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**Paper Title:**

**Thrust on Production and Export of Fish: Impact on Existing Institutions and Involving Communities in emerging New Institutions: A case of Gujarat (India).**

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**Introduction:**

The Indian economy is one of the fastest growing economies in the world today. All the sectors of the economy are experiencing robust growth. The economic liberalization and increasing integration with world economy is leading to greater emphasis on production for export. In spite of a long coastline of 8118 kms and tremendous potential to harness marine resources, not much attention has been paid on the issues faced by this sector and realizing the full potential of export of marine products in India, however, it is the third largest producer of fish and second largest producer of inland fish in the world. It is a source of cheap and nutritious food besides being a major foreign exchange earner. The fisheries sector provides employment to over 11 million people engaged fully, partly or in subsidiary activities pertaining to the sector, besides a good number of people engaged in ancillary activities. The present production of fish is much below the potential of fish production. The state of Gujarat accounts for a 1600 kms. of coastline i.e. one-fifth of India's coastline. Like India, in Gujarat also the potential of fish production has not been realized fully to its potential. The present paper attempts to study trends in production and exports of fish from India and Gujarat. Further, it studies recent policy initiatives taken by the government during past few years. Further, the role played by various stakeholders in production of fish in Gujarat has been discussed. For this purpose the interaction of stakeholders in two main centres of fish production namely, Veraval and Mangrol have been discussed. How the fishery resources are exploited and various emerging institutions have been studied. Further, how community involvement is affecting these institutions has been analyzed and probable best solution based on principles of common resource management has been made.

**Production and Export of Fish from India and Gujarat:**

The fisheries sector contributes the provision of employment and foreign exchange earning for the nation. It is also a source of cheap and nutritious food for the people of India. The **table 1** indicates the production and exporting marine products in India. It is clear that since last five years exports of marine products has stagnated. The current production of fish is almost 35 percent less than the estimated potential of fish production. The marine fish production potential has been estimated at 3.9 million tonnes and 4.5 million tonnes from inland sources for India. The table indicates that production from coastal waters has reached a plateau and therefore for increasing production deep-sea fishing will have to be relied upon. For developing inland fishery

there is a lot of scope in many of the Indian states e.g. in East and North Eastern states where it can help in tackling the problem of food as well as unemployment. The Indian government has adopted a comprehensive Marine policy in November 2004 to facilitate sustainable deep-sea fishing, which has been discussed in the following section.

The state of Gujarat has a long coastline of 1600 kms constituting 19.17 percent of India's coastline, which is broken by several bays, inlets estuaries and marshlands. The area available for fishing activities extends from Lakhpat in Kachchh district in north to Umargaon in Valsad district in south. Important commercial varieties of fish namely Pomfret, Jew fish, Bombay duck, Shrimp, Lobster, Squid, Cuttle, Silver bar, Hilsa, Shark, Catfish, Mulletts, etc., are caught in large quantities in these areas. In addition, the Gulf of Kachchh has congenial conditions for growth and sustenance of different type of Oyster, Shellfish and Sea-Weeds.

According to the Seventeenth Livestock Census 2003, there are 970 fishing landing centres scattered in the remote places or the state, classified into Marine (217), Inland (665), Estuarine (88) villages inhabited by 4.93 lakh fisherman, out of which 1.72 lakh were active fisherman who were engaged in fishing, marketing of fish and repairing of boats/nets, etc.

During the year 2003-2004, total fish production in the Gujarat State has been estimated at 6.55 lakh tonnes worth Rs. 1688.15 crore. The marine fish production constitutes about 93.06% of total fish production of the state. There were 31000 fishing boats in the state, out of which 18635 were mechanized boats and 12365 were non-mechanized boats. During the year 2003-04 through foreign export of 108386 tonnes fish and fish products, the State has obtained an exchequer of Rs. 614.41 crore.

During the year 2004-05(April-September, 2004), the total fish production has been estimated at 1.47 lakh tonnes Marine fish production is 1.32 lakh tonnes and the remaining inland) having worth of Rs. 379.74 crore. Foreign export of fish and dish products is estimated at 22695 in the state, out of which 17964 were mechanized boats and 12813 were non-mechanized boats. During the year 2004-05 (April-September, 2004), 5089 lakh fish seed (spawn) have been produced to meet the ever-growing demand of the state in inland sector.

