

National Fisheries Policy, 2020

1.0 Introduction

Intertwined in mythology, culture and the social fabric, Indian fisheries are set in a unique and diverse array of geographies, ranging from the mighty Himalayas in the north to the Oceans that surround the peninsular half of the country. Unparalleled in the global fisheries scenario, the astounding fisheries biodiversity of the country includes a vivid spectrum of fin and shellfishes and aquatic plants that provide livelihoods to millions of people directly and many more millions in the ancillary and supporting activities.

Growing in leaps and bounds from the time when the sector was brought under planned development in the early fifties, India's total fish production now stands at 13.76 million metric tonnes (2018-19), making it the third-largest producer of fish in the world after China and Indonesia. With the marine sector maintaining a steady trajectory of moving towards its estimated potential of 5.31 million metric tons (mmt), it's the aquaculture production that has exhibited phenomenal growth in the last three decades, placing India as the second highest producer of farmed fish in the world.

Providing livelihoods to an estimated 28 million fishers and fish farmers, which is about 2.04 percent of the national population, the sector offers immense opportunities for employment generation, especially for youth and women, and for meeting the food and nutritional security and foreign exchange earnings. During 2018-19, the sector's Gross Value Added (GVA) was Rs 2,12,915 crores at current prices, which was about 1.12 percent of the national GDP and 7.28 percent of the GVA from the agriculture and allied sector. During the same period, the sector has earned foreign exchange worth Rs. 46,589 crores by exporting 13.92 lakh tonnes of marine products. Overall, from 2014-15 to 2018-19, the sector has registered an average annual growth of 10.87 percent which is higher than the growth of the national economy (7.16%) at constant (2011-12) prices.

India's fisheries sector provides enormous potential in extending its reach to hitherto un/underexploited resources in both marine and inland waters; sizeable hikes in production and productivity from aquaculture; productive integration with other farming sectors such as agriculture, horticulture, poultry, and livestock; expansion of non-food fisheries such as ornamental; and in enhancing the availability of nutritious fish protein rich in omega-3 fatty acids to the nation's growing population. On the environmental front, pond, tanks and floodplains can play a very important role in harvesting and holding rainwater and in the process serving as a valuable ameliorating agent for the re-charging of groundwater.

With the growing population of the country and the increasing requirements for fish protein, the need for sustainable development of the resources is now felt much more than ever before. To match such demands and ensuring a growth trajectory that fulfils the requirements of today and leaves an equally better fishery for tomorrow, it is necessary for the country to develop a sound National Fisheries Policy framework. The Policy will provide the blueprint to optimally harness the capture and culture fishery resources that would help in sustaining the desired production and productivity levels. It is also expected that this policy framework will guide similar initiatives at the State and Union Territory-levels in the coming period.

Accepting the fact that the fisheries resources are set in diverse ecosystems that determine the health and the integrity of the resources and the plant and animal wealth contained in it, the NFP will adopt a mountain to sea-scape approach. This will ensure that the sector

receives minimum adverse impacts from external sources and in the process creates minimum adverse impacts on the environment. Within the framework of 'Blue Economy', the NFP will also ensure a productive integration with the other economic sectors, such as agriculture, livestock, water resources, hydro-electric power, energy, forestry and environment, eco-tourism, rural development, shipping, etc. to meet the goals of the 'Blue Economy'.

The NFP will lay adequate emphasis on reducing the vulnerability of fishing communities from the ever-increasing impacts of climate change mediated global warming, extreme natural events such as cyclones and tsunamis, floods and droughts, and any other unprecedented situation such as the COVID-19 pandemic, ensuring that the communities' resilience is built to offset such threats.

The NFP will also take into account the fact that fisheries are gradually moving into a globalized environment that involves trade, sharing of water basins, inter-Exclusive Economic Zone (EEZ) movement of migratory fish species, trans-boundary movement of live aquatic animals, curbing of Illegal, Unreported and Unregulated fishing, and finally India's commitments to international instruments of both binding and non-binding nature.

Similarly, the regional dimensions will also be adequately reflected in the NFP to ensure cooperative arrangements in the trans-boundary management of shared fisheries ecosystems and the resources contained in them and in the interest of their long-term sustainability.

