

DFM Working Paper

Institutional context of marine fisheries in Gujarat: A Review

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Abstract

This paper is the first among the series of analytical write-ups that we plan to bring out as part of the Gujarat regional component of the Dried Fish Matters research project. In this paper we re-view some of the major policies and institutional arrangements that are critical for understanding the social economy of fisheries, especially marine fisheries, in the state. The paper is divided into two sections. In section one, we present a brief overview of the trajectory of the evolution of fish-eries sector policies at the national level since they broadly define the context of our discussion. In section two, we will elaborate on the Gujarat case. Our focus here will be to interrogate the broader philosophy that guides Gujarat's approach to fisheries development in recent years.

Fisheries Development in India: An Overview of Institutional Arrangements

Indian marine fishing region is classified broadly into coastal fishing within the territorial waters [1] and deep-sea or offshore fishing beyond this limit up to the boundary of about 200 nautical miles, where the country enjoys exclusive legal right to all marine resources (the Exclusive Economic Zone or EEZ). In terms of Constitutional jurisdiction, coastal fisheries development falls under the state list (or Union List I) and, deep-sea fisheries operations are covered under the union list (Union List II). No legislative powers with respect to the fisheries sector are currently available with local governments. It may be noted that marine fish harvest in India is concentrated mostly around coastal waters up to 100 meters depth, with close to 90 percent of the catch coming from up to 50 meters [2]. The maritime states in India manage fisheries within the 12-nautical mile territorial limits under the Marine Fishing Regulation Acts (MFRA), introduced as a model piece of legislation by the Ministry of Agriculture, Government of India in 1979 with a view to govern the fishing space, resources, and equipment/gear for sustainable fisheries development.

The significance of the fisheries sector in India's economic development has been reiterated in the policy documents since the early 1950s. It has been historically considered, along with dairying and animal husbandry, as a critical sub-sector of agriculture, the main food-producing sector. The Five-Year Plans (FYP) initiated in 1951 provided the basic policy direction and guidelines to the fisheries sector as a component of the larger strategies to develop the agricultural sector. In the initial phase of planned development, fisheries activity was recognized by the state as much for its contribution to nutritional security as for employment, income, and exchange revenue. There was explicit acknowledgement of the sector's link with poverty and wellbeing and between increasing fish production and

the increased availability of 'preserved fish' for the poor. The 1st First Five Plan stated: "Increasing supplies for the poor man will...depend on increasing the availability of preserved fish. Facilities for the supply of the requisites of fishermen and the mechanization of country craft "...should result in larger production and, therefore, increased availability of preserved fish". It also recommended intensification of research "to determine the best curing seasons and types of cure and the degree of purity and correct proportion of salt required for preserving the different varieties of fish." [3]

Even as successive plan documents reiterated food and nutritional security and fishers' welfare as the objectives of fisheries development, government policies increasingly promoted strategies for motorizing fishing crafts and vessels and modernizing landing and harbour facilities as a means to intensify the exploitation of marine resources and enhance exports. The larger development discourse around the sector lamented the presence of exploitative institutions and practices – the middlemen, for instance – that vitiated the fisheries value chains and limited the gains accrued to small fishers. Co-operative organisation of production and marketing activities was thought to resolve such institutional aberrations. When the 3rd Five Year that coincided with the first half of the 1960s came to a close, there were claims of a booming fisheries sector, especially the marine fishery sector, in terms of production and exports.

Over the 4th and the 5th Plan periods spanning the 1970s, many initiatives were announced to develop the export potential further. The setting up of the Marine Products Export Development Authority (MPEDA) in 1972 through a legislation [4] was an important step during this phase. The responsibility of promoting and regulating the marine products exports rests with MPEDA. New institutional financial players like the Agricultural Refinance Corporation and the Industrial Development Bank of India (IDBI) were called upon to start schemes to finance fisheries development projects, in the hope of diversifying sources of funds beyond direct plan outlays. Starting from the 1980s the policies tilted decisively towards industrialization of

the fisheries sector [5]. With the advent of economic reforms driven by the processes of liberalization, privatization and globalization, fishery development received greater attention as a sector that could unleash an economic revolution - a blue revolution, presumably to draw parallels with the Green Revolution in agriculture of the 1960s and the enormously successful White Revolution in the dairy sector that started in the 1970s.

The logic of commercialization and industrialization of food was expected to get a fillip with the creation of the Ministry of Food Processing in 1988. All functions relating to fish processing were transferred to this ministry subsequently. The Ministry's chief goal is to catalyze technological modernization of and flow of investment into the food processing sector and facilitate increased value addition of primary produce, including fisheries. It also aims at promoting exports of processed food. Presumably, in recognition of the increasing commercial value of the food producing sectors allied to agriculture, a separate department was carved out for animal husbandry and dairying in 1991, to which was transferred the fisheries division later in 1997 to form the Department of Department for Animal Husbandry, Dairying and Fisheries (DAHDF). The Fisheries Division of DAHDF coordinates and provides assistance to the programmes implemented by various state governments for the development of both inland and marine fisheries in line with national priorities.

One of the important initiatives made during the 2000s was the establishment of the National Fisheries Development Board (NFDB) in 2006 as an autonomous society under the administrative control of the DAHDF to work towards the blue revolution to increase fish production, double up exports and generate additional employment through the development of inland, brackish and marine fisheries [6]. The main objective of the society is to coordinate activities pertaining to fisheries undertaken by different ministries and departments as also to liaison with state/UT governments. The society has been given a wider mandate spanning conservation and management of natural aquatic resources, improving processing and post-process-

ing facilities, enhancing employment, provision of fisheries infrastructure, and mobilizing resources. Allocations to the states are decided each financial year on the basis of state-specific plans developed through region-wise meetings with departments of fisheries. After scrutiny of the proposals by states, they are allocated budgets and detailed project proposals are called for.

