THRIVABLE INSIGHTS FROM THE THRIVABILITY MATTERS WEBINAR

Hi, passionate thrivability enthusiast. We live in unprecedented times. The numbers prove that climate change is here to stay. Social injustices corrupt the very fabric of our society, and misinformation and false narratives clog our devices through mainstream and social media. It's important to have reliable information from people who stand to gain nothing from sharing it with you. A person's agenda defines their motivation. THRIVE's agenda is to assist others to build a thrivable future, while our passionate volunteers walk the talk to deliver an authenticity that is difficult to find elsewhere.

Every month, THRIVE delivers a knowledge-filled webinar, straight to your screens, providing statistics, facts, tips, tricks, and hints on how we can solve the problems our world faces everyday. from new innovations and discoveries, to the actions that people and communities take every day to make our world just a little more thrivable.

Each month, a particular solution is unpacked, disseminated, and investigated, to see how it applies to us and how we can play as a global team, on the playing field of Earth, to reach these goals. It isn't enough for us to sit passively by and let governments and businesses make our decisions for us. After all, their motivation is driven by their agenda.
What does that mean for us?

Our aim is to arm you with the knowledge to change from being simply sustainable to terrifically thrivable. Therefore, I'd like to introduce you to Sathish Moses.
He was an esteemed guest for the September 2024 Thrivability Matters Webinar, who spoke to us on SDG 11: Sustainable Cities and Communities. Sathish's focus was building resilient marine ecosystems through a transdisciplinary approach. The thrivable insights that follow are his precious pearls of wisdom that he was generous enough to share with us during the Q&A session that follows every webinar.

INTRODUCING SATHISH MOSES

Guided by a vision of "Living Architecture," Sathish Moses focus on finding solutions to real-time environmental challenges by working closely with nature. Over the past 16 years, his experience spans a wide range of projects, from micro to macro scales, emphasizing the circularity of materials and resource recovery. Sathish have worked on the development of biocomposites and explored how design and spatial applications in real world environments can drive environmentally led socio-economic development within communities.

Q & A

How can local communities, particularly those dependent on marine resources, be involved in the saving marine biodiversity?

A participative approach involving the inclusion of local communities and women is a key through which the Community can be made into strong stakeholders of marine biodiversity conservation. It requires developing biodiversity management approaches and tools using the traditional knowledge systems that exist within them. Only then can an intersection of all three aspects of fishery (Economic, Environmental / Biological, and Social) can be achieved.

This has to be further linked to building sustainable livelihoods for the community by developing programs that promote alternative income sources, such as eco-tourism or sustainable aquaculture, to reduce pressure on marine resources. Another way is to encourage sustainable fishing practices through certification schemes that can enhance market access for local fishers.

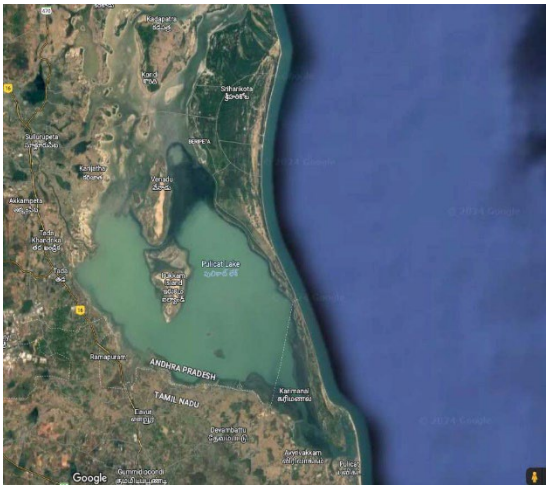


Figure 1: Pulicat Lake - A Socio-Economic-Ecological Marine Ecosystem

About 50 km north of Chennai, Tamil Nadu, is Pulicat Lake, the second largest brackish water ecosystem in India. Known as Pazhaverkadu, meaning “forest of the rooted fruit”, Pulicat Lake was once covered by dense mangrove trees. But over the centuries from mangroves being hacked for the construction of a Dutch fort in the 1600s, to the gradual clearing of forests owing to spreading urbanisation and industrial expansion, the mangroves of Pulicat have now been reduced to sporadic patches along the coast. And the mangroves’ destruction for industrial expansion have both severely affected biodiversity and endangered the livelihood of the

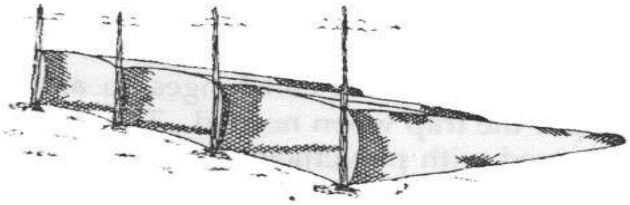
fisherfolk who depend on the mangrove ecosystem.

