

100. ENA002

Workshop Series : 2 / LU (2014)



ENHANCING CAPACITIES OF FISHING COMMUNITIES FOR RESOURCE MANAGEMENT

Gulf of Mannar



STATE PLANNING COMMISSION

Ezhilagam, Chepauk,
Chennai - 600 005.



ENHANCING CAPACITIES OF FISHING COMMUNITIES FOR RESOURCE MANAGEMENT

Gulf of Mannar

Organised By

International Collective in Support of Fishworkers

*College Road, Nungambakkam,
Chennai, Tamil Nadu*

Sponsored By

**Tamil Nadu State Land Use Research Board
State Planning Commission**

*Ezhilagam, Chepauk,
Chennai - 600 005*

JUNE 2014

Venue :

*Human Development Video Conference Hall
State Planning Commission
Ezhilagam, Chennai - 600 005*





Tamil Nadu State Planning Commission

The State Planning Commission was constituted in Tamil Nadu on 25th May 1971 under the Chairmanship of the Hon'ble Chief Minister as an Advisory body to make recommendations to the Government on various matters pertaining to the development of the State. The Chairman of the Commission is assisted by a team of Members, Consisting of Vice Chairman, Full Time Member & Part Time Members who are experts in various fields. The Additional Chief Secretary to Government, Planning, Development and Special Initiatives and the Principal Secretary to Government, Finance Department are the ex-officio members. The Member Secretary is responsible for administration in the Commission.

The Commission has the following technical divisions:

1. Agricultural Policy and Planning
2. Industries, Power and Transport
3. Land Use
4. Education and Employment
5. Health and Social Welfare
6. District Planning and Rural Development
7. Plan Co-ordination.

Main activities of SPC:

The Major Functions of the State Planning Commission are as follows:

1. Preparation of Five Year and Annual Plans based on the policies and priorities of the Government;
2. Undertake Mid Term review of the Five Year Plan, other special reviews on the Economy and advise the Government on appropriate modification and restructuring of the schemes;
3. Monitor development indicators that influence the Human Development Index, Gender Development Index, etc., at a disaggregated level and suggest correctional measures;
4. Undertake special studies as required for formulation and implementation of plan projects and programmes;
5. Tamil Nadu State Land Use Research Board (TNSLURB) is functioning under the chairmanship of Vice Chairman, State Planning Commission as a permanent body in the State Planning Commission. This Board is intended to promote interaction and study in the vital areas of land use. The State Planning Commission organizes seminars/workshops and undertakes studies.
6. Human Development Reports (HDRs) were prepared for Dindigul, Sivagangai, Tiruvannamalai, Cuddalore, Nagapattinam, the Nilgiris, Kanyakumari and Dharmapuri districts. The concept of Human Development has been disseminated to all districts through workshops organized in the concerned districts. Proposal for preparation of District Human Development Reports (DHDR) for the remaining districts is under process.
7. State Balanced Growth Fund (SBGF) is operated to bridge the regional imbalances among the districts.





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Dr. M.Ganesan,
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CSIR - Central Salt and Marine Chemicals Research Institute, Mandapam Camp,
Ramanathapuram District.



WORKSHOP SESSIONS

Welcome Address

Dr. Sugato Dutt, I.F.S.,
Member-Secretary (i/c),
State Planning Commission,
Chennai.

Presidential Address

Tmt. Santha Sheela Nair, I.A.S., (Retd.),
Vice-Chairperson,
State Planning Commission,
Chennai.

Session - I

Conservation, Sustainable use
and Management of Marine
Resources in the Gulf-of-Mannar

Ms. Ramya Rajagopalan
International Collective in Support of
Fishworkers (ICSF)
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Session - II

Sustainable Harvest of
Seaweed Beds of Gulf of Mannar

Dr. M. Ganesan
Senior Scientist,
Marine Algal Research Station,
CSIR Central Salt and Marine Chemicals
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Vote of Thanks

Dr. Sugato Dutt, I.F.S.,
Member Secretary (i/c),
Head of Division (Land Use),
State Planning Commission.



EXECUTIVE SUMMARY

The Gulf-of-Mannar National Park, declared in 1986, under the Wildlife (Protection) Act (WLPA) of 1972, includes 21 uninhabited islands, and covers an area of almost 560 sq.km. The National Park's notification in 1986, meant collection of any natural resource from the area was prohibited. The Gulf of Mannar, a shallow bay, with a coast line of 364.9 km, is known for its coral reefs and sea grass beds which harbour several *endangered species such as dugongs*. The Gulf-of-Mannar has around 125 fishing villages, of which 31 are in Tuticorin and 94 in Ramana-thapuram district, with over 35,000 active fishers, besides nearly 2000 women seaweed collectors. The community engages in a range of livelihoods including seaweed collection (mostly women), diving for sea cucumber, shell collection, artisanal fishing, and trawling. The fishing community has various local governance institutions based on caste/religious affiliations, gear, and trade unions.

Tamil Nadu State Planning Commission provided a forum for discussions between the community representatives and officials from State Fisheries and the Forest Departments, to present the proposals from the communities for conservation and sustainable use of resources in Gulf of Mannar. Towards this a workshop on "Enhancing Capacities of Fishing

Communities for Resource Management" was held on 11.06.2014, under the Chairmanship of Vice Chairman, SPC at the State Planning Commission.

The objective of the workshop was to discuss the issues connected with the livelihoods of fishing communities through seaweed resource management. The workshop included a general presentation on the Gulf-of-Mannar followed by presentations from community representatives and presentations from experts followed by intensive discussion. The participants included officials from experts from research institutions working in the area, NGOs and community members.

The first part was an overview presentation on conservation, sustainable use and management of marine resources in the Gulf-of-Mannar National Park and Biosphere Reserve. This was followed by four members of the community (two women seaweed collectors and two fishermen) presenting their viewpoints on the conflicts in the region and suggestions on the way forward.

Expert presentations were made on culturing of seaweeds, sea ranching (of sea cucumbers), LMMA, participatory governance and fisheries. During the presentations and subsequently as well, there were detailed discussions on many points that were raised.

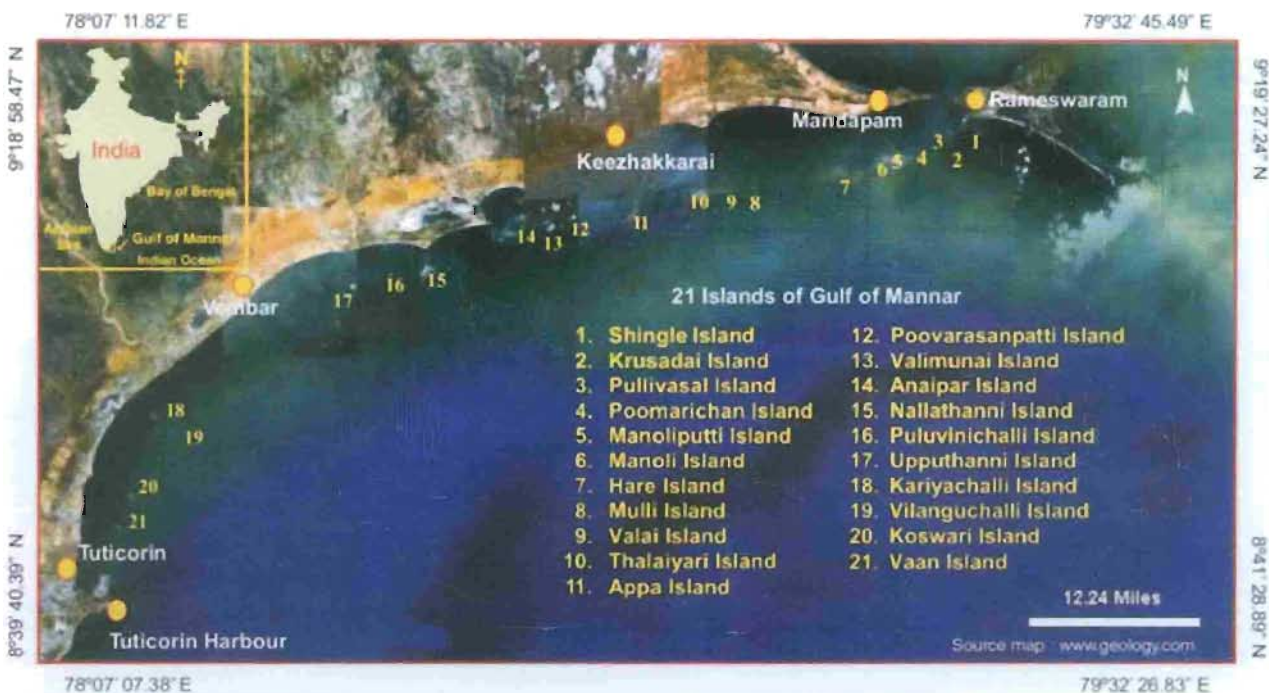


Some of the major conclusions were:

- The government had a responsibility to protect and conserve resources for future generations. The local community knowledge gained over a long period provided additions to scientific knowledge. The government and scientists would look at how to support the community in improving livelihoods. There is a need to look at providing access to resources under the Forest Rights Act (2006).
- This meeting was to understand the needs of the community. However given the conservation impetus, it was also necessary for the community to think of additional livelihood options.

Developing culturing / sea ranching techniques would take time and it had to be ensured that others did not enter into their field.

- A request was made for identity cards for the women seaweed collectors. This request was accepted and also the District Collector was requested to be in regular touch with the community to sort out local issues on access rights and alternate livelihoods, through local meetings
- The points made about the fisheries sector as a whole and the question of applicability of wildlife legislation on the marine sector must be considered.





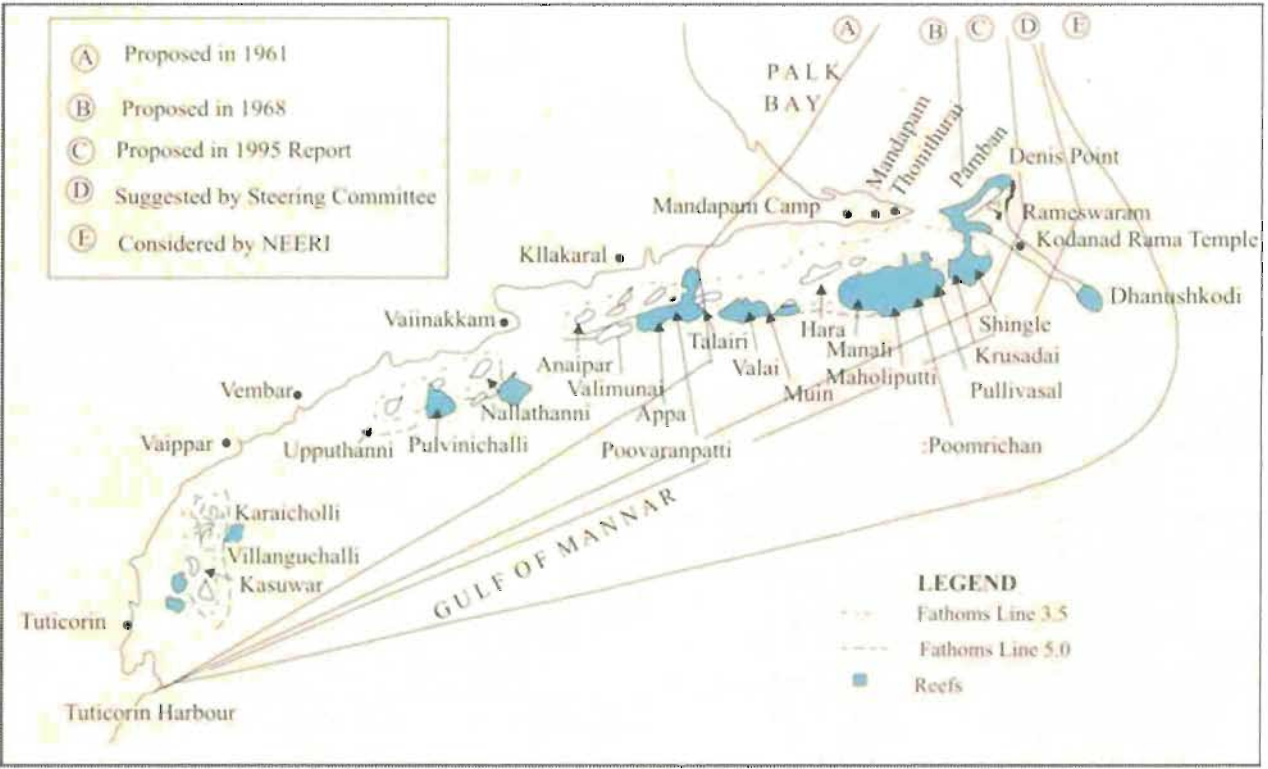
INTRODUCTION


In Tamil Nadu, activities are focused on fishing communities in Ramanathapuram District, Gulf of Mannar. The area falls within the Gulf-of-Mannar (marine) National Park and Biosphere Reserve. The Gulf-of-Mannar Biosphere Reserve Trust (GOMBRT) estimates that there are over 125 fishing villages dependent on the fishery resources in the Gulf-of-Mannar area, of which 31 in Tuticorin and 94 are in Ramanathapuram District. There are over several thousand small-scale fishers who are dependent on the resource, especially on fishing, seaweed collection and other marine resources.

The workshop on “Enhancing Capacities of Fishing Communities for

Resource Management” was held June 2014 under the Chairmanship of Vice Chairman, State Planning Commission. The primary objective of the workshop is to provide a platform for dialogue between key stakeholders on improving conservation and sustainable use of resources in the Gulf-of-Mannar and to advise on activities to undertake to achieve the same.

At the outset, Dr. Sugato Dutt, IFS, Member Secretary(i/c), State Planning Commission, welcomed the participants and stated that the purpose of the workshop was to discuss the issues connected with the livelihoods of fishing communities through seaweed resource management. In his opening remarks, he






brought attention to two relevant themes in the Vision-2023 document: Inclusive growth and nurturing a rich heritage and preserving ecology, and the need to interlink them. The Gulf-of-Mannar Marine National Park (GOMMNP) is the second Marine National Park in the India. The Gulf-of-Mannar is relevant as it is an obviously fragile and vulnerable ecosystem and there are several fishermen who earn their livelihood from this ecosystem.

Initiating the discussion the Vice Chairman, State Planning Commission requested the presenters and community members and experts to make the presentation.