An act to consolidate the laws relating to food - The Food Safety and Standards Act – was passed in 2006, through which the Food Safety and Standards Authority of India (FSSAI) was established. The Act lays down scientific standards of food safety and regulates the manufacture, storage, distribution, sale and import of food articles.

A decade later, in 2016, all centrally sponsored schemes of the fisheries sector were integrated under an umbrella scheme called ‘Blue Revolution: Integrated Development and Management of Fisheries’ (hereafter BR scheme). For implementing marine fishery related projects, the scheme is guided by the National Marine Fisheries Policy (notified in 2017), the purpose of which apparently is to retain the delicate balance between the goals of maintaining resource sustainability of the marine habitat and livelihood security of the fisherfolk. The BR scheme, hence, envisages “creation of an enabling environment for integrated development of the full potential of fisheries of the country, along with substantial improvement in the income status of fishers and fish farmers keeping in view the sustainability, bio-security and environmental concerns.” [7] A total fund of Rs. 3000 crore has been allocated for the period of five years (2015-16 to 2019-20) for the scheme. Enhancing fish production in a responsible and sustainable manner, modernization and technology upgradation, food and nutritional security, employment generation, increasing export earnings and inclusive development and empowerment of fishers and aquaculture farmers are the stated objectives of the Blue Revolution scheme.

While NFDB and its activities were considered one of the components of the BR Scheme, it reconstituted the activities relating to the

development of inland fisheries and aquaculture, marine fisheries, infrastructure, and post-harvest operations, and fishermen's welfare as three other components. The pattern of central funding of new projects under these schemes has been set as part of a resource-sharing arrangement with the states. For states other than in the North-Eastern/hilly regions, central funding is made available for 50 per cent of the project/unit cost, leaving the rest to state agencies/organizations, corporations, federations, boards, fishers' cooperatives, private entrepreneurs, and individual beneficiaries. The central share goes up to 80 per cent for the North-Eastern/ hilly states, whereas state agencies/organizations, cooperatives, or individual beneficiaries could contribute the rest 20 per cent. Central funding is 100 per cent for all projects directly implemented by the government of India through its institutes/organizations and in Union Territories.

From 2017-18 certain redistributive norms are also applied wherever subsidies are involved. Thus, whereas beneficiaries from general castes get 40 per cent (24 per cent from central and 16 per cent from state governments respectively) of the project cost as financial assistance from the government, for women and those belonging to scheduled castes and tribes as also their cooperatives, this share increases to 60 per cent (36 per cent from central and 24 per cent from state governments respectively). The sharing of finance between centre and state is prescribed as 90:10 for north-eastern and hilly states, 100:0 for UTs and 60:40 for other states [8]. The pattern of financial assistance proposed under Blue Revolution is explained in Appendix 1. It is the responsibility of the states to prepare and submit detailed project proposals and ensure that it has provided for financial resources to cover 50 per cent of the project/scheme cost.

The limits to capture fisheries have been a major theme in the debate around marine fisheries in the 2010s. As a solution to the problem, the concept of mariculture, mainly through coastal and open sea-cage farming, came to be promoted vigorously towards the end of the decade. The Draft National Mariculture Policy developed in 2018 [9] promises "to ensure sustainable farmed seafood production for the

benefit for food and nutritional security of the nation and to provide additional livelihood and entrepreneurial opportunities for coastal communities for better living”. It notes that globally, mariculture is the fastest growing subsector of aquaculture. However, the promotion of mariculture activities requires substantial institutional financial support as they are capital intensive and vulnerable to systemic risks.

The Fisheries and Aquaculture Infrastructure Development Fund (FIDF) was created by the government of India towards the end of 2018, whose implementation started in the financial year 2018-19. NFDB has been designated as the national implementing agency for this dedicated fund. It was created keeping in view the extant infrastructural bottlenecks, the limited availability of funds through the normal budgetary process, which are mostly grants that cannot be used to leverage debt funds, and the dearth of loans funds in the fisheries sector [10]. The total fund size of FIDF was fixed as Rs. 7522.48 crore, comprising of Rs, 5266.40 crore to be raised by the nodal loaning agencies (NLE). Of the remaining amount Rs. 1316.60 is the beneficiaries' contribution, while budgetary support is just Rs. 939.48 crore. Interestingly, even this contribution has been financed by a 5-year loan (2018-19 to 2022-23). Selected projects will be eligible for loans up to 80 percent of the project cost. Beneficiaries are required to contribute at least 20 percent of the project cost as margin money. The maximum repayment window is 12 years, including the moratorium period of two years. Interest subvention of up to 3 percent per annum is provided for all eligible entities. All loans carry a rate of interest not less than 5 percent per annum. The National Bank for Agriculture and Rural Development (NABARD), the National Cooperatives Development Corporation (NCDC), and all scheduled Banks have been designated as NLEs. The entities eligible to apply for financial assistance include state governments and UTs, state-owned corporations, state government undertakings, government sponsored and supported organizations, fisheries cooperative federations, cooperatives, fish farmer collectives and producer

groups, panchayat raj institutions, self-help groups (SHGs), non-government organizations (NGOs), individuals belonging to scheduled castes/scheduled tribes, marginal farmers, women, entrepreneurs, private companies etc. A range of activities from setting up markets, harbours, landing centres, training facilities, mariculture activities, processing units, and post-harvest facilities are specified as eligible for funding from FIDF.