For the development of reservoir fisheries particularly in tribal area, all the reservoirs in tribal area have been reserved for the tribal fisheries co-operative societies or the projects affected beneficiaries and are allotted on upset price. The Department has fixed the upset price of reservoir.

<b>Table 1 :</b>					
<b>Production and export of marine products</b>					
<b>Year</b>	<b>Fish production (million tonnes)</b>			<b>Export of marine products</b>	
	<b>Marine</b>	<b>Inland</b>	<b>Total</b>	<b>Quantity ('000 tonnes)</b>	<b>Value (Rs. Crore)</b>
1950-51	0.5	0.2	0.7	20	2
1960-61	0.9	0.3	1.2	20	4
1970-71	1.1	0.7	1.8	40	35
1980-81	1.5	0.9	2.4	80	235
1990-91	2.3	1.5	3.8	140	893
2000-01	2.8	2.8	5.6	503	6296
2001-02	2.8	3.1	5.9	458	5815
2002-03	3.0	3.2	6.2	521	6793
2003-04 (P)	3.0	3.4	6.4	412(P)	5739
<b>Source: Department of Animal Husbandry.</b>					

<b>Table 2:</b>			
<b>Fish Production (In '000 Tonnes)</b>			
<b>Year</b>	<b>Inland</b>	<b>Marine</b>	<b>Total</b>
1998-99	80	552	632
1999-00	70	671	741
2000-01	40	620	660
2001-02	51	651	702
2002-03	34	744	778
2003-04	45	609	654
<b>Source: Socio-Economic Review State 2003-2004</b>			

<b>Table 3: Growth of Fish Export from Gujarat</b>		
<b>Year</b>	<b>Quantity (In '000 Tonnes)</b>	<b>Value in Crores</b>
1971-72	0.2	0.40
1980 – 81	7	12.90
1990 – 91	22	75.25
1996 – 97	123	570.58
1997 – 98	125	63785.0
1998 – 99	70	367.46
1999 – 00	76	389.38
2000 – 01	124	615.65
2001 – 02	132	625.72
2002 – 03	134	760.36
2003 – 04	108	614.41
<b>Source: Sustainable Fishery Development: Focus on Gujarat and Gujarat Fisheries Statistics 2003 – 04.</b>		

Contribution of Gujarat in export of marine fish in total export of marine products from India is given in table 4.

<b>Table 4: Contribution of Gujarat to the marine product export from India.</b>		
<b>Year</b>	<b>% Contribution in Quantity</b>	<b>% Contribution in Value</b>
1972-73	00.90	1.22
1982-83	06.83	4.84
1992-93	21.28	10.75
1993-94	24.55	11.01
1994-95	28.30	11.69
1995-96	27.54	11.09
1996-97	32.58	13.84
1997-98	32.54	13.58
1998-99	23.25	7.94
1999-00	21.75	7.61
2000-01	28.19	9.55
2001-02	31.14	10.5
2002-03	28.69	11.05
2003-04	26.31	10.09
<b>Source : Sustainable Fishery Development : Focus on Gujarat pg – 30 and Gujarat Fisheries Statistics 2003 – 04 .</b>		

## **The Recent Legislative Measures:**

The central Government has passed a new **Marine fishing policy in 2004**. Its main provisions are as discussed below. Its objectives are to increase the marine fish production to a sustainable level in a responsible manner so as to boost exports of seafood from the country and to increase per capita fish food protein. Secondly, to increase socio-economic security of fisherman whose livelihood depends solely on this. And finally, to conserve bio-diversity and ecology, ensure sustainable development of marine fisheries.

The provisions of the Act are very broad based and encompass enactments related to all the stakeholders in the fishery sector. The main provisions contained in the policy are:

**Marine fisheries:** promoting exploitation in deep sea and oceanic waters would be another approach for reducing fishing pressure in the traditional fishing areas.

