

Annex VII: FISHERIES

A. Background

1. India is the world's fourth largest fishing nation, accounting for over 4.39 percent of global output. Its fish exports reached \$1.2 billion in 2002, about 1.21 percent of GDP while production rose from 5.9 million tons in 2001-02 to 6.2 million tons in 2002-03. However, this growth was mainly due to aquaculture and inland fisheries – marine capture fisheries have been stagnating in recent years in spite of an increased fishing effort.

2. Marine capture fisheries production for 2003 was stable at 2.58 million tons. Of the total landings, 66 percent were by the mechanized sector, 27 percent by the motorized sector and 7 percent by the artisanal sector. Trawl net (mechanized) and gill net (motorized) are the important gear operating throughout the Indian coast.

3. In 1999, the Central Marine Fisheries Research Institute (CMFRI) reported that marine fisheries production had moved from 500,000 tons in 1950 to 2.7 million tons in 1997. But by 1997, production from inshore waters (depth below 50 m) had reached its potential (2.2 million tons), and the scope for increasing production appeared to be limited. The catch rate of vessels had declined, with catches for trawlers in Chennai decreasing from 110.8 kg/hour in 1991 to 29.7 kg/hr in 1997. This declined further to 27 kg/hr in 2003. From 2001, Andhra Pradesh and Tamil Nadu imposed a 45-day fishing ban.

4. India's 10th Five Year Plan (2002-07) expresses concern about the level of over-exploitation and overcapacity of the Indian fishing fleets, both mechanized and traditional, and advocates better regulation measures, the need to diversify fisheries and aquaculture and upgrade the traditional fishing sector with new boat designs for offshore fishing, and the necessity to manage the resource in a more sustainable way.

5. Andhra Pradesh. Pre-tsunami information indicates a total catch of 264,000 tons of marine fish/shrimp by various types of boats, and this fleet was manned by 130,000 sea-going fishermen who operated from four harbors and 508 coastal fishing villages with 423 landing places.

6. Tamil Nadu. Marine catches remained stable at around 375,000-380,000 tons between 1999-00 and 2003-04. The catch is diverse with 26 to 44 different fish species/categories. Rameswaram, Nagapattinam, Pudukottai, Tuticorin and Kanniyakumari are the most important fishing districts. The share of Nagapattinam and Kanniyakumari fell during this period probably due to rapid and excessive expansion of the fleet.

7. During this period, the active-fisherman population increased from 117,214 to 197,490 while active fisherwomen – involved mainly in selling and processing fish – increased from 30,500 to 34,000.

8. **Pondicherry.** Of the total coastal villages, 11 are in Pondicherry, and 10 in Karaikal. The total catch is to the order of 28,400 tons with Karaikal's contribution increasing from 14,796 tons in 2000-01 to 18,238 tons in 2003-04. Seventy percent of the catch is by mechanized boats. Karaikal has 2,271 active fishermen and over 1,100 fisherwomen. Pondicherry also possesses shrimp farms, data about which was not available

8. **Kerala.** Kerala is India's second-most important fishing state after Gujarat. Of the state's 223 coastal villages, 26 are in Kollam and 29 in Alappuzha. There were estimated to be 177,068 active fishermen in the state in 2001. Total fish landings have varied due to the importance of the small pelagic component. From 1995-06 to 2001-02, landings ranged between 660,000 tons and 511,000 tons, but more normal values were in the 530,000-560,000 ton range. In Kollam and Alappuzha, total catches increased respectively from 111,780 and 91,626 tons in 1998-99 to 142,373 and 121,900 tons in 2001-02.

B. Damage Assessment

9. *Methodology.* The team visited a limited number of districts in the affected states where it discussed the methodology followed by the authorities to estimate physical damages. It assumed that other districts in that state followed the same procedure. However, at the time of the team's visit, data on damages was still being collected for the aquaculture industry while in some districts damage assessments for the capture fisheries sector were being substantially revised. The different governments organized and presented information in different formats, and it was not possible to visit every location to clarify how the estimates had been prepared. Further, the same level of aggregation of detail was not available in all states. Data for assessing damage and needs for the sector is limited, and our estimates are based on various assumptions, and do not pretend to be more accurate than those prepared by the states. However, in order to use common evaluation standards to arrive at a global picture of the impact, the results presented here are slightly different from those presented by the individual states. Clearly, more accurate damage estimates will be available in the future.

10. *Damage.* The tsunami destroyed or damaged nearly 5,000 mechanized boats causing damage valued at Rs. 663.1 crore (\$152.4 million) - a total of 7,933 FRP boats/*vallams* valued at Rs. 50.1 (\$11.5 million); about 24,580 boats of other categories, mainly motorized, valued at Rs. 121.0 crore (\$27.8 million); and 35,483 wooden catamarans valued at Rs. 90.0 crore (\$20.7 million). In addition, 2,342 outboard motors worth Rs. 10.1 crore (\$2.3 million) were damaged or lost. This figure is expected to increase substantially after revision. Net sets valued at Rs. 44.4 crore (\$10.2 million) were damaged or lost. (This has been calculated after converting the tonnage provided by Tamil Nadu into individual nets, though this figure may have to be re-evaluated since the unit values used by Andhra Pradesh appear to be very low.) Boat seines worth Rs. 19.9 crore (\$4.6 million) were lost in Kerala.

