

Governance of marine fisheries in India: Special reference to Tamil Nadu

J. Amali Infantina, R. Jayaraman, T. Umamaheswari, B. S. Viswanatha & L. Ranjith*

Department of Fisheries Economics, Fisheries College and Research Institute, Tamil Nadu Fisheries University, Thoothukudi, Tamil Nadu, India.

*Marine Biodiversity Division, Tuticorin Research Centre, Central Marine Fisheries Research Institute, Thoothukudi, Tamil Nadu, India.

[E.Mail: amaliinfantina@gmail.com]

Received 03 April 2014; revised 10 October 2014

Fisheries contribute significantly to India's national economy (1.21 % of total GDP and 5.3 % of agricultural GDP) and provide a livelihood to an estimated 10 million people. Marine fisheries has undergone a perceptible change due to continuous increase in fishing activities involving introduction of different advanced fishing technologies, gears and fishing fleets. This sustained increase in fishing activities coupled with industrialization has further attributed to the profound impact on the fishery resources affecting the sustainability of the same. This paper attempts to critically analyze the marine fisheries of India with special reference to Tamil Nadu, with an aim to explore appropriate management options for ensuring ecological integrity, better conservation and sustainability of the resources and also livelihood security for the coastal fisher folk. International issues like crossing maritime border (Indo-Srilankan border) have also been discussed.

[Keywords: GDP, Sustainability, Marine fisheries, Ecological integrity, Crossing maritime border]

Introduction

The marine fishery in India has witnessed a phenomenal change in growth during the last five decades. Marine fish production of India which was at a subsistence level of 0.5 million t in 1950, increased to 3.9 million t in 2012¹. India has registered a rapid developmental phase in marine fisheries particularly during the second half of the 20th century. Mechanization of the indigenous crafts, conversion of traditional crafts into motorized, introduction of commercial fishing techniques and launching of deep sea fishing schemes were the main factors responsible for achieving the present level of fishing capacity and fish production.

The table 1 shows the decadal changes in the marine fish landings of India from 1950 – 2010¹. Co-efficient of Variation (%) and growth rate (%) are the indicators used to access the change in marine landings across these decades. Co-efficient of Variation was found to high during 1950 – 60 and growth was recorded highest during 1991 – 2000. The decline in growth rate cannot be assessed on the basis of landings alone. But, fisheries scientists/managers take other measures, which are considered as warning signals to get a clearer picture. Some of them are i) a perceptible

decline in catch rate (measured as Catch Per Unit Effort), ii) widely reported incidents of high fishing mortality due to wanton destruction of juveniles, discards and by-catches, and iii) deviations noticed in landing pattern i.e., changes in size composition and mean length at capture². Indian Exclusive Economic Zone (EEZ) declaration was done in 1977. Ever since then, India has been conducting exploratory surveys in the EEZ in order to determine the type of resources and their potential through Ministry of Agriculture. Subsequent to these results, there had been a renewed vigor in the introduction of new technologies in the commercial sector followed by modernization of artisanal crafts and fishing techniques. The total exploitable potential yield of the marine fishery resources of Indian Exclusive Economic Zone (EEZ) was estimated to be 3.93 mmt in 1991. The revalidation was done in 2011 and was found to be 4.419 mmt, which is almost in a close agreement with the former estimate³. Of the total marine fishery potential, about 58% of the resources are available at a depth of 0 – 50 m, 35% at 50 – 200 m and 7% beyond 200 m depth⁴. It is also noteworthy to mention that the present catch is largely derived from the intensively fished shelf waters.

Marine fishing fleet in India consists of (i) non mechanized (artisanal) sector using country

craft and traditional gears, (ii) motorized sector using traditional craft with outboard motor(s) (OBMs) (9.9-120 hp) and, more recently, inboard engines (IBM) (89-156 hp); (iii) mechanized sector (8.5-16.7 m LOA; 89-156 hp; and (iv) deep sea fishing sector (>16.7m LOA; 156 hp and above). There have been significant structural changes in the fishing fleet over the last few decades. Percentage contribution of the mechanized boats to the total marine fishing fleet increased from 14 to 25% and motorized craft from 4 to 32 %, over the years from 1985 to 2005, while that of non-motorized craft decreased from 83 to 44%. Percentage contribution by the mechanized sector towards total marine fish production increased from 43.1 to 71.2% during 2001 – 10 while fish production by the non-motorized sector declined from 18.4% in 2001 to 1.1% in 2010. And percentage contribution by the motorized sector declined from 49.5% in 2006 to 26.1% in 2009⁵.