**Harvesting of marine fish resources:** This policy advocates protection, consideration and encouragement of subsistence level of fishermen and technology transfer to small-scale sector and infrastructure support to industrial sector. There is a demarcation area for in terms of area and dept for motorized and non-motorized craft.

**Post harvest operations:** to fully comply with international requirement in post harvest care of catch as to achieve highest standard in food safety.

**Resource management:** exploitation of living resources within 50 meters depth zone is showing symptoms of depletion and in certain belts in onshore waters.

**Fisherman welfare:** fishing is the sole livelihood of 10lakh fisherman living in the Indian coastline. So this policy attaches top priority for ensuring social security and economic welfare.

**Environmental aspects:** health hazards due to consumption of fish from contaminated water are creating great concerns. Pollution control agencies are urged to implement environmental pollution control norms more stringently.

**Infrastructure development for marine fisheries:** The infrastructure is of vital importance and will include jetties, landing centre, provisions for fuel, water, ice repairs and gears.

**Legislative support:** Legal framework is a pre-requisite for proper management and control of fisheries. In India, the subject of fisheries lies under state list under article 21 of Indian constitution.

**Policy for development of fisheries in the union territories of Lakshadweep and Andaman and Nicobar islands:** The waters in these two areas are rich in fish resources and are not exploited below the exploitable limits. Fisheries- capture, post harvest operations and marketing – is still an important means of livelihood for inhabitants of these islands.

During the year 2003-04 **Gujarat Fisheries Act, 2003** has been promulgated in Gujarat Legislative assembly. The formulation of fishing laws beyond territorial water is the prerogative of the central government. The state governments legislate for inland and territorial water fishing. The Gujarat state was observing the provisions of Indian Fishery Act 1897 till the year 2003. Its provisions were outdated and inadequate to regulate the fishery sector development in Gujarat. This resulted into unsystematic development in the fishery sector leading to depletion of

stock and deterioration of habitat. This was the result of overexploitation and overcapitalization of fishery sector in Gujarat. Thus, in accordance with the provisions of Marine Fishery Regulation Act (MFRA) to cater to the demand of fishery sector of the state Gujarat Fishery Act 2003 was passed to provide for the protection, conservation and development of fishery in inland and territorial water of Gujarat along the coastline of the state of Gujarat. The important provisions of this law are explained as under:

The act provides for the prohibition against destruction of fish using dynamite or any explosive substance in any water, it prohibits destruction of fish by poisons in water, prohibits introduction of exotic fish in any water and empowers the state government to regulate, restrict or prohibit certain fishing activities in any specified area. The law prohibits the use of vessel for fishing in any water, in specified area without obtaining a license by the owner and registering the vessel. It further provides for furnishing return of fishing by owner of fishing vessel. There are provisions of the Act or the rules or order made thereunder. A fishery Terminal Authority has been constituted which is empowered to charge such amount as may be fixed by the state government for providing services at the Fisheries terminals. Thus, the new act provides for a comprehensive regulation of fishing activities in the state. However it is crucial that the laws are implemented appropriately and community and all stakeholders are involved in managing the fishery resource.

### **(I) To study various common property management practice in Gujarat**

Tragedy of the common has become a core theoretical model for the analysis of natural resource problems. The tragedy of the commons is nested within a set of models that try to predict the outcome of situations in which the fortune of a group of people is a function of the cumulative effect of many individuals' actions. The results are non-cooperative solutions in which each individual acts in his or her own self-interest culminating into the group's ultimate disadvantage. Similarly, the tragedy of the commons posits that environmental degradation inevitably occurs in a commons because individual incentives are not commensurate with either sustainable use of resources or economic efficiency: when an individual conserves for tomorrow that only provides someone else with the resource today. Use of the tragedy of the commons model is also prevalent in marine fisheries management. A group of fisheries economist opined that "one of the most robust results in economic theory is the theorem that common property resources will be overexploited, possibly to the point of ultimate depletion" The central argument is that fish are difficult to fence off specially in sea, and each fish taken is not available for someone else. This race usually leads to industry overcapitalization and overexploitation of fishery resources. The marine fishery sector of Gujarat is characterized by both "overexploitation" and "overcapitalization". The common resource management practice in the marine fishery sector is studied under the following head

