

# **Sustainable Fisheries and Community Management Systems**

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## **Abstract**

The objective of the paper is to examine the threat to the sustainability of the fisheries in India and in particular in the Gulf of Mannar region. It is widely quoted that the depletion is due to the introduction of trawler fishing techniques, which are scrape, the bottom of the sea and end up catching juvenile fish. In viewing this problem of over fishing (by the trawlers) as a negative externality to the traditional fishing community, the best way to internalize the social cost inflicted by the people who over fish is the question that this study attempts to seek the answer for. One of the most commonly practiced techniques to sustain the fisheries resource is the blanket ban on fishing during specific months of the year like the one practiced in the coastal regions in India. I have attempted to critically evaluate the effectiveness of this method of resource conservation. I have also proposed an alternative model for sustaining the resources, which would be an effective solution for the problem.

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## **Contents**

- 1. Introduction**
- 2. Mechanized Trawling**
- 3. Tuticorin and Gulf of Mannar Region**
- 4. Tamil Nadu Marine Fisheries Act, 1983**
- 5. An Alternative Model**
- 6. Conclusions**

## 1. Introduction

The objective of the paper is to closely examine the threat to the sustainability of the fisheries in India and in particular in the Gulf of Mannar region. It is widely quoted that the depletion is due to the introduction of trawler fishing techniques, which scrape the bottom of the sea and end up catching juvenile fish. A lot of research conducted by many fisheries research firms does not deny the fact that there is a definite threat to the fishing resources. In viewing this problem of over fishing (by the trawlers) as a negative externality to the traditional fishing community, the best way to internalize the social cost inflicted by the people who over fish is the question that this study attempts to seek the answer for. One of the most commonly practiced techniques to sustain the fisheries resource is the blanket ban on fishing during specific months of the year<sup>1</sup>, like the one practiced in the coastal regions in India. I have attempted to critically evaluate the effectiveness of this method of resource conservation. I have also proposed an alternative model for sustaining the resources, which would be an effective solution for the problem.

I have conducted a field research in the district of Tuticorin (Tamil Nadu) in South India. The multi-species marine environment and the heterogeneity of the fisheries management system are some of the reasons underlying the choice of Tuticorin as the area of study. The study focuses on the methods that are used to ensure the sustainability of marine resources. This study was conducted in the light of the 45-day ban<sup>2</sup> that was in place throughout coastal India for the same cause. The validity of the arguments justifying the ban, factor incentives other than the biological ones for the regeneration and conservation of the fisheries wealth and socio-economic and political factors that shaped the current design of the ban are also examined. The study also sheds light on the complex fisheries management systems that are prevalent in India: formal and countless informal agreements and the conflict management systems that are in practice. The drawbacks of the uniform ban are systematically analysed and a case study of Tharuvaikulam, a village near Tuticorin has been presented to showcase community managed resource conservation model. Based on this model I have presented an alternative way of tackling the situation that can prove to be an effective solution to the problem in the long run compared to the uniform blanket ban.

## 2. Mechanised Trawling

It will be appropriate to look in to the history of introduction of mechanised trawling before examining the reasons for depletion of fisheries wealth. Around 1890, trawler fishing developed in Europe and over the years this technology was transferred to India. The first two Five Year plans emphasised the need for an expanding fishery to provide an inexpensive protein source to improve the health of the Indian poor. (Salagrama, 2002)

This was carried out by projects like the Indo– Norwegian programme in order to provide food for the masses and to boost the national economy, by stimulating the mechanisation of the fisheries sector. Initially, the mechanisation was in the form of motors, for the traditional crafts.

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<sup>1</sup> This period normally coincides with the spawning period of the fish, facilitating the growth of the juvenile fish.

<sup>2</sup> This ban has been in place in Tamil Nadu from April 15 to May 30 every year, since 2001.

However the government initiated development programs switched to European type boats-small boats with in board motors, the so-called mechanised boats.

At the outset of mechanisation, the gear was still the same old gill nets but they were now nylon nets as opposed to the conventional cotton, hemp, and linen yarn. Later, the introduction of trawlers became prominent. This improvement in the gear and the vessels saw an increasing U.S and Japanese demand for the Indian prawn. The returns were impressive and this led to the introduction of mechanised vessels on a larger scale and modernization of the indigenous crafts for the development of marine fisheries.<sup>3</sup> These proved to be an important source of foreign exchange. The third Five-Year plan and the ones that followed shifted the focus from the development of fisheries to help the poor to increasing production for export (Salagrama, 2002). From 1980-92 an increase in mechanised boats of nearly 50 percent has been reported in Tamil Nadu (Thirumilu et.al 1994). This attracted investments from areas other than the fishermen community. The investment was initially in export trade and processing, but later direct investments in boats and hiring of fishermen as the crew and for maintenance transformed it into a modern, export-oriented industry (Hapke 2001).

The artisanal fishermen could not digest a co-existing mechanised sector, with the traditional sector, as the disparities between the internationally linked trawler fishermen and the traditional- non-mechanised fishermen, who were confined to domestic markets, were sizeable. The traditional fishermen started to mechanise their traditional crafts with low power outboard engines, which has been facilitated by the government. But this didn't seem to leverage the socio-economic status of traditional fishermen in the expected manner. The reasons can be attributed to the fact that the benefits of increased volume of the catch were negated by the rising investment costs in gear, engines and the fuel.