Finally, drawing inspiration from the fact that the Government has created a separate Ministry for the fisheries sector, the policy will mirror the national aspirations and the developmental goals set by the country's leadership, to ensure that fisheries become an equal partner with the other developmental sectors in making India a USD 5.0 trillion economy by the year 2025.

2.0 Preamble

Based on the cardinal principles of the Constitution, and adopting a people-centric and participatory approach, the National Fisheries Policy will aim at furthering equity and equality, ensuring sustainability, mainstreaming gender and enhancing its role, fostering inclusive development, promoting self-reliance and entrepreneurship, building partnerships, maintaining intergenerational equity, following the principle of subsidiarity, and charting a road-map for the fisheries sector for the coming one decade.

3.0 Vision

“A healthy and vibrant fisheries sector that meets the needs of the present and future generations.”

4.0 Mission

“While keeping the sustainability of the resources at the core of all actions, the National Fisheries Policy will meet the social and economic goals and well-being of the fishers and fish farmers and is intended to guide the coordination and management of the fisheries sector in the country during the next ten years.”

5.0 Objectives

The objective of the National Fisheries Policy is to secure the overall development of capture fisheries and aquaculture in the country. While the fishers and fish farmers will be at the core of the Policy, the intent will be to ensure sound management and sustainable development of the resources and associated habitats, maintaining the ecosystem integrity, meeting the food and nutritional security of the growing population, protecting the rights of the fishing and farming communities and building their resilience, making Indian fish and fish products globally competitive, and supporting India's commitment towards fulfilment of the global agenda on sustainable and wise-use of the fisheries resources.

6.0 Strategy

The National Fisheries Policy (NFP) encompasses the entire land and the EEZ of the country and is set in a time-frame of ten years (2021-2030). The broad parameters of the strategy are outlined under 10 sections (6.1-6.10) in the following narrative.

6.2 Inland Fisheries

The inland capture fisheries resources are as vast and varied as the marine fisheries resources and their importance as a source of livelihoods, food, and nutrition for the population has been no less than their marine counterpart. The riparian communities along the major river systems of India have been as old and traditional as the marine fishers, although with the changing scenario in the inland sector, their migration to other sources of livelihoods is more prominent than any other food production sector.

The inland capture fisheries resources include a riverine length of 2,01,496 km (including the tributaries, and irrigational canals), 3.52 million ha of small and large reservoirs and 1.2 million ha of floodplains, etc. The total area available for the inland fishery is estimated at 8.24 million ha excluding rivers and canals. The total inland fisher population is estimated at approximately 24.29 million.

6.2.1 Managing fisheries in the Indian rivers and their floodplains, natural lakes and wetlands

Rivers, their tributaries and associated floodplain lakes form the prime resource of inland capture fisheries in the country. Since ages, these inland fisheries resources have sustained thriving riparian communities and provided freshwater fishes to a large segment of the population. Until the technology for seed production of Indian Major Carps (IMC; catla, rohu, mrigal) was not perfected, the Major River Systems like the Ganges and the Brahmaputra were the source of fish seed that was raised in ponds and tanks for growing into table-size fishes. These river systems are still the backbone of freshwater aquaculture production in the country as they are the only source of obtaining mature/graavid IMC species for maintaining the vitality of the germplasm.

With the increasing urbanization, industrial development, flood protection and water abstraction for irrigation and power generation, the riverine fisheries have been badly affected. Reduced water flow in the rivers is not only affecting the riverine ecosystem but is also impacting the estuaries and the coastal waters, which need an adequate flow of

freshwater and sediments to retain their ecological integrity. To revive the riverine ecosystem and reverse the decline of fisheries, the prime focus of the NFP will be to ensure that the availability of water flow is conducive to sustain fisheries in the rivers and their tributaries. Second, the Policy will focus on improving the ecological health of the riverine ecosystem and curbing the flow of pollution from point and non-point sources into the rivers and their tributaries. Third, the riverine stretches and the associated floodplains that are proven grounds for breeding and larval growth of IMC species, minor carps, catfishes and a large number of forage fish species and several other key riverine species (mahseer, catfish, etc.) will be protected to ensure that the population of these endemic species is sustained. Any disruption in the riverine environment that hampers the IMC populations, will have major repercussions on the freshwater aquaculture production in the country.