#### **PROPERTY RIGHT**

Lack of property rights has motivated fishermen to race each other in the sea for the fish. Main problem is "the 'commons,' where a lack of clear property rights leads to a difference between individual and short-term interests on the one hand and societal and long-term interests on the other. The Fishery department has tackled this problem by system of registration of boat and licensing of fishing activity. Every boat whether mechanised or non – mechanized is needed to be registered with Custom Department / Gujarat Maritime Board, Kandla Post Trust, Marine Mercantile Department. Certificate of registry of fishing boat contains information

regarding type of boat, its dimension in terms of length, breath, and depth and tonnage capacity. Registered boat gets a distinct number and distinct name. This certificate needs to be produced for inspection whenever demanded by the authorised person. According to Gujarat Fishery Act 2003, if the boat intended for fishing purpose then it required license from the fishery department after paying prescribed fees. During the field visit it was observed that the boat had registration number but fisherman did not take license for fishing from the fishery department. Registered boat is also required to take “creek pass” from the custom department for venturing into sea. “Creek Pass” is issued twice in the year by the custom department. Registered boat is also required to make entry into register at the custom department before going into sea and also after the fishing operation. It was found that fisherman make entry in this register regularly.

### **Co-management of Common Resource**

Marine fishery is complex and interdependent ecological and social system that requires integrated management approach. The action of one person or group of user affects the availability of resource for others. Managing such common property resource require conscious effort by broad range of stakeholder. They craft rule enabling equitable and sustainable use of the resources for benefit of everyone. Collective action is prerequisite for the community-based co-management of common property resource. In marine sector, 300 marine fishermen cooperative society has been found as on 31 March 2004. During the field visit it was observed that 90 per cent marine fisherman cooperative societies are in financial shambles. So they are not contributing any thing towards the co-management of the fishery resource. It was also reported by the fisherman association such as Shree Porbandar Fisherman Boat Association, All India Fisherman Boat Association Veraval , Mangrol, National Fish Worker Forum ( Gujarat Chapter) and Shree Bhidia Koli Samaj Boat Association Veraval that fisherman in marine sector did not strive any activity to protect the resource on which their earning is dependent. Paryavaran Vikash Kendra, a NGO who works for increasing community participation in the fishery management in the Veraval, Chorwad, Mangrol Bara and Mangrol confirmed low participation of community in fish resource management. Koli and Kharva are two dominant fisherman communities in these areas. These communities are homogeneous and their social fabric is intricately interwoven. The community has well defined set of rule for social subject like marriage, education and also trade related dispute like loss of gear. But as per the office bearer of the respective association, the community did not reached to consensus to devise community-based rule for conservation and development of marine fishery. Community is driven by greed or sense of loss if did not go on fishing. In such condition they go on exploiting the resource indiscriminately while fully realizing the dire consequence of such action. New generation who is educated acknowledge the fact that some of the species like ell in Porbandar and tiger prawn in Veraval are no longer found now. The number of species has declined and size of fish has decreased over the period. Due to lack of broad based understanding in the community for co-management of resource a small chunk of enlighten fisherman cannot contribute significantly towards resource management. Owner of registered vessel is required as per Gujarat Fishery Act to provide returns details of fishing at the end of every quarter of the year. Such data helps in analysis of resource and the reason behind it. But it was found that no such information is provided. This has impeded the availability of port wise or landing centre wise data for technical analysis. So it is concluded that there is no co-management in the marine sector.