All this slowly triggered severe competition characterised by high imperfections in terms of the supply potential that led to conflicts between the two sectors<sup>4</sup>. Declining volume of catches faced by the traditional fishermen, intrusion of mechanised vessels in the fishing grounds allotted for traditional fishermen, increased fishing pressure can be quoted as some of the reasons for the conflicts.

### **3. Tuticorin and Gulf of Mannar Region**

Tuticorin district is in southern Tamil Nadu, in the Gulf of Mannar region, which is situated between India and Sri Lanka. The Gulf of Mannar region houses the densest of the fisher folk population and is rich in fish as compared to the Coromandel Coast and Palk Strait regions, housing around 450 of the 2200 species of fish found in India (20 percent). This makes it the single richest coastal area in terms of fish diversity in India (UNDP 1999). The major varieties that are exploited here include Mackerel, tuna, Pomfret, sharks, Cods, flatfish, ocean perch, catfish, shrimps, prawn, lobster and crab. The decline of these during the 1960's is mainly attributed to the anthropogenic and natural factors.

The study focuses on the town of Tuticorin, which has the largest harbour in this region and Thirespuram, a village located adjacent to the town that houses traditional fishermen. The construction of the port in 1968 led to rapid industrialization in and around the district of

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<sup>3</sup> This is commonly referred to as the famous 'pink gold rush'.

<sup>4</sup> Riots between the two sectors in madras in 1977 and 1978 are worth mentioning

Tuticorin. This rapid industrialisation and emergence of a thermal power station and a fertilizer plant in this region are responsible for the pollution in this region.

### ***Fisheries Management in Tuticorin***

In India, fisheries management is often intertwined between formal and informal or traditional management systems (Pido et al. 1996). The formal management system declared by the government centralizes the administration of the resource exploitation under the department of fisheries. While on the other hand the traditional fishing communities have a strong adherence to existing traditions and customs of the fishing community. Given the heterogeneity of the fishing customs amongst the villages, there is an inevitable clash of interests. This discrepancy between numerous local agreements impeded the uniform regulation of fisheries, sought by the government. Further, the increasing divide between the traditional and mechanized fishermen lead to a lot of conflicts during the late 1970's. As the severity of these conflicts increased, the government attempted to resolve them by devising Tamil Nadu Marine Fisheries Act of 1983.

### ***Local Management Systems in Practice***

Understanding the local management systems that are in practice would primarily require knowledge of the existing gears and vessels that are used for fishing in this region. The vessels that are used are catamarans, *vallams*, mechanised boats, which are of two types in general depending upon the size. The gears used by these vessels are gillnets, fish traps, hook and line, boat seines, trawler nets etc. (out of these, trawling nets are the only active gears and the rest: passive gears. The motorised *vallams* however has not been included in the category of mechanised boats.

### ***Panchayats and Fisheries Management***

*Panchayats* form the central structure to the local management systems. These entities have no connection to the government but are very strong among the fishermen population as the fishermen have a tendency to oblige the rules they created for themselves and their existing customs, in contrast to government regulations. When the local agreements work well the act behaves as basic background rather than a regulating body (Eline & Marjanka 2003). *Panchayats* serve as the agencies for fisheries management and the authority is concentrated at the village level. The disputes are solved at an internal level and the *Panchayats* ensure that the problems do not go out of the village.

The members who represent various areas that constitute a village constitute *the Panchayat*. Two people from each area<sup>5</sup> are a part of the *Panchayat*. The *Panchayat* at the harbour consists of more than 20 members currently<sup>6</sup>.

### ***Sustainability and Trawling- Is There a Trade Off?***

In my investigation I tried to ascertain whether there is a trade off between maintaining a sustainable fisheries wealth and modern mechanised fishing techniques<sup>7</sup>. Though there are

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<sup>5</sup> The area here refers to colonies or streets in a village. The representatives are normally experienced and respected members in their community.

<sup>6</sup> Every member of the fishing community who is over 21 years has to be a member of the relevant fishermen association, which exists in that particular region to be a recognized fisherman. Anyone who is not a member of the association is not permitted to go to the sea for fishing. The locals refer these associations, mostly informal, sometimes registered, as *Sangams*. They ensure the fishermen some sort of a protection by helping them to defend their rights to a certain extent. However, conflict solving tops their agenda.

<sup>7</sup> That use active gears such as trawling nets

other variables such as pollution, which lead to the depletion of the fisheries, the prominent factors that one has to take in to account would be the weak restriction mechanisms and the fact that there is no limit on the no. of trawlers that are operating. In determining these, one inevitably faces collective action problems. Intensive mechanisation in such a situation will prove to be disastrous in the long run for sustainable resource management.