The estuaries, as the transitional zones between the rivers and seas, also offer lucrative fisheries. All the major river systems in the country that flow into the seas have estuarine stretches; in some cases, like those of the Gangetic River system, the estuaries cover very large areas and support thriving fisheries of a large number of fin and shellfishes. The flow of fresh water and tidal influence largely determines the productivity of fish and fisheries of the estuaries. However, with the increase in the coastal settlements and industrialization, estuaries have also become the receptacle of pollution coming from point and non-point sources. Further, with the upstream abstraction of water, the required flow of freshwater into the estuaries has gradually diminished, affecting its unique characteristic and consequent reduction in the production and productivity of fin and shellfishes.

Floodplain lakes, as a continuum of the rivers and their tributaries, have since time immemorial formed vital fisheries resources in the Ganga and the Brahmaputra river basins. They are the lifeline of riverine fisheries. With an estimated area of around 1.2 million ha, these water bodies have not only sustained fisheries for the communities but have also served as a receptacle for the excess riverine flows during the monsoon months. With heavy siltation, loss of connection between several floodplains and their associated rivers, and weed infestation (primarily water hyacinth – *Eichhornia crassipes*), the water retention capacity and productivity of these water bodies have considerably reduced, leading to a decline in the riverine fisheries and also the occurrence of recurrent floods in the river basins. Encroachment has further aggravated the situation. The use of harmful fishing gear and excessive exploitation of the resources by the marginal communities is also rampant and needs regulation. Efforts will be made to restore the link between the rivers and the floodplains and rejuvenate these resources to gainfully utilize their innumerable ecosystem services.

Natural lakes and wetlands form another important fishery resource in the country. From the high altitude lakes and wetlands to the *tals* and *jheels* of the Gangetic plains and the estuarine lakes such as Chilika in Odisha, Pulicat in Tamil Nadu/Andhra Pradesh and Vembanad in Kerala, these water bodies have been providing both animal and plant protein as also various other ecosystem services to the community. The *tals* and *jheels* of the Gangetic basin are the key source plant protein such as *makhana* or fox nut (*Eurayle ferox*) and *singhara* or water caltrops (*Trapa bispinosa*). Estuarine lakes such as Chilika are home to the iconic Gangetic and Irrawaddy dolphins, protected under the Wildlife (Protection) Act, 1972. Upland lakes in the Himalayas also need due attention to harness their fisheries potential that can provide valuable food and nutrition for the communities in such remote areas as also for the defence personnel guarding the country's frontiers.

As inland capture fisheries are subject to heavy external influences, management approaches, which in a broad sense are considered akin to marine fisheries, will be

followed. This *inter alia* will include optimisation of the fleet size and the number of fishing days; review of the leasing policies, updating them where required; recognizing the rights of traditional fishing communities; implementation of the closed season and closed areas (fish sanctuaries) largely for the protection of broodstock of key species used for aquaculture; regulation on fishing gear and methods; habitat restoration including de-encroachment and regulations on minimum water flow in the rivers and their tributaries that will ultimately reach the estuaries; provision of fish passes and ladders where the rivers or their tributaries have dams or barrages; and ensuring adequate flow of seawater into the estuarine lakes through regular dredging of the lake mouth. Such structures/actions will allow for the migratory species to negotiate and reach the breeding or the feeding grounds. Ranching of rivers and other inland water bodies with selected endemic fish species will be resorted to where populations have declined considerably and require stock replenishment/enhancement. Policy interventions, through active engagement with the Central Water Commission and the Central State Pollution Control Boards will aim to restore the pristine condition of these water bodies so that their food and other ecosystem services are available to the population residing in the area and elsewhere in the country. Bearing in mind that the Government intends to link major rivers, policy interventions will ensure that such linkages do not have an adverse impact on the fisheries resources and more importantly on the endemic germplasm that the rivers harbour.

6.2.2 Harnessing the potential of Indian reservoirs

The reservoir resources in the country are huge (>3.0 million ha) and comprise water bodies of large (>5000 ha), medium (1000 – 5000 ha) and small (<100 ha) sizes that can be manipulated to several combinations of stocking and harvesting and can be a valuable source of fish production from the inland waters. India, being a country of continental proportions, its reservoirs are spread over various types of terrains and soil types are exposed to diverse climatic conditions, and they receive drainage from a variety of catchment areas.

