# Asservation of mangroves on the Gulf of Mannar, Tamil Nadu, India

The Indian mangrove cover is dispersed with a total area of 4627.63 sq. km among 12 States and Union Territories. Mangroves are under pressure in the country due to increasing population, development of seaports, salt pan and aquaculture, disposal of harmful industrial leftovers and sewage, development of fertilizer flora and exploitation for refineries. Transformation of mangal forests for aquaculture and residential purposes is also leading to loss of this important ecosystem[1]. Based on the above observations, a concerted and coordinated effort is necessary to undertake management measures to conserve these natural resources. To prevent further destruction of mangrove forests, an integrated approach is required. The conservation of the existing mangrove resources is the first step towards achieving this goal[2]. The mangrove species diversity varies from one place to another due to climate, tidal factors and anthropogenic pressure. In Tamil Nadu, Pichavaram region has a maximum of 12 true mangrove species, whereas only 9 species are represented in the Gulf of Mannar (GoM) region. In the Muthupet region, only eight species were recorded. In all three places, 14 taxa of mangrove species were recorded from the Tamil Nadu region[3].

GoM, the first Marine Biosphere Reserve in South and Southeast Asia, spreads down south from Rameswaram to Kanyakumari in Tamil Nadu. It is situated between 78°08–79°30E long. and 8°35–9°25N lat. in an area of about 21 islands from the northernmost Pamban to Tuticorin. This Marine Biosphere Reserve is situated along the coast of Tamil Nadu covering an area of about 10,500 sq. km in the southeast and parallel to the main coastline to a distance of about 170 nautical miles. The total island area is about 555 ha. GoM is influenced by both the southwest monsoon (from April to July), which is highly erratic, and the northeast monsoon (October to December) rainfall[4]. A survey of the distribution of various mangrove species was carried out in GoM islands like Shingle, Kurusadai, Pullivasal, Poomarichan, Manauliputti, Manauli, Valai, Hare, Muli, Talayari, Poovarasanpatti, Anaipar, Upputhannai, Kasuwar, Valai, Appa, Nallathanni, Karaichalli, Vantivu, Valimunai, Puluvinichalli, Vilanguchalli, Rameshwaram[5].

In GoM, a total of 11 true mangrove species, 17 mangrove associates, and 201 flowering plants were identified. The mangrove species were *Avicennia marina*, *Bruguiera cylindrica*, *Bruguiera gymnorrhiza*, *Ceriops tagal*, *Exoecaria agallocha*, *Lumnitzera racemosa*, *Pemphis acidula*, *Rhizophora apiculata* and *Rhizophora mucronata* belonging to five families with a predominance of Rhizophoraceae. *A. marina* was the most abundant species, followed by *P. acidula*. This was followed in descending order by *C. tagal*, *R. mucronata*, *B. cylindrica*, *L. racemosa*, *E. agallocha* and *R. apiculata*[6].

Mangroves in GoM with considerable diversity support a variety of biological organisms. It is believed that the region was once flourishing with mangrove forests. There are indications that there was overexploitation which led to the disappearance of mangrove species. As a result, species such as *B. gymnorhizha* and *Acanthus ilicifolius* recorded earlier in Rameshwaram have not been seen in recent years. Similar are the cases of *Pemphis acidula* in Pamban and *A. ilicifolius* on Krusadai Island. The increase in the extent of salt pans is yet another factor leading to the shrinkage of mangroves, particularly around Tuticorin. In the islands of GoM small patches of mangroves are present, of which *C. tagal* and *P. acidula* are endemic to these islands. They are not present in any other mangrove forest of Tamil Nadu. With broad conventional methods we can restore this treasure of nature and protect our coastline from hazardous threats of global warming.


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# Mass occurrence of blue button hydrozoan fauna in the Lakshadweep Archipelago, India

*Porpita porpita* (Linnaeus, 1758), the blue button jelly-like predatory plankton belonging to Phylum Cnidaria has been reported as cast ashore by strong winds[1], climate change-mediated sea surface temperature (SST) increase[2] and a northward shift of plankton species[3]. Mass occurrence of *P. porpita* (National Zoological Collections ID ZSIHQ/GNC/P4482/1) was noticed on 20 December 2021 (Figure 1 *a*–*c*) and also got drifted towards the north-eastern tip of Kavaratti Island (N10°34.6333′ and E72°38.4418′), Lakshadweep Archipelago. Recently, the reason behind the bloom of *Pyrostremma spinosum* (Herdman, 1888) has been reported from the nearest Bangaram Island[4]. It was interpreted with the occurrence of phytoplankton bloom by estimating the concentration of chlorophyll-*a* from the downloaded satellite image. Similarly, the cloud-free image of