The fisheries scientists believe that fishing techniques using active gears such as bottom trawling scrape the sea floor, damaging bottom structure and the coral reefs. It destroys habitats, shelter and suitable breeding areas for the fish and disturbing the larvae and eggs (Mounsey and Prado 1997, Vijayan, Edward and Ravindran 2000). Along with these effects to the benthic environment one cannot ignore the damage that is inflicted on the food web of the marine organisms (Pauly et al.). This method is indiscriminative as large amounts of non-commercially; juvenile, low value fish are also caught as by catch.

The quantitative estimates regarding depletion levels are listed below:

-Sivasubramaniam (1990) stated that 50 percent of the by catch samples he had studies were immature fish that had no chance of spawning even once (Salagrama 2002)

-Sujatha (1996) found that by catch in Vishakapatnam by small trawlers amounted from 66-94% of juveniles. The reasons being small mesh size at the cod end and the design of the cod ends (Vijayan, Ravindran and Edwin 2000)

Various studies show that there has been a definite and steady decline of the marine fishery in this region after it reached its peak in 1989. This decline is often the decline in the catch-per-unit effort over the past years. There has also been a decline in the size of most of the commercially important finfish and shrimp species. A major reason for this is the use of nets, which have a small mesh at the cod end and thus end up catching juveniles.

According to a recent study (Raghavan 2002), the finfish and shrimp resources in this region are in the stage of over exploitation. The reason for this can be attributed to increased fishing pressure, damaging effects of bottom trawling, disposal of industrial wastes and thermal pollution, pollution by heavy metals, discharge of untreated sewage, over fishing and port related activities; coral and sand mining can also be quoted (Elin and Shaap 2003).

#### **4. Tamil Nadu Marine Fisheries Act, 1983**

In paying attention to the complaints of the traditional fishermen regarding exploitation of fisheries by the trawlers, and to put an end to the increasing conflicts between them, the government devised the Tamil Nadu Marine Fisheries Act, 1983. The primary motive was to regulate fishing activities and establish law and order at sea. This was accomplished by physically separating the fishing grounds of the traditional and mechanised sectors and by placing regulations for gears, meshes size and licensing procedures. The act also demarcated two zones, three nautical miles to the traditional fishermen, only beyond this the mechanised boats were allowed to carry out their fishing operations. The act strived to protect the interests of traditional fishermen by not placing any zone and time restrictions.

The act has three basic intentions:

*To protect the interest of different sections of persons engaged in fishing particularly those engaged in fishing using traditional fishing craft such as catamaran, country craft (vallams<sup>8</sup> in this case) or canoe.*

*To conserve fish and regulate fishing on scientific basis*

*The need to maintain law and order in the sea*

The mechanised vessels threaten the livelihood of the traditional fishermen with their advanced gears and trawler nets; also posing a serious threat to the benthic environment. These are some of the reasons that lie behind the formulation of the Act. Since the fish schools lie mostly in the continental shelf region,<sup>9</sup> the restriction on the mechanised vessels to fish outside the three nautical miles ensures that the traditional fishermen have a decent deal.

Also, the traditional fishermen have no time restrictions like the mechanised vessels, which cannot go to sea before 5am and shall not return back after 9 pm. The officials claim that the time restrictions are strictly implemented in Tuticorin harbour area. The Fisheries Department officials, who are in charge of opening and closing time in the harbour area, undertake the supervision of these trawlers. The trawlers that are late are fined and/or prohibited from going to the sea. However, excuses such as engine repairs are entertained, provided, prior notification is given either by wireless or by other vessels returning back from the sea. However, if this happens on a regular basis and if the fishermen stay out late intentionally, the officials take action. The local *Panchayat* also ensures that these things do not happen by warning their members time and again.

The implementation of the Act in Tuticorin has a lot of enforcement problems. The enforcement of restrictions on mesh size seems to be difficult for the government officials, as they have no control over the fishermen once they are off to the sea. Moreover, monitoring the mesh size is a tricky and difficult task, for which, The Department of Fisheries is not equipped with enough officials. It was observed that some of the net makers' even make mesh with sizes from 20mm and above, while the norms are at 30 mm in the cod end of the trawling nets. (See appendix 2 for further details on the shortcomings of the Act)

Although the Act is supposed to be uniformly implemented in all the places, one observes that there are fishing customs that already exist among the fishermen in the district of Tuticorin and other coastal villages. The local agreements based on these fishing customs differ from the act in major areas, like, the time restrictions on fishing. Tuticorin harbour is one of the few places where the Act<sup>10</sup> is supposedly strictly implemented with regard to the timings.<sup>11</sup>

### ***Heterogeneous Local Management Systems***

As in many tropical developing countries, the fisheries management in India is often intertwined between formal and informal agreements (traditional systems), which are not easily observed (Pido et al. 1996) Most of these local agreements are semi-official, traditional, and sometimes even oral among different players involved in the activity. Even though all the fishing activities in Tamil Nadu are formally governed by the *Tamil Nadu Marine Fisheries Regulation Act, 1983*, the

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<sup>8</sup> *Vallam* – A boat made of wooden planks stitched together with a choir.

<sup>9</sup> This is normally the case in the tropical waters

<sup>10</sup> Tamil Nadu Marine Fisheries Regulation Act, 1983. Here after referred as Act.