However, the present yield levels from the Indian reservoirs are very low and these water bodies need to be put to sound management practices to realise their production potential and contribute to the national fish production targets. The key policy interventions required for fisheries development in the reservoirs would include (i) categorisation of the resources from their productivity and fisheries management point of view (natural recruitment, supplemental stocking and harvesting strategies, etc.); (ii) sound policies for leasing/fishing rights in the water bodies, including setting up of pens and cages for raising of stocking material and table-sized fish; (iii) empowering the reservoir-based communities to manage the fisheries resources and also sustaining their traditional rights in such reservoirs where part or the whole water body falls within the protected or reserved area; (iv) productive utilization through cage/pen fish farming in the extensive network of irrigation canals that carry water from the reservoirs to the agriculture fields; (v) discouraging the use of harmful gear and also unsafe fishing craft using thermocole and plastics; and (vi) establishing forward and backward linkages to support supplemental stocking of the reservoirs where required and provision of post-harvest infrastructure to ensure hygienic handling and quick movement of the catch to the markets.

The key areas for immediate intervention would include:

- *Ensuring the availability of water flow conducive to sustain fisheries in the rivers and their tributaries.*

- *Improving the ecological health of the riverine ecosystem by curbing the flow of pollution from point and non-point sources into the rivers and their tributaries in coordination with relevant agencies.*
- *Protecting the riverine stretches and the associated floodplains to ensure that the population of the endemic species is sustained through setting up of the protected area, time and area closure, and effort management.*
- *Restoring the link between the rivers and the floodplains to rejuvenate these resources and to gainfully utilize their innumerable ecosystem services.*
- *Implementing leasing policies to ensure resources are used as per their productivity and empowering local communities to manage resources.*
- *Providing necessary infrastructure for seed production and stocking.*

6.4 Infrastructure

India started constructing Fishing Harbours (FHs) and Fish Landing Centres (FLCs) since the mid-sixties and over the decades a large number of major and minor FHs and FLCs have been constructed. However, the growing fleet numbers and sizes have outpaced the facilities created so far and it is estimated that the present infrastructure caters to about 25-30 percent of the total fleet size in the country. This situation has brought in congestion at the landing points and delays in offloading the catch as also in re-provisioning of the vessels for subsequent fishing trips. More than this is the lack of facilities in the FHs and FLCs and their poor

maintenance from the hygiene and sanitation point of view. Cumulatively, all these drawbacks result in huge wastage of fish.

Post-harvest starts from the point fish is landed on-board the vessel. The policy, as a matter of urgency, will focus on the entire infrastructure facilities set up so far and their modernization to meet the requirements of the sector. This *per se* will also look into the modalities of ensuring that the boats are maintained in conditions that do not allow contamination or spoilage of fish. Based on a master plan for the entire country's infrastructure requirements, additional facilities wherever required will be created so that the fishing fleet is provided with adequate landing and berthing facilities. The master plan will also take into account all the back-up facilities required for sorting, cleaning, auctioning, and packing and other infrastructure needs such as availability of clean potable water and quality ice. The policy will also consider the modus-operandi for the creation of new infrastructure bearing in mind various options such as through public funding, private or public-private financing and using different delivery and operational mechanisms such as Build-Own-Operate (BOO), Build-Operate-Transfer (BOT) and Build-Own-Operate-Transfer (BOOT).

As the FHs and FLCs are the nerve centre of marine capture fisheries where the forward and backward linkages also converge, it will be the endeavour of the Government to establish a National Fishing Harbour Authority and in the interim period set up an Inter-Ministerial/Department Committee involving the concerned Ministries/Department in the Union Government and coastal states/UTs to oversee the masterplan and the effective management of the infrastructure facilities.

Besides attending to the needs of the existing FHs and FLCs, the policy will also look into the requirements of the infrastructure facilities for the beach landing centres (BLC). The country has approximately 3,400 fishing villages and >90 percent of the villages have traditional and motorised boats operating from the beaches. Many such villages have a large number of boats with hardly any facility to land the fish in hygienic conditions or sheds and anchoring points for net mending or engine repair. Based on a sound survey and assessment of the needs of such BLCs, necessary assistance would be considered.

In the inland sector, infrastructure facilities would be required in terms of fish landing platforms and small auction and packing areas for key landing sites located on the reservoirs, lakes and riverfronts. Such facilities will be more essential for landing sites where the harvested fish has to be transported over longer distances for marketing. In this regard, adequate support will also be made for towards the creation of transport facilities that can allow the harvests to reach their destination in proper condition and with a minimum lag of time.