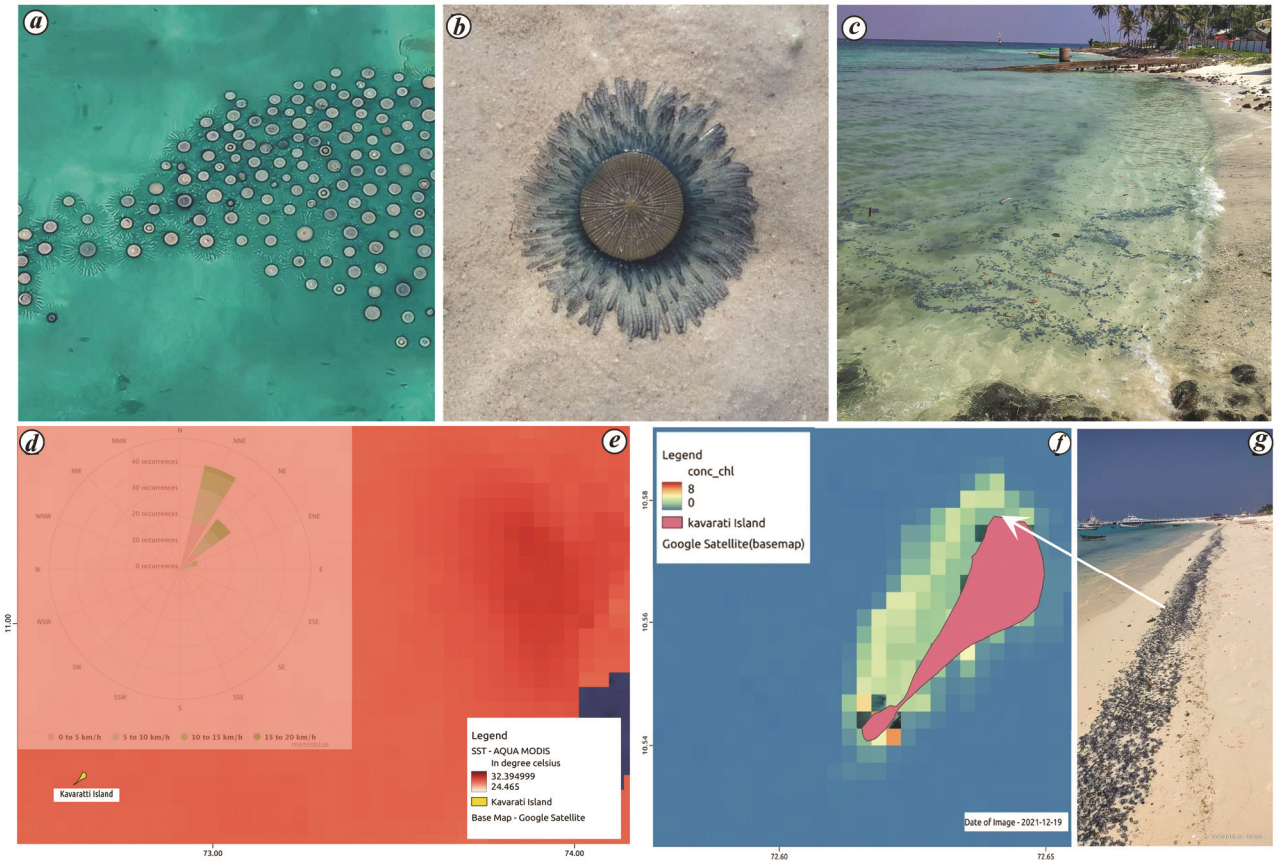


**Figure 1.** Mass occurrence of *Porpita porpita* cast ashore in Kavaratti Island, Lakshadweep. ***a–c***, *Porpita porpita* bloom. ***d***, Wind rose diagram. **e**, Sea surface temperature data. ***f***, Chlorophyll data. ***g***, *Porpita porpita* cast ashore.

Kavaratti Island of the respective period was downloaded from the Sentinel-3 Ocean and Land Colour Instrument (OLCI) with spatial resolution of 300 m. Sentinel-3 Tool kit[5] (Sentinel-3 OLCI) followed by Case-2 Regional Coast Colour[6] (C2RCC) modules were used for the extraction of chlorophyll-*a* data. It was observed that chlorophyll level of the reef flat was $4.02 \pm 0.79$ mg m$^{-3}$, whereas on the eastern coast it was $1.66 \pm 0.69$ mg m$^{-3}$, which is in the accepted level. However, the maximum SST of the northeastern part of Kavaratti Island was observed to be 30.255°C (ref. 7). Moreover, the wind rose diagram of 19 December 2021 (Figure 1 *d*) showed higher occurrence of winds from the north and north-northeast[8]. Hence, these populations drifted towards the northeastern tip of the Island. Higher SST and wind data indicate that *P. porpita* was cast ashore based on wind direction and climate change-mediated unusual increase in temperature (Figure 1 *g*).


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