- Presentation-I: “Conservation, Sustainable Use and Management of Marine Resources in the Gulf-of-Mannar National Park and Biosphere Reserve” by Ms. Ramya Rajagopalan, ICSF.
- Presentation-II: “Sustainable Harvest of Seaweed Beds of Gulf-of-Mannar” by Dr. M.Ganesan, Senior Scientist, Marine Algal Research Station, CSIR - Central Salt and Marine Chemicals Research Institute (CSMCRI), Mandapam Camp, Ramnathapuram District.





CONSERVATION, SUSTAINABLE USE AND MANAGEMENT OF MARINE RESOURCES IN THE GULF-OF-MANNAR NATIONAL PARK & BIOSPHERE RESERVE

Ms. Ramya Rajagopalan

International Collective in Support of Fishworkers,
Chennai



INTRODUCTION

The Gulf-of-Mannar is located in Ramanathapuram District in the south Indian State of Tamil Nadu. There are 178 fishing villages, with over 41,000 fishermen families of which over 37,000 are traditional fishermen families¹. of the over 67,000 fishers in this district, over 48,000 are active fisher's landing fish in 90 landing centres. The Gulf-of-Mannar coastline extends upto 141 km in Ramanathapuram District alone, according to the Government of Tamil Nadu. The Gulf has a variety of habitats including coral reefs, especially fringing reefs, back swamps, lagoons, sand dunes and salt flats, among others.

The Gulf-of-Mannar Marine National Park (GOMMNP) declared in 1986, under the Wildlife (Protection) Act, 1972, covers an area of almost 560 sq. km and includes 21 islands. The initial notification was brought out in 1986. But, as per the requirements of the WLPA, the final

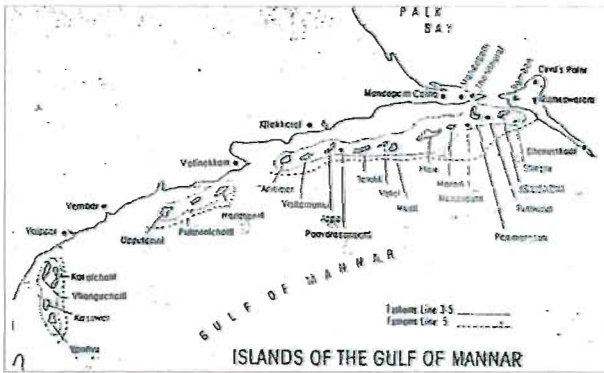
notification requires approval from the Chief Naval Hydrographer's Office, after the settlement of rights of communities. This is yet to be brought out. Since the declaration of these areas as national park, collection of any natural resources from the area has been prohibited. The area was also declared as Gulf-of-Mannar Biosphere Reserve in 1989 (as part of the UNESCO MAB programme), covering an area of about 10,500 km² running along the mainland coast for about 170 nautical miles with the core as the GOMMNP.

The 21 islands are distributed in four groups - Mandapam, Keezhakarai, Vembar and Tuticorin groups. These islands are located at a distance of 3-6 miles from the coast and vary in area from 0.25 ha to 230 ha. The total area of the islands is about 623 Sq. ha. During discussions, the communities highlighted that presently some of the older islands have split and three new islands have been

¹ CMFRI 2011. Tamil Nadu Marine Fishing Census. Part IV.



formed closer to the Mandapam and Keezhakarai area. On the other hand, in the case of Tuticorin group, two of the islands have been submerged. The fishing communities have their own names for some of these islands, for example Krusadai was earlier called as 'Dorai' Island. The national park as per the original notification covers waters around these islands upto a depth of 3.5 fathoms on the bay side, and 5 fathoms on the seaward side.



Source: Original Notification of the Gulf-of-Mannar National Park, dated 10th September 1986

The major threat to these islands at the time of declaration of the national park was quarrying of corals for production of calcium carbide and lime. The government of Madras (now, Tamil Nadu), in two instances leased out to private individuals

the right of collection of dead corals from these islands. From 1960s, these coral stones were mined and sold by these private lessors and also by the government in large numbers³. It has also been reported that except for the Krusadai Island, all others were uninhabited in 1970s.

HISTORIC INFORMATION

According to Hornell⁴, the Paravas as noted by the Dutch were living a seafaring life, gaining their livelihood by fishing and by diving for pearls. These Paravas had purchased from the Rajah of Ramanathapuram a small stretch of the shore, on which they settled and built villages, that was headed by their own headmen. Hornell further writes that there were temporary settlements of the Paravas in the Madura Islands (as the Gulf-of-Mannar Islands were referred to in 1560's); especially fishery camps were set up in Nallatanni Tivu. The Paravas, Muslims and the Kadeiyars were historically reported to fish in these areas. Hornell further writes that the Nallathanni Tivu was farmed under the Zamindari of Ramnad, and there were flourishing plantations of casuarinas,

² Monishiya, B., Padmanaban, R. Mapping and Change Detection Analysis of Marine Resources in the Tuticorin and Vembar Group of Island Using Remote Sensing. *International Journal of Advanced Forest Science and Management*, North America, 1, Oct. 2012. Available at: <<http://scientific.cloud-journals.com/index.php/LJAFSM/article/view/Sci-18>>. Date accessed: 12 Sep. 2014.

³ Mahadevan, S and K. Nagappan Nayar. Distribution of coral reefs in the Gulf of Mannar and Palk Bay and their exploitation and utilization. <http://eprints.cmfri.org.in/6781/1/mahadevan.pdf>

⁴ Hornell. 1922. The Indian Pearl Fisheries of the Gulf of Mannar and Palk Bay Madras. *Fisheries Information Bulletin*. Vol. XVI. http://archive.org/stream/madrasfisheriesb16madr/madrasfisheriesb16madr_djvu.txt



coconut and palmyra. According to the 1972, Ramanathapuram Gazetteer, some of the islands such as Shingle Island were named, after the Sri Lankans who stayed in these islands, when they came for fishing. The Gazetteer provides detailed records of leasing for mining of limestone's as well in 1960s and 1970s.

FISHING COMMUNITIES AND RESOURCES

According to the reports from the Gulf-of-Mannar Biosphere Reserve Trust (GOMBRT), there are 125 fishing villages⁵ (31 villages in Thoothukudi⁶ District and 94 villages in Ramanathapuram District) and 35,000 active fishers in the Gulf of Mannar. However, local fishing communities have identified 54 villages (from the CMFRI 2011 Census) as being specifically dependent on the Gulf-of-Mannar resources for their livelihoods. In these 54 villages, there are over 12,000 traditional fishing families (with over 16,000 fishers) dependent on the resource for their livelihood, using over 800 small-scale fishing craft that are non-motorized, besides the women seaweed collectors. In the CMFRI census, information on the women seaweed collectors or on other dependent population is not completely captured. Besides these people, there are

other who are indirectly dependent on the fisheries sector for their livelihood, such as fish vendors, ice factory workers, market related activities etc.

The major gears operated in the Gulf-of-Mannar are trawl net, hook and line, shore seine, gill nets, drift nets, purse-seine, trammel net, stake net, traps and long line. Besides the wooden catamarans, vathais and vallams (dug-out canoes), there are also trawlers and motorized fishing craft. According to Johnson (pers. comm.), there are about 850 trawlers, 5300 vallams, 2100 Fibre-reinforced boats (FRP boats of which 372 are motorized) operating in Gulf of Mannar.

The fishing community here are not homogenous as they belong to various castes. These communities have distinct social, cultural governance structures and traditional practices. Besides the traditional organization of fishing communities, they are also organized into sectors such as the mechanized sector – boat owner associations, trade unions, cooperatives, self-help groups, gear-based associations, and federations. The communities along the Gulf-of-Mannar are mostly Paravas; some of them converted to Islam much earlier in the past and to Christianity in relatively recent times.

⁵ Throughout this report, village means the fishing hamlet and not the revenue village.

⁶ This training programme was limited to the Ramanathapuram section of the Gulf of Mannar as the fishing community in Thoothukudi district were not interested in participating.



The Gulf-of-Mannar was known for its pearl fishing history, which is currently not being practiced. There are records from 1796 to 1961 on the pearl diving activities conducted in the Gulf of Mannar⁷. Earlier records of CMFRI indicate that shore-seine fishing was carried out in the 21 islands in the Gulf of Mannar⁸. Earlier records also indicate that leases were granted to individuals for the right to fish Chanks in the Gulf-of-Mannar and Palk Bay by the Rajah of Ramanathapuram (In 1946, lease was granted for 10 years on an annual rent of Rs 14,000). The trap fishing that is

famous in this district has been described by Hornell⁹, and is very common along the coasts of Kilakarai and the adjacent localities. Trap fishing was recorded to be carried out in Gulf-of-Mannar area from September to March, especially in Mandapam, Vedalai, Pullivasal, Pudumadhom, Muthupet and Kilakarai region¹⁰. Fishing was earlier carried out using shore seines, boat seines, drift nets and gill nets, it was only post 1965 that trawling has been introduced in these areas.



⁷ Mahadevan, S (1971) *Fishing for pearls in India*. Seafood Export Journal, 3 (3). pp. 11-23.

⁸ Lal Mohan, R.S. 1971. Note on a case of death due to jelly fish sting in Gulf of Mannar. *Current Science*. December 5, 1971. Vol. 40, No. 23, pp. 637-638.

⁹ Hornell, James. 1950. *Fishing in many waters*. Cambridge University Press, Cambridge, 210p.

¹⁰Prabhu, M.S. The perch-fishery by special traps in the area around Mandapam in the Gulf of Mannar and Palk Bay. In *Indian Journal of Fisheries*. http://eprints.cmfri.org.in/1606/1/Article_07.pdf



RESOURCES

The marine ecosystem in the GOMNP has been established as being highly diverse, comprising 3,600 species, of which 44 are protected as endangered species under the WIPA. The area is home to 79 species of crustaceans, 108 species of sponges, 260 species of molluscs, 441 species of fin fishes and 147 species of seaweeds¹¹. The inter-tidal regions near the islands are an important source of sea cucumbers (Holothuria), which are exported as *bêche de mer*.

The main species of seaweed collected for commercial purposes are *Gelidiella acerosa*, *Gracilaria edulis*, *Ulva lactuca*, *Turbinaria* and *Sargassum*. Gulf-of-Mannar is home to an endemic species

called the *Balanoglossus* (Phychodera fluva), a unique living fossil that links invertebrates and chordates. There are 117 species of corals in Gulf-of-Mannar alone¹². Besides this, it is also home to the Seacow (*Dugong dugong*), besides other marine mammals. There are five species of turtles found in Gulf-of-Mannar waters, of which olive ridley is more common. Nine species of mangroves have been recorded in the Gulf of Mannar. Some of the islands such as Manoli, Manoliputti, Pullivasal and Poomarichan exhibit a rich diversity of mangrove species like *Avicennia*, *Rhizophora*, *Brugueira*, *Ceriops*, *Lumnitzera* and *Pemphis acidula* (Johnson, CMFRI, pers. comm).



Melina Beach Turtle



Olive Ridley Turtle

¹¹Melkani, V K, J KPatterson Edward, A Murugan, Jami la Patterson and V Naganathan. Capacity Building in Marine Biodiversity Conservation. Ramanathapuram: Gulf of Mannar Biosphere Reserve Trust, 2006.

¹²Kumaraguru A.K., V. Edwin Joseph, N. Marimuthu and J. Jerald Wilson, 2006. Scientific information on Gulf of Mannar - A bibliography. (<http://eprints.cmfri.org.in/6766/1/Bibliography.pdf>)



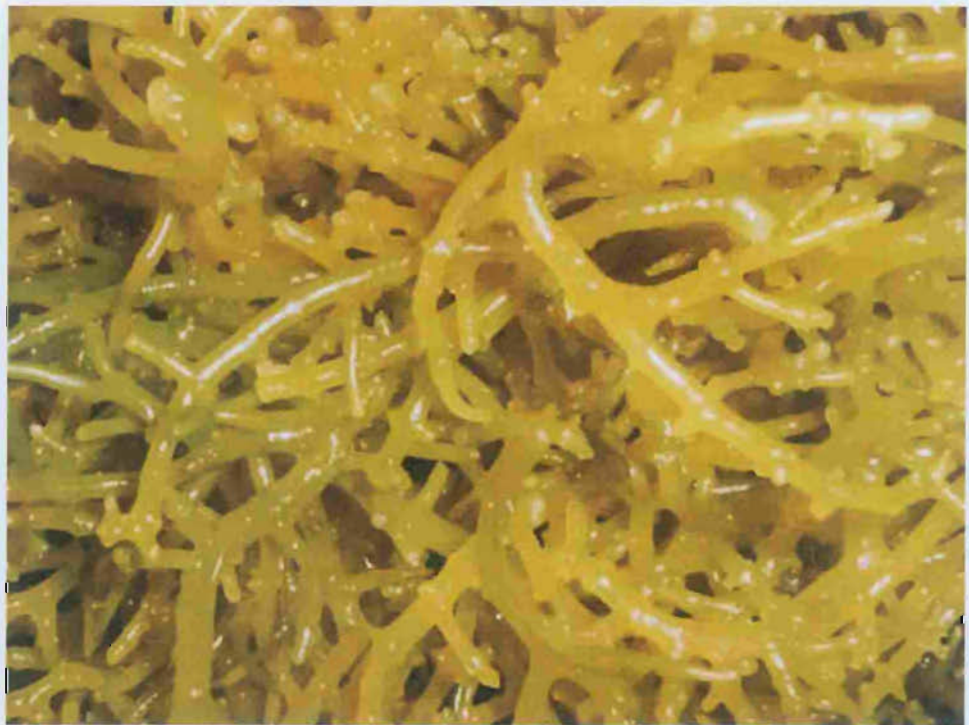
Seacow (*Dugong dugong*)



