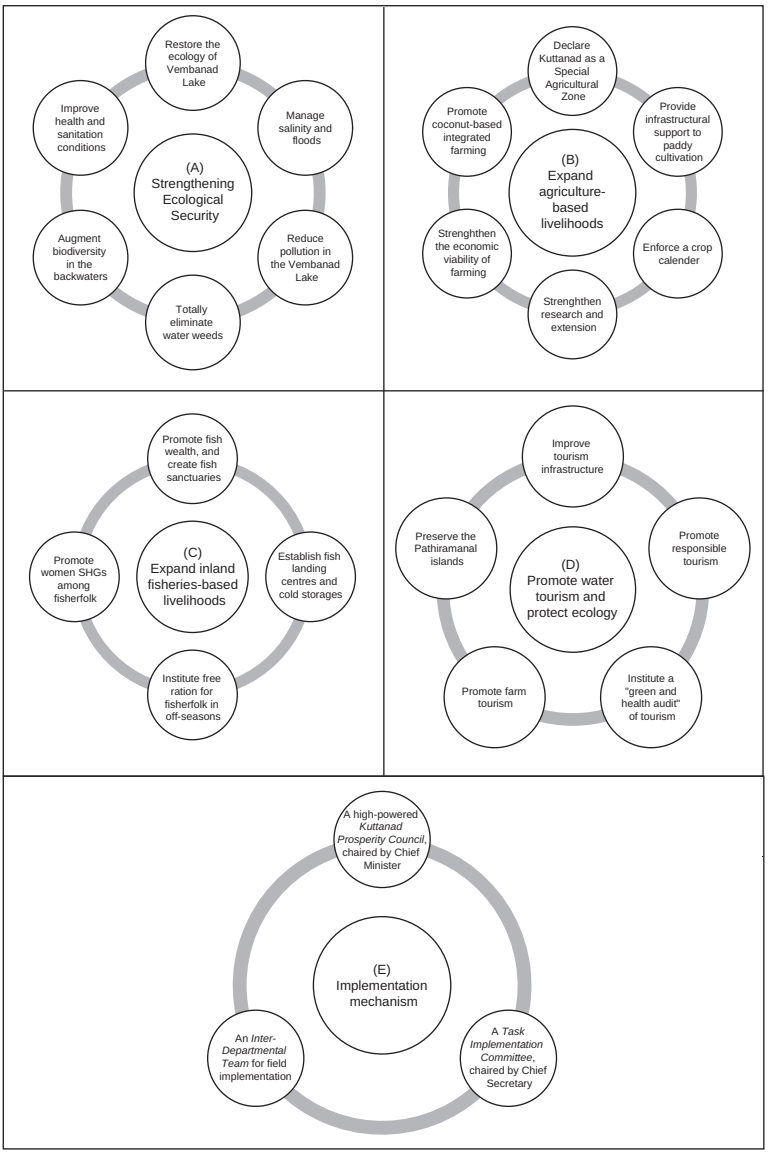

Figure 3 *A summary of recommendations in the MSSRF Report on Kuttanad, 2007*

shrunk because of unchecked encroachments, reclamation of the lake area, and the rise of the lakebed because of silting. The report recommended that the boundaries of the lake and its canal networks be demarcated (by using detailed satellite imagery) and thus protected from encroachment and reclamation in the future. All illegal encroachments were to be vacated and a 4 to 6-metre-wide strip of "ecotone," planted with mangroves or coconut trees, should be put in place between the mainland and the lake.

Secondly, the report suggested measures to manage floods better. The Thottappally Spillway's flood management capacity was only 30 per cent of its original designed capacity because of the inadequate width of its leading channel, the poor quality of its side-bunds and the persistent formation of a sand bar near the sea mouth. The report recommended measures that included modernising the spillway shutters, widening the leading channel with side-bund protection, and improved management of the working of the spillway.

Thirdly, the report outlined a scientific approach to salinity management in the Vembanad Lake. It urged that the third stage of the Thanneermukkam Bund be completed as early as possible. Most importantly, it recommended that the Bund be closed for a minimum period every year, from 15 December to 15 March. More recently, Swaminathan also favoured intensifying research to develop short-duration varieties of paddy that would facilitate an early harvest of the monsoon crop that would synchronise with the Bund's schedule. The Commission also recommended the construction of 33 more structures for the regulation of water flows in order to prevent the entry of saline water and thereby stabilise rice cultivation in Kuttanad.