In May 2019, a separate ministry – Ministry of Fisheries, Animal Husbandry and Dairying - was created for fisheries along with animal husbandry and dairying out of the erstwhile DAHDF. The ministry is responsible for overseeing matters related to inland and marine fishing and fisheries through the Department of Fisheries, and to livestock and dairy development-related affairs, through the Department of Animal Husbandry and Dairying. This move has been widely appreciated by the sector stakeholders as an affirmative step in the direction of giving the sector its much deserved due. It may be noted that the criticality of sectors' allied' to agriculture in transforming the rural economy was emphasized in the Economic Survey 2018-19 [11]. The Union Budget 2019-20 allocated an estimated Rs. 804.75 crore for the fisheries sector (and Rs 2,932.25 crore for animal husbandry and dairying). A new scheme by the name Pradhan Mantri Matsya Sampada Yojana (PMMSY), was also announced in the budget with the objective of addressing critical gaps in the value chain, including infrastructure, modernization, traceability, production, productivity, post-harvest management, and quality control under the Department of Fisheries. The National Fisheries Policy, 2020 which encompasses development, management, and regulation of inland and marine fishery resources, including aquaculture in marine, freshwater, brackish water and saline/alkaline areas and their post-harvest management, strengthening and modernization of the value chain.

State and Fisheries Sector Development: The Case of Gujarat

Gujarat is a major maritime state in India with a long and rich history of trans-oceanic trade relationships. The coastline of the state is the longest (1600 km) and accounts for 19 percent of the total Indian coastline and 46 percent of the west coast. Two gulfs - the Gulf of Khambhat and the Gulf of Kutch – characterize the coastline [12]. The state has also been a major marine fish producer in India ever since it was reorganized as a separate linguistic state in 1960. Johnson [13] has pointed to the distinct pattern of fisheries development that Gujarat has followed since the 1950s, where the state's active intervention early on in industrializing the sector, a vibrant international market, and indigenous capital and entrepreneurial resources from local fisher communities came together to shape a fast-growing marine fisheries sector.

Gujarat is one of the last maritime states to have enacted the marine fishery regulation focused on the development of the sector. The Gujarat Fisheries Act 2003 provides for the protection, conservation, and development of fisheries as well as regulation of fishing in the inland and territorial waters along the coastline of the state. Under the Act are prohibitions on certain fishing gear, regulations on mesh size, the establishment of closed seasons and areas, demarcations of zones for no-trawling, besides other measures such as the use of turtle excluder devices, and designation of no-fishing areas.

Growth of Fisheries Sector: Major Indicators

As of 2017-18, Gujarat accounts for about 19 percent of the total marine fish production in India and 34 percent of the production on the west coast [14]. A close look at the trend in the state's share in national production reveals a gradual increase (from about 13 percent in 1970-71) to 18 percent in the mid-1980s to about 22-23 percent through the mid-1990s through 2000s, followed by a decline. Of total fisheries production in the state the share of marine fisheries has declined since the mid-2000s from 95 percent to about 86 percent in 2017-18. In comparison, during this period the share of inland fisheries increased – from about 6 percent to 14 percent [15]. It needs to be noted that 760 aquaculture farms were registered by the Coastal Aquaculture Authority of India between December 2005 and March 2016 covering 3450 ha farm area and 2461 ha water spread area [16].

As per the Marine Fisheries Census (MFC) 2016, the fisher population in the state is 3.55 lakh, up from 3.36 lakh estimated in the previous round conducted in 2010 (CMFR, 2010 and 2018). Traditional fisherfolk makes up as high as 96 percent of the total fisher population. The percentage of officially designated poor (below the poverty line) among the fisher households appears to have increased from 25.4 percent to 28.3 percent between the two census rounds. As per the available *Handbook of Fisheries* estimates [17], about 43 per cent of the fish workers are engaged full-time in fisheries-related activities. Women constitute 35 percent of all workers, though the status of engagement is unspecified for two-thirds of them.

The state accounts for about a fifth of all marine fish production in India [18]. During the 2010s, the annual average volume of production was estimated to be around 695,000 tonnes. The available estimates show that about half of this amount is converted to dried items

[19]. The state accounts for 89 percent of unsalted and 69 percent of salted or smoked dried fish in the country. Only 30 percent of the marine fish produced in the state is sold fresh. Frozen fish makes up about 20 percent. It is important to note that fish consumption within the state is extremely low. As per the National Family Health Survey (NFHS) reports three-fourths of adult women and two-thirds of adult men in the state have never eaten fish [20]. The widespread practice of vegetarianism, especially among the economically and politically dominant caste elites, has remained a major constraint to expanding retail markets even in large cities like Ahmedabad where consumption of fish is prevalent among the sizeable migrant population hailing from southern and eastern states [21].

On the other hand, Gujarat's contribution to exports of fish is very significant [22]. About 22 percent of the fisheries exports from the country in 2019-20 moved through the ports in the state. Pipavav port in Amreli alone handled more than 90 percent of the state's seafood exports and about 22 percent of the total marine exports from the country [23]. The rest is handled by ports like Mundra and Hazira. In value terms, Gujarat's share in exports has remained in the range of 10-11 percent since 2012-13. The value share was somewhat higher, around 16 percent between 2006-07 and 2011-12 (Table 1). A comparison of volume and value of fisheries exports through Pipavav and Vizag suggests that relatively low-value processed fish dominates Gujarat's exports. Over the second half of the 2010s, with about a 21 percent share in volume of export, the state accounted for about 11 percent of the value generated. As against this, the port of Vizag in Andhra Pradesh cornered about 25 percent of export value generated, while accounting for just about 11 percent of quantity exported. The processing activity in Andhra Pradesh is almost entirely organized around frozen shrimp and prawn, the highest value item among all fisheries items exported from India over the years. In contrast, Gujarat's exports mostly comprise low-valued dried items.