Table 1: Marine Fish Landings of India during 1950 - 2010 (CMFRI, 2013)¹

Period	Avg. landings (t)	Co-efficient of Variance (%)	Growth rate (%)
1950-1960	656844	18.84	-
1961-1970	832426	15.62	26.73
1971-1980	1259624	9.91	51.32
1981-1990	1702478	16.17	35.16
1991-2000	2408741	9.22	41.48
2001-2010	2773996	12.61	15.16

Marine fisheries of Tamil Nadu

Marine fisheries development in Tamil Nadu is similar to that of the all-Indian scenario. Tamil Nadu is bestowed with the bountiful riches of three major seas, the Arabian Sea on the west coast, the Indian Ocean, and the Bay of Bengal on the east coast, and has the benefit of both the South-West and the North-East monsoons. With a 1,076 km long coast line, 35,000 sq km of continental shelf and an estimated 2.2 lakh hectares of offshore area, this state is considered as a pioneer in the exploitation of marine fisheries resources. Tamil Nadu marine fish production was accounted to be 7.1 lakh t in 2012¹. The marine fisheries of Tamil Nadu have been extensively studied by many fishery scientists and they have concluded that TN fishery has undergone a perceptible change due to the sustained increase in fishing activity⁶. Particularly during the last decade, 2001 – 11, fish production

has grown in a haphazard way. With the initial years on the upswing, 2004 – 06 has seen plunge in production which subsequently stabilized in the latter part of the decade. It is believed that the plunge in production between the years 2004 – 06 was largely attributed by tsunami in 2003 (Fig. 1).

Characteristically, four types of coastal ecosystems exist along the Tamil Nadu coast: the northern Coromandel coast from Arangankuppam in Pulicat near Chennai to the north end of Nagapattinam, the middle Palk Strait from Kodiakarai on the south of Nagapattinam to Rameswaram, the southern Gulf of Mannar, from Thanuskodi to Kanyakumari and the meager west coast which lies extreme south of Kanyakumari. Marine fish production varies significantly across these four coasts which could be well emphasized through the average production data (2001 – 11) as in Fig. 2 & 3. **Note:** Palk bay has found to contribute the most i.e. average production was 137059t, followed by Coromandel Coast (117693t) and Gulf of Mannar (107965t). The West coast contributed the least (21296t) (Fig. 2 & 3).

Estimates of Optimum Fleet Size for Indian Waters

Excess capacity (or over capacity) may be defined as the capacity in excess of the stock of inputs that will produce a desired level of outputs. Excessive fishing capacity leads to overfishing and affects long term sustainability of resources, biodiversity and environment and subsequently the economic viability of fishing. The FAO Code of Conduct for Responsible Fisheries⁷ recognizes that excessive fishing capacity threatens the world's fishery resources and thus their ability to provide sustainable catches and benefits to fishers and consumers. The excess fishing capacity stems essentially from the widespread tendency for overcapitalization and overfishing under free and open-access conditions. India, being an open access fishery, endures the similar problem of excess capacity (Table 2). Estimation of optimum fleet size and its comparison with the current fleet size portrays a vivid picture of excess capacity. Few attempts have been made to estimate the optimum fleet size in Indian waters, so as to assist in harvesting of marine fishery resources in sustainable manner⁸⁻¹¹ (Table 2). Estimate of optimum fleet size by was initially done by Kalawar (1985)⁸ but it was limited to the territorial waters of Kerala. CMFRI (1998)⁹ has estimated the optimum fleet size and it

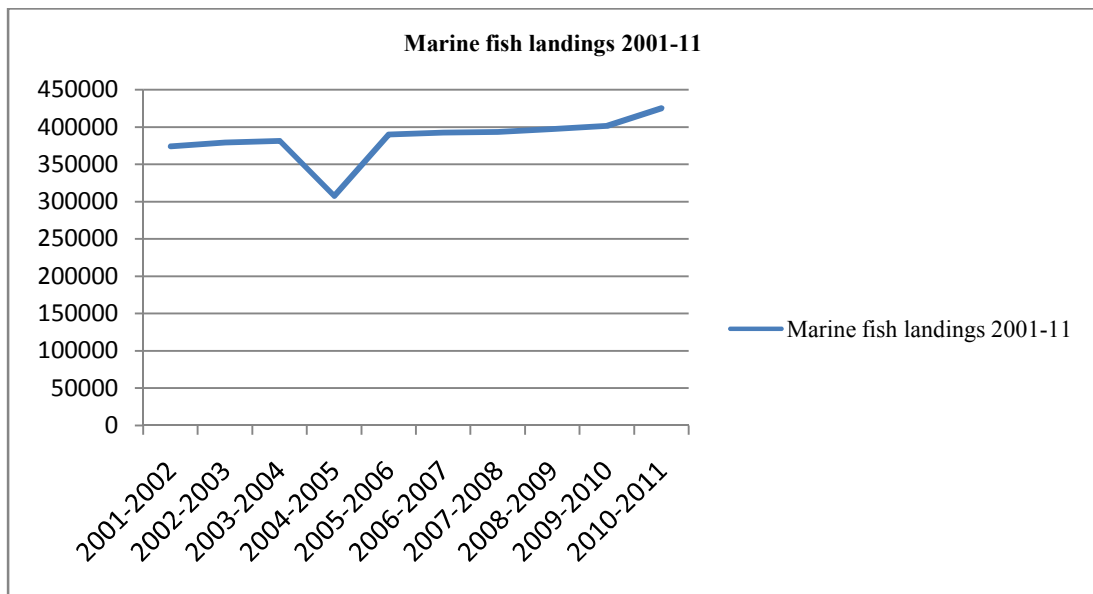


Fig. 1 Tamil Nadu Marine Fish Production during 2001-11 (Department of Fisheries, TN, 2013)