## Season Restriction

Fishing season is very much interrelated to the climatic conditions. As per Gujarat Fishery Act 2003, close season between 10th June to 15th August is declared close fishing season. The sea become very rough and also this is breeding time for the most of the commercial marine fish so fishing is suspended in close season. Government of India also issue notification separately to this effect. Office of the Collector issue public notice to this effect, which is given wide circulation. During the close season custom department did not issue creek pass which is required to produce for taking subsidized High Speed Diesel (HSD). During the field visit it was found that fishermen were aware about the close season and its importance for the their livelihood. But only 98 per cent fishermen completely observed the close season. 2 per cent fishermen risk their life and go into sea for fishing. It is widely believed by the fisherman community that this ban is skewed in more than one sense. First is perceived as trawler fishing ban. In real sense the sea become rough since mid may onwards so trawler fisherman did not prefer to go in sea as catching the fish in turbulent water become difficult. Some time it is not economically viable. So trawler started reduce sea venture from mid may itself and prefer to take the craft out of sea for drying or repair work. But artisan fisherman and FRP fisherman continued the fishing activity in the near shore fishing ground even if in the ban period from 10 June to 15 August. Artisanal fisherman argued that their bread and butter is dependent on daily catch and during ban period government did not provide alternative employment or financial assistance so they are forced to fishing in ban period. FRP fisherman argued that they fish in near shore area, which is not breeding ground for fish. Second aspect is that the blank fishing ban is based on the fact this is the breeding period of most of the commercial species. There are 300 species found along the Gujarat coast (Source- S.K. Datta , IIM ( A ), Sustainable Development of Fishery In Gujarat ,2001 ). Community believed that all the species did not breed during this period. Different species have different breeding time throughout the year. Fisherman of Mangrol reported that they catch prompret with ovary during March – April near the Jakhau. So this ban is not technically effective. It was also reported by the fishermen of mechanized boat in Porbandar, and Mangrol that thought they observe close season but the foreign fishing vessel who are under joint venture with Indian company under the provision of deep sea policy continue fishing activity in the deep sea. The artisanal fisherman and mechanized fisherman were found to reach an understanding on the sharing of fishing ground in the Veraval. Generally area up to 5 nautical miles is left by the trawler for the dol netter, bag netter and use trawler beyond this point. But such type of agreement was not reported in Mangrol and Porbandar. On further investigation it was found that the ground under the sea is rocky up to 5 nautical miles and not suitable for bottom trawling fishing. So in Veraval this type of agreement exist.

But is has been found that traditional prawn fishery in inshore sea and fishing of The close fishing season of some of the important marine fish is given in table



<b>Table 5 :</b>			
<b>Region wise close fishing season in Gujarat</b>			
<b>Fish Type</b>	<b>Close Fishing Season</b>		
	Saurashtra	Gulf of Katchchh	South Gujarat
Bombay Duck	March to September	March to October	April to September
Pomfret	May to September	September to June	May to September
Jew Fish	May to September	June to February	May to September
Prawn	May to September	May to Jan	October to June

**Source – Adpated from the Fishery sector Development of Gujarat by Prof S.K. Datta.**

### **Social Restriction**

The Whale shark, which was the first fish to be included in the Schedule I of the Indian Wildlife Protection Act 1972, used to be slaughtered in large numbers off the Gujarat coast for its oil and meat, which was being exported to south east Asian countries. According to a trade survey conducted by TRAFFIC India in 2001, the commercial harvesting of Whale Sharks in India for export was non-existent till the 1980's though it was hunted for its liver as early as 1955 - 1960. The first harpoon fishery, noticed off Veraval in 1986, engaged itself in local extraction of Shark liver oil. Though till about 1990, its fins were discarded, suddenly, in 1991, there was a demand for pectoral, dorsal and caudal fins of the Whale Shark. Post 1991, most of the Whale Shark's body parts were being sold - liver, fins, cartilage, skin and meat. The whale sharks have for hundreds of years been making an annual voyage to the Gujarat coast from the waters off Australia. They do this in the March-May period but being slaughtered due to valuable body parts The reason was simple: the meat and liver of an adult fish can fetch up to Rs 1 lakh. More than 1,200 whale sharks were being killed every year before the Indian government, in 2001, banned the fishing of this breed and the trade in its meat. Making the whale shark a protected species under the Wildlife Protection Act has given the fish a lifeline, but the length of the Gujarat coastline nearly 1,600 km means that the Indian Navy or the Coast Guard can only stem, rather than stop, the slaughter Although its hunting and trade was banned after the notification, its trade in small numbers was continuing for the first time in India and specially in Gujarat, Morari Bapu , a Gujarati spiritual leader known for his discourses on the Ramayana and interpretations of Indian tradition was roped in to took up the cause of conservation of whale shark , along with an NGO , the forest department, and two local corporate houses , Tata Chemical and Gujarat Heavy Chemicals Ltd . Gujarati culture, traditions and beliefs promote the right to life for all living beings. Instilling the sense of conservation in the people on the basis of religious beliefs proved a better and a more permanent way of protecting whale shark than policing,"