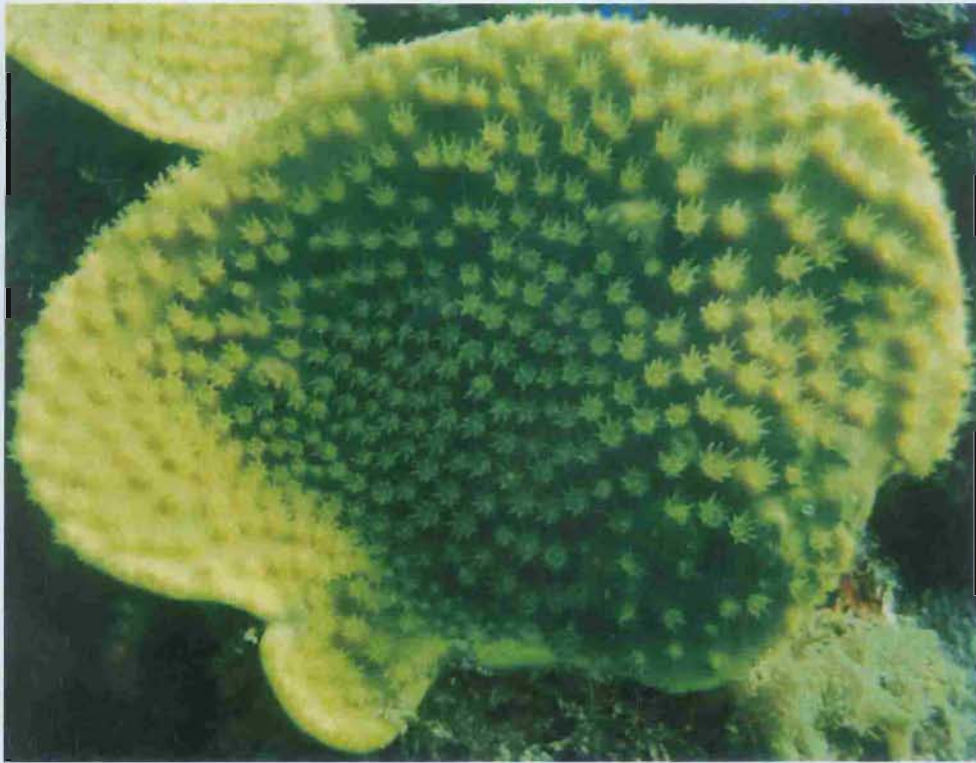
Gelidiella acerosa



Ulva lactuca



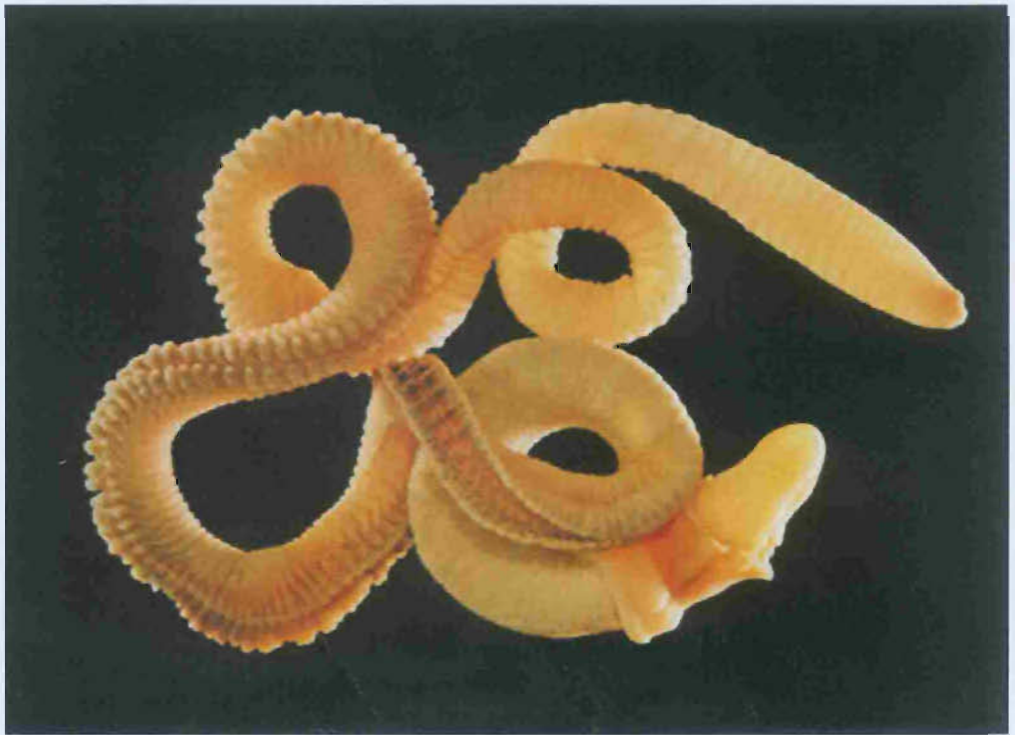
Gracilaria edulis



Turbinaria



Sargassum



Phychodera fluva

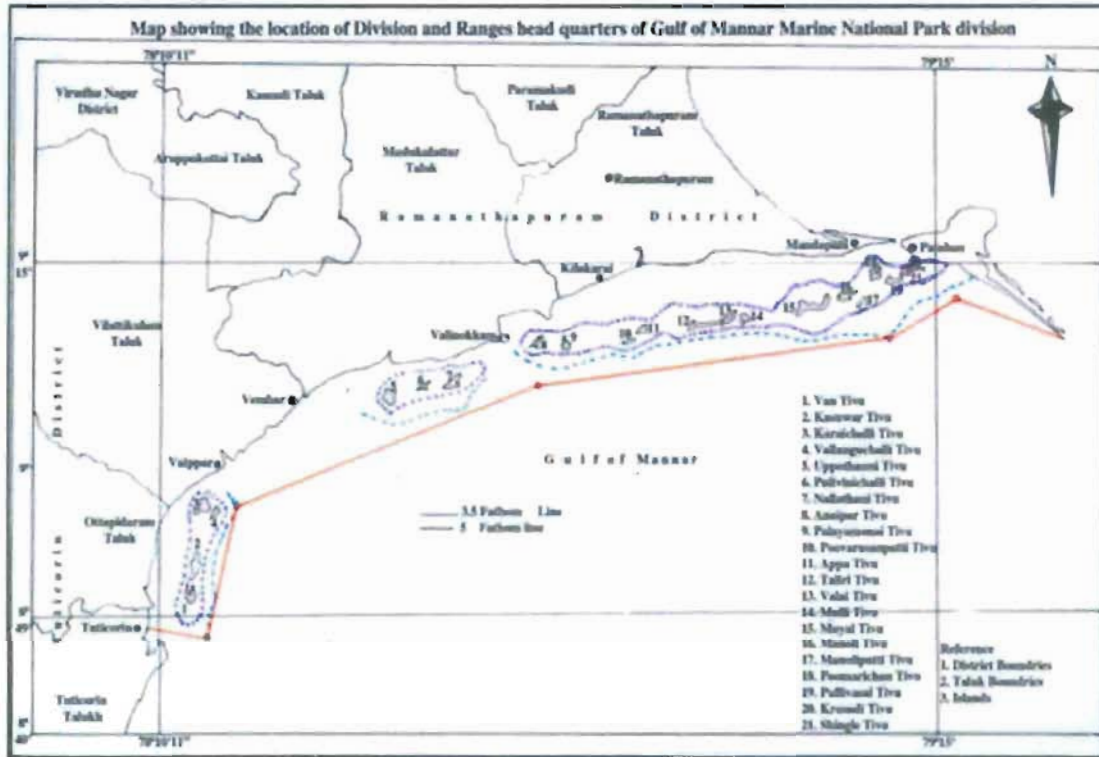


Corals



While there have been periodic estimates of the status of biological resources in the area, neither the Department of Environment and Forests

nor the Department of Fisheries in Tamil Nadu has any estimate about the total number of people dependent on the marine resources in the GOMMNP and GOMBR.



Source: GOMNP Notification, 1986

SEAWEEDS

The important seaweeds collected from the areas around the 21 islands are Brown algae-*Gracilaria edulis* (Kanchi pasi), *Gelidiella acerosa* (Marekozhudu), and Red algae -*Sargassam* (Kattakorai) and *Turbinaria* (Baagoda pasi). These are the native species found in Indian waters. While *G.edulis* and *G.acerosa* are used in the agar industry, *Sargassam* and *Turbinaria* are used for agarose/alginate

industries. These seaweed resources are available in abundance only in shallow areas around the islands. *G.edulis* produces edible quality agar. *G.acerosa* is available only around corals, while *G.edulis* can grow in any shallow waters on soft substratum such as clay. Manufacture of agar from these two seaweeds was initiated on an experimental level during World War-II, due to shortage of Agar. Earlier studies in 1950s and 60s indicate that *G.edulis* and *G.acerosa* are found closer to



the islands, while *Sargassum* and *Turbinaria* are found further away from the islands¹³.

Carrageenan is obtained from *Hypea* spp and *Kappaphycus* spp. *Hypea* species is available in small quantities in India, while cultivation of *Kappaphycus* spp has been introduced since 2004.

Seaweed collection provides the primary source of livelihood for almost 2000 women in the districts of Ramanathapuram and Tuticorin, especially in the



Strict implementation of the regulations with respect to the GOMMNP began only in early 2000, when people were prohibited from going near the islands to collect seaweeds. Fishing communities, especially women, have since then been fighting for their right to legally collect seaweeds from the areas around the islands.

21 islands in the Gulf-of-Mannar region. Some of the important villages in Ramanathapuram district where seaweed collection is carried out are Chinna-palayam, Thoopukadu, Naadutheru, Vedalai, Keezhakarai, Bharathi Nagar, S.M. Madasai. Besides the women seaweed collectors, there are also men who collect seaweeds as part time occupation in some of these villages. Large-scale harvesting of seaweeds was initiated since 1966 around these islands¹⁴.



During discussions, fishing communities clearly highlight the difference between the different bottom substrates around these islands—as corals, dead corals and rocky or calcareous substratum. Scientific studies clearly identify that seaweeds do not grow in coral reef areas, and are found only in regions with dead corals and rocky bottoms (*paru*).

¹³ Prasanna Varma, R. and K. Krishna Rao. Algal resources of Pamban area. In Indian Journal of Fisheries. http://eprints.cmfri.org.in/2004/1/Article_16.pdf

¹⁴ Umamaheswara Rao, M. 1973. The seaweed potential of the seas around India. In Proceedings of the Symposium on Living Resources of the Seas Around India (1968). pp. 687- 692.

SEA CUCUMBERS

Sea cucumbers are echinoderms from the class Holothuroidea. They are marine animals with a leathery skin and an elongated body and are gathered for human consumption with the harvested product generally known as *beche de mer* (literally “sea-spade”) in French, *trepang* (or *tr+pang*) in Indonesian, *namako* in Japanese, and *balatan* in Tagalog. In Malay, it is known as the *gamat*. The three

economically important species are *Holothuria scabra* (vella attai, sandfish), *Holothuria atra* (Karuppu attai, lollyfish), and *Holothuria spinifera* (cheena attai or raja attai, brownfish). These species are mainly caught by diving, trawling and through artisanal mini-trawls. In certain areas, they are also caught in bottom-set gill nets. Records show that sea cucumber fishery has been in practice since 1890s in the Gulf of Mannar; it went into a decline in 1910, but was revived again after 1965.



Sea cucumbers 'beche-de-mer'



Holothuria scabra (vella attai, sandfish)



Holothuria atra (Karuppu attai, lollyfish)



Holothuria spinifera (cheena attai or raja attai, brownfish)



In July 2001, the Ministry of Environment and Forests listed sea cucumbers (all Holothurians) under Schedule-I¹⁵ of the Wildlife (Protection) Act, 1972, as per the notification no. S.O.665 (E), along with corals and sea horses. However, it is imperative to note that there were no discussions with either the scientific or the fishing community, before this species was included in the Schedule-I list nor were there resource assessment or stock assessment studies for any of these species in Indian Waters. The first status assessment of the Beche-de-mer industry in the Palk bay and Gulf-of-Mannar was done in 1987¹⁶, from Adirampatnam to Cape Comorin. A resource assessment study was carried out specifically for Palk Bay in 2003¹⁷, in December 2006 for both Palk Bay and Gulf-of-Mannar using line intercept method and in 2011 by the Zoological Survey of India for the Gulf-of-Mannar Biosphere Reserve Trust¹⁸.

H.scabra is known to have two spawning peaks: a major spawning peak (March-May) and a minor breeding peak

(September-December)¹⁹. *H. atra* also has two spawning peaks, while *H.spinifera* has a single prolonged spawning period from November to March. There have been no studies to identify the spawning or breeding grounds of these species. The general fecundity of these species ranges from 10-20 lakh eggs during each spawning. There have been no studies focusing on the recruitment pattern of the larvae into the fishery (Asha, pers.comm).

In Ramanathapuram District alone, there are roughly 4500 divers, skilled to manually dive (without any additional gear or oxygen tanks) for collecting sea cucumbers and chanks (Source: discussions with the Sea Cucumber Divers Union). There has been constant demand from the fishing communities that at least for three species (*H. atra*, *H. scabra*, *Bohadschia marmorata*) be removed from Schedule-I list, so that these can be collected legally.

The divers highlight that the fishery is carried out only for a period of six months (October to March) in Gulf of Mannar, out of which diving can be done only for three

¹⁵ Schedule I list according to the Wildlife (Protection) Act, 1972, includes all species that are prohibited from being captured or traded, and has the highest level of protection at species level.

¹⁶ James, D.B. and B.K. Baskar (1994). Present status of the Beche-de-Mer industry in the Palk Bay and the Gulf of Mannar. Bull.Cent.Mar.Fish. Res.Inst., 46: 85-90.

¹⁷ Venkataraman.K, M. Nithyanandan, and K.P. Raghuram. 2003. Report on the status survey of sea cucumber at selected sites in Palk Bay (Thonithurai to Thondi), Tamil Nadu. Survey Report, Marine Biological Station, Zoological Survey of India, Chennai. 9pp

¹⁸ Raghunathan.C. 2008. Present Status of Holothurians (Echinodermata) in Palk Bay and Gulf of Mannar- A case study. Nature Environment and Pollution Technology. Vol. 7(3): 525-544.