Governance

The Office of the Commissioner of Fisheries, located within the Department of Agriculture, Farmers' Welfare, and Cooperation of the government of Gujarat is the nodal department for the regulation and development of fishing activities in the state. The Department regulates the registration of fishing boats (as per Merchant Shipping Act, 1958) and granting of fishing licenses (as per Gujarat Fisheries Act, 2003). It implements various schemes and programmes as well as undertaking the development of infrastructure and other facilities like fishing ports and landing centres. The Department works through a network of regional and divisional offices.

The state government implements various need-based programmes like assistance to the fishing vessels for purchasing electrical equipment, lifesaving equipment, Distress Alert Transmission (DAT), fishing nets, insulated boxes, solar lights, assistance for fish marketing to women, assistance to artisanal fishers, and training to the fishers and extension services. Fish landing centers are also upgraded by the state government. The financial resources for various schemes for fisheries development are allocated through the state budget under the Department of Agriculture and Cooperation.

The Gujarat Fisheries Central Co-operative Association Limited (GFCCA), the apex body of the fishermen cooperatives in the state, is the main agency that implements the fishery development projects in the state and the chief conduit for the flow of governmental and institutional assistance to the fisherfolk. Set up in 1956 with 90 percent shareholding by the state government, GFCCA is mandated to improve the socio-economic condition of the fisher community in the state. As of 2018-19, the association has 308 primary societies and 2952 individuals as its members, apart from the state government (GFCCA Annual Report 2018-19).

Major Development Schemes of the Central Government

Fisheries development being a state subject, the provincial government plays a pivotal role in ensuring effective translation of the national and regional development goals related to the sector. Even in the case of 100 percent centrally sponsored schemes, the implementing agency is the state government. As mentioned earlier in the paper, until 2017 the development policies for the fisheries sector were formulated under Five Year Plans and financed through both budgetary and plan allocations. With the closure of Planning Commission and the central planning mechanism, the central funding is limited to budgetary allocation under the union budget. We also mentioned in the previous sections that all centrally funded schemes are now integrated under the Blue Revolution umbrella. This being a demand-driven scheme, it is the responsibility of the state government to develop detailed project proposals to be submitted to NFDB, while ensuring financial resources to match the central assistance as per the norms of the scheme.

All the central schemes are administered through the nodal agency of NFDB. The schemes are broadly grouped into production, infrastructure, and welfare and others. Under these schemes, it finances a variety of projects in a demand-driven model. Up to 2014-15, separate budget allocations were made for different sectors of fisheries like marine and inland and NFDB. Since 2015-16 after such schemes have been integrated within Blue Revolution, NFDB's major activity is implementing BR (not clear whether it also finances private individuals). Most part of the budget is hence allocated to BR, with NFDB getting a smaller allocation – 90 percent of the funds were allocated to BR in 2016-17, 76 percent in 2017-18.

Gujarat state has consistently lagged behind other maritime states in terms of mobilizing central finances available for the fisheries sector (including inland fishing). (There is no data readily available on state share in funds released for Gujarat). Between 2008-09 and 2014-15, Gujarat submitted 18 proposals, of which 14 got accepted. In comparison, Andhra Pradesh and Kerala submitted 283 and 138 proposals respectively and received financial sanctions for the majority of them (85 percent in the case of Andhra Pradesh and 83 percent for Kerala).

We have presented in Table 3 the comparative picture of the states on the western coast of India with respect to the share in central funds released for fisheries development between 2010-11 and 2017-18. Gujarat's share is less than two percent, while Kerala received 8 percent. Much of the funds received were used for developing infrastructures like fishing harbours and landing centres. The emphasis laid by the state on infrastructure is clear from Table 4, which shows that more than 90 percent of finances released by NFDB since inception was meant for developing such facilities. Table 5 is a further corroboration of the relative inaction on the part of the state in resource mobilization for fisheries sector development. In 2017-18 the state submitted a smaller number of proposals under BR scheme and received a third fewer funds compared to Karnataka, Kerala and Maharashtra. The share of the state in total funds released under Blue Revolution scheme between 2015-16 and 2017-18 is the least among all the western coastal states – 1.06 percent compared to 6.98 percent in the case of Kerala and 6.76 percent by Karnataka. The other problem is the low utilization of received funds [24] (Table 6).

Table 3: Share in Central Funds Released for Fisheries Development by State in West Coast of India

	State	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2010-11 to 2017-18
1	Andhra Pradesh	1.08	0.00	3.70	5.29	2.95	1.86	4.47	5.11	3.17
2	Goa	0.34	0.85	0.22	1.81	0.79	0.17	2.36	0.63	0.92
3	Gujarat	1.71	4.21	1.67	0.87	0.71	1.18	0.91	3.61	1.84
4	Karnataka	4.25	4.05	6.76	4.82	3.96	5.64	6.77	7.86	5.64
5	Kerala	7.24	5.01	14.63	12.31	8.74	16.11	3.06	1.92	8.42
6	Maharashtra	2.46	0.05	8.85	8.32	3.66	3.03	4.84	5.34	4.55
	All states	45.89	44.72	75.88	77.15	62.87	66.54	90.60	76.18	68.82

Table 4: Amount Sanctioned and Released to Gujarat by NFDB by Component since Inception. Source: <http://nfdb.gov.in/>