The key areas for immediate intervention would include:

- *Providing required numbers of modern Fishing Harbours and Fish Landing Centres along with the back-up infrastructure to meet the requirements of the fishing fleet.*
- *Modernizing the existing facilities.*
- *Creating required infrastructure facilities on the reservoirs, lakes and riverfronts to facilitate landing and transportation of fish.*
- *Establishing a National Fishing Harbour Authority*
- *Setting up of an Inter-Ministerial/Department Committee involving the concerned Ministries/Department in the Union Government and States/UTs and other concerned*

stakeholders to oversee the masterplan and the effective management of the infrastructure facilities.

6.5 Post-harvest & Trade

A *food value chain* (FVC) consists of all the stakeholders who participate in the coordinated production and value-adding activities that are needed to make food products. The key attributes of a **sustainable** FVC ensure that it (i) is profitable throughout all of its stages (economic sustainability); (ii) has broad-based benefits for society (social sustainability); and (iii) has a positive or neutral impact on the natural environment (environmental sustainability). Presently, post-harvest losses in both the marine and inland sector are enormous and there is an urgent need to reduce such losses so that additional and safe fish is available to the consumers. To meet these objectives, the policy will be directed at the following actions.

6.5.1 Improving supply chain and value chain

The supply chain is perhaps the weakest link in the entire series of operations in the fisheries sector in India and results in huge losses to the operators as also to the national economy. Improving the supply chain from 'boat to plate' and 'farm to fork' can bring many benefits to fish harvesters, farmers, processors, and finally to the consumers. This one area has remained grossly neglected and needs to be improved significantly to reduce post-harvest losses, provide safe food to people, and improve the economy of the participants in the chain. Improvements in the supply chain would necessitate the following major policy initiatives.

Zero wastage: To reduce fish wastage in terms of physical and quality loss, policy initiatives will be directed towards improvements in the handling and storage of fish in the vessel. The deck is the first point of contact, and if the fish is handled and stored properly the chances of contamination are minimised. The use of clean ice and or provision of Refrigerated Sea Water/Slurry Ice facilities is paramount and it would be ensured that the fishing vessels are provisioned with clean ice and or other such cooling facilities on-board.

Once the catch is landed, policy initiatives will aim at well-developed distribution channels and cold chain arrangements to move the harvest to the consumers in the shortest possible time. It is also important to reduce the number of nodal points in the supply chain and minimize the distribution channels. Establishing a partnership of actors in the value chain is the key to realise the best values for the products. Appropriate revenue structures, which ensure adequate compensation to fishers and farmers and protect their livelihoods, are also necessary to ensure their participation in the value realisation.

With production from marine capture fisheries plateauing and wastage of fish across the supply chain not decreasing, in the coming years, there could be a scarcity of raw material for export. Trade policies including tariffs also significantly shape fish production and international trade. The policy measures required for improving the value chain in the domestic market (as also for exports) would include establishing a well organised supply chain, and making available adequate facilities at the landing sites such as clean water, clean ice and proper storage. For implementing the Hazard Analysis Critical Control Point (HACCP) System based on the recognition that microbiological hazards exist at various points of the supply chain, policy measures will be put in place to control them.

Value addition: Value addition can start as soon as fish is out of water. Proper on-board handling as mentioned earlier can substantially reduce wastage and on-board gilling and gutting and placing the fish in crates with adequate ice further enhances the value. On landing at the FH or the FLC, further value addition can take place by dressing the fish, vacuum packing, etc. and then moving it to the retail markets. As we move up the value addition, values can be enhanced by adding specialised ingredients to increase nutritional value, increasing shelf life and realising the convenience of using fish products. There is also immense scope to develop non-food, pharmaceutical, and nutraceutical products.

Value creation: Certification and labelling schemes and traceability for environmentally and socially responsible production will create new markets and these products can be traded globally. These measures also focus on environmental concerns and strive to achieve sustainability in fisheries. Certification can also offer other benefits to producers in the form of improved or maintained market access, and potentially price improvements. Effective MCS and a 'block chain' approach could boost transparency of the sector by providing means to trace and record the entire fish supply chain, and convince the public, industry and consumers about sustainability, and food safety.