¹⁹ Asha.P.S, M. Rajagopalan and K. Diwaker. 2007. Stock enhancement of sea cucumbers- a solution for the depletion of natural stocks of Holothuris scabra along Gulf of Mananr. Marine Fisheries Information Service (193): 7-10



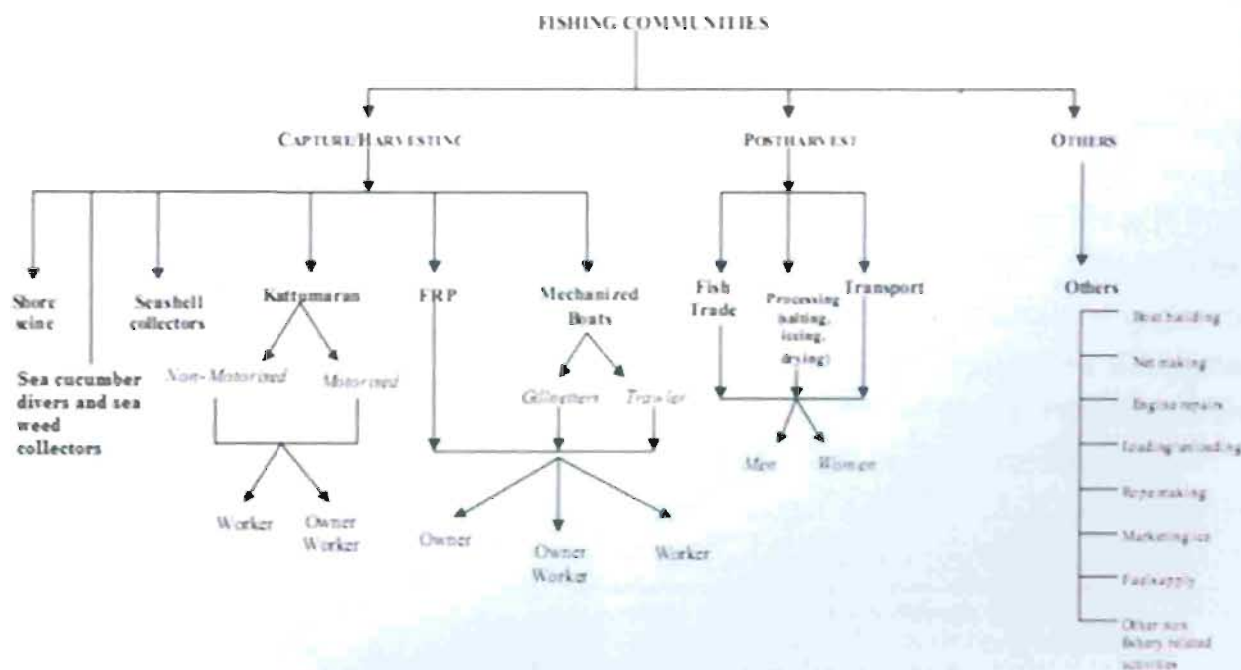
months. Besides this, there are weekly holidays as well for the divers. The collection of sea cucumbers is also restricted by the diver's ability to hold his breath under water, and their eyesight.


COMMUNITY-INITIATIVES FOR CONSERVATION

Government authorities are not the only source of conservation initiatives. Local fishing communities (two villages Chinnapalayam and Thopukadu) have developed their own management regulations, partly in order to reduce conflicts with the Forest Department. Such community regulations include ban on the collection of protected species and the

destruction of coral, cutting of mangroves and wood in the islands, catching turtles, harvesting sea cucumbers, and restricting the number of days of seaweed collection to 12 days a month. Such regulations are enforced by a guard appointed from within the community, by the villagers.

While community regulations and initiatives are neither recognized nor supported by the Forest Department, community members are said to follow them strictly, as violation of these involves severe penalties from the village leaders. In the case of these two villages, there is also restrictions on the fishers (including women) to fish only in certain islands (Krusadai, Manali, Moyal Islands), and





fishers from other villages are not allowed to access resources in these areas.

Seaweed collection is an important livelihood activity in the area. Since June 2006, the Fishermen's Union, in cooperation with other organizations in the area, has banned the use of metal scrapers for collecting seaweeds and the sale of products harvested in this manner. A joint agreement (2006), initiated by GOMBRT, between the Tamil Nadu government, fishing communities and other stakeholders has banned the collection of seaweeds from March to May every year. Affected communities have pressed for alternative livelihood options, including seaweed culture. The fishing villages have also declared a ban on fishing on all Tuesdays in the areas around Mandapam group of islands.

Community-initiated self-regulations for conservation and sustainable use are generally yet to be recognized and supported by government institutions. Traditional ecological knowledge systems, which underlie such self-regulatory behaviour, are hitherto not utilized in formulating official plans and regulations.

LEGAL FRAMEWORK

CONSERVATION LEGAL FRAMEWORKS

The Marine National Park is declared under the Wildlife (Protection) Act, 1972, as amended in 2002 and 2006. Under the Act, fishing or hunting or destruction of natural habitat is prohibited within national park boundaries. These sanctuaries and national parks were brought under a new heading, 'Protected Areas', under the 2002 Wild Life (Protection) Amendment Act. Such 'Protected Areas' are designated either to protect wild fauna and flora and their habitats exclusively in the marine and coastal area (i.e., area between the mean high water mark and the limit of the territorial sea), or to protect, *inter alia*, the marine and coastal component of larger sanctuaries or national parks. In other words, they are essentially non-extractive protected areas under the jurisdiction of Environment and Forests authorities.





The WLPA, which is essentially a terrestrial framework, also has some provisions that are specific to the coastal and marine context and have relevance for protecting the socio-economic interests of local fishing communities. For example, the Act requires that if any part of the territorial waters is to be included within a sanctuary or national park, adequate measures must be taken to protect the occupational interests of local fishers. The right of innocent passage of any vessel or boat travelling through territorial waters should also not be affected by the designation of a sanctuary. However, there are no clear cut guidelines on how these provisions can be implemented. Fishing communities have been demanding for a need to develop participatory guidelines for such provisions, as these are often interpreted differently by officials²⁰.

In almost all designated MCPAs in India, there has been no consultative process with the local communities, especially those who are dependent on the resource. Fishing communities are often not even aware of the designation of the area as protected, as seen in the case of Gulf-of-Mannar Marine National Park, where communities realized the 'protected status' only when they were restricted from accessing their fishing grounds and


resources. The Gulf-of-Mannar Biosphere Reserve Trust (GOMBRT) that was formed to advise and provide input for managing the biosphere reserve and national park does not have direct community representatives as members²¹.

The Forest Rights Act (FRA), 2006, recognizes rights of communities (besides Scheduled Tribes) who have traditionally been living in forests for generations and are dependent on it for their livelihoods. The communities can claim rights of use or entitlement, such as rights to fish or access to natural resources under Section 3 of the FRA. The Act recognizes the rights of communities to protect regenerate or conserve or manage any community forest resource that have been traditionally protected and conserved for sustainable use. The Act under section 5 provides clear provisions for responsibilities of these rights holders (including Gram Sabha and village level institutions) to protect wildlife and biodiversity, and ensure that it is protected from any destructive practices that affect the cultural and forest heritage of the concerned community.

The Gram Sabhas are the local governance unit who have the authority to receive claims, consolidate and verify them, prepare a map outlining the area of each claim and pass resolutions on the claim

²⁰ ICSF, 2012. Report of the Workshop on "Fishery-Dependent Livelihoods, Conservation and Sustainable use of Biodiversity: The case of marine and coastal protected areas of India". Chennai. ICSF

²¹ Rajagopalan, 2008. Marine Protected Areas in India. SAMUDRA Monograph series. Chennai, India



before forwarding a copy to the sub-divisional level committee that finally goes to the district level committees for final decision-making. These committees are also to consist of three members from the Panchayat Raj Institutions at the appropriate level, who are appointed by the respective Panchayat Raj Institutions. In the case of marine and coastal ecosystems, FRA will apply in mangrove and estuarine areas that are either notified as 'forests', 'reserve forests', 'critical wildlife habitats' or as Protected Areas. However, there is not much clarity as to how Forest Rights Act can be applied to the Gulf-of-Mannar area.

FISHERIES LEGAL FRAMEWORKS

The Tamil Nadu Marine Fishing Regulation Act (TNMFRA) (1983, amended in 2000) and Rules (1983), is an important fisheries-related legislation that is applicable for fishing within the territorial waters (upto 12 nautical miles)²². Based on the rules of the MFRA, fishing is banned for a period of 45 days every year (between April 15- May 31) every year in Tamil Nadu. Besides this, the TNMFRA also prohibits fishing by mechanized and deep-sea fishing vessels within three nautical miles from the coastline. There is also prohibition on the use of gear with mesh size less than 10 mm (knot to knot), and prohibits pair trawling

and purse seining. Besides this, there are also other district level and village level regulations for fishing vessels in Gulf of Mannar. The 'three-four' day fishing rule as it is called has been implemented in Ramanathapuram district from 1993 based on the decision taken at a District Collector's meeting. The regulations in the Gulf-of-Mannar are implemented by the fishermen organizations and boat-owners associations. This regulation is also followed by the non-mechanized fishermen who observe specific times for setting sails and returning to shore.

IMPACTS ON LIVELIHOOD

The above restrictions and prohibitions on extraction of resources in Gulf-of-Mannar have affected fishing communities. As mentioned earlier, the fishing communities have not been involved in any of the management processes of the national park, nor were they part of the preparation of the management plan for the area. Fishing communities are not directly represented in the Gulf-of-Mannar Biosphere Reserve Trust either. It is important to note that for non-motorized fishers, waters around these islands are the closest fishing grounds, and prohibition of access to these islands leads to loss of livelihoods. In the case of the Chinnapalayam village, the Krusada

²² However, the waters around Gulf of Mannar are considered as internal waters as per the notification issued by the Ministry of External Affairs (giving the baseline of India, 2009 notification)



Island waters are located 500 mts away from the village, and to go beyond these waters will require them to have better fishing technologies to which they may not have access. The situation is similar in most fishing villages, and also to motorised fishers, who find it difficult to access fishing grounds beyond the islands. The listing of Sea Cucumbers in Schedule I has led to 4500 divers left without any livelihood option, while these species continue to be caught in trawlers as bycatch. The lack of enforcement of restrictions under the MFRA has affected the resources and also small-scale fishing communities, as small trawlers and pair trawlers continue to fish in waters around the Gulf of Mannar. As mentioned earlier, the restriction on access to these islands has also affected the women seaweed collectors.

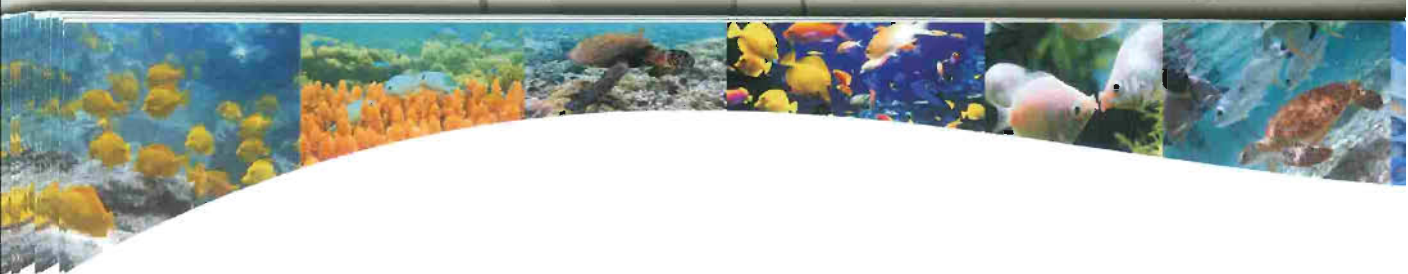
The Gulf-of-Mannar Biosphere Reserve Trust (GOMBRT) has initiated number of alternate livelihood options for communities; however, none of these are viable in the long-term. These communities also often lack basic facilities such as education and health facilities, as most villages are located in remote areas. These aspects also need to be taken into account while developing alternate livelihood plans.

TRAINING PROGRAMME

The International Collective in Support of Fishworkers (ICSF) Trust organized training programme for fishing communities in Gulf-of-Mannar to enhance the capacities for resource management under a Bay of Bengal Large Marine Ecosystem (BOBLME)-supported project²³. The training programme aimed to enhance the capacity of participating fishing community members by drawing on their traditional and experiential knowledge and institutions to relate their knowledge systems with an ecosystem approach to fisheries (EAF); and to explore and propose ways of enhancing sustainable and equitable resource use, and the role that communities can play

ICSF Trust organized two workshops for fishing communities (both men and women) in Ramanathapuram district between 23 and 26 October 2013. The first workshop was organized on 23 and 24 October in Pamban and the second workshop was organized on 25 and 26 October in Ramanathapuram. The workshops provided a forum for the fishing communities to relate their knowledge systems within an ecosystem approach to

²³ BOBLME is executed by the Food and Agriculture Organization (FAO) of the United Nations. <http://www.boblme.org/>



fisheries. Participants discussed and came out with detailed proposals for the sustainable use, management and conservation of marine and fisheries resources in the Gulf-of-Mannar Marine National Park. The focus was specifically on management of fisheries resources, seaweed and sea cucumber resources.

Fishing communities, including women seaweed collectors, came up with suggestions and proposals for conservation, sustainable use and management of resources in the Gulf of Mannar. New proposals from the communities include ban on certain types of gear, ban on trawling in waters between the shoreline and the islands, rotational closed areas (certain areas will be demarcated around the islands where seaweeds will not be harvested annually), harvesting areas will be alternated on a monthly basis to facilitate the growth of resources, harvesting of *Gracilaria edulis* will be undertaken based on suggestions from scientific research institutions, and Sea Cucumber harvesting to be regulated similar to the present Chank Fishery regulations²⁴.