Year	Activity	Sanctioned (Rs. lakh)	Released (Rs. Lakh)
2006-07	-	-	-
2007-08	Sea weed cultivation	0.70	-
2008-09	-	-	-
2009-10	-	-	-
2010-11	Domestic marketing	139.53	69.77
	Infrastructure of fish harbour and landing centres	-	776
	Other activities	0.46	0.46
2011-12	HRD	0.79	0.79
	Infrastructure of fish harbour and landing centres	1693.43	-
2012-13	Sea weed cultivation	2.02	2.02
	Infrastructure of fish harbour and landing centres	985.03	246.23
	Other activities	6.54	6.54
2013-14	-	-	-
2014-15	Other activities	1.00	1.00
2015-16	Coastal aqua culture	0.35	0.35
2016-17	Infrastructure of fish harbour and landing centres	1212.36	-
2017-18	HRD	12.68	12.68

Table 5: Number of Projects, Estimated Cost and Central Share Released for West Coast States under Blue Revolution: 2017-18. Source: NFDB (2018).

State	No. of projects proposed	Nature of projects	Estimated cost	Central Share released	Utilization (%)	Completion (%)
Goa	18	Insulated trucks, auto rickshaw/motor cycle with ice-box, FRP boats, dredging of harbours landing sites	1800.02	900.1	52.5	3.1
Gujarat	9	Hatcheries, feed mills, craft and gear, pond construction, sea weed cultivation, welfare of fishers	1897.5	948.75	45.6	64.9
Karnataka	22	Construction/renovation of ponds, fish seed rearing units, FRP boats, motorisation of traditional craft and gear	2726.5	1370.75	44.9	45.5
Kerala	7	Construction/renovation of ponds, cage culture in open seas and brackish water, welfare of fishers (housing)	2540.8	1298.1	60.8	68.5
Maharashtra	21	Insulated icebox, ice plants, dredging of harbour and landing centres, construction/renovation of ponds, hatcheries, see mills, cage in reservoirs, welfare projects	2941.86	1470.3	13.8	0.02

Table 6: Share in Central Funds Released for Fisheries Development by State in the West Coast of India. Source: Department of Fisheries (2019).

	State	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2010-11 to 2017-18
1	Andhra Pradesh	1.08	0.00	3.70	5.29	2.95	1.86	4.47	5.11	3.17
2	Goa	0.34	0.85	0.22	1.81	0.79	0.17	2.36	0.63	0.92
3	Gujarat	1.71	4.21	1.67	0.87	0.71	1.18	0.91	3.61	1.84
4	Karnataka	4.25	4.05	6.76	4.82	3.96	5.64	6.77	7.86	5.64
5	Kerala	7.24	5.01	14.63	12.31	8.74	16.11	3.06	1.92	8.42
6	Maharashtra	2.46	0.05	8.85	8.32	3.66	3.03	4.84	5.34	4.55
	All states	45.89	44.72	75.88	77.15	62.87	66.54	90.60	76.18	68.82

State Schemes

The Department has designed several schemes with 100 percent financing by the state. The finances are made available every year by the state government against scheme-wise proposals submitted by the Department. Most of the exclusively state-sponsored schemes under the fisheries sector focus on providing subsidized financial assistance or tax subsidies to purchase safety equipment/high-end technical equipment/fuel as also to help investment in assets needed for post-production processing activities (processing plant, cold storage, ice plant, solar dryers). A few schemes focus on the provision of social security benefits to fisher communities (Table 7).

Table 7: Select Schemes Implemented by the State Government for Fisheries Development. Source: Development Programme 2019-20, GoG

Funded Exclusively by GoG		Funded Partially by GoI
1	Fish seed production and inland fisheries resources (in nontribal area)	Blue Revolution integrated development and management of fisheries (Partially Centrally sponsored) Scheme (60:40)
2	Establishment of coastal aquaculture units	Safety of fishermen at sea (40:60)
3	Providing navigational aids and other infrastructural Facilities	Mechanisation of fishing crafts (50:50)
4	Strengthening of publicity and extension programme	Construction of docks, berths and jetties (50:50)
5	Accident insurance scheme of fishermen member of co-operative societies	Welfare Scheme for Fishermen Co-Operative Societies (housing, sanitation etc.) (50:50)
6	Sales tax subsidy on high speed diesel to mechanised fishing vessels below 20 meters length	
7	Kerosene subsidy to OBM boat owners Fishermen	
8	Providing Infrastructures at minor ports	
9	Subsidy to scheduled castes for fisheries	
10	Development of Inland fisheries in tribal areas	

After reviewing the targets and achievements of six schemes in the marine fisheries Sector during 2012-13 to 2016-17, the CAG has taken note of the wide variation in performance among six selected schemes in its 2018 report (Government of Gujarat, 2018). For instance, many of the sub-schemes that target fishing operation reveal good performance thanks to higher levels of demand (for instance, solar light with achievement more than four times the target), whereas serious underachievement is visible in sub-schemes that mainly target processing activities (solar drier, for example). Achievement has also been lacking in schemes that are overtly pro-poor (women SHGs, for instance).

The share of revenue expenditure on the fisheries sector as a proportion of overall expenditure in the agricultural sector improved between 2011-12 and 2014-15 but has remained more or less the same in the Blue Revolution phase (since 2015-16). Some increase in the share was indicated in the 2019-20 budget of the state (Table 8).

Table 8: Gujarat State's Revenue Expenditure on Fisheries Sector. Source: Budget Statements, various years.