was further revised and revalidated by Ministry of Agriculture (MoA)⁹ and Kurup and Devaraj (2000)¹⁰. Excess capacity is further analyzed against these estimates. Present level of fleet capacity has been compared with Table 2 to derive at the current level of overcapacity in India and Tamil Nadu. According to these estimates, the existing number¹² of mechanized fishing vessels was in excess by a factor of 3.8 and motorized vessels by 4.8 (Table 3). Thus, India seems to have a significant level of excess capacity in both mechanized and motorized sector.

Similarly, excess fleet capacity levels of Tamil Nadu are similar to that of the all-Indian scenario. According to XI five year plan³, the existing number of trawlers was in excess by a factor of 1.22 and gill netters by 1.77 (Table 4). The excess vessels should be curtailed in order to maintain the long term sustainability of the marine fishery. Globally, there are plentiful researches on progress towards fishing capacity management. Indian scenario is quite tough to lever, being a multi species open access fishery.

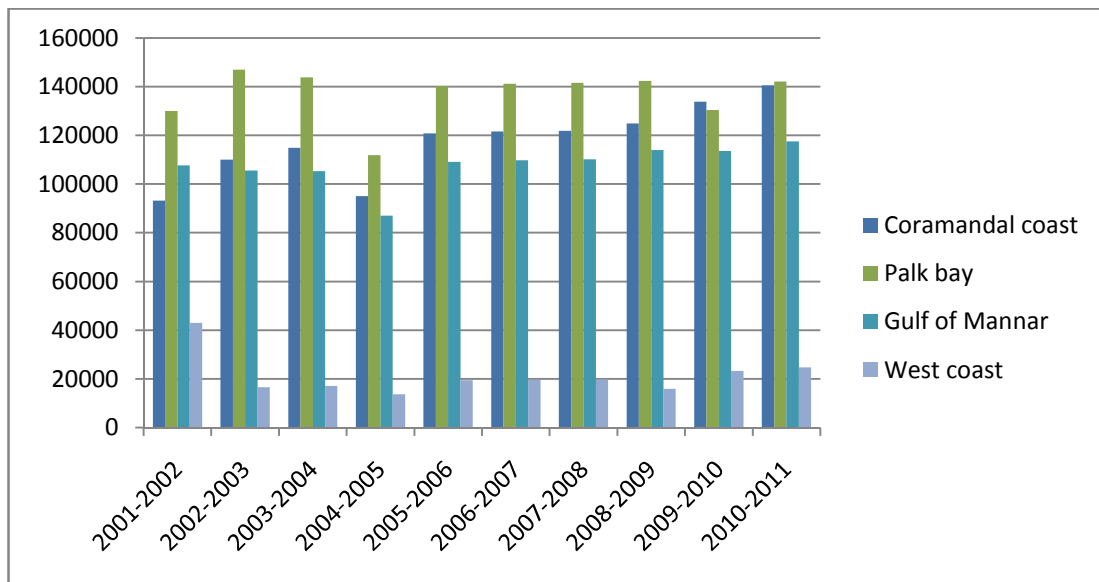


Fig. 2 Tamil Nadu Marine Fish Production: Coastal region-wise during 2001-2011 (Dept. of Fisheries, TN, 2010-11)