11. Damages have been reported on both coasts to about 388 ha of shrimp ponds (worth Rs. 8.4 crore or \$1.9 million) and five hatcheries (Rs. 0.25 crore or \$57,500), and to 102 small-scale oyster farms in Kerala valued at Rs. 0.102 crore (\$23,500).

12. *Shrimp culture.* The shrimp culture sector is of considerable importance as a foreign currency earner particularly in Andhra Pradesh but also in Tamil Nadu. It has a downstream industry (feed manufacturing plants, equipment and service providers, and processing plants) dependent on it. It is suggested that damage to shrimp farm infrastructure, equipment, stocks, production inputs, and hatchery facilities and stocks be assessed and estimates of recovery time be prepared as this sub-sector would require a specific support policy for its recovery.

13. *Small-scale aquaculture.* Smaller but socially important forms of coastal aquaculture such as oyster projects implemented by women's self-help groups in Kerala have lost their infrastructure and potential harvest. A separate damage assessment should be made for this category as well, and compensation and other forms of support be provided quickly so that these disadvantaged groups can regain the momentum they had developed.

14. *Gaps in evaluations.* In their evaluations, the governments have focused on the damage to productive assets but paid less attention to damages caused to livelihoods in fishing villages, and to those who provide support services. Compensations tend to favor boat and equipment owners but do not take into sufficient consideration jobs and income lost, for example, by fishing crew and fish sellers. Moreover, compensations for lost jobs do not cover the period required for the sector to recover.

15. Collection of damage information appears to have been constrained several factors, such as:

- the forms distributed to fisheries officers, which mainly sought information on boats, engines and nets but did not have the flexibility to include local realities and account for damages to assets or services related to fishery operations;
- the lack of complete and accurate registers of boats, particularly traditional and FRP boats. Many have been claimed as washed away. While this might be possible for FRP boats and, to a lesser extent, for mechanised boats which have more often been grounded, catamaran logs should be retrievable as they are returned by the sea;
- the exact damage valuation for the mechanized boat category appears to be a difficult task. Compensation claims have been based on the cost of a new boat regardless of age depreciation of the lost asset or the fact that some boats were not operational;
- the accurate damage evaluation of FRP boats. In Tamil Nadu, more than 4,400 FRP boats have been classified as totally damaged but a good proportion of these can be easily repaired, and indeed some repair is occurring with the assistance of NGOs as was observed in Seruthur village in Nagapattinam district. A better method would be to collect damaged hulls in open workshops for inspection by qualified personnel, which can be done relatively quickly, and would cost much less;
- damage classification of outboard engines presents similar problems. In some cases, fishermen have tried to restart recovered engines without dismounting and cleaning them properly, ruining those which could have been repaired, and finally,
- different approaches adopted for the state for paying compensation. Kerala pays the boatyards, while other states will pay fishermen directly. This may lead to disbursement of funds in excess of what is really needed.

Evaluation of losses.

16. A proper assessment of losses in production and wages is still to be done. The length of the recovery period will have an impact on production and livelihood of coastal communities as well as those inland who depend totally or partially on the fishing and aquaculture industries. Evaluating losses by estimating the value of the catch which could have been obtained had the tsunami not occurred or the value of wages lost by the crews is difficult for the following reasons:

- The actual number of boats of various categories fully and partially in operation before and after the tsunami is not yet clear. It is necessary to have a correct estimate for the operational fleet that has disappeared in order to reduce the catch value by the correct proportion.
- It is not clear, but quite likely, that fishermen from other states will enter the fishing grounds of the affected states in the absence of local activity. Hence, some catch that would be accounted as lost might actually be produced by migrant fleets.
- The period required to restart production by larger boats is related to the residual capacity of boatyards in both affected and other states, which has not yet been fully assessed. Recovery time will also be influenced by how repair work will be organized. The three to six month recovery time voiced by many fisheries officers appears optimistic particularly for the mechanized fleet, and does not take into account the abnormal pressure on boatyards, some of which themselves are damaged.
- Manning boatyards might also be an issue as owners may be reluctant to recruit additional skilled hands knowing that the flood of orders will be temporary.
- Sufficient quantities of properly cured wooden planks and logs are required. The time to log and cure these will depend on stocks and the supply strategy adopted. This also has an environmental dimension as catamarans source *Albizia* sp logs from Kerala forests, and each boat requires four to five trees.
- Since the collection of tsunami-impact data on aquaculture has not been completed and evaluated, this prevents a discussion on pond reconstruction times, stocks lost and shortage of post-larvae for the next cycles, which are also linked to the availability of broodstock. The governments should be alerted to the possibility that broodstock or post-larvae imports risk the introduction of diseases like the white spot virus.
- It has not been possible to discuss the time and cost implications of possible alternative reconstruction scenarios and their effect on estimated losses.

