

# The Challenge of Disasters & Sea Level Rise to the Coastal Communities

## A Case Study of Two States in India

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### Research Background

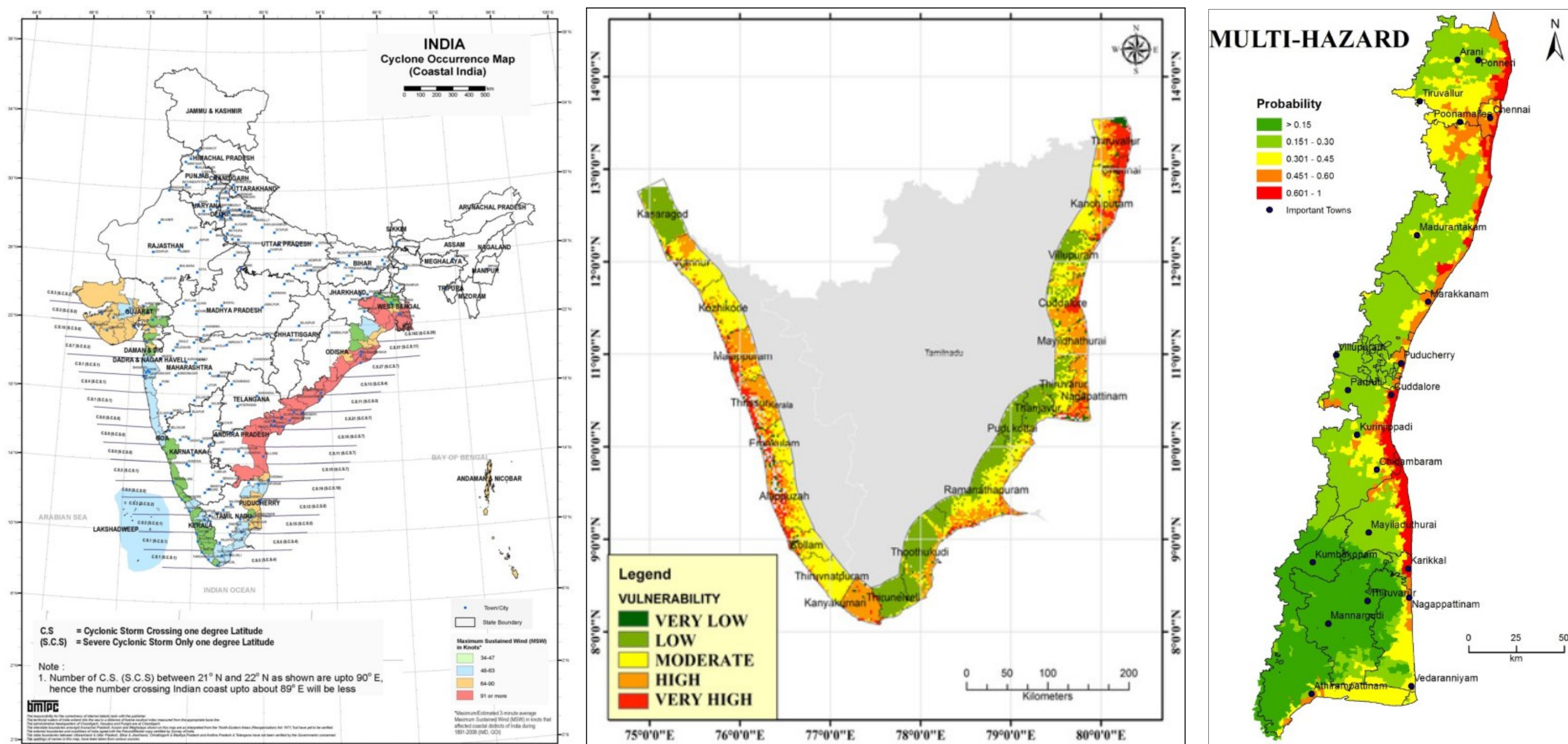


Figure (1-3): Coastal vulnerability of India 1891-2008 (Left), Coastal vulnerability of Tamil Nadu and Kerala 2023 (Center), Multi-Hazard line of Tamil Nadu 2023 (Right). INCOIS, KeAi & MDPI.