Year	State's Revenue Expenditure on Fisheries (Rs. Lakhs)	Annual Growth rate	Percentage Share in Agriculture Expenditure
2011 - 2012	5353	-10.17	1.84
2012 - 2013	9522	77.88	2.45
2013 - 2014	15210	59.74	3.84
2014 - 2015	20152	32.49	4.95
2015 - 2016	16509	-18.08	3.83
2016 - 2017	16816	1.86	3.34
2017 - 2018	28801	71.27	3.69
2018 - 2019	35739	24.09	4.01
2019 - 2020	36519	2.18	4.97

Conclusion

There indeed is a paradox in that though Gujarat is a major producer and exporter of marine fisheries in India, it mobilizes far fewer resources available with the central pool. Budgetary transfers from the state government have also not significantly helped the processing end of the fisheries' value chains. How are the much-needed investments in the sector funded then? Predominantly by private investments, it appears. A recent study observed that the capital formation in the fishery sector is almost exclusively by the private sector, and the public sector's contribution is virtually nil [25]. The implications of this for the poorer producers and processors in the value chains need serious analysis.

The fisheries sector of Gujarat has long been suffering from other structural problems too. The impact of overfishing due to the increase in numbers of shrimp trawlers on catch composition was noted even in the 1980s [26]. Expansion of mechanized fishing and emphasis on export-oriented production in later years have further deteriorated marine resources [27]. Coastal industrialization and the development of port infrastructure have been central to the state's growth strategy for over two decades now. As per some estimates, there is a port every 24.3 km in Gujarat [28]. However, the lack of fish landing facilities is still a major issue. As per the government's own estimate, the five fishing harbours and 18 fish landing centres (FLCs) now available provides berthing space for only 12 percent of mechanized fishing boats (24,720) operating within the state [29]. Many enquiries have identified the development of mega industrial projects in sectors like oil/ petroleum refineries, cement, fertilizer, salt pans, mining of bauxite, limestone, dredging, shipping, and related activities along the Gujarat coast as a major cause for marine environment [30]. These industries have flourished in Kutch and

Saurashtra after 2001 thanks to liberal policies of the state government.

An important policy initiative taken by the state government that can positively impact Gujarat's fisheries industry is the framing of a policy for agro-business development (the Comprehensive Agro-Business Policy - 2016-21) and the Chief Minister's Mission on Food Processing. The AB policy has defined what the term food processing means and designates the sectors and activities that would be encouraged to set up units. Fisheries is included as a major sector with a high potential for growth. The CMFP mission underscores the importance of food and nutritional security and food safety and promises to add capacities to the system through capital infusion, technology transfer, skill upgradation as also enhance employment opportunities on a wider scale. This is an opportune moment to get some of the long-neglected concerns of small-scale producers engaged in low-end processing of fish, including curing/drying included in the state's agenda.

Appendix

Table 1: Administrative Oversight Framework of Marine Capture Fisheries. List of Ministries and Departments at the Central and State Levels and their spheres of involvement in the administration of marine habitat and marine capture fisheries. Source: Adapted from Morgan (2004).

Sphere of involvement	Agency/Ministry/Department
Deep Sea fishing (Union List)· Survey & assessment of fisheries resources· Research· Training & extension· Aquaculture development	Ministry of Fisheries, Animal Husbandry and Dairying/ Department of Fisheries
Monitoring of fishing by foreign vessels (Union List)· Prevention of marine pollution by ships· Protection of endangered species (Wildlife Protection Act, 1972)	Ministry of Defence /Coast Guard
Fish processing· Processing units	Ministry of Food Processing
Seafood exports (Union List)· Quality control	Ministry of Commerce & Industry / Marine Products Export Development Authority (MPEDA) Export Inspection Council (EIC)
Law of the Sea negotiations (Union List)	Ministry of External Affairs
Potential fishing zones· Monitoring ocean pollution	Ministry of Earth Sciences (MoES)
Fishing vessel industry (Union List)· Major fishing ports (Union List)· Minor fishing ports (State List)	Ministry of Shipping
Aquaculture in territorial waters (State List)· Fisheries in territorial waters (State List)	State Government /Department (Commissionerate) of Fisheries
Protection of marine biodiversity (Concurrent List)· Protection of coastal habitats (Concurrent List)· Focal point for Ramsar, CITES, CMS & CBD Conventions (Concurrent List)	Ministry of Environment and Forests (MoEF)

Appendix Table 1: Trend in Marine and Inland Fish Production in Gujarat: 2000-01 to 2017-18. Source: Government of India (2009).

Year	Production (lakh tonnes)			% to total	
	Marine	Inland	Total	Marine	Inland
2000-01	620.47	40.27	660.74	93.91	6.09
2001-02	650.83	50.77	701.60	92.76	7.24
2002-03	743.64	33.96	777.60	95.63	4.37
2003-04	609.14	45.48	654.62	93.05	6.95
2004-05	584.78	50.43	635.21	92.06	7.94
2005-06	663.88	69.94	733.82	90.47	9.53
2006-07	670.51	76.82	747.33	89.72	10.28
2007-08	644.53	77.38	721.91	89.28	10.72
2008-09	623.05	142.85	765.90	81.35	18.65
2009-10	687.44	84.08	771.52	89.10	10.90
2010-11	688.93	85.97	774.90	88.91	11.09
2011-12	692.49	91.23	783.72	88.36	11.64
2012-13	693.56	94.93	788.49	87.96	12.04
2013-14	696.00	102.49	798.49	87.16	12.84
2014-15	698.00	111.93	809.93	86.18	13.82
2015-16	697.00	112.56	809.56	86.10	13.90
2016-17	699.00	113.10	812.10	86.07	13.93
2017-18	701.00	125.74	826.74	84.79	15.21