The popular religious leader of Gujarat, wildlife conservation NGOs, the forest department and two major business corporate houses had come together in a unique partnership to protect an endangered species off the coast of Gujarat, the Whale Shark. Morari Bapu, laid foundation for instilling moral and ethical values in the conservation effort of whale shark. Morari Bapu used his religious discourses to create awareness about the plight of the whale shark, known to be a regular visitor to the state's coast amongst the fishermen communities in the coastal region of Saurashtra . He spread the message of conservation of endangered species among the fisherfolk.

During launching of campaign Morari Bapu preached "Gujarati people always believed in non-violence and honoring our guests has been a Gujarati tradition down the ages. This message needed to permeate to the people who make a living out of killing this animal. These creatures come to the Gujarat coast to breed. Religious leader likened the whale shark visiting the shores of Gujarat to a daughter visiting her parents to give birth to her child and then, it becomes responsibility to take care of her," (Source: Maria A. Schulz Animal News Centre Inc., 2/7/04).

Apart from the religious route, street plays and exhibitions highlighting the plight of the species were staged along the Gujarat coast, in port towns such as Okha, Bet Dwarka, Porbandar and Veraval, and children have been involved through painting competitions. The campaign had begun to make a visible difference. The locals who earlier called the whale shark 'barrel', (as barrel is used to keep afloat hunted whale shark) now they call it 'Vhali' (means 'dear one' in vernacular language). The municipalities of Porbandar, Diu, Dwarka and Okha have adopted Vhali as their mascot. Its effect was so profound that the mayor of the Ahmedabad Municipal Corporation, Aneesa Begum Mirza declared the world's biggest fish, the whale shark as its city mascot at a public ceremony that made Ahmedabad the first inland city to adopt a marine species. The Department of Port also took special interest in the campaign and expedited the procedure to release a special postal cover on the whale shark. Wildlife Trust of India (WTI), the International Fund for Animal Welfare were also partner for this whole campaign.

### **Selection of Gear**

Selectivity of gear is the ability to capture target fish by species, size and sex or a combination of all these during the harvesting operation and allow release of all by-catch. This by-catch includes juvenile and sub adult fish, non-targeted fish species, and mammal. Fishermen are using both selective gear like dol net, Gillnet, hook and line and non-selective gear like trawl and seines in the marine sector. In the selective fishing gear unwanted fishing mortality is minimized by allowing separation of non-target species. Thus selective gears are found contributing to the conservation of fishery resource and protection of species particularly of the pelagic and mid water resources. The proportion of by-catch in the total landing of shrimp is around 35 per cent (Techno-economic and social survey of fisherman of Gujarat by Dalal Consultant and Engineering Limited, 2001), in the non-selective gear like trawler net. In Gujarat these by catch is consumed by the fish meal industry so no immediate concern is being raised. But in recent time the production of shrimp has declined and increasing by-catch is becoming major concern. Gujarat Fishery Act 2003 has prescribed mesh size of dol net, trawler net and gill net. In the case of dol net at least 40 mm mesh size at cod end (tail end), in case of trawl net square mesh of minimum 40 mm at cod end and in case of gill net mesh size of at least 150 mm is recommended. Optimum mesh size for the important commercial species caught in gill net have been described by the CIFT. Recommended mesh size of gill net for Silver Pomfret is 126 mm while for Hilsa it is 102 mm. But during the field visit it was reported by the fisherman that mesh size is invariably lower than the prescribed size to maximize their catch. In the case of trawl net square mesh size of as low as 5 mm size at cod end was reported by the fisherman. Lowering of mesh size than the prescribed one has short term harm in form of low volume target fish and high volume of by-catch in total and long term in the form of species imbalance.