17. Losses to production are estimated in Table 1 below. It has been possible to make this crude estimate, based on the present government thinking to reconstruct assets to pre-tsunami levels, only for Tamil Nadu and Kerala where there was at least enough data to attempt a theoretical calculation. It speculates on the number of operational vessels and presumes a rather optimistic one year for the reconstruction of wooden boats. Nevertheless, it provides an idea of the dimension of the production losses, which are particularly important for Tamil Nadu.

Table 1: Assessment of Damages to Assets and Losses in Production and Income (Rs. crore)

	Kerala	Tamil Nadu	Andhra Pradesh	Pondicherry	Total
Damages to Assets	50.8	801.3	51.8	94.7	998.6
Losses³⁰	117.8	1,304.0	36.8	12.6	1,471.2
Total (Rs. crore)	168.6	2,105.3	88.6	107.3	2,469.8
Total (\$ million)	38.8	484.0	20.4	24.6	567.8

³⁰ Includes losses to fisheries production and crew incomes.

C. Recovery strategy

18. The sudden elimination of a large operational fleet is rare in the fishing industry. But the disaster presents an opportunity to redesign the capture fisheries industry in a better and more sustainable way – and, in fact, to address the concerns raised by the 10th Five Year Plan. This applies mainly to Tamil Nadu and Pondicherry, which are the worst affected.

19. Replacing mechanized boats with new ones of the same design will certainly accelerate over-exploitation and increase conflicts with the traditional sector. New activities related to deep sea fishing and aquaculture could be promoted instead, with boats and gear designed to tap resources in deeper waters and to reduce operational expenses while being less damaging to the resource.

20. Efforts should also be made to diversify and expand employment. For example, a wooden trawler costing Rs. 2 million and employing 10 men could be replaced at the same cost with 10 fully equipped FRP boats that would employ 40 to 50 fishermen, or by new boats intermediate in size between FRP boats and trawlers, such as bottom gill-netters or longliners which can operate beyond the range of the FRP boats. This opportunity could be captured through an Integrated Coastal Zone Management Program.

D. Recommendations

Short Term (12 months)

21. Short term activities should comprise:

(a) Completion and revisions of assessments, including for the capture fishery sector and its ancillaries; aquaculture sector and its ancillaries; livelihood losses; national-level boatbuilding capacity. This is expected to cost Rs. 235.2 crore (\$54.1 million) (including assistance for salaries to crews) of which Rs. 150.5 crore (\$34.6 million) is required for Tamil Nadu, Rs. 28.3 crore (\$6.5 million) for Kerala, Rs. 30.1 crore (\$6.9 million) for Pondicherry and Rs. 26.3 crore (\$6.0 million) for Andhra Pradesh.

(b) Evaluation of options for reconstructing the sector, in particular for mechanized boats. Financial needs are estimated at roughly Rs. 1.4 crore (\$0.3 million), of which Rs. 0.8 crore (\$0.18 million) would be for Tamil Nadu and Rs. 0.6 crore (\$0.14 million) for Pondicherry. The evaluation should include:

- A look at alternatives to reorganize the fisheries sector with special attention on the protection of the resource base for future generations. This should be completed before disbursing funds for larger boats.
- Evaluate the legal and regulatory implications of the alternative scenarios in relation to fishing rights, access, monitoring, control and surveillance.
- Address issues related to the registration and control of the operation of boats and the marine capture sector in general, including satellite tracking of boat operations.
- Evaluate the possibilities offered by new boat designs to tap resources in deeper waters or to replace trawler operations in a more efficient and sustainable way.
- Discuss with fishing associations schemes to buy boat owners out of the sector and invest compensations in other activities.

(c) Identification of new forms of livelihood in coastal villages, especially for women and youth. Costs are estimated at Rs. 1.15 crore (\$0.26 million) as a common fund for the four affected areas. The activities here would include:

- Studies to identify alternative forms of coastal livelihoods which could complement fishing such as group activities to support the industry, value addition through processing, aquaculture, social forestry linked to coastal and hazard risk management, etc.
- Prepare projects for pilot testing of alternatives identified.

Mid term measures (24-36 months)

22. This is a continuation and expansion of activities outlined in the short term strategy after they have been discussed and agreed. Reconstruction of the fleet of larger boats can be expected to be completed in the mid-term period. The financial needs for this will depend on the course of action decided in the short term. If simple replacement of assets is the strategy chosen, then the cost estimate would be around Rs. 998.6 crore (\$229.6 million), of which Rs. 801.3 crore (\$184.2 million) would be for Tamil Nadu, Rs. 94.7 crore (\$21.8 million) for Pondicherry, Rs. 51.8 crore (\$11.9 million) for Andhra Pradesh and Rs. 50.8 crore (\$11.7 million) for Kerala.

23. It can also be envisaged that in this period all aspects related to the new regulations of the fishery sector will be put in place. Training programs on more sustainable exploitation of the resource and complementary income generation activities will have a major role. Pilot testing of the new approaches will commence in this period.