<sup>11</sup> According to this Act the trawlers cannot undertake fishing operations within three miles from the coastline in the state

local agreements, rather than the Act and other government directives, seem to determine the management of the fisheries. The local agreements are exclusive for a village and do not apply for the nearby villages even though same fishing grounds might be shared. However the Department of fisheries, the District Collector and the Panchayat authorize these local agreements before they come in to order. These informal management systems are highly dynamic providing solutions for newly emerging problems<sup>12</sup>.

A look at the villages near the Tuticorin harbour and the existing local agreements, give us a glimpse of the heterogeneous local management system that prevails in these places. In Vembar<sup>13</sup>, during the non-closed season the boats leave the shore at 1 am and return at 5 pm (during June) and from August onwards they leave at 5.30 am and return at midnight. Although the local artisanal fishermen demand that the timings should be strictly followed as per the Act but this goal has not been accomplished.

In Tharuvaikulam the fishermen in the village do not use trawling methods to fish albeit the possession of mechanised vessels. Instead they use only passive gears like gill nets<sup>14</sup>. There is a local agreement between the mechanised and traditional sectors, which prohibits bottom trawling under any circumstance. The agreement doesn't impose any restrictions on the time schedule to be followed by both the sectors. The vessels leave to the sea at the best suitable time depending on the targeted fish. The mechanised vessels here also have a concession of staying out for multiple days and undertake night fishing, unlike other villages near by and Tuticorin harbour, where the agreements subscribe to strict time schedules. In Veerapandianpatnam mechanised boats do not operate for 5-6 months in a year as dictated by the local agreements. (November-June)

Although in Tuticorin harbour area all the local agreements that were existent came to a standstill after September 2002, following an accident, which involved a mechanised vessel colliding with a *vallam* from Punnakkayal village near Tuticorin harbour. This later broke in to a serious problem as three traditional fishermen died in this incident and all the peace talks failed. Since then the Act has been strictly implemented as was demanded by the traditional fishermen. However the fishermen are trying to formulate new local agreements and requesting the fisheries department to acknowledge it as the trawler fishermen find it unprofitable to go for fishing as per the timings mentioned by the act which are implemented now. Paying heed to this request the Department of Fisheries has relaxed the restrictions on timings from 9.00 pm to 11.00 pm for sometime.

Though the diverse local agreements constrain government intentions to enforce a uniform law, they nevertheless are very effective when it comes for enforcement and at the same time serve as effective tools for conflict management. Given such agreements, which are in place, which vary from village to village, the key is to identify the most effective way of sustaining the resources with minimum social cost inflicted on the people belonging to the community.

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<sup>12</sup> The main problems that these local agreements strive to solve in areas where there is a potential conflict between the two sectors include the financial loss inflicted upon the traditional fishermen by motorised boats, dangers posed by the trawlers to the safety of the traditional fishermen due to collision and other accidents and depletion of marine resources. (Eline & Marjanka 2003).

<sup>13</sup> An important fish landing centre and village 60 Kilometers to the north of Tuticorin

<sup>14</sup> Gillnets are passive gears, typically a wall of netting in a straight line, equipped with weights at the bottom and floats at the top, anchored at each end. The gills of the fish are caught in the invisible netting when they try to swim through the netting and hence the method is called gill netting.

### ***Uniform vs. Community Management Systems - In The Light Of 45-Day Ban On Fishing***

The Gulf of Mannar region is characterized by a bimodal oscillation in water temperature where the surface temperature of water reaches its high twice- one during the Northeast monsoon season and the other during the Southwest monsoon season. Further, the fisheries of the Gulf of Mannar region show the typical characteristics of tropical fisheries: high fish stocks tend to be concentrated along the continental shelf, and bio diversity higher than in temperate waters, leading to multi species fisheries. (Ramachandran 1998, Le sann 1998)

In order to conserve the marine wealth from depletion and for regeneration and rejuvenation of the juvenile fish, the government decided to implement a uniform ban on trawlers and mechanised boats along the coastal areas. Kerala has a ban on trawling during monsoon season since 1988(Krishna Srinath et al. 2002). This was a reaction to the declining catches and a proclamation by the artisanal fishermen that trawling during monsoon is detrimental to the commercially important pelagic fish stocks, which have their nursery in the inshore during the monsoon (Ammini 2001). Other coastal states<sup>17</sup> also implemented the ban, but on different seasons which led to conflicts due to intrusion of fishermen from other states in to the areas where the ban was in place. Finally the states came to a decision to adopt the ban during the Southwest monsoon months, June-July.

It was however complicated as Tamil Nadu had a problem with the timings agreed by the rest of the states. This is because Tamil Nadu is mostly affected by the North- East monsoon (October-November) rather than Southwest monsoon. However the Center for Marine Fisheries Research Institute<sup>18</sup> of Madras stated that the spawning season of some of the important fish varieties along Tamil Nadu does fall within April and August. The increasing clashes between the Andhra and Tamil Nadu fishermen along with CMFRI report pressured Tamil Nadu to enforce a uniform ban. Eventually Tamil Nadu implemented ban between 15 April- 29 May<sup>19</sup> of every year and it was the last state to do so. The socio economic motives, rather than the scientific research regarding sustainability formed the basis for the choice of the length of the ban (45 days), as the fishermen cannot sustain their livelihood for any period longer than that.