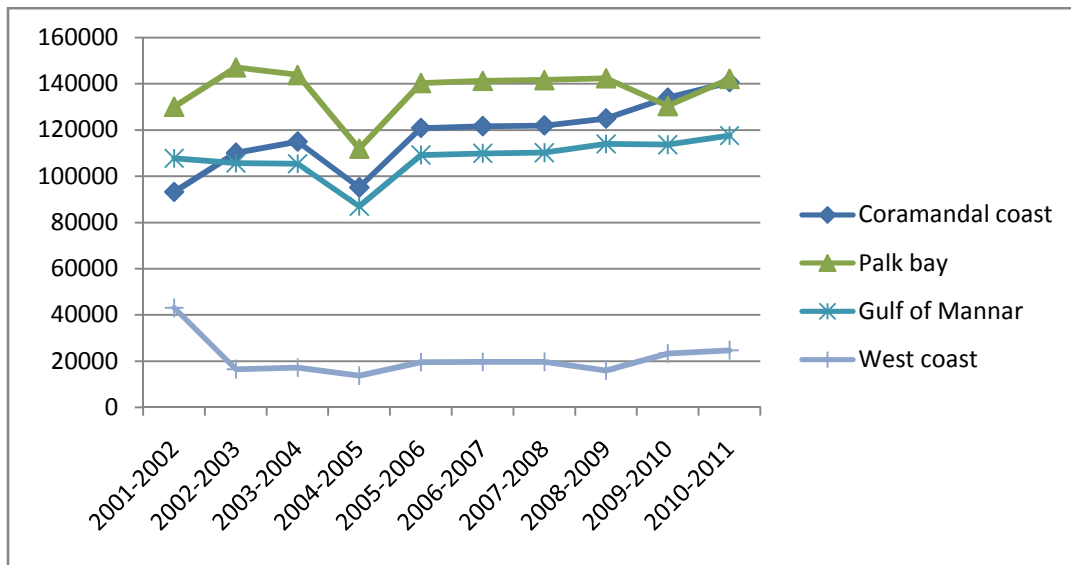


Fig: 3 Tamil Nadu Marine Fish Production: Coastal region-wise during 2001-2011 (Dept. of Fisheries, TN, 2010-11)

Table 2 Estimates of Optimum Fleet Size for Indian Waters (Kurup and Devaraj, 2000)¹⁰

Craft Type	CMFRI (1998) ⁸	MoA (2000) ⁹	Kurup & Devaraj (2000) ¹⁰
Mechanized boats	20928	47683	19048
Mechanized trawler	12245	-	10998
Mechanized purse seiner	835	-	784
Mechanized gill netter	3972	-	3694
Mechanized bag netter	2193	-	2014
Other mechanized boats	1683	-	1558
Motorized craft	15998	51726	14862
OBM boat seiner	326	-	304
OBM gill netter	10746	-	10018
OBM ring seiner	1302	-	1219
OBM dol netter	159	-	147
Other OBM boats	3465	-	3174
Non-motorized craft	31058	159481	28837
Total fleet size	67984	258890	62748

Regulations of Marine fisheries

In India, there are several marine regulations in place to manage fishing and fisheries. As per the Constitution of India, the states have jurisdiction only within the territorial waters i.e. fisheries within 12 nautical miles. However, fishing and fisheries beyond the territorial waters falls on the Union list i.e. beyond 12 nautical miles. The existing legal system in India comprises the following.

Indian Fisheries Act of 1897

This is the oldest legislation related to fisheries, which is still in force in many states including Tamil Nadu. It even pre-dates the establishment of the Fisheries Department of the Madras Presidency, 1907. It is a brief and simple law that apply to both inland and marine fisheries in India.

This 116 year old law seems amazingly relevant even today. Except for registration or licensing, it seems to contain every other regulation present in all other modern laws. The Indian Fisheries Act is no more applied to marine fisheries in Tamil Nadu (and rest of India) with the coming of the Marine Fisheries Regulation Act (MFRA) in 1983.

Marine Fisheries Regulation Act (MFRA) – Emergence

The introduction of small mechanized trawlers for the first time in India in 1967 resulted in disparity between trawlers and artisanal fishermen when the latter experienced lack of accessibility to the new technology¹³. The need to regulate marine fishing was felt only in the late 1970s when the situation worsened in many parts

Table 3 Current fleet strength of India (Boopendranath, 2012)⁴

Craft type	Recommended No. of boats	Existing No. of boats	Excess Factor*
Mechanized boats	19,048	72,559	3.8
Motorized craft	14,862	71,313	4.8

Table 4 Current fleet strength in Tamil Nadu (Planning Commission, 2011)³

Craft type	Recommended No. of boats	Existing No. of boats	Excess Factor*
Trawlers (Multi day & single day)	4,333	5,300	1.22
Motorized craft (Gill netters)	12,689	22,478	1.77

of India; especially Goa, Kerala and Tamil Nadu. Tamil Nadu, in particular, had many violent clashes between fishermen groups. This marked the beginning of the National Forum of Kattumaram and Country Boat Fishermen, NFF (which was subsequently renamed as National Fishworkers Forum) in Chennai in 1978 and the Majumdar Committee. The Committee recommended the enactment of legislation in order to protect the interests of small scale fishermen and also to conserve fish resources. In 1979, the Government of India prepared a model “marine fishing regulation act” or MFRA and circulated it to all the coastal states for it to be enacted with appropriate modifications¹⁴.

The process of enacting MFRA had been deliberately slow, with some states going ahead within a few years of receiving the model Act, while others took an inordinate amount of time to legislate. Kerala was the first off the blocks, with the KMFRA coming out in 1980 followed by Goa in 1981. Tamil Nadu was the third with the TNMFRA coming in January 1983. The general trend has been that the states facing intense heat because of the conflict between small fishermen and trawlers adopted the MFRA first.

Pre-TNMFRA

Palk Bay area (late 1970s), witnessed clashes between trawlers and the “artisanal boats”. These “artisanal boats” were fundamentally traditional canoes (vallams) that uses large drift nets. Till the coming of the trawlers, these canoes were the aristocracy of the Palk Bay, providing no space for any new technology like trawling to co-exist. Clashes between the two forms of fishing were inevitable and led to a series of negotiations between the two groups which were mediated by the District administration and the local officials of the fisheries department. These negotiations resulted in the famous “three day-four day rule” that still governs Palk Bay fishing.