The key areas for immediate intervention would include:

- *Improving distribution channels for moving towards zero wastage.*
- *Encouraging and supporting value chain participants and enhancing their capacities for value addition and value creation.*
- *Promoting eco-labeling of selected fisheries with full engagement of the concerned stakeholders.*

6.5.2 *Developing domestic marketing*

While the country has the most modern processing infrastructure catering to the export market, the same is not the case for domestic marketing. Fish is sold in the most unhygienic manner at the landing sites and or at wholesale/retail markets. Despite substantial assistance being made available by the Government for setting up/improving FHs and FLCs and fish markets, the situation has not improved. This is also one of the reasons for the sale and consumption of fish in India not increasing as compared to neighbouring countries like Bangladesh, Sri Lanka, and Thailand. Unfortunately, there has also been little consumer resistance to buy fish handled in the most unhygienic manner.

Though the slow pace of increase in fish consumption in the country, despite the immense health and nutrition benefits of fish, has been raised from time to time, but the real pinch has been felt since the spread of COVID-19 pandemic. With the closure of export markets, producers have felt the need for developing domestic markets so that the dependence on exports can be reduced. The policy initiatives in this regard, besides the creation of awareness amongst the consumers, would be to further strengthen the domestic supply chain and provide incentives to retail chains to include fish in their product list. Policy initiatives to include fish in mid-day meal provided to schoolchildren will also be made in areas where fish forms a regular part of the diet. Facilities that are extended to the agriculture sector for the concessional movement of their produce will also be provided for the transportation of fish by rail, road or air.

Similarly, policy incentives would also be directed towards the establishment of small processors who would establish a link with the harvesters and with basic value addition market the product directly to the restaurants or other outlets. In this direction, the policy will also aim at strengthening the role of women in small-scale processing and retail marketing by providing them with the necessary support to make them business savvy and play a key role in this segment of marketing.

Finally, the growth of online fish marketing has now created ample opportunities for the supply of processed fish to a large number of consumers profitably. This shortening of the value chain will be remunerative for fishers as they will have an increasing share of the consumer's rupee. The processor can also ensure better value chain governance owing to the direct linkage with the fishers. Over time, if fishers can develop the required skills, they can establish captive value chains with end-to-end connectivity. The policy will support and promote such initiatives.

The key areas for immediate intervention would include:

- *Creating consumer awareness on the benefit of fish consumption and exploring novel ways to popularize fish consumption.*
- *Improving supply chains to facilitate accessibility, affordability and availability of fish.*
- *Promoting product development and new marketing methods such as online marketing.*
- *Supporting close-knitted local producer-processor value chains to reduce the role of middlemen.*

6.5.3 Promoting trade and food safety

India's fish trade remains heavily dependent on shrimps. It comprises about 40 percent of export in quantity terms and 68 percent in value terms. In this scenario, the matter of concern is that during the last 24 years while the value of trade has increased by 13 times and quantity by 5 times, the nature of India's export basket remains the same. For long-term development, it is important that India's export potential is diversified and capture and culture fishery is fully realized. Further, it is also necessary for the Indian processing sector to move to higher-order value addition, keeping in view the requirements of key markets.

In terms of markets, during the said period, India has consolidated on the US market but has not been so successful in the EU market. India has also been successful in opening new markets in China, the Middle East, and Southeast Asia. A competitive diversified offering will help India in further consolidating its position in these markets.

However, global trade is becoming increasingly subjected to different barriers and filters. Especially, the high-value markets of US, EU and Japan are subjected to increasing constraints, largely on account of safety and hygiene and biodiversity conservation (*e.g.* protection to turtles and mammals). Therefore, policy interventions will focus on quality control and maintaining traceability throughout the supply chain for ensuring competitiveness.

India, with its rising economic status and other factors is likely to lose/fail to regain most preferential tariff agreements. Therefore, the policy directions will also be oriented towards

keeping India competitive *vis-à-vis* the emergence of new developing countries, losing preferential status, or in other words, a global non-cooperative trade environment.