Also, the wetlands of Pulicat are important because of the mosaic of different ecologies that can be found here. The Kosasthalai, Arani, and Kalangi rivers that empty into this lagoon make it possible for riverine floodplains, tidal flats, salt pans, mangroves, tropical dry evergreen forests, backwaters, coastal sand dunes, sandy beaches and the large Pulicat ecosystem itself to exist. He goes on to add that the mangroves of Pulicat Lake also acts as a natural buffer against floods. The bioregion is Chennai's largest flood catchment area and cyclonic buffer zone; for a city that's constantly frequented by cyclones, it's important that this land is preserved. About 100,000 people living in 200 villages around Pulicat Lake depend directly on its highly productive lagoon ecosystem with its rich fishery resources for their livelihood. This large and fragile wetland ecosystem is currently struggling from the pressures of human activities in the area.

Unless there is an intersection of local communities, their economic livelihoods and the ecosystem containing all these marine resources, it will be impractical to achieve conservation efforts. This is a very strong context where resilience at intersections could be looked at. By fostering a sense of ownership, providing education, and creating sustainable alternatives, the local communities of Pulicat will play a vital role in the conservation of marine biodiversity. Collaboration, respect for local knowledge, and equitable resource sharing are essential for achieving long-term resilience and ecological health of this region.

Figure 2: The Intersection of Ecosystems, Communities and Livelihoods

The evolution of human cultures has traditionally helped build cities and spaces. In reference to this, to what extent can traditional knowledge of India's coastal communities be integrated with modern science to develop resilient marine ecosystems?



Figures 3 & 4: Pulicat's Padu System

The fishing communities in Pulicat practice the Padu system; a traditional system of allocating fishing rights to eligible fishermen in the lagoon area. This originated with the dominant Pattanavar community, but is now being practiced by people from other fishing communities in

the region as well. The term 'Padu' means 'fishing site'. The Padu system follows spatio-temporal regulations, with fishermen granted access to specific fishing grounds by rotation. This means that all eligible fishers can eventually access all fishing grounds.

The system depends on a traditional patriarchal institution at the village level called the 'talaekettu'. Every male above the age of 18 belonging to the Pattanavar community is eligible to become a member of the talaekattu and gain access to the fishing grounds. Membership rights to new members are bestowed by the village elders. The talaekattu makes decisions related not only to fishing but also to conflicts and disputes among villagers, and drag-nets (badi valai), shaped like shore seines, for all fish species.

The predominant fishing community in the area is the Pattanavar community. In the last few years, some dalit (people traditionally assigned a low status in the caste hierarchy) community members have also started fishing near the mouth of the lake.

There are two ways of viewing this traditional resource management system. The Padu system ensures a harmonious and conflict-free life for everyone in the village as it implements an equitable distribution of fishing grounds irrespective of the skills of the fishermen. It can also be seen as a resource management initiative. That despite the number of fishing villages in the region increasing from three to 24, the Padu system has spread to cover the new villages, with each village designating its own Padu area. The villagers have thus managed to avoid conflicts over resource use.

A very different picture of the Padu system emerges, however, from fisherwoman from Pulicat. Women in these fishing villages are not members of the talaekattu and hence have no rights over fishing in the Padu system. Most women are involved in selling and drying fish that are caught by their husbands. So, in case of households where there are no male children, on the death of the fisherman, the Padu rights automatically revert back to the system, as the wife or daughter is not entitled to such rights. Therefore, we see how traditional community resource management systems, even while addressing issues of equitable resource use and conflict resolution, can embed within themselves a gender bias. However, even as resource constraints are forcing the system to change, women are beginning to find ways of asserting their rights. Earlier, women-headed households had no access to village funds. But now, with the establishment of self-help groups in these villages, women are coming out and discussing some of their problems. They have started taking part in a few village-level activities. Women were earlier not allowed to work outside the household; it is only recently that they have started working in the markets.