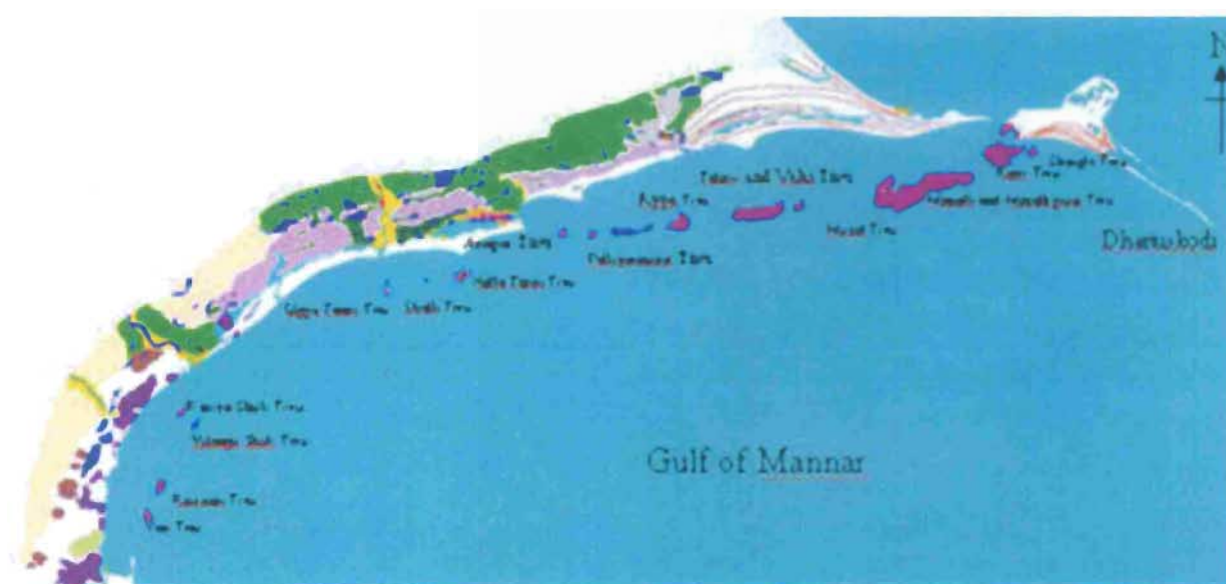
FUTURE OPTIONS

It is important that future management measures focus on
















sustainable use, conservation and management of resources in Gulf of Mannar that can be implemented in a participatory manner. It is essential that community rights to access traditional fishing grounds are recognized, as an existing traditional community structure (institutions). Fishing communities should have equal power in decision-making process, as well. There is need to recognize and support the existing community conservation initiatives. There have been instances in other parts of the world such as the Locally Managed Marine Area (LMMA) initiative in south-east Asia, where communities using traditional knowledge have designed and managed areas with restrictions and regulations to manage and conserve resources.

Fishing communities must be involved in the enforcement of regulations using existing community structures, as to ensure effective implementation of rules and regulations. Communities should be made aware of the existing fishing/for regulations and restrictions, as these will help in conflict reduction as well. When efforts are taken to focus on fishery activities, it is essential to regulate impact of the non-fisheries activities as well on the ecosystem.

²⁴ Licences are given to divers, licence fees are collected, and diving areas also selected by the Tamil Nadu Fisheries Department



Legend

- | | | | |
|---|--------------------------|---|-------------------|
|  | Sandy area/Spit |  | Back swamp |
|  | Beach ridges |  | Sand dune complex |
|  | Fringing reefs |  | Saltpan/Salt flat |
|  | Estuary/Creek/Lagoon/Sea |  | Mud flat |
|  | Patchy reefs |  | Teri dune |
|  | Tanks |  | Swale |
|  | Pedi plain |  | Water logged area |
|  | Flood basin |  | Aquaculture ponds |
|  | Flood plain |  | Island |
|  | Deltaic plain |  | Settlement |
|  | Natural levee |  | Strandline |



SUSTAINABLE HARVEST OF SEAWEED BEDS OF GULF OF MANNAR

Dr. M.Ganesan

Senior Scientist,
CSIR Central Salt and Marine Chemicals
Research Institute
Mandapam camp 623 510, India



IMPORTANCE OF MARINE ALGAE ECOLOGICAL:

- ❖ As primary producers of the rocky intertidal and sub-tidal region of the coast
- ❖ Food for benthic grazing fauna and fishes
- ❖ Micro-algae as food for larval stages
- ❖ Phytoremediation

ECONOMICAL:

- ❖ Food for human intake
- ❖ Fish feed in aqua-hatcheries
- ❖ Pigment production
- ❖ Phycocolloids
- ❖ Seaweed liquid fertilizer
- ❖ Energy source
- ❖ Medicine

PRODUCTION AND MARKET VALUE OF INTERNATIONAL SEAWEED GUMS

Seaweed products	Total(t)	Price(\$ per kg)	Total value (\$ million)
Agar	10,161	20	203
Carrageenan	25,403	8	203
Alginate	>25,000	6	150
	Total		560

PILOT PLANT PRODUCTION OF BACTERIOLOGICAL GRADE AGAR (SAGAR) FROM 'GELIDIELLA ACEROSA'



Washing of alga after treatment



Pressure extraction



Collection of hot extract using filter press



Gelling of filtrate at room temperature



Thawing of frozen agar



Purification of agar by dissolution in hot water



Regelling of filtrate at room temperature



Agar flakes and powdered agar

UTILITY OF SEAWEED RESOURCES



From food to lipstick

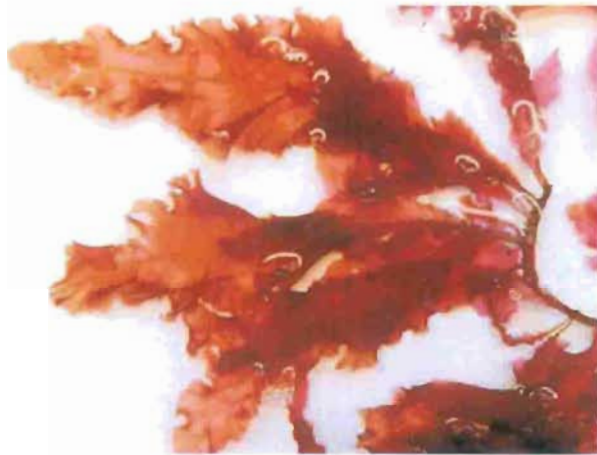




SEAWEED DIVERSITY OF THE INDIAN COAST

Algae	Order	Family	Genus	Species/Varieties	Total
Rhodophyta	16	36	136	406+28	434
Phaeophyta	6	13	37	159+32	191
Xanthophyta	1	1	1	3+0	3
Chlorophyta	7	19	43	179+37	216
Total	30	69	217	746+97	844

Source: Oza and Zaidi, 2001

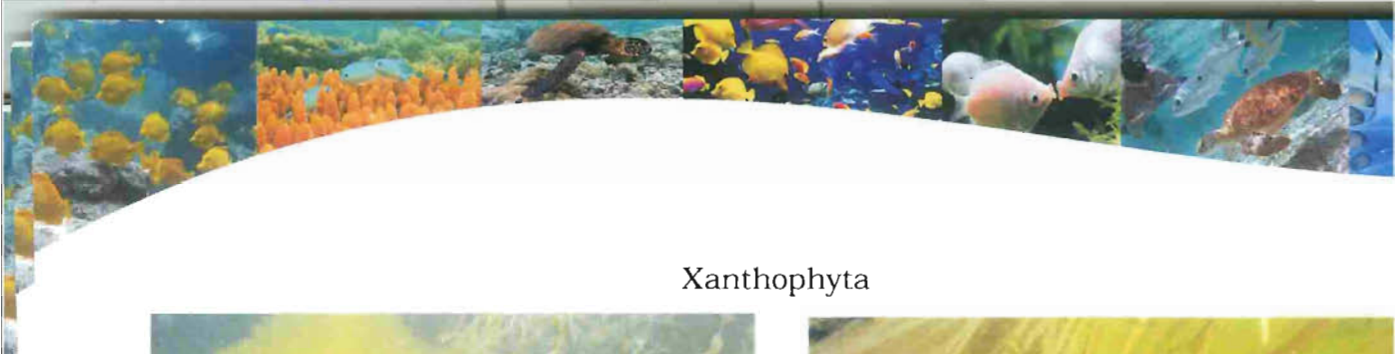


Rhodophyta



Phaeophyta





Xanthophyta



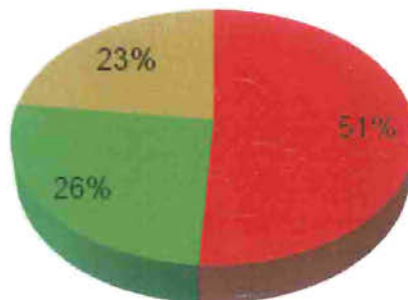
Chlorophyta



CONTRIBUTION BY 3 GROUPS OF ALGAE

Chart Title

■ Red ■ Green ■ Brown

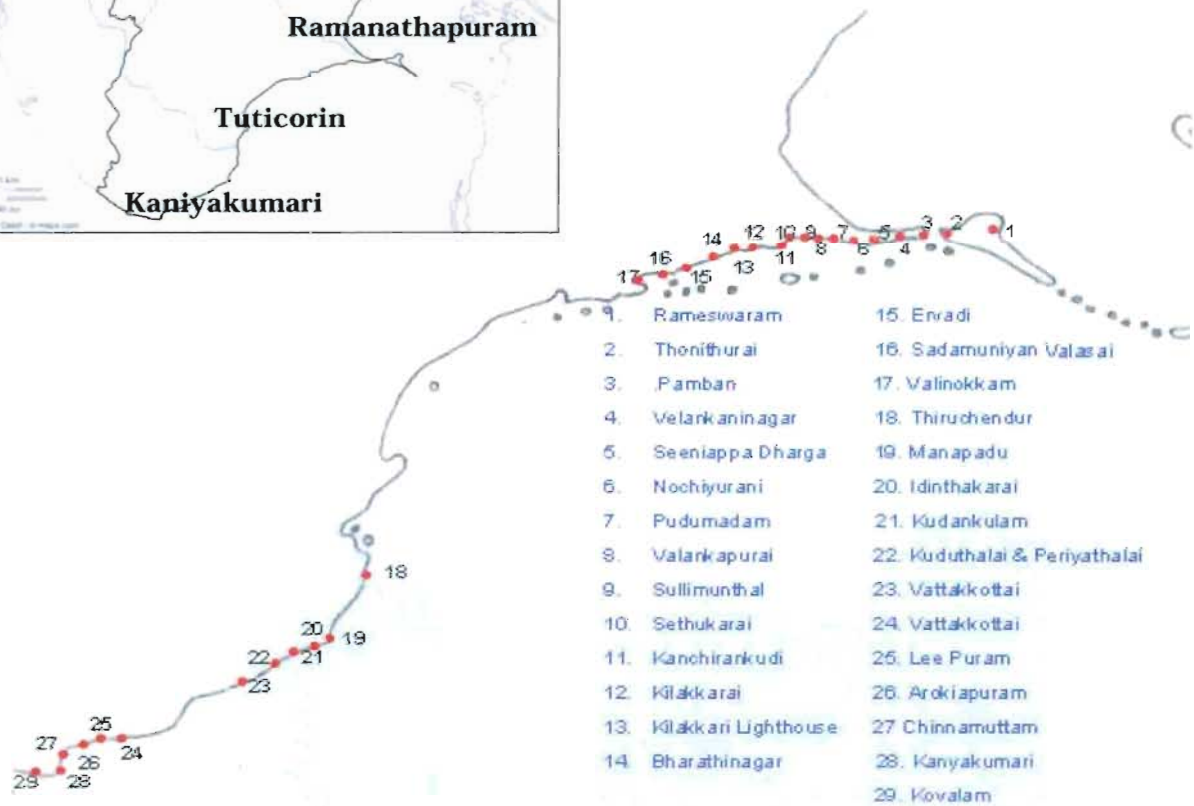
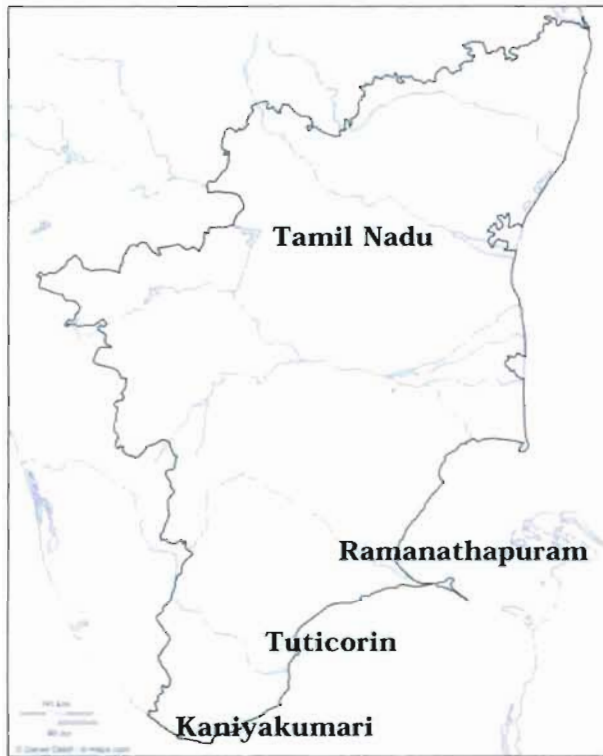




SEAWEED BIODIVERSITY SURVEY OF THE TAMIL NADU COAST

CSIR-CSMCRI has done an extensive survey of the entire Tamilnadu coast from Ennore to Kanyakumari and

GoM Islands for seaweed biodiversity assessment. The sampling stations include 42 along the mainland coast and 14 islands





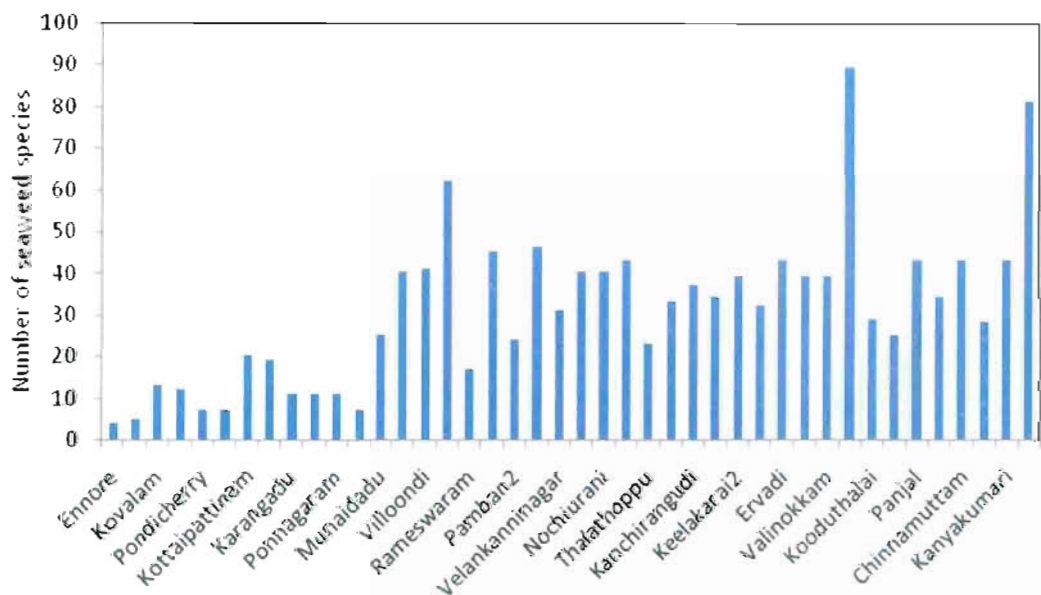
SEAWEED BIODIVERSITY OF THE GULF-OF-MANNAR COAST

S.No.	Division	Genera	Total number of species
1.	Chlorophyta	23	80
2.	Rhodophyta	60	146
3.	Phaeophyta	18	56
	Total	101	282 (40')