### **Selection of Craft**

Unlike inland fishery sector, selection of craft plays important role in the management of fish in marine fishery sector. Non-mechanized (traditional) and mechanized are two broad category of marine craft. The total fleet size in Gujarat increased from 3531 in 1960 – 61 to 31000 during 2003 – 04. During this period mechanized boat increased from 314 to 18635 while non – mechanised boat increased from 3217 to 12365. Mechanised vessel constitute 62 percent and non mechanized boat constitute 38 per cent of total boat capacity of the state . There has been rapid expansion in the mechansied boat from 1980's but the expansion of non –mechanised boat remain almost stagnant . However the fish catch per boat per year decreased from 32.47 tonnes in 1990 – 91 to 28.16 tonnes in 1999- 2000.( Source - Techno- economic and social survey of fisherman of Gujarat by Dalal Consultant and Engineering Limited, 2001). Marine fishery sector is dominated by mechansied boat. As per National Review Committee , 2000 the Gujarat coast is in excess of 35 per cent of mechansied boat. ( Source- M.R.Boopendranath et al 2003, Sustainable Fisheries Development Focus on Gujarat pg 124 ). Fisherman community is found to switch from trawl netting to gill netting in the state. Medium size trawler with hp up to 75 can be alternatively use as gill netter. Big size trawlers (>15 meter OAL) are found to venture into deep sea beyond 12 nautical miles thus decongesting the traditional fishing site in territorial water.

The Fishery Survey of India has estimated in marine sector the maximum sustainable yield of Gujarat as 703000 (Fishery Survey of India. Bulletin No 25 ) . Marine fish production in state has recorded 702355 tonnes during 1997 – 9 8 and 743638 tonnes again during 2002 – 03 indicating a near total exploitation of the potential resource. Thus marine fishery sector is characterized by over exploitation and over capitalization.

### **Prohibition of Undesirable Practice**

During the shrimp trawling operation sea turtle which is listed as endangered species as per Wild Life Protection Act 1972 and juvenile fin fish are trapped in the mesh as a by-catch. These are of low economical value but drastically affect the conservation of marine fishery resources. Turtle Excluder Device (TED) is designed for protecting sea turtle during the fishing. It is attached to trawler net, which allows the turtle to escape the net. Importer of marine product in USA and EU insist on the TED certificate. During the field visit it was found that no fisherman use TED. Fishermen also use Fish Eye and Radical Escapement Device ( RED ) for reducing the catch fin fish of low economic value with the shrimps of high economic value.

### **Credit and subsidy.**

Marine fishery is capital-intensive sector. The cost of mechanized boat, gear, motor, fishing and navigational equipment cost well over 10 lakh in general in case of mechanized boat. During 1980 which was growth period for the trawler in the state the credit support by the National Cooperative Development Corporation (NCDC) and counter guarantee by the state government helped the expansion of mechansied boat. Growth rate of expansion of mechanized boat specially trawler was so high that soon the Veraval the biggest site for trawler operation become over crowded. This resulted in overfishing of marine resource, over capitalization , depletion of valuable fish stock, increasing the economy of scale, and harming ecosystem. Easy credit availability, expansion in demand for the pawn in China and Japan has been identified as catalyst for the rapid growth in the mechanized boat. National Review Committee (2000) recommend phasing out the excess mechanized boat specially trawlers in systematic manner. Though the

phasing out of existing boat was not found easy so government decided to check further expansion by not adding new boat and hence decided to withdraw counter guarantee to the credit by the NCDC. As per Regional Director of NCDC, Gandhinagar NCDC has stopped giving credit for the mechanised boat since 2001. The Government also subsidised the cost of fuel ( high speed diesel ) which was major variable component of the cost of operation. The state government decided to give subsidy on the sales tax on high-speed diesel. This subsidy and its size have also been identified as catalyst for frequent venturing into sea thus increasing cost of operation. When the quantity and quality of production dwindled then it automatically increased the economic cost of catch per voyage. This exerted more pressure on natural resources as to recover the excess operational cost, fisherman resorted to overfishing. Thus discontinuance of credit and lowering the subsidy were used for conservation of marine fish resource of the state.