This gives an enumerated picture of traditional fishing practices which were very resource conscious and sustainable, so the focus can be oriented towards how these traditional resource management systems can be further strengthened using modern science in building resilience. By blending traditional knowledge with modern scientific approaches, we can create more resilient marine ecosystems that benefit both local communities and biodiversity. This integration not only enhances ecological health but also strengthens community ties and fosters sustainable livelihoods, creating a holistic approach to marine conservation in India's coastal regions.

Figure 3: Fishing Methods used in Pulicat Lake

Through your experience can you share some of the challenges you faced in implementing transdisciplinary marine conservation strategies in India, and how you overcame them?

India is the 'land of diversity'. On one hand, it is a strength, but on the other hand, the fragmented diverse ecosystems and livelihoods are leading to conflicting interests in resource use, especially in the face of climate change.

Diverse beliefs, practices, and customs sometimes lead to misunderstandings or conflicts between communities. Regional and ethnic identities create fragmented landscapes, making governance more complex and often polarising.

Also, conflicting interests among stakeholders such as fishermen, tourism operators, government agencies, and conservationists also hinders collaboration. Additionally, existing policies don't support innovative transdisciplinary approaches, creating regulatory hurdles.

The impacts of climate change and ongoing environmental degradation complicate conservation efforts, making it difficult to predict outcomes, and securing adequate funding for transdisciplinary initiatives is very challenging, especially in resource limited settings. To this end, we have used these solutions:

1. *Aligning with diverse stakeholders*

Figure 4: Diverse Stakeholders

To converge all these fragmented and diverse entities, we have been working on collaborative models of work. Our work converges on how to establish inclusive platforms (like the interlocking modules that we have designed and developed) for dialogue that bring together all stakeholders. We are trying to facilitate connections through continuous meetings to discuss shared goals, emphasising the benefits of collaboration. In the process, we align our direction with all parties concerned including institutions, locals, governments, and research bodies who are involved in the local context to help navigate conflicts thereby achieving the integration of traditional and scientific knowledge.

2. *Building Institutional Collaborations like the National Institute of Ocean Technology, IIT Madras, CSIR-National Metallurgical Lab etc*

While there are significant challenges to implementing transdisciplinary

marine conservation strategies in India, these can often be overcome through collaborative approaches, mutual respect, and a commitment to integrating diverse forms of knowledge. By fostering strong partnerships, building capacity, and ensuring that policies support innovative solutions, stakeholders can work together to create resilient marine ecosystems that benefit both communities and biodiversity.

Figures 5 & 6: Institutional Collaboration Example

Would it be possible for you to share some numbers regarding the cost, maintenance, lifespan, and time to build such breathable houses in comparison to traditionally built houses? Also, can they be built anywhere and everywhere in all climate/geographical zones?

Yes, the system can be adopted anywhere as it works on artisanal manufacturing. The system can be easily trained and adopted to different communities and this will pave the way for a new method of community based housing development.

The comparisons are attached as an image on the next page.

Breathable houses can offer significant long-term benefits in terms of energy efficiency and sustainability. Their adaptability to different climates is possible but requires careful planning. Unlike current options, such as cement, the composite of clay-lime allows the walls of a building to breathe. The slaked lime in the composite naturally reverts to limestone by capturing ambient CO2.

This is called carbonation (or mineralisation by carbonation) and is essential for long term strength gain. The structure acts as a carbon sink capturing CO2 from the atmosphere, which reacts with the lime to produce calcium carbonate crystals. This does not occur with concrete, as it is not a material which responds to