Appendix Table 2: Marine Seafood Exports: Comparison of Vizag (Andhra Pradesh) and Pipavav (Gujarat). Source: https://mpeda.gov.in/MPEDA/marine_products_exports.php#

Port	Vizag		Pipavav, Gujarat		Total Exports		% share of Vizag		% share of Pipavav	
	Quantity in ton	Value (US\$ Million)	Quantity in ton	Value (US\$ Million)	Quantity in ton	Value (US\$ Million)	Quantity	Value	Quantity	Value
1999-00	23721	211	3371	5	343031	1416	6.92	17.72	0.98	0.38
2000-01	23049	214	52219	54	440473	1253	5.23	15.10	11.86	3.80
2001-02	22154	162	78097	75	424470	1425	5.22	12.96	18.40	6.00
2002-03	25571	183	99070	110	467297	1331	5.47	12.88	21.20	7.67
2003-04	24284	166	89628	104	412017	1478	5.89	12.54	21.75	7.84
2004-05	32028	229	109597	141	512164	1644	6.25	15.48	21.40	9.47
2005-06	37121	253	115101	175	612641	1853	6.06	15.39	18.79	10.72
2006-07	36594	279	178751	259	541701	1899	6.76	15.12	33.00	13.89
2007-08	35535	254	149734	269	602835	1909	5.89	13.37	24.84	14.11
2008-09	32277	200	163866	308	678436	2133	4.76	10.43	24.15	16.36
2009-10	31863	199	182052	361	813091	2857	3.92	9.39	22.39	16.66
2010-11	38217	286	197478	452	862021	3508	4.43	10.08	22.91	15.70
2011-12	62215	565	219801	564	928215	3512	6.70	15.98	23.68	16.33
2012-13	78542	621	233738	526	928215	3512	8.46	17.74	25.18	14.89
2013-14	102146	1131	248621	596	983756	5008	10.38	22.59	25.27	11.93
2014-15	115672	1252	243640	588	1051243	5511	11.00	22.66	23.18	10.73
2015-16	128718	1106	204799	525	945892	4688	13.61	23.54	21.65	11.27
2016-17	159973	1402	232391	630	1134948	5778	14.10	24.54	20.48	11.14
2017-18	200779	1797	306181	761	1377244	7082	14.58	25.37	22.23	10.81

2018-19	221374	1726	293835	693	1392559	6729	15.90	25.57	21.10	10.40
2019-20	241783	1880	257402	650	1289651	6679	18.75	28.16	19.96	9.76
2012-13	78542	621	233738	526	928215	3512	8.46	17.74	25.18	14.89
2013-14	102146	1131	248621	596	983756	5008	10.38	22.59	25.27	11.93
2014-15	115672	1252	243640	588	1051243	5511	11.00	22.66	23.18	10.73

Appendix Table 3: Quantity and Value of Marine Seafood Exports from India by Item.
Source: https://mpeda.gov.in/MPEDA/marine_products_exports.php

Year	Dried items				Frozen items				Frozen shrimp	
	Qty (ton)	Value (\$ Mil-lion)	Qty - % share	Value -% share	Qty (ton)	Value (\$ Mil-lion)	Qty - % share	Value -% share	% share- Qty in all frozen items	% share- Value in all frozen items
1995-96	7506	14	2.5	1.3	274687	1051	92.7	94.5	34.8	71.2
1996-97	9893	12	2.6	1.0	351134	1091	92.8	94.7	30.0	69.2
1997-98	5840	10	1.5	0.7	361700	1231	93.7	95.0	28.0	70.4
1998-99	6320	10	2.1	0.9	277883	1047	91.7	94.7	36.9	76.3
1999-00	6853	10	2.0	0.9	309296	1106	90.2	93.1	35.7	76.5
2000-01	7532	15	1.7	1.1	396082	1312	89.9	92.6	28.2	75.1
2001-02	8307	14	2.0	1.1	373043	1149	87.9	91.7	34.2	75.8
2002-03	8178	17	1.8	1.2	410356	1294	87.8	90.8	32.9	73.7
2003-04	12574	32	3.1	2.4	345233	1188	83.8	89.3	37.6	73.8
2004-05	9692	27	2.1	1.8	390137	1319	84.6	89.2	35.4	71.2
2005-06	14167	30	2.8	1.8	429527	1451	83.9	88.3	33.8	66.9
2006-07	24293	41	4.0	2.2	511101	1622	83.4	87.5	26.9	61.5
2007-08	22414	65	4.1	3.4	436550	1594	80.6	83.9	31.2	61.5
2008-09	31688	93	5.3	4.8	472458	1526	78.4	79.9	26.7	55.0
2009-10	47053	209	6.9	9.8	516481	1642	76.1	77.0	25.3	53.8
2010-11	79059	212	9.7	7.4	610561	2314	75.1	81.0	24.8	54.5
2011-12	53721	118	6.2	3.4	668287	2970	77.5	84.7	28.3	58.6
2012-13	72953	153	7.9	4.4	711179	2929	76.6	83.4	32.1	61.6
2013-14	67901	168	6.9	3.4	781808	4432	79.5	88.5	38.6	72.4
2014-	70544	166	6.7	3.0	818861	4840	77.9	87.8	43.7	76.6