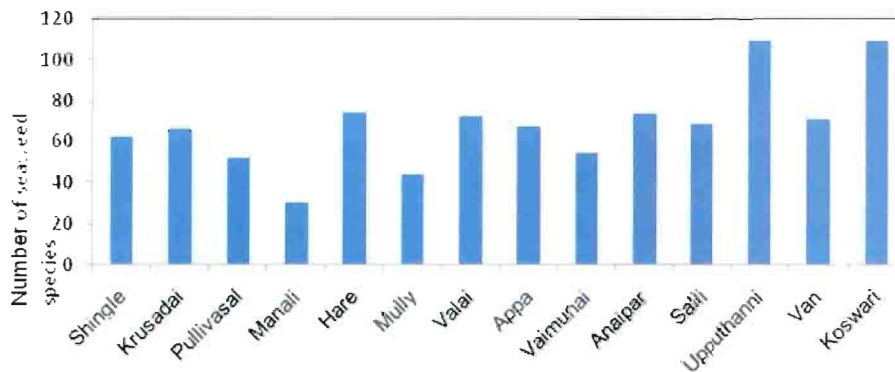
SEAWEED DIVERSITY OF MAINLAND COAST OF THE TAMILNADU - 42 STATIONS

Seaweed diversity is avail maximum in Manapadu with 89 species and Kovalam with 81 species. Minimum diversity is at Ennore (North chennai) with 4 species.



SEAWEED DIVERSITY OF ISLANDS OF THE GULF-OF-MANNAR - 14 STATIONS

Seaweed Biodiversity is maximum in Koswari Island (Tuticorin group) with 110 species and Upputhanni Island (Keelakarai group) with 109 species). Manali Island (Mandapam group) has 30 species.



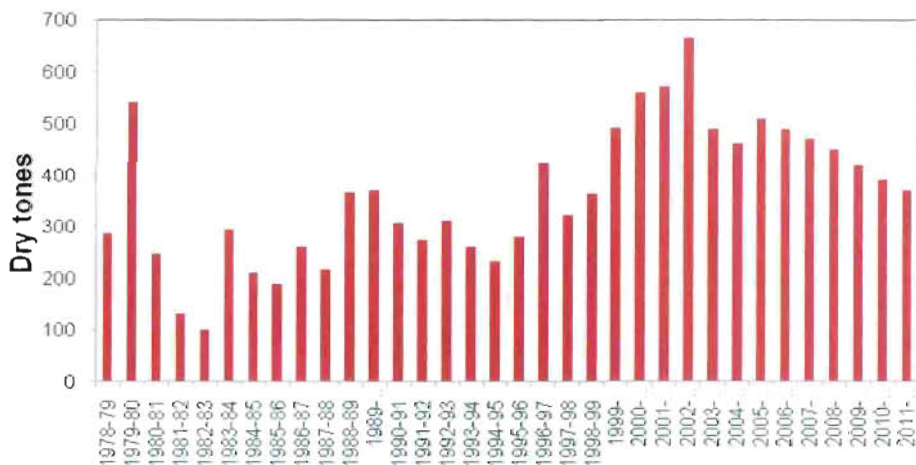
SEAWEED BEDS OF GULF-OF-MANNAR COAST





**LANDINGS OF 'AGAROPHYTE *GELIDIELLA ACEROSA*' IN THE GULF-OF-MANNAR
- 34 YEARS DATA * (1978-2012)**

- About 2000 fisher folk are involving in *Gelidiella acerosa* harvest.
- Harvest from wild stock is being done in all Islands of Gulf of Mannar.
- Harvest in mainland coast is being done along the 40 Km stretch of reef between Sethukarai and Valinokkam.



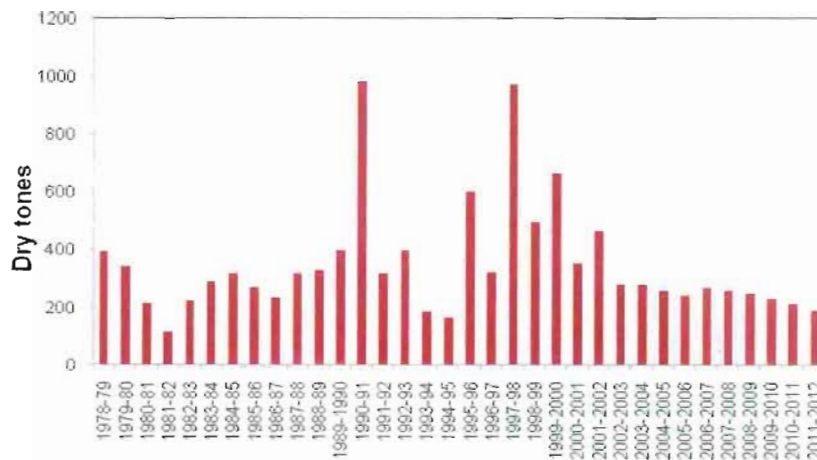
* Courtesy: Association of Indian seaweed industry, Madurai





LANDINGS OF 'AGAROPHYTE GRACILARIA EDULIS' IN TAMILNADU - 34 YEARS DATA * (1978-2012)

- Sharp decrease in landings of *Gracilaria edulis* from 2000 onwards.
- Wild stock in Gulf-of-Mannar became extinct due to over harvesting.
- Seaweed phycocolloid Industries now harvesting the seaweed from north Palk Bay region.



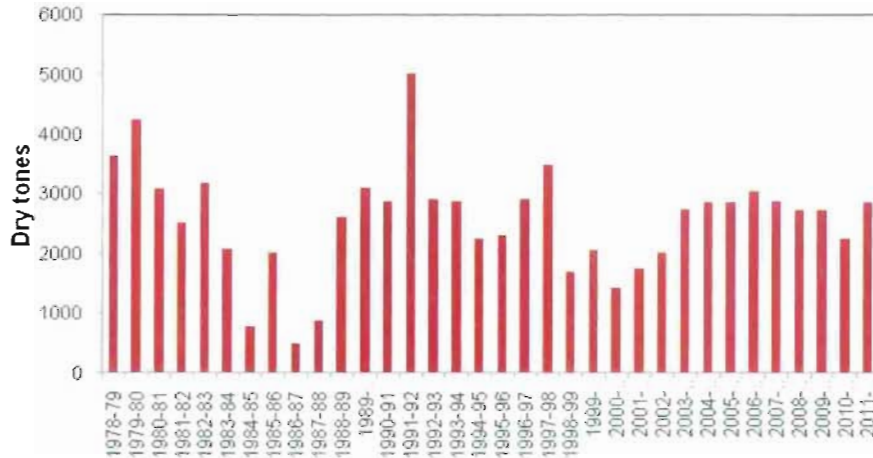
* **Courtesy:** Association of Indian seaweed industry, Madurai





LANDINGS OF 'ALGINOPHYTE SARGASSUM SPP.' IN TAMILNADU - 34 YEARS DATA* (1978-2012)

About 90% of *Sargassum* landings are harvested from GOM Islands. Always conflict exists between Forest officials and Industries on harvest in reef areas. It gives livelihood for about 3000 coastal people.

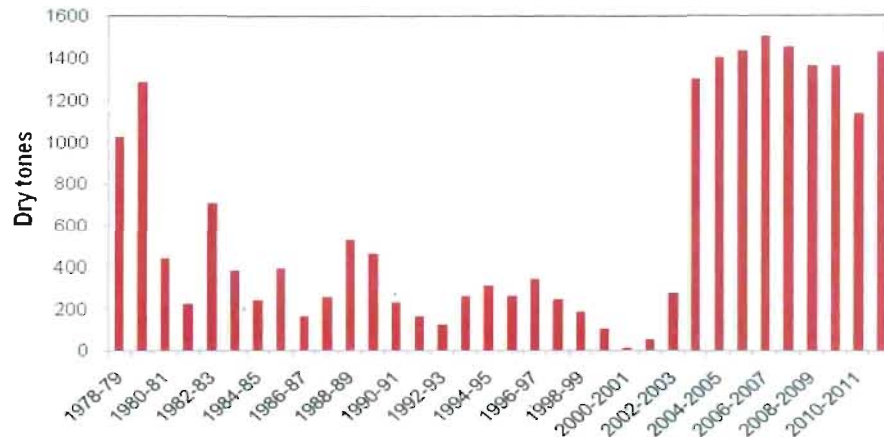


* Courtesy: Association of Indian seaweed industry, Madurai



LANDINGS OF 'ALGINOPHYTE *TURBINARIA SPP.*' IN TAMILNADU - 34 YEARS DATA * (1978-2012)

Earlier, *Turbinaria* spp. were harvested in lesser quantity. For the last one decade, *Turbinaria* spp. landings are high as its alginic acid yield and quality is equally good as that of *Sargassum* spp.



* Courtesy: Association of Indian seaweed industry, Madurai

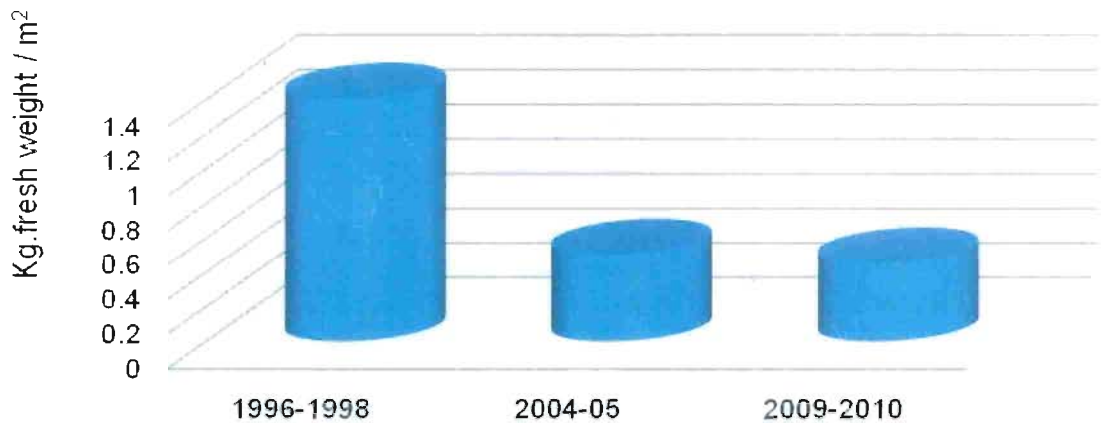


THREAT TO WILD STOCKS OF COMMERCIAL SEAWEEDS IN GULF-OF-MANNAR

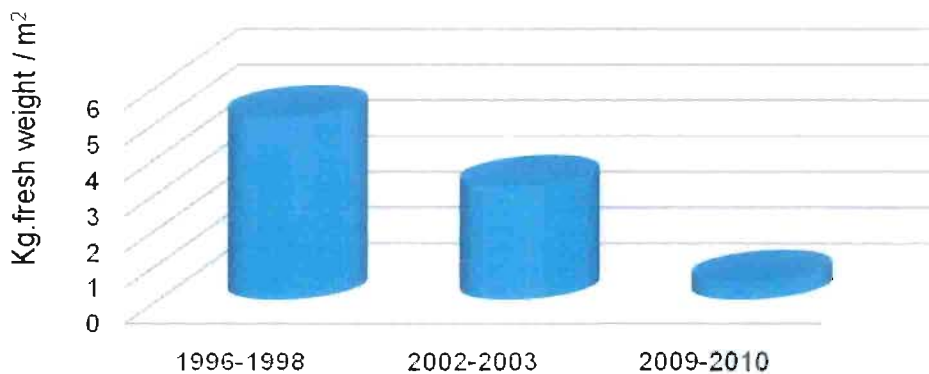
DATA COLLECTED FROM THE FOLLOWING RESOURCES