TECHNICAL COMPARISION OF 3D REBAR MESH STRUCTURE

SNO	ACTIVITY	RCC Structure	Steel Deck Structure	Precast Structure	3D REBAR MESH
1	STRUCTURAL SYSTEM	Framed Structure with RCC	Framed Structure with Steel	Frames structure with Precast Structural Components	Loadbearing System with continuous 3D Mesh
2	FOUNDATION	Isolated/Combined RCC Footings continues as RCC Columns above	Isolated /Combined RCC footings continues as Steel Columns with Bolted to plates	Isolated/Combined RCC Footings continues as Precast Columns above	Continuous Raft Foundation made of 3D Welded space frame mesh and the total structure continues as an integrated box
3	SUB STRUCTURE	Grade beam and Plinth beam ties using RCC .Substructure is Formed using Block works / Bricks to form base pad	Grade beam and Plinth beam ties using RCC .Substructure is Formed using Block works / Bricks to form base pad	Grade beam and Plinth beam ties using RCC .Substructure is Formed using Block works / Bricks to form base pad	Continuous Raft Walls and substructure is formed using these rafts, there are no additional block works
4	SYSTEM CONTINUITY	Continuous System from Foundation to Super structure using RCC Framing & Block work used as infill to create the base pad as it is a below ground activity	Discontinuous System from Foundation to Super structure as Steel is only used above Substructure	Discontinuous System from Foundation to Super structure as Precast components are only used above Substructure	Continuous System from Foundation to Super structure giving a homogenised continuity
5	SUPER STRUCTURE	Columns and beams framing using RCC	Columns and beams framing using Steel Members	Columns and beams framing using Precast Components	Continuous walls & Slabs
6	WALLS	All internal & External Walls through Block work using preferred Material	All internal & External Walls through Block work using preferred Material	All internal & External Walls through Block work using preferred Material/Precast Walls can also be used	All Internal & External Walls using 3D Mesh
7	FORM-WORK	Shuttering & Centering for columns ,beams & Slabs	Doesn't require much of a formwork as it is decking slab and other members are steel	Formwork required wherever Joining of the precast components happens	Integrated Formwork required, Options of using Hessian Burlap interlacing
8	ERECTION	Cast In Situ Process	Steel Fabrication at Factory & Assembling at Site Requires Machinery for Handling and Erection due to it weight	Precast at Factory & Assembly at site-Requires Machinery for Handling and Erection due to it weight	Steel Fabrication at Factory & Assembling at site.Requires very light machinery as the steel Mesh is easy to handle
9	SERVICE UTILITIES	Concealing of Electrical Conduits and Plumbing pipes to be preplanned in RCC Members and chasing required to conceal these in Block work	Concealing can happen in Deck system, but wherever there are steel members concealing the service utilities becomes difficult	Concealing in Precast is not quite advisable as it will chase the integrated wall & slab panels	Concealing of service conduits happens within the 3D Mesh
10	GREY SHELL COMPLETION	Plastering to integrate all components Walls,Slabs ,Columns and Beams	Plastering required but Steel Members are exposed and requires some additional panelling to get an aesthetic finish	Plastering is required if concealing of Service elements needs to be done as a separate layer	If proper formwork is used there is no Plastering required. If Hossain Burlap Interlacing is used,Plastering becomes the formwork
11	SEISMIC DESIGN	Since these are Frame Structure, Each structural member column & beam has to be specifically designed for Seismic Forces	Since the foundation to superstructure there are two discontinuous systems, the Seismic forces have to checked at the joining of these two systems	Since the foundation to superstructure there are two discontinuous systems, the Seismic forces have to checked at the joining of these two systems	Since it is a Uniformly distributed structure and the structural continuity to foundation to super structure is homogenous it has better stability to Seismic Forces. Specific force can be achieved by adjusting the Rebar diameter of the mesh
12	INTERIOR ELEMENTS	Wardrobes,Kitchen Shelving,Bed ,Storage are add-ons and not part of the structural system	Wardrobes,Kitchen Shelving,Bed ,Storage are add-ons and not part of the structural system	Wardrobes,Kitchen Shelving,Bed ,Storage are add-ons and not part of the structural system	All integrated built in Wardrobes ,Kitchen counters,Built in Beds and Sofas are now part of an integrated structural system, which is very big cost factor in the overall budget of the project, as it ensures comprehensive completion
13	SPEED OF CONSTRUCTION	It is a conventional practice right now	Faster Method as steel erection can be quickly done	Faster Method as Precast erection can be quickly done	Faster Method as it combines different activities to one short operation
14	COST COMPARISON	100% OF CURRENT MARKET PRICE OF CONVENTIONAL RCC STRUCTURE WITH FINISHING	130% OF CURRENT MARKET PRICE OF CONVENTIONAL RCC STRUCTURE WITH FINISHING	130% OF CURRENT MARKET PRICE OF CONVENTIONAL RCC STRUCTURE WITH FINISHING (30% IS REQUIRED FOR ASSEMBLING)	85-95% OF CURRENT MARKET PRICE OF CONVENTIONAL RCC STRUCTURE WITH FINISHING
15	CODE OF PRACTICE	IS 456:2000	IS 800:2007	IS 15917:2010	NEED TO DEVELOP CODES