15										
2015-16	43320	112	4.6	2.4	749980	4124	79.3	88.0	49.9	75.1
2016-17	61071	200	5.4	3.5	893916	5080	78.8	87.9	48.6	73.4
2017-18	88997	164	6.5	2.3	1089200	6336	79.1	89.5	52.0	76.5
2018-19	95296	190	6.8	2.8	1114389	5952	80.0	88.5	55.1	77.5
2019-20	84417	141	6.5	2.1	1034108	6003	80.2	89.9	63.1	81.4
2020-21	85661	157	7.5	2.6	898873	5324	78.2	89.4	65.7	83.1

Notes

1. ↑ Territorial waters or territorial sea is the area of the sea which goes up to a maximum of 12 nautical miles from an appropriate baseline of a coastal state.
2. ↑ Sinha, Anrose, and Pratyush Das, “Indian Deep Sea Fisheries- Its Prospects, Issues and Challenges”
3. ↑ Chapter 23, ‘Fisheries’, The First Five Year Plan, <http://164.100.161.239/plans/planrel/fiveyr/index1.html>
4. ↑ The other legislations passed during this phase are the Territorial Waters, Continental Shelf, Exclusive Economic Zone and other Maritime Zones Act (1976) and the Maritime Zones of India (Regulation of Fishing by Foreign Vessels) Act of 1981. The former recognizes the sovereign rights to conservation and management, exploration and exploitation of living resources in the Indian EEZ and empowers the central government to legislate for these. See, Morgan (2004).
5. ↑ Johnson, “Wealth and Waste: Contrasting Legacies of Fisheries Development in Gujarat since 1950s”
6. ↑ Ayyappan and Diwan, “National Fisheries Development Board and Fisheries Policy”
7. ↑ <http://nfdb.gov.in/PDF/Blue%20Revolution%20-%20An%20Overview.pdf>
8. ↑ Department of Animal Husbandry, Dairying & Fisheries (DAHFD), “Centrally Sponsored Scheme on Blue Revolution: Integrated Development and Management of Fisheries”
9. ↑ <http://nfdb.gov.in/PDF/Draft%20National%20Policy%20on%20Mariculture%20NFDB%20%20CM-FRI%2028%20Sept.2018.pdf>
10. ↑ Department of Fisheries, “Fisheries and Aquaculture Infrastructure Development Fund (FIDF)”

11. ↑ Government of India, “Economic Survey 2018-19 - Volume 2”
12. ↑ Sharma, Swain, and Kalamkar, “Evaluation and Assessment of Economic Losses on Account of Inadequate Post Harvest Infrastructure Facilities for Fisheries Sector in Gujarat Stat. Vallbh Vidya”
13. ↑ Johnson, “Wealth and Waste: Contrasting Legacies of Fisheries Development in Gujarat since 1950s”
14. ↑ It must be noted that availability of reliable data has long remained a very critical problem with the fisheries sector. There are serious inconsistencies in the data provided by multiple sources. “As regards marine fisheries statistics, the sample methodology in use is considered to be satisfactory. There is, however, a need for periodic review of sample size, stratification, and intensity of data collection in view of the changes in the pattern of fish landings. There are also problems in the flow of data from States and consequently much delay in the compilation of all-India statistics. As far as the deep-sea sector is concerned, though only a small number of licensed vessels are in operation, the data on fish catch do not flow in a regular manner”. <http://mospi.nic.in/416-fisheries-statistics>
15. ↑ Inland fisheries in India is classified into freshwater aquaculture, including the pond culture of carp; brackish water aquaculture, involving mostly shrimp culture; and capture fisheries in rivers, estuaries, lakes, reservoirs, etc. See, Sugunan (1997).
16. ↑ Coastal Aquaculture Authority of India, “Coastal Aquaculture Authority Annual Report 2015-2016”
17. ↑ Department of Fisheries, “Handbook on Fisheries Statistics 2018”
18. ↑ Government of India, “Economic Survey 2018-19 - Volume 2”
19. ↑ Government of India, “Economic Survey 2018-19 - Volume 2”
20. ↑ International Institute for Population Sciences (IIPS) and Macro International, “National Family Health Survey (NFHS-

- 3), India, 2005-06”; International Institute for Population Sciences (IIPS) and Macro International, “National Family Health Survey (NFHS-4), India, 2015-16”
21. ↑ Das, “Gujarat yet to Tap Its Full Marine Products Export Potential”
 22. ↑ It may be noted that Gujarat’s share in India's aggregate exports is about 20 percent. The state accounts for about 40 per cent of all cargo and more than 71 per cent cargo handled by non-major ports of the country. However, earnings from fisheries exports still remains below one percent of the state’s GDP. See, Government of Gujarat, 2018.
 23. ↑ https://www.mpeda.gov.in/MPEDA/marine_products_exports.php#
 24. ↑ The CAG Report pertaining to the performance of the fisheries sector during 2012-17 states: “The infrastructure projects for upgradation of Fish Landing Centres and Fisheries Terminal Division financed by National Fisheries Development Board have been delayed due to slow pace of execution. The Department failed to carry out works for construction of nine new harbours as envisaged in the 12th Five Year Plan thereby depriving better facilities to the fishermen and fishing Community” (p.5).
 25. ↑ Suresha and Shinoj, “Capital Formation in Fisheries Sector in India: Trends, Compositional Changes and Potential Implications for Sustainable Development”
 26. ↑ Bostock, “Marine Fisheries of Gujarat”
 27. ↑ Research Collective, “Where Have the Fish Gone?”
 28. ↑ Research Collective, “Where Have the Fish Gone?”
 29. ↑ <http://timesofindia.indiatimes.com/articleshow/74057823.cms>
 30. ↑ Magotra et al., “Review of Status of Marine National Park, Jamnagar & Evolving Vision Statement for Management of

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