By the three day-four day rule, the trawlers and vallams agreed to fish on alternate days of the week, with the trawlers getting three days and the vallams four days per week to fish. This agreement has no bearing on the other smaller fishing operations (kattumarams and vathai fishing), which operate closer to shore and can continue to fish on all days of the week. This rule initially devised for Thanjavur and Pudukottai fishermen, was soon endorsed by the Ramanathapuram District fishermen as well. This rule has stood the test of time for over three decades and governs the fishing resourcefully in the Palk Bay. This can be considered the first major instance of “co-management” in India

leading to a stable arrangement over a 400 km coastline.

TNMFRA—Enactment

With the Palk Bay issue adequately resolved, there was no much pressure on the TN Government to enact the MFRA. It was the break out of clashes in the Gulf of Mannar between the Tuticorin trawlers and the traditional fishermen that led to the MFRA. The *Parava* fishing community that dominates the Gulf of Mannar is one of the oldest fishing communities of India and is known for its internal organisation and fishing skills. The trawl revolution split this community into two and led to irreconcilable differences. Further, the small scale fishermen, who obviously have a brute majority on shore, demanded the state intervention to protect their interest. They demanded that the trawlers keep a good distance from the shore and not operate at night time when the drift-gillnets are being set.

Cornered by this intense situation, the TN Government decided to enact the MFRA with suitable provisions to cater to the demands of the small scale fishermen. Initially, the reservation of a three nautical mile zone specific to the small scale fishermen and other regulations related to mesh sizes, time zonation, etc., were enforced under the Act. Through the specific and continued demand of the Tuticorin fishermen, the night fishing rule became a rule, common for the whole of Tamil Nadu. Both the three day-four day rule and the night-fishing rule represent instances of temporal guideline. In the case of the three day-four day rule, the time interval is 24 hours, while it is 12 hours in the case of the night-fishing rule. The reason for this relates to the difference in the shelf area available for fishing in the two areas¹⁴.

TNMFRA

The following are some of the important rules and regulations as specified by TNMFRA.

- Registration and licensing
- Vessel categorisation: Non-mechanized, Mechanized and Deep sea vessels.
- Zonation of the sea
- Daily and seasonal fishing trip patterns.
- Mesh size for all gears other than trawl nets should be above 10 mm.
- Bottom trawling is prohibited within three nautical miles.
- All mechanised boats need to obtain a “token” from the fisheries department before leaving for fishing on every trip.

- Boats are expected to notify authorities in its port before shifting operations to another port.
- Fishing within 100 m of a river mouth is prohibited.
- Non mechanised vessels shall be used for fishing within three nautical miles and shall use hook & line and boat seine.
- Ban on certain gears like ring-seine, purse seine, pair trawl and push net.
- Annual seasonal ban: The most significant regulation of fishing in all the states of India is the annual six week ban on fishing, the ban period varying on the east and west coasts. In Tamil Nadu, ban fishing is followed every year for 45 days from April 15th to May 29th.
- Penalties
- Ministry of Commerce and Industry - MPEDA
- Ministry of Food Processing Industries
- Ministry of Defense – Coast Guard
- Ministry of Shipping
- Ministry of Environment and Forests
- Ministry of Earth Science
- Ministry of External Affairs

Ministries contributing to Fisheries Development and Management

The various ministries involved in the governance of marine fisheries at the Central level are as follows;

- Ministry of Agriculture - DAHDF & ICAR

Of all the above ministries, Ministry of Agriculture plays a vital role in the governance, through Department of Animal Husbandry, Dairying & Fisheries (DAHDF) and Indian Council for Agricultural Research (ICAR). While Central Institutes (through ICAR) like CMFRI is involved in estimation of catches and stock assessment; CIFT does development of responsible fishing gears. Fishery Survey of India (FSI), through DAHDF, collates the data given by CMFRI and prepares charts and atlas. CMFRI and FSI serve as valuable input to the state fisheries departments in framing fishery regulations viz., MFRA. Ministry of Environment & Forestry are responsible for safe guarding endangered species and protecting sensitive habitats i.e. Coral, Mangroves and Protected areas (Fig. 4).