Figure 7: Comparison of Mesh Structures.

the environment. As a result the average age of cement concrete is only 40 -50 years, whereas these poured earth structures can gain strength and adapt to climate change, meaning they can sustain themselves beyond 100 + years. It also helps regulate the moisture content in walls, also reducing humidity in a room, thereby creating the right setting for a passive cooling through right thermal balance in a tropical setting. The same performance in a temperate setting is not still explored.

India has been actively promoting its marine tourism industry. In what ways can resilient marine ecosystems contribute towards a nation's GDP and the overall growth of the region?

Resilient marine ecosystems can significantly contribute to India's GDP and regional growth through various avenues, particularly in the context of promoting marine tourism. Healthy marine ecosystems attract tourists, generating direct income for local economies.

Coastal communities often have rich cultural practices linked to marine resources.

Promoting these can enhance the tourism experience and provide economic benefits. Resilient ecosystems support sustainable fisheries, leading to higher catches and better livelihoods for fishing communities, which contribute to local and national economies. Promoting sustainable fishing can lead to the development of high-value seafood products that can be marketed domestically and internationally. The marine tourism sector creates jobs not only directly (guides, hospitality) but also indirectly (transport, handicrafts, local markets).

Training programs for local communities in marine conservation and tourism management enhance employability and entrepreneurial opportunities. Healthy reefs and mangroves protect coastlines from erosion and storm surges, reducing infrastructure damage and associated costs. Marine ecosystems like mangroves and seagrasses

capture carbon, contributing to climate mitigation efforts and potential carbon credit markets.

Healthy marine ecosystems provide opportunities for research and education, fostering innovation and attracting investment in marine sciences. Educational tourism focused on marine conservation can raise awareness and contribute to a more informed public, leading to better conservation efforts.

Involving local communities in the management of marine resources promotes stewardship and enhances sustainable practices, leading to long-term resilience. Ensuring that tourism revenue is shared with local communities fosters economic equity and community development. Increased tourism leads to improved infrastructure (roads, ports, facilities), which can benefit local economies beyond just the tourism sector.

Collaborations between government and private sectors can lead to sustainable investments in marine tourism. Healthy marine ecosystems support diverse economic activities beyond tourism, such as aquaculture and artisanal crafts, contributing to regional resilience. Strong marine ecosystems can enhance the overall economic stability of coastal regions, leading to better living standards and reduced poverty.

By promoting resilient marine ecosystems, India can enhance its marine tourism industry, creating a sustainable economic model that supports GDP growth, community well-being, and environmental health. The integration of conservation practices with tourism development is crucial for achieving long-term benefits for both the economy and the environment.

What are some global best practices in marine conservation and circularity, that can India adopt or localise to support its coastal communities and ecosystems?

1. *In countries like Australia and New Zealand, local communities manage fish stocks through traditional knowledge and collaborative governance. One example is a four-year program of community-based fisheries research with Aboriginal Australians was implemented to assess the viability of indigenous Australians' involvement in wild-stock fishery.*

2. *The Great Barrier Reef Marine Park in Australia effectively protects biodiversity while allowing sustainable tourism.*

3. *The United States employs ecosystem-based management to consider entire ecosystems rather than single species, leading to more sustainable outcomes.*

4. *Countries like the Netherlands promote a circular economy, reducing waste and reusing resources, including in the marine sector (e.g., waste management in fisheries).*

5. *In Norway and Canada, sustainable aquaculture practices minimise environmental impacts while enhancing productivity.*

6. *The European Union's Marine Strategy Framework Directive sets clear goals for marine protection.*

There are many more practices in the global context, but how we can take the best learnings and outcomes, and localise the frameworks within the context of a transdisciplinary approach, leading to a local model of development, is a direction we need to take in the future.

If you found value in this webinar, and loved it as much as we did, please register for our next exciting webinar at **thrivabilitymatters.online**.

We can't wait to see you there. Keep on thriving!

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