There are several questions that I was trying to find answers to. How valid is this ban and does it meet the intended objectives? What does the government do to ensure that the economic problems associated with the ban are addressed ? What are the problems with ban in the eyes of fishermen, scientists? Are there any alternative means to achieve the same goal?

The 45-day ban translates to 45 days of no income for the fishermen in the mechanised sector. Although it does not pinch the boat owners much, it most definitely has a considerable impact on the economic situation of the crewmembers. So far the ban has been strictly implemented in Tamil Nadu. In Tuticorin harbour alone there are around 400 mechanised boats and there is a sizable population that is dependent on this sector.

The traditional sector was accommodating the fishermen who were out of their jobs during the ban period. The crewmembers from the mechanised sector went on *vallams*, mended nets and indulged in other fishing related activities. Some boat owners lent money to the crewmembers with/ without interest. Micro credit for fishermen is almost non-existent and with the absence of

alternative means of earning, the plight of the lower end workers paints a sad picture. When it comes for saving for a lean season, it is tough, to say the least, impossible, to say further.

The government does provide assistance in the form of saving cum relief scheme, which is of some help for these fishermen. In this scheme the fishermen save a sum of Rs 80 per month for eight months and the government provides 50 percent assistance and returns them a sum of Rs 1200 during the lean season. Some of our respondents complain that even this was not given in time. Some even complained that they have not received the diesel subsidy, which was due for the previous year. Lack of micro credit facilities for the fishermen forces a lot of them to borrow from indigenous moneylenders, who charge them high interest and this eventually becomes a vicious spiral. The financial strain shades the minds of the fishermen with very minimal government assistance, which is far from adequate.

The improvement and modernization of the fishing sector show a lop-sided growth, as the socio economic conditions of the traditional fishermen did not seem to have improved in contrast to the rapid growth of the sector. The disparity in the economic status of the two sectors and also, unequal wealth distribution between the boat owners and fishermen is readily observable.

During the investigation I found that the fishermen seem to be aware of the motive of the ban to sustain the marine resource sustainably. In Tuticorin the reactions from the fishermen's side were mixed. The fishermen from the mechanised sector agreed with the advantages of the ban and surprisingly quite a few of them feel that the trawling operation might pose a potential danger to the sustain fisheries in the future. But they have other problems. They feel that it is not a wise decision to ban only the mechanised boats. They feel that the motorised *vallams* should also be stopped from going for fishing. Most of them have a problem with the timing of the ban.

They feel that the right time for imposing the ban would be during October November, that is during the North East monsoon. This is also the rainy season and the fresh water mixing will enhance breeding and the surface temperature of the water is conducive for spawning. One should also pay attention to the fact that this season is normally rough and there is some sort of a self-imposed ban in Tuticorin area. A lot of the vessels do not engage in fishing. But implementing a ban that is customised to suit various areas appears to be a tough option. A ban during this will be economically more favourable, as the current ban season coincides with the peak season.

The traditional fishermen, who are in majority, seem to have an edge in swaying the political will to their side, being major vote banks. This makes the ban of motorised *vallams* less likely to happen. But according to fisheries scientists, the passive gear does not pose great danger to sustainability.

However the country boats seem to welcome the ban. Almost everyone from the traditional sector who I spoke to felt that trawling has serious downsides. Some even feel that trawling method should be completely banned. When asked about the increase in catches during the ban, they felt that there was a little increase in catch, but it did not seem to be very spectacular though. As one of the *vallam* owner puts it- *"Because there was no fishing conducted by the mechanised boats, the demand went up, accompanied by limited supply during the closed season and naturally we got a good price for our fish although the catch was not as high as*

*expected*". The mechanised fishermen felt that they also didn't see an increase in the catch volume except for the first few days after the ban.

The ban period was chosen keeping in mind the administrative convenience, which was as or in fact more important for the government; did not seem to have achieved the desired goal. This can be sensed from the opinions voiced by the fishermen regarding the change of ban period. Although, the validity of the report of CMFRI regarding the spawning season of the commercially important varieties of fish in the east coast, for Tamil Nadu in general and Gulf of Mannar region in particular seems to create a great deal of controversy. The officials in the Department of Fisheries who seemed to have different opinions regarding the current timings of the ban chose to remain silent for obvious reasons.

On the other hand, the ban is not on the trawling method per se but on the entire mechanised sector and hence places like Tharuvaikulam<sup>20</sup> where they operate only gill nets obliging local agreements get a bad deal despite their efforts to sustain the fisheries wealth.

The fishermen acknowledge that fish stocks have declined over the past years. They feel that the boats have to travel longer distances to fishing grounds that are located further from the shore to get the same catch that they used to get some ten years ago. *If the current scenario of declining fish catches and increasing expenditure prevails, the increased fishing pressure will eventually lead to the stabilization and hence the reduction of the number of mechanised boats that indulge in fishing, as there are too many trawlers leaving only the players who can afford the cost-* says, a fisheries college staff.