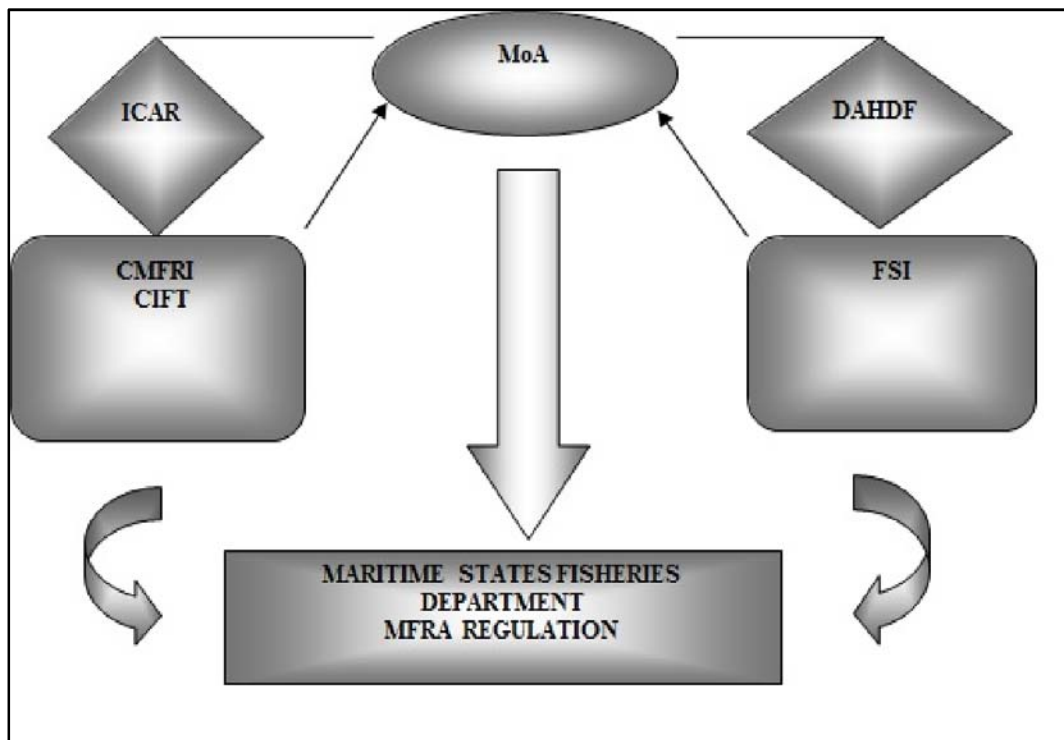


Fig: 4 Organisation structure of Marine Fisheries governance in India

Likewise at the state level, State Fisheries Departments are highly responsible in governing

the marine fisheries. Officials employed in this regard include; Director of Fisheries, Joint

Director, Deputy Director, Assistant Director, Inspector and Sub inspector. The Directorate of Fisheries is headed by the Director (also Commissioner) of Fisheries, a professional administrator who belongs to the Indian Administrative Service (IAS). The Director of Fisheries reports to the Secretary of Fisheries of the Central Government (Ministry of Animal Husbandry and Fisheries) and to the Minister of Fisheries, both of whom hold office in the Government Secretariat¹⁵.

On Regional level, the regional Fisheries Departments are headed by Joint Director (JD) of Fisheries. On District level are the District Offices. Not every district in Tamil Nadu has its own office; some offices are responsible for more than one district. Each district office has several Assistant Directors (ADs), heading different sections, for example Research, Fisheries Extensions or Fishermen Affairs. The ADs are supported by administrative staff, as well as by Inspectors (and Sub Inspectors of Fisheries).

Common issues in Marine fisheries in India

The major common issues are;

- Dwindling catches and overfishing in coastal waters
- Over capacity
- Post-harvest losses (discard, spoilage, reduced quality)
- Habitat degradation (trawling, industrial waste, domestic sewage, pesticides, etc.)
- Illegal, unreported and unregulated (IUU) landings
- Poor implementation of regulations (e.g. mesh size)
- Crossing maritime borders

Dwindling catches has become one of the major concern. It is the outcome of human interferences like overcapacity, industrial effluents, urban runoff, oil spills at ports, aquaculture, etc. Similarly, habitat degradation is also the consequence of destructive fishing practices and such human interferences. Excess fishing capacity has been identified as one another most pernicious problems affecting the long term sustainability and biodiversity of fishery resources as well as the economic viability of the fishing operations.

IUU fishing refers to fishing in violation of the law and fishing which is unreported / misreported to the relevant authority. About 20% of the total Tamil Nadu landings have been reported to be caught from Andhra Pradesh and Sri Lanka¹⁶. IUU contributes significantly to over

exploitation and it is a hindrance to the recovery of fish population and ecosystem.

All these issues are common to both India and Tamil Nadu. Crossing maritime border is one of the significant issues prevailing in Tamil Nadu. The problem of fishermen crossing borders is a serious one on the Indo-Sri Lankan maritime border. It has led to great deal of suffering to fisherfolk of both countries. The number of incidents of firing at Indian fishing boats in the Palk Bay by the Sri Lankan Navy and the subsequent loss of lives has been a grave issue for decades together. The arrest of Indian fishermen at sea and their consequent confinement in jails by the Sri Lankan Navy has resulted in an enormous perplexity. Rameshwaram being incredibly close to the International Maritime Border Line (IMBL) is the most affected place in this issue. Both governments are highly responsible in evolving the precise solution for this problem by acknowledging the real causes behind it.