1996- 1998	=	DBT
2002-2003	=	MoE &F
2004-2005	=	MoE &F
2009-2010	=	CSIR

'*Gelidiella acerosa*' in Sethukarai, Ervadi, Sullimunthal, Krusadai Island

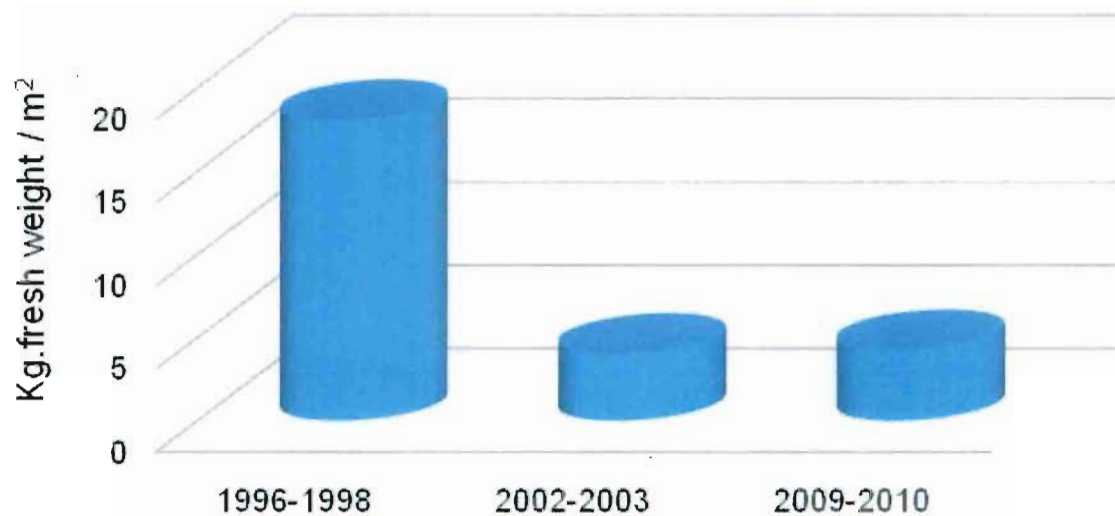


'*Gracilaria edulis*' in Rameswaram, Palk Bay, Mandapam, Krusadai Island

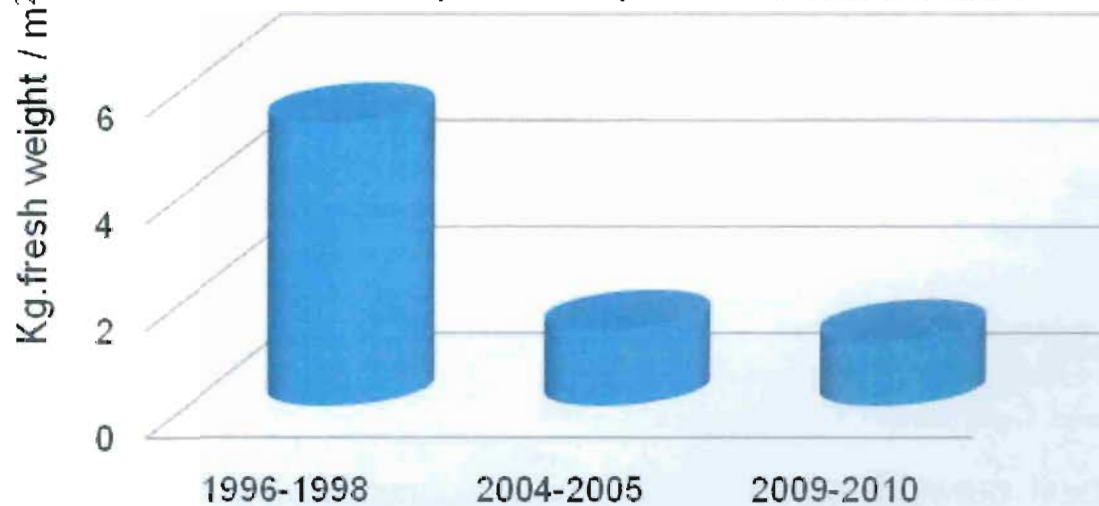




'Sargassum wightii' in Mandapam, Pudumadam, Krusadai Island



'Turbinaria conoides' in Sethukarai, Ervadi, Krusadai Island





1. Impacts of Harvesting on Plant Regrowth

- The species harvested.
- The proportion of a plant harvested.
- The age of the plant.
- The extent and pattern of branching.
- The level of exposure to waves and coastal processes.
- The presence or absence of grazers.

Cutting of the blades around 3 to 6 cm above the holdfast does not adversely impact on re growth in this species. The removal of a plant in its entirety or close to the holdfast is unlikely to permit re growth of an individual plant.

2. Environmental Effects

- Loss of Seaweed Stocks and Habitats for Marine Fauna
- Loss of Seaweed Species
- Loss of Coastal Biodiversity and Stabilisation
- Loss of Storm Protection and Coastal Processes
- Increased Competition for Resources

Several countries have adopted regulations to address sustainability and

environmental concerns held over wild harvesting. These include:

In Norway, harvesting is conducted under harvest plans that outline areas for harvest rotation over a five-year period. In these plans, only one-fifth of seaweed in these harvest areas is harvested every year allowing the seaweed community in these areas four years of re growth before being harvested again

In France, seaweed harvesting is regulated by the French Government and the National Syndicate of Marine Algae, a group consisting of representatives from the industry, fishermen and scientific advisers. Licensing of boats for harvesting of specific species, restrictions on seaweed landings and regulation of harvesting times are imposed to allow for the growth, reproduction and regeneration of wild stocks

In Canada, those involved in the actual harvest of seaweed must have a valid licence issued by Fisheries and Oceans Canada. These licences and leases detail a series of conditions for harvesting operations and can include stipulations that harvesting be undertaken by hand, limits on the species harvested, where a plant can be cut and how many plants in a given area can be harvested.



ENVIRONMENTALLY SUSTAINABLE SEAWEED HARVEST

a) Baseline Report

- The baseline report should be carried out on a site specific basis
- The report should detail the available biomass, percentage cover and the annual growth rate of the target species.
- An assessment should be also be made of the physical attributes of the site eg slope, substrate, wave exposure etc.

b) Rotation cycles

- A sufficient rotational time between successive harvesting in any one site should be allowed, to facilitate the regeneration and recovery of the resource and associated ecosystem.
- In any given location, a comparable area adjacent to the harvested areas should be left unharvested. This will provide a reproductive pool for re-colonisation of the target seaweed species and associated animals and plants.

c) Harvesting methods

- The quantity of seaweed collected that can be sustainably harvested at each site should be determined on a site by site basis. This will depend on the

species harvested, available biomass, physical attributes of the site, wave exposure and annual growth rate. As a precautionary measure, the amount of the target species harvested from a given area should be well below its annual growth rate.

- Hand harvesting methods should be used to collect seaweed. These include hand grabbing, raking, or the use of knives or sickles for cutting.

d) Environmental protection measures

- Stones and/or seaweed not harvested should always be returned to their original position.
- Associated fauna inadvertently collected with the target species should be returned to the harvested area, if possible
- Damage and disturbance to the surrounding environment should be minimised e.g. avoid dislodging rocks and boulders, avoid use of vehicles on the shoreline, avoid trampling of associated habitats in the area and use existing slipways and jetties to launch boats.
- Avoid disturbing wildlife e.g. seals and birds.



e) Harvesting Records

It is good practice for harvesters to record and monitor the following information to aid assessment of sustainable management:

- location of harvesting area, including grid reference
- date & time
- tidal state
- date of previous cropping
- harvesting method used
- size of patch cropped
- average length of target species within the cropped patch
- reproductive state of target species within the cropped patch
- wet weight of each species harvested
- photographs of the harvesting area before and after cropping

HARVEST METHODS FOR COMMERCIAL SEAWEEDS OF GULF-OF-MANNAR

Species	Harvesting cycle	Harvesting method
<i>Sargassum spp.</i>	2-3 years	Cut at a height of 10-15cm above the holdfast
<i>Turbinaris spp.</i>	1-2 years	Cut at a height of 5-8-cm above the holdfast
<i>Gelidiella acerosa</i>	1-2 years	The frond should be cut above the holdfast
<i>Gracilaria spp.</i>	6-9 months	The frond should be cut above the holdfast





ROUNDTABLE DISCUSSION

The roundtable discussion begins with the **Presentation-I “Conservation, Sustainable Use and Management of Marine Resources in the Gulf-of-Mannar National Park and Biosphere Reserve”** presented by Ms. Ramya Rajagopalan, ICSF. The was discussed about the original notification of the Gulf-of-Mannar National Park and its distribution of the islands across Ramanathapuram and Tuticorin districts and which comprises 21 uninhabited islands. The Forest Departments and CMFRI indicated that it was declared as a national park to prevent destruction of coral reefs by mining of coral lime stone. Ms. Ramya discussed about the different categories in fishing communities and over 50,000 families are depending on fisheries, with over 35,000 active fishers. Ms. Ramya stated that according to the Gulf-of-Mannar Biosphere Reserve Trust (GOMBRT), there are 125 villages dependent on these resources and they use row boats and sail boats to fishing on average. And about 5,000 women seaweed collectors who manually collect seaweed for the agar industry and nowhere else in Tamil Nadu can women collectors be seen. There are also 6,500 divers who dive for sea cucumbers.

Ms. Ramya explained the regulations under the Tamil Nadu Marine Fisheries Regulation Act (TNMFRA), registration of all fishing vessels and require license for

fishing. The Act prohibits use of gear with mesh size less than 10mm; prohibits fishing by mechanized and deep-sea fishing vessels, within three nautical miles (5.4km from coast) and prohibits pair trawling and purse seining. There is also a fishing ban for a period of 45 days every year (closed season). And there are District level regulations in Ramanathapuram (which are not there in the rest of TN), Specifically, there is the three-four day rule that was adopted in the 1990s, whereby mechanized vessels fish for 3 days and small-scale vessels fish for four days. For implementation of the system, daily tokens are issued to mechanized vessels to venture into the sea. The Rules also restrict the number of outboard motors (OBMs) due to security reasons.

Ms. Ramya also pointed out that there are many countries especially in the Pacific and East Asia (Thailand, Indonesia, Philippines) where there are coral reefs ecosystems on which communities are highly dependent and they follow a method of management called Locally Managed Marine Areas (LMMA) which is a legally recognized entity. Japan they have a unique system called Satoumi.

Presentation-II on “Sustainable Harvest of Seaweed Beds of Gulf-Of-Mannar” by Dr.M.Ganesan, Scientist, Central Salt and Marine Chemicals Research Institute (CSMCRI) stated that



seaweeds are important both ecologically and economically. In India, 844 species of seaweeds have been recorded. There are three dominant groups of seaweeds: green, brown and red algae. For the last 30 years, periodic studies have been carried out in the Gulf-of-Mannar area to the production. The coast has been surveyed from Kanyakumari to Ennore in Tamil Nadu. From their records, it is seen that there are 282 species of seaweeds along the Tamil Nadu coast. The first survey was done in the 1970s. After that the survey was carried out starting in 2010 and completed in 2013. Dr Ganesan also showed a map of the areas where seaweeds are found and stated that seaweeds require

a hard substratum to grow. They grow to whatever depth light can penetrate, even at 10-15 metres depth, as long as there is some hard surface, even small stones, seaweeds will grow. The villages such as Periyapattanam, Sethukarai, Kilakkarai, Erwadi and others on the mainland as well as some of the islands are involved in the production. This resource is available in thousands of tonnes in the Gulf of Mannar. This is what is harvested from the islands. The yield has changed appreciably, going a little up and down depending on the season. Between 1998 - 2010, major seaweed collection areas are around Kilakkarai and Erwadi, an overall a steady decline could be observed.





COMMUNITY PRESENTATIONS

The community representatives were then invited to speak and their presentations are summarized as follows:

Community Presentation-I:

Tmt. Meenakshi seaweed collector, Bharathi Nagar village of Ramanathapuram District stated that they harvest seaweed only from dead corals and not from live ones. She added that seaweed collectors do not go near live corals; instead they protected the corals, marine life and the islands and coast. Seaweeds do not grow on live corals and hence they do not go near them. She stressed that the sea belongs to the fishers and it is their asset and hence they protect it.

Community Presentation-II:

Tmt. Lakshmi, seaweed collector from Chinnapalam village said that near Krusadai Islands, 3 villages are dependent on it for their livelihoods for a very long time, fishers as well as seaweed collectors. She also stressed that if they did not collect Seaweed, it would break off and get washed away and only the 'Pepsi paasi' grows on coral and kills them, seen like circular dead patches. They mainly collect *marikozhundu* (*Gelidiella sp*), *kanji paasi* (*Gracilaria edulis*), *kattakorai* (*Sargassum sp*), *Karukan paasi* and *kota paasi*. Earlier in a year, they used to go for at least 300 days of harvesting but now, the population is high and the seaweed growth is less, and hence

they restricted themselves to collect seaweed only for 12 days in a month: 6 days around the new moon and 6 around the full moon. They do not use any iron implements but collected with their bare fingers and this has been practiced for generations by their parents and grandparents. The remaining 18 days, they go fishing with the fishers in the vathai.

Just like the men, the women too stayed back during the 45 day ban period. For those days, they got Rs.2500/- They have stayed back now for two and a half months. She also demands that, like men, the women seaweed collectors should be given identification cards as they went out into the sea. Insurance was also needed for women in case something untoward happened to them.

Community Presentation-III:

Thiru. Palsamy, Member from the Fishers' Community said that there were 21 islands in the Gulf-of-Mannar and the depth between the 21 islands and shore was low. It is a good fishing area but trawlers are operating here even though they are banned within the 3 nautical miles and trawlers from Mandapam, Kilakkarai, Tuticorin and other places were also operating between the islands. 20-30 years ago, there were plenty of sea cows (dugongs) and turtles. But now because of trawlers, they have all gone. It was highlighted that all trawl nets need to be



banned and the trawlers should be moved away beyond the islands.

Plastic nets are banned according to the MFRA rules but they are still used. The use of plastic nets results in catching of a lot of small fish which are killed and go waste. He also asked the government should ban the production of the plastic nets and with small size holes) must be banned. He said that collection of sea cucumbers was banned. They had wanted to go ahead with culturing sea cucumbers. They want that permission needed for growing sea cucumbers (ranching) as well as exporting them be obtained. He asked that fishers be allowed to live a peaceful life pursuing their traditional livelihood and urgent action be taken to ensure that the banned nets especially those with fine mesh are not used.

Community Presentation-IV:

Thiru. Murugesan, Village Head, Chinnapalam said that there were about 1000 people in the village. He said that the Forest Department asked them not to put *kedaivalai* (a set net, with no mesh size regulation, left overnight in the sea) in the islands. Also, they told them not to stay in the island and pursue our livelihood. When they did, they would seize the nets, filed a case against them, fined them and had even sent them to jail. Even for this amount, the fishers would have to pawn women's jewellery. They would pay the fine and retrieve the vathai and nets. He said that for three generations, they had been dependent on the islands for their livelihood. They would go to the island to take shelter from cyclones, winds and rain; we have stopped the use of monofilament net about six months ago."