If the ban is viewed as an instrument to minimise the social cost that results from over exploitation, given the situation above, then the ban itself imposes a high cost on the society. By minimising the employment opportunities to accommodate the traditional fishing population, which is involved in the mechanised sector, in the absence of any decent alternative opportunities for earning a living, the choice of the policy becomes even more crucial.

### ***Resource Conservation in Community Managed Systems***

Community management of marine resources is an alternative that is worth considering while the private and government managed systems proved have their downsides and proved to be ineffective in the past.

The fishermen of Tharuvaikulam village are seriously concerned about the fact that bottom trawling causes a serious damage to the resource by affecting the benthic environment. Besides the effects of bottom trawling on the marine ecosystem, the fishermen perceive that trawling also causes damage to the gear and the crafts of the traditional fishermen. They chose to have a self-imposed ban on trawling method in order to avoid the conflicts that could arise between the two sectors due to the aforesaid reasons. Since the usage of gill nets by the mechanised boats have very little scope of initiating conflicts, the self-imposed ban seems to have reduced the possibility of conflicts in a local level to a great extent, even as they exploit the same fishing grounds. Even when they do arise, the *Panchayat* resolves them<sup>21</sup>. Anyone who violates the norms of the local agreements gets his vessels being prohibited from going to the sea for a stipulated period as a punishment. The fear of being ostracised by their own community is a predominantly factor in the success of these local agreements. Fishermen from other locations

are also not allowed to use trawling off Tharuvaikulam. The agreement between the two sectors, however, is not formal and was apparently oral.

This brings us to the fashionable “state or community?” debate, in terms of who has the right over the resources. Though one cannot overlook the strategic interests of the state over natural resources, experience from various examples around the world suggests that community managed resource pools work efficiently in sustaining the resource. Humans adopt a narrow, self-interested perspective in many settings, but can also use reciprocity to overcome social dilemmas (Ostrom), also the community normally will possess the information and the required knowledge regarding the resource pools which they depend upon for their livelihood. There is a high possibility that the community will also make decisions keeping in mind the importance of regeneration and conservation, provided they are entitled with the ownership of the resource, which can prove to be superior to the state. Here the problem of free riding by people outside the community is efficiently handled by a community-managed system. In addition one can expect the players more likely to adhere to the rules they have set for themselves in order to conserve the resources, as opposed to the government Act. This deserves special importance where the players’ social identity is highly dependent on his relation with the Panchayat and violation of the norms set by the community is likely to strain this relationship.

## **5. An Alternative Model**

The alternative model that I am proposing here primarily deals with what could be the most effective way, in my opinion, of dealing with the problem of conservation. We have seen how the 45-day uniform ban as a restrictive mechanism, if not completely inappropriate, is not the most effective way of ensuring sustainability and also the fallacy of the one-size-fit-all approach to resource conservation, via the example of Tuticorin. I believe that an attempt to conserve the fisheries resource, in the Indian context, would be incomplete without an effective restriction mechanism on both the maximum number of trawlers operating in the sea and the zonal & time restrictions on them. These restrictions must be compatible with each other and should not impose a high social cost to the players by restricting employment opportunities.

Fishing quotas are worth considering as a system to restrict ‘too many players’ in the mechanised sector. To do so, careful estimation of the total available resource (X) and the Maximum Permissible Catch (MPC) or the Maximum Sustainable Yield (MSY) by both The Department of Fisheries and other independent research bodies should be reviewed every year. But these fishing quotas would require us to clearly determine what percentage of the resource can be exploited by the traditional and mechanised sectors respectively. This could either be determined by taking in to account the historical catch records, as in the case of Iceland- the average catch by both sectors over the years. But here one should pause to consider that trawler fishing is relatively a recent phenomenon and the traditional communities, for whom fishing is not just a source of livelihood, but also a question of identity and culture which should be taken in to account.

An alternative could be that all families could be given an equal percentage of the MSY as a quota, irrespective of the differences in their historical catch. This would be an egalitarian allocation of fishing rights. The commercial fishing companies would get only their family quota, just as other fishing families. The new communities with fishing rights would form cooperatives to monitor and enforce the legal quotas. The Marine Department can act as

supervisors/consultants. There should not be any in case a fisherman wants to sell his quotas to a member of the fishing community, but in case he wants to sell it to someone outside the community, the cooperative can take a collective decision. Note that a percentage of MSY should be given as a quota. This is because MSY can itself change over time and this should be kept in mind. Thus at the beginning of the year, the fishermen know that the MSY is X amounts of fish, of which each fisherman is eligible for y%. Thus calculate y% of X and you have your quota.

The other alternative could be that the community, which is normally not very large, as is the case here, be given authority to independently determine the share of the MSY allotted to traditional and mechanised trawlers. Here the community, with interests to sustain their resource, will allocate the quotas considering the distribution of the population involved in both sectors and will still have the catch falling within a sustainable level. Since the problem is mainly with the trawling method, one can afford to overlook monitoring the catch of the traditional vessels. Here it becomes essential to create a market for fishing licenses for the operating trawlers. This license, in essence, is a right to over fish, or fish using techniques that might inflict a social cost to the traditional fishermen- a negative externality. So, determining the number of licenses that can be issued becomes a crucial factor. Then working backwards, the maximum possible catch by the single trawler in a day can be estimated (Y). Also the number of licenses (N) issued should be such that the  $N \cdot Y < MPC$ . The percentage share determined by the community can be equated with the maximum catch possible by any trawler in a day and the number of licenses can be kept such that they do not exceed the MSY. i.e.  $N \cdot Y < \% \text{ share}$  allotted to the trawlers.