### **Experience of Veraval and Mangrol in Common Resource Management**

There are two fishermen community in Veraval. Koli and Kharva. They dominate in the boat ownership and fishery. Around 40 per cent person employed as khalasi(helpers) and cook on board are migrants from other states mostly from Bihar and UP. This generation of Koli and Kharva are educated lot and they have visited other states also in connection with fishery. They understand that the fishing effort should be minimal in order to conserve the resource. But two communities do not any leader (esteemed person) who can take lead for encouraging community people self regulation and exert peer pressure on the fellow person. Ultimately there is unhealthy competition for running into sea and extracting the resource mostly by bull trawling in which they sweep the sea from the bottom. This is very harmful in order to conservation as 60 per cent catch is not economical but important in the food chain of marine fishery. An NGO -the Parivartan Vikas Kendra- who is trying hard to bring the community to one platform to reach a mutual understanding has opinion that it is very difficult because the fishing is capital intensive (one trawl cost more than 15 lakh rupees). The NGO is promoting responsible fishing practices, hygienic practices and community participation among the stakeholders. So every one is tempted to take maximum return on his investment by venturing into sea. Community is also under pressure from export industry to catch fishes to meet their demand. There is one feeling that if he (individual or community) is not fishing then it will be fished by some one else. This perception is forcing every body not to loose chance to fish.

### **The Stakeholders View:**

#### **Community and The Fisherman:**

Community is a major stakeholder in the marine resource. Their income is solely dependent on them. The fisherman community is in this business since generation and they don't know any other trade so well as fishing. Their educational background is also very low which gives them very little opportunity for alternative employment. They are also primary stakeholders who interact first with the resource.

So it becomes their prime task to conserve the resources, which are renewable in nature in such a way that it can be available for them and to the society for generations. But it is not in practice. The community feels that the catch and species has dwindled due to reckless fishing in past. This

is very much in the mind of fishermen as some of the important commercial varieties of fish like eel and black trigger are no longer available for catch. Similarly the size of the catch now has also decreased resulting in the low economic return. But the community is not doing anything specially taking the fishermen in confidence and evolving some strategy for conserving the resources with the greater participation of fishermen community. Interestingly, the community has social mechanism to settle trade related problem like destroying of net. Fishing Community is composed of boat owners who hire skipper and crewmember on salary basis. This mechanism put pressure on workforce to make frequent trip in the sea. Community is also driven by the lack of consciousness. The fisherman has to obey the orders from its employers.

### **Industry:**

Industry is second stakeholder in the fishery sector. They buy fish as raw material and sell them either in domestic or in international market. Export is major activity in the marine fishery. Export is driven by the international demand and they exert the same pressure on the fishermen community to catch the species from the sea. So it is often alleged that marine fishery is victim of the export demand of fishery. Since the earning of foreign currency is major thrust of the central and state government so conservation of fishery comes at the last in the priority list where the economic factor is the deciding one. But industry is also facing problem of loosing the value resource. It was reported by the Marine Products Development Authority (MPEAD) that during the year 2003 – 04 there was shortage of raw material. In fact around 70 processing plants has shut their operations since the deceleration crept in the industry.

### **Government:**

Government is responsible for framing rules, regulations and administrative set up for steering clear the fishery industry from the mess to a responsive fishery regime. But in the state, non-vegetarian food habits play decisive role in the interaction of government and general populous within the fishing industry. There is no separate ministry and department for the development of fishery. Fishery comes under the Department of Port and now government has appointed one Minister of State for fishery who works as appendage of Agriculture Minister. IAS who is non-technical person heads the office of the commissioner of fishery. When management of fishery is concerned, Government is mostly involved in making regulations for fishery management. But it has no manpower or resource to implement the same. Often such regulation is framed without involving the other stakeholder specially the fishermen so the effect of regulation always fails due to stiff resistance from the community.

Marine fishery is an open access system and it so wide that it is next to impossible to implement any regulation like conservation without involving the primary stakeholder. The full involvement of community in decision making and managing the resources will only ensure the conservation and sustainable development of the resource.

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