Figure (4-6): Heavy rains and flash floods across coastal districts of Tamil Nadu . The Hindu

### Results

Coastal Districts	Oceanic disasters	Knowledge of the hazard & warning System	Government response	Public awareness & Casualties
Nagapattinam, Thanjavur, Thiruvallur, Pudukottai, Karaikal, Cuddalore, Trichy and Ramanathapuram	<b>Cyclone Gaja 2018.</b> Very severe cyclonic storm. 100-165 Km/hr.	tracking cyclone; Color coded warning.	Kerala: Evacuation, relief camps and multi-hazard warning. TN: Early warning issued via re-lays, loudspeakers and LED lights by Tamil Nadu. pre-positioned men and materials to ensure smooth rescue and relief operations.	Kerala: <b>504 dead</b> ; 3.4 million displaced; 110,000 houses damaged/destroyed; 23 million affected. TN: 45 dead; 250,000 displaced; 115,000 houses damaged/destroyed. Warnings through television news and radio. Some individuals took precautions while others did not.
Chennai, Cuddalore and Kanchipuram	<b>Rainfall 2015.</b> Heavy to very heavy rainfall.	Early warning system; A hotline between the IMD and the State Emergency Operation Centre; timely transfer of weather information	Evacuation incoastal and low-lying areas; National Disaster Response Force (NDRF) deployed; Relief centers to provide shelter and assistance. The delayed opening of sluices at the Chembarambakkam reservoir contributed to the flooding.	Tamil Nadu: <b>422 dead</b> ; 3 million affected; 8000 communities affected. Urban flood risks; Spontaneous response of citizens in providing shelter and food demonstrated the importance of community resilience and preparedness.
Wayanad	<b>Monsoon Rainfall 2024.</b> Heavy to very heavy rainfall; Landslides. 280mm.	Discrepancies in forecasts. Early warning systems alerted. IMD warned for flash floods	Government issued "experimental rainfall induced landslide forecast bulletin." Rescue challenged by difficult terrain and destroyed infrastructure.	Kerala: <b>270 dead</b> , 378 displaced, 70 injured, 8500 affected, 85 camps. Need for multi-hazard early warning systems.
Thiruvananthapuram, Kollam, Alappuzha, Kozhikode and Kannur; Ernakulam, Thrissur, Malappuram and Kasargode	<b>Cyclone Vayu 2019.</b> Very Extremely Cyclonic Storm, 110-120 Km/hr. formed over eastern Arabian Sea.	Early warnings; 47 rescue & relief teams pre-positioned/ deployed	Evacuating/relocating; emergency response; Distribution of food	Kerala: <b>85 Dead.</b>
Villupuram, Kallakurichi and Tiruvannamalai	<b>Cyclone Fengal 2024.</b> (Marked a significant rise in extreme weather events; 67 days) 90 Km/hr.	Video conference with district officers; rainfall forecast; monitoring	Evacuation; Relief camps; emergency restoration and rehabilitation fund	Tamil Nadu: <b>25 deaths</b> , 1681 displaced, 7000 people and 149 houses affected.