### ***How should these licenses be distributed?***

One of the ways to limit the number of players, perhaps the most effective way is to create a market for the licenses to operate trawlers. By knowing the value of N, those many licenses can be auctioned on a daily basis. Auctions will enable the capable players to venture in to the sea and the amount of fish captured by these players will be well within the permissible level required to sustain the resource. The authority that carries out the auction here deserves a little more attention. The community, which depends on the resource directly or indirectly for their livelihood should have the right to conduct the auction of these licenses and will also be entitled to the revenues resulting from the auction. This revenue could be used for the welfare of the community or the region.

The state with its strategic interests can have its representatives of the fisheries department to monitor these auctions and still conduct patrols etc. It can be a consultant in terms of making required information available to these communities. The amount of revenue that accrues to the community through this method of licensing would depend on the demand conditions. Fish being a necessary commodity with a relatively low elasticity of demand, there is a possibility of steady flow revenue which can be higher than tax revenues obtained from the fishermen post catch, since most of them do not report the actual amount of the catch, fearing income tax payments.

With strong adherence to the Panchayat or the established co-operative system, monitoring overfishing becomes more efficient. It is expected of the community to have strong agreements and rules against those players who indulge in catching juvenile fish by denying them the license and even resort to a complete prohibition of these players from fishing. Barring a player

from fishing would reduce competition and thus would be an incentive large enough to encourage other players to constantly monitor those who use smaller mesh to scrape the sea floor.

A choice between both the approaches suggested here can be made based on the implementation feasibility. However both are meritorious than the existing status quo.

## **6. Conclusion**

Although the long-term effects of the current ban are yet to be evaluated, it is important to understand that the tropical waters characterised by multi species marine environment is different from the temperate waters. The spawning seasons in tropical waters are different for different species. Some of the scientists and fishermen who I spoke to feel that the spawning occurs round the year. Tamil Nadu comprises four different topographic marine regions; breeding season differing with each area, making a uniform ban lesser effective. Equally drastic will be a move to establish separate ban periods. The riots that happened in the past between Tamil Nadu and Andhra fishermen vouch for the dangers that accompany such a move. Even the government does not have the required manpower to enforce such a variable ban. Peace seems to go hand and glove with the uniform ban. In the biological perspective, the current ban is viewed as, if not the best option, the least that should be done. But the worry is that the socio-economic impact on the fishing community should remain within the tolerable limits. I believe that the alternative model suggested here is worth considering. Though it has its own limitations when it comes for societies, which are highly heterogeneous in terms of fishing population; the underlying idea is clear. Though the above study is restricted to a particular area, I believe there is high scope for deriving lessons for effective resource management.

Common Resource pools, like fisheries, managed by the community, which holds the right over decisions regarding the resource exploitation, is a much better option than open access, government and private ownership of the resource (Ostrom, 1999). The communities will have the right to restrict access and will create enough incentives for users to invest in it rather than overexploit it. Cases like Tharuvaikulam shed light on the effectiveness of community-managed resources in the task of ensuring sustainability. Decentralised community management systems; customised to meet local needs will be required to tackle the problems that will be faced by the fishing community in the near future.

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## **Appendix: 1**

### ***An Introduction to Tuticorin- The Marine and Human Environment***

Tuticorin district is in southern Tamil Nadu, in the Gulf of Mannar region, which is situated between India and Sri Lanka. Tuticorin district names 21 fishing villages, with a population close to 70,000. Founded by Portuguese, captured by the Dutch and then ceded to the British, Tuticorin, once referred to as the Pearl City, is also known for its *chank* fisheries.

The Gulf of Mannar region houses the densest of the fisher folk population and is rich in fish as compared to the Coromandel Coast and Palk Strait regions, housing around 450 of the 2200 species of fish found in India (20 percent). This makes it the single richest coastal area in terms of fish diversity in India (UNDP 1999). The major varieties that are exploited here include Mackerel, tuna, Pomfret, sharks, Cods, flatfish, ocean perch, catfish, shrimps, prawn, lobster and crab. The decline of these during the 1960's is mainly attributed to the anthropogenic and natural factors.

The study focuses on the town of Tuticorin, which has the largest harbour in this region and Thirespuram, a village located adjacent to the town that houses traditional fishermen. The construction of the port in 1968 led to rapid industrialization in and around the district of Tuticorin. This rapid industrialisation and emergence of a thermal power station and a fertilizer plant in this region are responsible for the pollution in this region. Tuticorin harbour is unique because of the physical separation of mechanised and the traditional vessels; with separate landing centres for both. This is in contrast to other fishing villages, where both the sectors have a common landing centre. One of the interesting features of Tuticorin is the conflict management system between the two sections of the *fisher folk*, who do not meet on a daily basis.