Recommendation

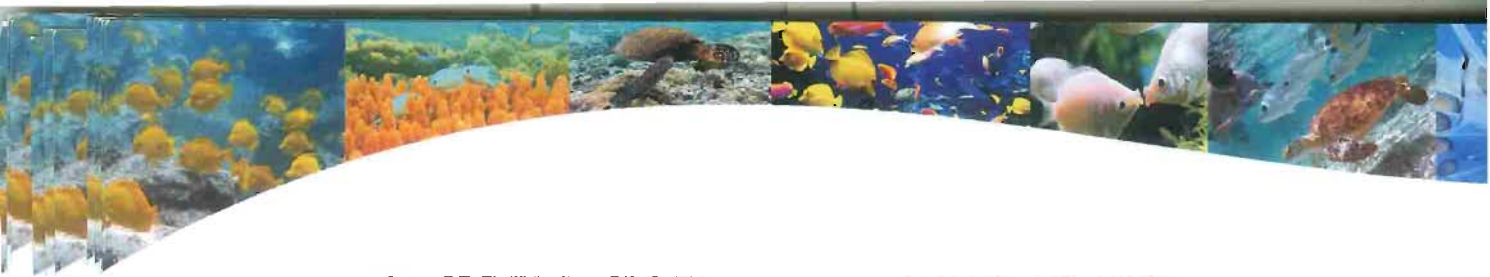
Community representative Tmt. Meenakshi suggested that special access to the islands be given especially when there was a need to repair boats or engines or take shelter. Boats cannot be repaired while out sea. Thousands of fisherwomen and men are dependent on the sea. They wanted the harassment of forest officials to stop and they should be allowed to pursue their livelihood of collecting seaweed without any problems. She contended that permitting genuine fisher folk actually supported for life in the islands. She reiterated that the sea was their asset and they were highly dependent on sea resources. She said that they were ready to work with the Forests Department and protect the resources.

Community representative Tmt. Lakshmi suggested that identity card be issued to women's because at any moment, an untoward thing could happen to women's also. Like men, they too went out to the sea. Sometimes when the Forest Department or coast guard questioned them, it would be good to have an identity card on hand. They want an identity as fisher-folk.

The Principal Secretary to Government PD&SI suggested that options to be explored for providing seaweed culture as alternate livelihood options and better harvesting techniques (gloves and scissors) for women.

Dr. E. Vivekanandan, CMFRI suggested that techniques are available for farming sea cucumber and to produce hatchlings. These techniques have been developed by CMFRI for a couple of species, though not for all (of WLPA); much progress has not been there for up-scaling to allow large scale production owing to the stipulation of the Wild Life Act. This practice is being followed in several other countries quite successfully realizing that the natural population of sea cucumber has declined. Policy support is needed so that this can be harvested for hatchery purposes.

Dr. Jayanthi, I.F.S., Addl. Director, Department of Environment, referring to the CRZ Notification, said that the Gulf-of-Mannar comes under ecologically sensitive zone. MoEF is trying to have a stakeholders meeting to see how the development can take place in this area. At present the water area from the shore to 12 nautical miles



comes under CRZ IV. In CRZ IV, you can do traditional fishing and allied activities but industries cannot have effluents or sewage going into this area. Based on CRZ IV, traditional fishermen are allowed to carry out their activities.

Thiru Upadhyay, I.F.S., Addl. PCCF said that if the Fisheries Department and District Collector can recognize the community as traditional dwellers within the meaning of Forest Rights Act, then under Section 3, then community rights or individual rights can be recognized. If individual rights cannot be identified, then 'this community in this village in this area' can be specified and this kind of harassment can be stopped.

Dr. Ganesan suggests that there were several reasons such as unfavourable season and indiscriminate harvest. Seaweed resources were declining but that did not mean we could ban the seaweed collection as it was one of people's livelihoods. They need to harvest it sustainably.

Dr. E.Vivekanandan, CMFRI, highlighted three key aspects that were discussed during the earlier sessions:

1. Artificial farming; farming seaweeds

- through raft culture would definitely be advantageous. Seaweed cultivation does not have the complications of sea cucumber cultivation; it could be done in a simple manner. He believed that this should be definitely encouraged.
2. Identity cards empower them as seaweed collectors and it would be a government recognized authority. It is a win-win situation for the government as the government will also be able to monitor how much they are harvesting of which species.
3. Locally Managed Marine Areas (LMMAs), is successful in other countries such as the Philippines, Thailand, Indonesia, Papua New Guinea, Fiji and other islands. In LMMA, it is the communities that devise the plan for management which is supported and guided by the government. Such measures have to be institutionalized. The stakeholders such as fishers, seaweed collectors, sea cucumber collectors and other interest groups, should be brought together to form a governing council under the guidance of Fisheries Officials and the Forest Department. Issues such as plastic nets, pollution, trans-boundary issues etc., can be monitored and managed locally by the community itself.



Dr. V. Suresh of Barefoot Academy stated that the evolving new institutional mechanisms of joint partnership between different sets of people in the Gulf-of-Mannar as an experimental measure how would be interface with three groups of people (1) fishers (2) scientists and scientific community and (3) officials. In the area of officials, there are the Forest Department, Fisheries Department, District Administration and the Coast Guard. How do we bring in the convergence between the various wings of the department and the convergence between the department, the fishers and the scientific community? We need to bring in governance and need to look at institutional change right from the beginning.

Thiru V.Vivekanandan, Member ICSEF, stated that in the Gulf-of-Mannar, the most vulnerable people are seaweed harvesters because they are not on the radar. There is no category of harvesters; they are only on the general category of fishers on the record. These are fundamental things that we need to recognize in the fisheries. He also stated that alternative employment to fishing

community looks very logical, but is not going to easily happen. A sea-going person is not going to give up the sea immediately. It requires an inter-generational change. There has been very little success of getting fishermen out of fishing into another employment. Some of the shore based people can be got into diversified employment, supplement the income; the younger generation who are getting educated can be got out of fishing. So the education of fishing community and inter-generational movement of fishery is going to be the real way out as far as Tamil Nadu fishermen are concerned.

Thiru A.Venkatesh, I.F.S., Conservator of Forests, Gulf-of-Mannar Marine Biosphere Reserve stated that two reasons which have been attributed for the degradation of seaweeds viz. 1. Bottom trawling and the collection of seaweed using destructive techniques; 2. Around the 21 islands, boats have to travel over coral reefs, there is a possibility for the corals to get damaged. Hence, protection of the coral reefs is very important. Industries collect surreptitiously and he is not aware if any price policy exists for that. Industries need to be regulated and cultivation also promoted so that coral reefs



are protected and seaweed growth can also be promoted, and people's livelihoods can also be enhanced.

Thiru R.K. Upadhyay, I.F.S., Addl. PCCF (Planning & Budgeting) emphasizing the conservation significance of the area, said that Krusadai Island was the only place for *Balanoglossus* a species that was a link between invertebrates and vertebrates and thus very rare and endangered.

Thiru K.Nantha Kumar, I.A.S., District Collector, Ramanathapuram said that he, along with the Wildlife Warden, would look into the matter of providing rights under FRA at the district level itself. According to the CSMCRI, the seaweed growth was coming down and this had been accepted by the community. He pointed out that it had been suggested that seaweed harvest alone is not enough, and some additional income generation methods had to be looked at. He said there was a need to look at what other seaweeds could be cultured. From the Planning Commission, funds have been allocated for cage culture, crab fattening and other activities. Different alternatives to generate additional income had to be examined. He said that while

catching fish has been going on for many hundreds of years, seaweed demand has been prevalent only in the last 30-50 years. It is a question of livelihoods. If seaweeds are not available naturally, methods of culturing them need to be established. If that is not possible, then there is a need to move out and look at other related livelihoods. The government is prepared to offer all manner of assistance. At the district level, he said that they would provide all support. There is a need for proper study by government or by private entities such as the SDMRI, Thoothukudi which is doing extensive studies on this subject. So, at least for the time being, we could think of artificial culturing of these seaweeds.

Thiru Deepak Bilgi, I.F.S., Wildlife Warden, Ramanathapuram stated that the purpose of the notification is to ensure disturbance free environment for the coral, which requires some 20-25 years for regenerating. They referred to limestone or dead coral - this was once live coral which is now dead and occupied by seaweeds. The corals keep migrating to new areas. Thus an undisturbed environment was a critical need. He said that they were not blocking



the collection of seaweed in the Gulf-of-Mannar Biosphere Reserve. The only restriction was in the 560 sq.km of the islands which form the National Park. Outside the National Park, at a depth of 6-7 metres, seaweed was available. At present, only the shallow water seaweeds were being collected which is a relatively easy activity. Access around the island is mainly because of shallow waters. If technology could be enhanced for collecting seaweeds from deeper water by giving some subsidy or devices, to some extent the stress on the national park could be reduced.

Dr. Beela Rajesh, I.A.S., Commissioner, Fisheries Department said that

everyone should work together to come to an agreement. She suggested that they (community) come up with ideas about allied employment. While issues can be easily highlighted, it was necessary to look at solving the issues. The scientists had said that the resource was depleting and it was for them to come up with suggestions on how to enhance the resource. Referring to the community, she said that they also knew that the resource was getting depleted. She asked them to put forward with suggestions on what would be the best in terms of additional livelihoods such as cage culture or ornamental fish or something else. The government was prepared to help them.





CONCLUSION

Concluding the meeting, the Vice Chairman, SPC said that they (community) had been following certain traditional livelihoods. They knew about the place much more than scientists as they had been there for a long time. The government and scientists would look at how to support the community in improving livelihoods. But they need to remember that it was a protected area. The government had a responsibility to protect and conserve resources for future generations as well; to be left behind as a legacy for the future generations. Only if the government, scientists and the community work together, this would be successful.

The VC, SPC said that they had to ensure that if some techniques or plans for the fisher folk are developed for their benefits; outside parties would not come and usurp it. However, scientists were still researching into suitable methods (for bio-culture) and hence solutions would occur only in the future. Until then, the community should work with the scientists. They also need to understand that the government does not want to make life difficult for the community. The government wants the community to keep well. This is why this meeting was organized, so that they could understand the community's needs. At the same time, the community also needed to think of additional livelihood options. They were not saying community members should

become electricians or learn computers. But they needed to look at additional livelihood options in their own area (of work) and ensure that others do not enter into their field.

The VC, SPC said that with regard to the identity card, the authorities had accepted the request. And the District Collector, Ramanathapuram would talk to them on a regular basis to sort out all the small issues. The new Fisheries Commissioner may consider the points made by Thiru Vivekanandan about the sector as a whole and the question of applicability of wildlife legislation on the marine sector. A valid point has been made; and hence there was a need to think and talk about it and research to understand it better.

The VC, SPC said that, the women seaweed collectors may be given diving kits, oxygen cylinders and other equipment and be allowed to dive. The community members and the District Collector would look into it and call for a meeting with the community and enquire about who has been there for many generations. Fundamental Rights Act requires 75 years or three generations, the Collector can take a look at the records and be convinced. Based on the records, in the district level committee, if he is satisfied, then he can recognize local rights.



Major Action Points:


- Recognition of seaweed collectors as a unique group of women fishers all over India, provision of identification cards to women seaweed collectors by the fisheries department (a first time initiative, to be included in the Policy Note)
- Collector to look at Section 3(1) d of FRA for Rights of Access to communities
- Identification of areas being used by the community in the NP area before declaring inviolate
- Proposal on sea cucumber ranching from CMFRI to be prepared and sent to MoEF, supported by Planning Commission
- CMSCRI to research further and advise on artificial culture of seaweeds
- Community to give suggestions on alternate/allied employment options that they would like to take up
- Provision of protective equipment such as gloves for the women collectors; check if use of scissors / cutters to harvest seaweed is possible
- Exploration of seaweed collection from deeper waters (6-7m), training for diving as well as gear such as oxygen tanks
- Collector to hold regular meetings with the community to decide about access rights as well as to look at alternate livelihoods
- Further research on the need for a legal framework for conservation and management that is more relevant for marine areas, rather than using terrestrial framework.





LIST OF PARTICIPANTS

Sl.No	Name and Designation
1.	Tmt. Santha Sheela Nair, I.A.S., (Retd.), Vice Chairman, State Planning Commission, Chennai.
2.	Thiru S. Krishnan, I.A.S., Principal Secretary to Government (Planning and Development), Planning Development and Special Initiatives Department, Secretariat, Chennai.
3.	Dr. Beela Rajesh, I.A.S., Commissioner, Department of Fisheries, Chennai.
4.	Thiru K. Nanthakumar, I.A.S., District Collector, Ramanathapuram.
5.	Dr. Sugato Dutt, I.F.S., Member Secretary (i/c), State Planning Commission, Chennai.
6.	Thiru Lakshmi Narayanan, I.F.S., Principal Chief Conservator (Wildlife) & Chief Wildlife Warden, Panagal Maligai, Chennai.
7.	Thiru Syed Muzammil Abbas, I.F.S., Special Secretary, Environment and Forest Department, Secretariat, Chennai.
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 15. **Dr. S. Noorjahan Beevi,**
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Community Members from Ramanathapuram

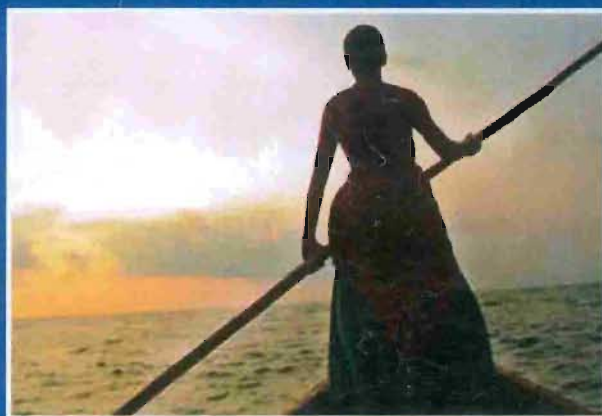
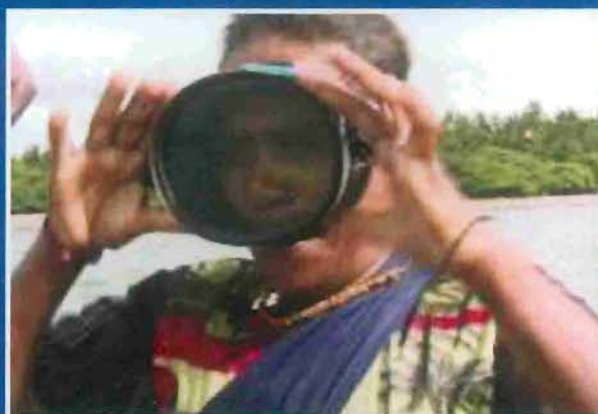
30. **Thiru A Palsamy,** Bharathi Nagar
31. **Thiru Muthiaya,** Bharathi Nagar
32. **Thiru Murugesan,** Chinnapalam
33. **Tmt. Lakshmi,** Chinnapalam
34. **Tmt. Meenakshi,** Bharathi Nagar
35. **Tmt. Nambu,** Chinnapalam







ENHANCING CAPACITIES OF FISHING COMMUNITIES FOR RESOURCE MANAGEMENT



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