Future approaches for management and development

In this paper we have discussed few measures focussing the long term sustainability of the marine fisheries. They are as follows:

- a. Fishing Capacity Management measures
- b. Co-management measures
- c. Ecosystem Based Fisheries Management
- d. Catch Certificates and Eco-labelling

Fishing Capacity Management measures

Existence of excess fleet capacity poses serious problem to fisheries management. It results in poor economic performance, inefficiency and biological overfishing. Incentive based instruments are employed to overcome this issue. In literature, 'Incentive blocking' and 'incentive adjusting' is pointed out as two Incentive based management instruments. 'Incentive blocking' measures attempt to restrict the level of fishers' activities in some way i.e. limited entry, whereas in incentive adjusting measures fishers benefit within harvesting constraints¹⁷. Among the important incentive blocking instruments are limited entry, buyback programmes, gear and vessel restrictions, aggregate quotas, non transferable vessel catch limits, individual effort quota (IEQs), etc. Group/community fishing rights, Territorial use rights, individual transferable quotas and taxes and royalties constitute important incentive adjusting instruments¹⁸.

Community regulation by fishermen – Examples

There are two types of community organisations that govern fishing. One is the village level self-governance system that is prevalent all over the Tamil Nadu coast. These govern many aspects of life and livelihoods in a fishing village especially that of small scale fishers. The second type of organisation is the modern association of mechanised boats that have many common interests including that of the small scale fishermen. In some parts of the Coromandel coast (notably Nagapattinam District and Karaikal), the village organisation governs both small scale and mechanised fishing¹³. The following are few instances of common regulations accepted over reasonable stretches of coastline¹⁹.

- Alternate-day fishing regulations in the Gulf of Mannar and Palk Bay areas of Tamil Nadu commonly referred as three day- four day rule. Though these measures were initiated as conflict-management measures, increasingly they have contributed towards resource management in this region²⁰.
- Community-based fisheries management in Nagapattinam District addresses the problems that have been hampering the fisheries sector, specifically, dwindling catches and declining catch quality.
- Self-regulation by women seaweed collectors in the Gulf of Mannar region of Tamil Nadu is one another instance of co management. The women collect seaweed daily, for six months (October to March, with the peak season being December-February). They use outboard motor-powered vallams (plank-built canoes) to spend around eight hours a day in neck-deep waters. Further, these communities have banned the use of metal scrapers, which were originally used to collect seaweeds, as they destroy seaweed and prevent their propagation.
- Another illustration is the local village governance at Olaikuda village, Rameshwaram shares the available shore area evenly among all fishers for seaweed cultivation i.e. sea area proximate to shore is subdivided and allocated to each family for seaweed cultivation.
- Entry barriers for trawlers in Royapuram fishing harbor, Chennai is another victorious example for comanagement. The mechanized association of three districts (Chennai, Thiruvallur and

Kanchipuram) has frozen the fleet size as trawl operations are becoming uneconomical.

Ecosystem Based Fisheries Management (EBFM)

It refers to the ecological effect of selective removal of a particular fish stock from the ecosystem and its impact on the dynamics of the ecosystem. EBFM was first stressed during FAO-CCRF, 1995 but was introduced in the 5th conference, the United Nation conference on Biological Diversity, 2000. This concept strives to balance fisheries and the whole ecosystem. They include the effects of weather, climate, interactions with predators, competitors & prey, trophic structure and the anticipated effects of sea floor habitats. E.g. Zone based management regimes, gear design and restrictions. Present fishery management system in India needs to be suitably modified with this new approach.

Catch certificates and Eco-labeling

Mandatory catch certificate for export of fish and fishery products to European Union (EU) is the latest initiative to stop IUU fishing. Catch documentation was first encouraged in FAO's International Plan of Action for IUU fishing. Marine Stewardship Council (MSC) is an international nonprofit organization which runs catch certification and eco-labelling program in order to seafood traceability. Fisheries that meet MSC standard for sustainable fishery can use blue label on seafood products. In India, MPEDA is responsible for these catch certificates.

Conclusion

Marine fisheries in India, beset with problems of over capitalization, over capacity, increased operational expenses and reduced catch rates, is at cross roads seeking proper direction and guidance. Excess crafts (Mechanized-3.8 times & Motorized-4.8 times) should be suitably curtailed. Another issue of concern is the lack of valid fisheries database system. Fishermen do not maintain log books, which results in poor accountability of the catch. Hence, necessary measures should be taken to emphasize proper and appropriate database. Apart from this, the fishing ban period must be critically evaluated on sound scientific grounds.

Fisheries management is a continuous and interactive process. It is vital that fisheries management takes a paradigm shift in ensuring sustainable development of marine fisheries with due concern for ecological integrity and biodiversity. Practicing the FAO Code of Conduct for Responsible Fisheries and ultimately evolving a working model for an informed participatory

management of marine fisheries resources of the country is the need of the hour. This can be achieved only jointly by all the stakeholders including fishers, scientists, policy developers and implementers.

Acknowledgements

The first author is grateful to the HOD, Department of Fisheries Economics & Dean, Fisheries College and Research Institute, Tuticorin for their support and State Fisheries Department, Tamil Nadu for providing the Marine Fish Production data.