Though the traditional fishermen form the predominant fishing population, the mechanised sector contributes for more than half of the district's catch volume and even a larger share of the export earnings (Government of Tamil Nadu, 2000b). It is also one of the very few places where the Marine fisheries regulation Act of Tamil Nadu is strictly implemented. The fishing operations are usually undertaken throughout the week and Sunday is normally a holiday, a fact attributable to the predominant Roman Catholic faith in and around this region, among both traditional and trawler fishermen.

## **Appendix:2**

### ***Shortcomings of the implementation of the Tamil Nadu marine fisheries Act, 1983:***

In the age of GPS<sup>30</sup> and other modern gadgets to locate the schools of fish, safety still remains a secondary issue. Life jackets and other life saving equipments are almost non-existent in most traditional boats, surprisingly in trawlers too. Though affordability is no issue for the owner of a trawler, who has invested a heavy sum of money in the vessel, the lackadaisical attitude is because of the abundant labour, which is non-demanding. The crewmembers are mostly fishermen who borrow money from the owner of the vessel and they have no choice but to stick to the same vessel till they pay off their debts.

In the licensing procedure for the fishing vessels mentioned under the Section 4-B, Tamil Nadu Marine Fisheries Act, 1983 states that *in the granting or refusing license under sub section (3) the authorized officer shall have regard to the condition of fishing vessel including the*

*accessories, which include approved life jackets on board (approved by Mercantile Marine Department) so that one adult life jacket is available for every person on board.*<sup>31</sup>

Though the government officials claim that they have been distributing life jackets at subsidized rates, they seem to be non-existent among the fishermen. Blame it on the unaware fishermen or the fact that there are too many fishermen and there is too little dough, but the safety regulations appear to be far from being enforced.

The Act also mentions that *every owner of a registered fishing vessel shall furnish to the authorized officer at the end of every quarter a return in form 7*. This ordinarily does not happen in practice because the fishermen expect that they would be questioned on income tax. This makes the estimation of the catch by first hand reports from the fishermen extremely difficult. This set back in the estimation of the catch is sad phenomenon as it makes it difficult to calculate catch related estimates such as Maximum Sustainable Yield and other estimations like over-fishing and sustainable fishing.

### **Appendix:3** ***Economics of Fishing***

The mechanised sector accounts for more than half of the district's catch volume and even a larger share of the export earnings (Government of Tamil Nadu, 2000b). Most fishermen in the mechanised sector work as wage labourers under the boat owners. The seasonal nature of the fisheries; the risk and uncertainties associated with fishing combine to form a life of low income; leaving the fishermen with little opportunity to save for lean seasons. Alternative employment opportunities are low because of low educational qualification of the fishermen and the lack of any training for work in other sectors.

#### *Mechanised Sector:*

Normally there are 12-14 members in the crew who operate by shifts in the mechanised vessels. They get a daily wage of Rs 100-125 from the boat owner and further the profit is divided among the crew and the boat owner in the ratio 40:60<sup>32</sup> after deducting the operating costs, which includes diesel, icing and fuel. In some cases the profits is divided in to eight parts, five parts for the owner and the crew and the remaining three for engine, crafts and gear; one each. However if current revenues do not cover operating costs then the crewmembers do not have a claim on the profits of the successive days. This cut in the share of the crewmembers is used to compensate for previous losses.

#### The Physical and Financial Flow<sup>33</sup>

The fishermen land the catch from their vessels and they are sold only through middlemen who are called *Vatakkarans*. They finance the boat owners by providing them interest free loans and hence the boat owners are indebted to them. *Vatakkaran* plays the role of an auctioneer and also settle the payment on a daily basis to the fishermen, immediately after the sales. The commission rates that prevail are between three to nine percent depending on the amount loaned to the owner. But mostly it is a sizeable 6.25 percent.

A wholesaler, who buys on a week's credit from the *vattakkaran*, purchases the fish; this is in turn sold to a retailer or a secondary wholesaler. This is then sold to the companies, which process the fish and export them. Trade with the *Vatakkaran* is accompanied by an assurance of regular payment and that the entire fish will be sold. This is a crucial factor, since fish is a perishable good and the fishermen lack advanced storage facilities. The fish landing at the Tuticorin harbour starts normally from 9.00 PM as the vessels returns from the sea and this is when the fish market starts to roll its wheels. Open auction is the normal practice and some

commercially important varieties seem to have a standard price through out the district, set by the traders.

The sale is carried out in heaps or in lots, instead of on kilogram basis as it speeds up the sales. This system seems to fetch the fishermen a better price, as several traders participate in an auction conducted by a single auctioneer. The fish are sold for local consumption and to other states like Kerala as well (Eline & Marjanka 2003).

The mechanised boat fishermen in Tuticorin complain that the present timings are unfavourable for them, because, it takes time to reach the fishing grounds, which are distant from the shore. They also have to return back in time to avoid the fine. The effective *Catch-time*<sup>34</sup> is thus reduced. Increased diesel prices and declining catches aggravate their problem. Mechanised fishermen also complain about the fact that the motorised *vallams* are not subjected to any time restrictions, even when they venture in to the fishing grounds meant exclusively for the former.