Fourthly, the report noted that most of the waterways in Kuttanad were blocked by unscientifically constructed roads, bridges, and culverts, and by silt and aggressive waterweeds. As a result, there was flooding and waterlogging, bunds were breached, and waste accumulated. Other consequences of these obstructions were the breeding of predatory fish species, the spread of water-born parasites and pathogens like *Leptospirae* and *Vibriocholerae*, the degradation of water quality, and obstructions to navigation. The report recommended that renovation be undertaken in about 700 km of canals (*thodu*) and in about 55 public ponds. The Commission further suggested that three major obstructions in the area of the Vembanad Lake be removed. The first and second of these lay between the C and D Blocks in Pulinkunnu, and between the Rani and Chithira blocks in Kainakari. The plan was to create a new canal – *Kochar* – to speed up the draining of flood water into the Vembanad Lake. The third obstruction was caused by the failure to complete the AC Canal. The report recommended that it be constructed in order to regulate water flow from Upper Kuttanad into the Vembanad Lake. These improvements were expected to considerably reduce the problem of flooding in Kuttanad.

Fifthly, the report suggested better management of the problem of aquatic weeds. The cultivation practice of one-paddy-one-fish was also likely to reduce weed growth, as it would help entry of saline water into Kuttanad for a greater number of months. A new crop calendar was also suggested to meet this objective.

Sixthly, the report recommended measures to augment animal and fish biodiversity in Kuttanad. The Pathiramanal Island- – an area with pristine biodiversity – was to be restored and maintained. The Commission recommended that mangrove restoration work begin along the borders of the Vembanad and Kayamkulam lakes. It

recommended that special programmes be introduced to revive and promote the production and productivity of pearl spot (*karimeen*) fish, and freshwater prawn.

Seventh, the report suggested that successful eco-restoration of Kuttanad wetlands would, by itself, go a long way in reducing the health and sanitation hazards among the people living there. It suggested a programme for reviving ponds, canals, and other natural water storage systems to augment supplies of clean drinking water.

Finally, a three-level implementation mechanism was also suggested in the report, which envisaged convergence across departments and agencies, as well as effective monitoring.

The MSSRF report gave rise to the first Kuttanad Package in 2009. This package – a series of schemes of the government – was to be financed by the Union and State governments. The only publication that has a composite account of the different activities undertaken as part of the first Kuttanad Package, and expenditures incurred, is of the Kerala State Planning Board (KSPB, 2019). This assessment lists the substantial achievements that were realised under the first Kuttanad Package. It also noted that most schemes under the Package were implemented, but without convergence between different departments. As a result, the design and implementation of the package was fragmented and disorganised.

Throughout the period of implementation of the report, Swaminathan was keen on being informed about the progress in its implementation. When I met him in 2018 to discuss the contours of a second phase of the Kuttanad Package – after the floods of 2018 – he was happy to note the progress achieved, but also rued the lack of coordination across departments, and the consequent absence of an integrated strategy and response. He said, "We gave a very detailed report, but only a few recommendations were actually implemented."

In an interview in August 2018, after the floods had begun to recede, Swaminathan said:

> "I hope that, as a result of the unprecedented floods, the government will again go into the package, see how it could be strengthened; how it should be modified; and how it should be implemented . . . I am sure that there will be a new package, which will be more holistic, which would also look at jobs and incomes…" (Mathrubhumi News, 2018)

The Second Kuttanad Package and After

After the floods of 2018, the Chief Minister of Kerala asked the Kerala State Planning Board (KSPB) to prepare a second Kuttanad Package (KSPB, 2019). The new report tried to ensure continuity with the approach adopted in the MSSRF report. It sought to build on the MSSRF report even as it included new responses to new challenges, and absorbed the lessons learnt from the implementation of the first Kuttanad Package.

A team from KSPB (of which this author was a part) met Swaminathan twice – first to discuss the approach of the Second Report, and then to share its findings and recommendations with him. Swaminathan was most helpful; he spent many hours with us and provided detailed points of advice and modifications to our suggestions. The final report submitted to the Government of Kerala had, without doubt, his approval. The report is now in the early stages of implementation.

Swaminathan's academic and policy interventions in Kuttanad reflected his love for the land and people of Kuttanad. For instance, the MSSRF was instrumental in recommending that Kuttanad be declared a Globally Important Agricultural Heritage System (GIAHS) by the FAO. Under Swaminathan's supervision, the MSSRF prepared the initial proposal in collaboration with local organisations and community members. A team from the MSSRF conducted studies, organised field visits and surveys, and conducted discussions with different departments of the State government before submitting a detailed final report to the FAO.

In return, Swaminathan was deeply loved by the people of Kuttanad. Residents of Monkombu referred to him as "our son," one who had made their village famous globally. As an occasional visitor to the Monkombu village, I have often seen posters and banners with Swaminathan's photograph, celebrating an award he won, greeting him on his birthday, thanking him for a grant to the local school, and after September 28 2023, condoling his death.

A true tribute to Swaminathan's legacy would be to ensure that his vision for the development of Kuttanad is realised in practice. Public policy at the Union and State levels must prioritise plans and measures that ensure a progressive, equitable and sustainable future for Kuttanad and its people.

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