Reference

1. CMFRI, Annual Report. Central Marine Fisheries Research Institute, Kochi, 2011-12, pp 28.
2. Ramchandran C., *Teaching Not To F(in)ish? : A Constructivist Perspective on Reinventing a Responsible Marine Fisheries Extension System*, (CMFRI, Kochi) 2004, Responsible Fisheries Extension Series 6, pp 12.
3. Planning Commission, *Report of the Working Group on Development and Management of Fisheries and Aquaculture: XII Five Year Plan: 2012-17*, (Planning Commission, GoI) 2011.
4. Boopendranath, M.R., Biodiversity conservation technologies in Fisheries, *Journal of Aquatic Biology & Fisheries*, 1(2012) 14-26.
5. Boopendranath, M.R., Fishing capacity management, *IFP souvenir*, (2007) 7-14.
6. Kasim H M, Management of Tamil Nadu Marine Fisheries. Paper presented at the Workshop on wellbeing of fisheries, *IDS Proc.*, (2009) 7-23.
7. FAO, Code of Conduct for Responsible Fisheries. Food and Agricultural Organization, Rome, 1995.
8. Kalawar A G, Devaraj M and Parulekar A K, Report of the Expert Committee on Marine Fishery Management in Kerala, Central Institute of Fisheries Education, Bombay, India, 1985.
9. CMFRI, Annual Report 1997-98. Central Marine Fisheries Research Institute, Kochi, 1998, pp 24.
10. Ministry of Agriculture, Report of the National level Review Committee to assess the area-wise requirements of different categories of fishing vessels below 20 m OAL, Department of Animal Husbandry and Dairying, Fisheries Division, Government of India, 2000.
11. Kurup, K.N and Devaraj, N., Estimates of optimum fleet size for the exploited Indian shelf fisheries, *Mar. Fish. Infor. Sew. T & E Ser.*, 165 (2000) 2-11.
12. CMFRI, Marine Fisheries Census 2010 Part I India, Ministry of Agriculture, Krishi Bhavan, New Delhi and Central Marine Fisheries Research Institute, Kochi, 2012, pp 44.
13. Vivekanandan E, Sustainable Coastal Fisheries for Nutritional Security, in: *Sustainable Indian Fisheries*, edited by T. J. Pandian, (National Academy of Agricultural Sciences, New Delhi) 2001, pp. 19-42.
14. Vivekanandan V and Kasim H M., Supplementary Papers on Fisheries Management. Fisheries Management for Sustainable Livelihoods (FIMSUL) Project report, undertaken by the UN FAO in association with the World Bank, the Government of Tamil Nadu and the Government of Puducherry. Report No. FIMSUL/ WP5AR3. FAO/UTF/IND/180/IND. New Delhi, Chennai and Puducherry, India, 2011, pp 12.
15. Bavinck M, *Marine resource management: conflict and regulation in the fisheries of the Coromandel coast*, (Sage Publications, New Delhi), 2001, pp. 394.
16. Sampath V and Srinivasan, R. Characterisation of Marine Fisheries Sector in Tamil Nadu and Puducherry. Fisheries Management for Sustainable Livelihoods (FIMSUL) Project report, undertaken by the FAO in association with the World Bank, the Government of Tamil Nadu and the Government of Puducherry. Report No. FIMSUL/R8B.FAO/UTF/IND/180/IND. New Delhi, Chennai and Puducherry, India, 2011, pp 15.
17. Ward, J.M., Kirkley, J.E, Metzner, R. and Pascoe, S., Measuring and assessing capacity in fisheries: Basic Concepts and Management options, FAO Fisheries Technical Paper No. 433/1, Rome, (2004) FAO, Rome, Italy.
18. Sathyapalan J, Jeena T S, and Joeri S, *Maintaining a Viable Trawler Fishery: A Study of Regulatory Failures and Overcapitalisation in the Palk Bay Fishery*, (Centre for Economic and Social Studies, Hyderabad), 2008, pp. 1-21.
19. International Collective in Support of Fish Workers, Marine Fisheries, www.icsf.net, 2013.
20. Sampath V, *India – National Report on the Status and Development Potential of the Coastal and Marine Environment of the East Coast of India and its Living Resources*, GEF PDF Block B Phase of FAO/BOBLME Programme, India, 2003, pp 26.
21. Tamil Nadu Marine Fisheries Statistics, Endeavors and Achievements. Tamil Nadu Fisheries Department, Statistics Division, Chennai, 2013, pp 7.
22. BoBN, Poverty alleviation in small-scale fishing communities, *Bay of Bengal News*, 4:1(2004) 6-10.
23. CMFRI. Annual Report. Central Marine Fisheries Research Institute, Kochi, 2009-10, pp 19.
24. Govt. of Tamil Nadu, Animal Husbandry, Dairying and Fisheries Policy Note. Minister of Fisheries, Govt. of Tamil Nadu, 2011-2012, pp 14.
25. Narayankumar, R., Sathiadhas, R. and Aswathy. N., Economic performance of marine fishing methods in India, *Marine Fisheries Information Service: Technical and Extension Series*, 200(2009) 3-15.