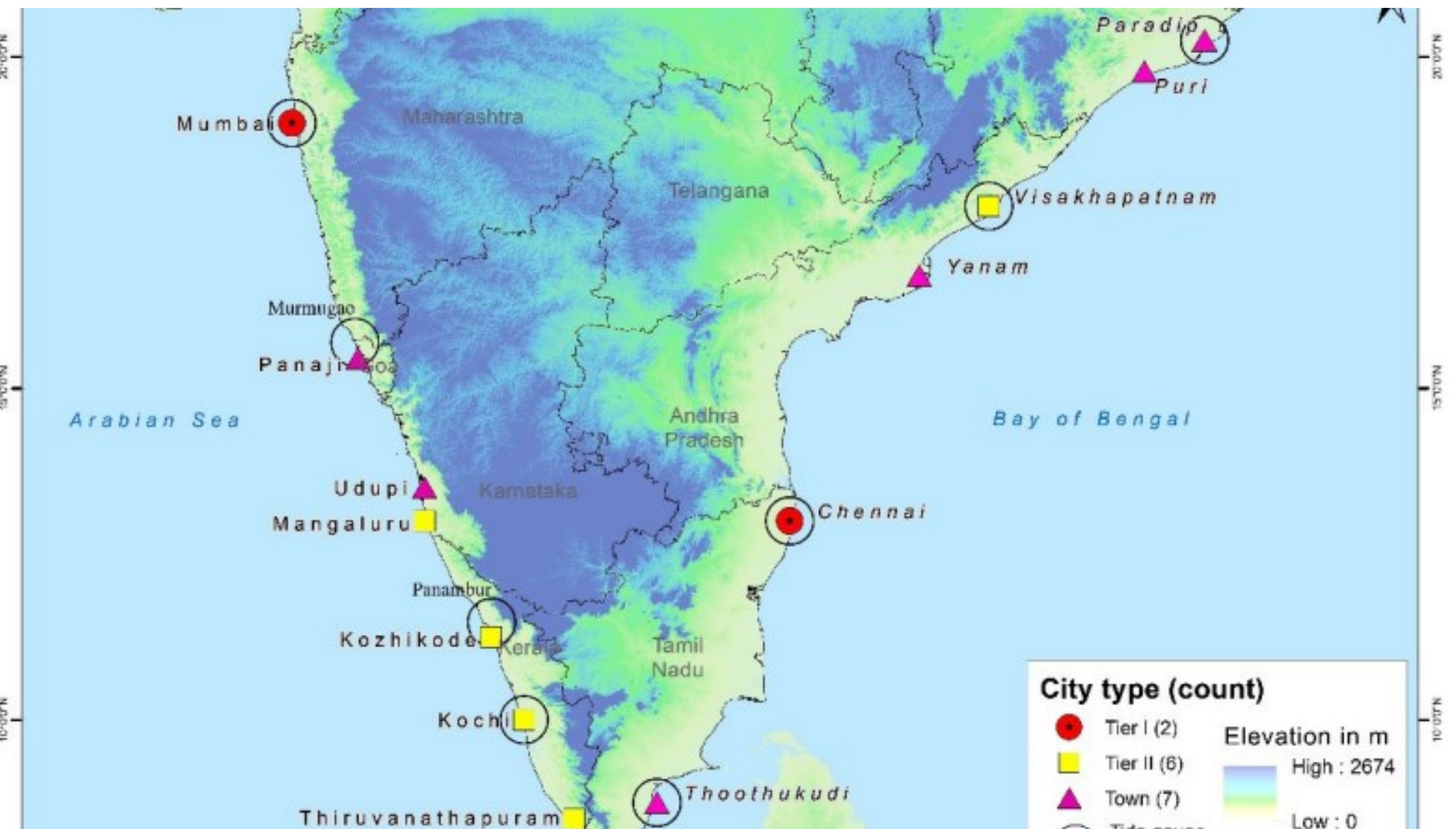


Figure 7: Map highlighting the hotspots of SLR in Kerala and Tamil Nadu. Centre for study of Science, Technology & Policy.

### Conclusion

- # Tamil Nadu sets a new record for the 2015-2025 period with the most frequent "Very Extremely Severe" cyclonic storms.
- # Kerala's seasonal monsoon rains have begun to form a pattern of "Heavy rains and flash floods."
- # Coastal communities in Tamil Nadu seem to rely on the government due to its better disaster response while those in Kerala are more self aware of the precautionary measures in times of a disaster or rely more on NGO's.
- # Tamil Nadu instead of construction of strong infrastructures instead should mark protected zone across coast to prevent loss from SLR.
- # Integration within: The disaster response force of Kanyakumari can be a model for the other coastal districts.
- # Lessons from the Caribbean and Europe to for integrated community based approach for building resilience.



Figure (8,9,11,12, 13): Concrete structures, FGD with fishermen, Marine Police in Kanyakumari, Fishermen in Neerodi, Fishermen in Trivandrum, Banner on plastic ban in Kanyakumari. Figure 10: Rescue of a civilian during flash floods across coastal district of Kerala. The Hindu