The key areas for immediate intervention would include:

- *Promoting species and product diversification to expand the export market and export value.*
- *Exploring new markets and promoting 'Brand India' seafood.*
- *Improving hygiene and sanitation in FHs and FLCs to ensure fish and fish products that meet international standards.*
- *Ensuring protection to endangered species by promoting the use of conservation devices.*
- *Bringing traceability in the supply chain.*

6.6 Environment & Climate Change

6.6.1 Climate change

Climate change is one of the biggest challenges that the fisheries sector is facing in recent times and time-bound adaptation and management plans are necessary to sustain the growth trajectory of fisheries and aquaculture in the country. The impacts of climate change on marine fisheries are amply visible in the Indian EEZ and the surrounding high seas. Several studies carried out by the Fisheries Research Institutions in the country have brought out the changes in the distribution of fish species, their abundance, breeding behaviour and other phenological attributes, relating such changes to rising temperature or shift in salinity patterns in the oceans. The policy will encourage focussed studies on climate change impacts on fish stocks that can improve our understanding of such climate-induced changes and provide adaptive mechanisms to the fishing and farming communities in a time-bound manner so that their livelihoods are not impacted. As part of India's international commitments on climate change, the concept of green fisheries by reducing Green House Gases (GHG) emissions from fishing and fishing-related activities will also be encouraged through dedicated activities.

The key areas for immediate intervention would include:

- *Supporting studies to better understand the impacts of climate change on fishing and fish farming.*
- *Implementing pilots on the adaptation of fishers and fish farmers on changes brought by climate and its associated natural events.*
- *Promoting the use of solar energy in fishing boats, fisheries infrastructures like FHs and FLCs and fish farm operations.*
- *Developing climate-resilient technologies in cooperation and coordination with sister agencies and the private sector.*

6.6.2 Ensuring ecosystem health and integrity

The state of the environment in both marine and inland waters in India is under stress due to pollution and is probably one of the reasons for the decline in fish stocks. With the increasing anthropogenic activities on land and inadequate mechanisms for effluent treatment, the abundance of solid waste and in particular plastics (especially, micro-

plastic particles) have increased manifold in the sea as well as in the inland waters, resulting in negative impacts on the fauna and flora. There are also several alarming studies that indicate the movement of micro-plastic particles back to the human being through the fish food cycle.

Wanton and un-wanton dumping of fishing nets in the oceans are also contributing to micro-particles besides the nets also engaging in ghost fishing, which is affecting fish stocks. The policy directives will aim at strengthening regulatory mechanisms to control pollutants to ensure that the land and sea-based pollution is effectively controlled and the ecosystems monitored. Fishers will make all-out efforts to ensure that fishing vessels do not contribute to marine pollution in any form by considering the required measures, in the design and construction of fishing vessels and subsequently in the use of gear.

The policy will also address external factors such as habitat degradation, pollution, and climate change that affect inland and marine fisheries. Improved management has the potential to reverse the decline in fish stocks, leading to an increase in fish biomass and yield and an increase in the annual economic net benefits accruing to inland and marine fisheries and ultimately improving the economic returns to the fishers and other stakeholders in the sector. The Policy will continuously strive to promote the flow of new information and technologies that are potential game-changers for fisheries management and can be of help in achieving sustainable growth.

On the infrastructure front, the development of FHs and FLCs sometimes leads to erosion and accretion along the coasts. These developments may bring changes in coastal configuration, which may have an impact on the coastline, ecology and ultimately the fisheries. The Government will consider placing adequate mechanisms to address these aspects while considering infrastructure developments on the coast.

It is well known that coastal and inshore waters are tail-end ecosystems and marine fish resources inhabiting therein are highly dependent on the inflow of freshwater and sediments that bring in nutrients. However, these water bodies are subject to anthropogenic pressures, resulting in the degradation of environmental quality and reduced freshwater inflow. Such changes impact stocks of several important estuarine and marine fishery resources, particularly the high-value shrimps, which complete a phase of their life cycle in these inland coastal waters. Therefore, to safeguard the ecological integrity of such tail-end ecosystems, the policy will initiate measures to promote a landscape- to- seascape approach where sound management of inland water resources and maintaining optimum levels of water flow will also ensure the health and well-being of the coastal ecosystems.

In the inland sector, the dams and barrages constructed over rivers and their tributaries often restrict the migration of fish species that move up and downstream for completing parts of their biological life-cycle. Policy interventions will ensure that necessary safeguards are in place in all future infrastructure developments on rivers and their tributaries and will also endeavour to correct the situation in the existing structures, wherever feasible.

The key areas for immediate intervention would include:

- *Strengthening regulatory mechanisms to control pollutants, including plastics, and to encourage leading by example by taking necessary measures to reduce pollution from fishing.*

- *Arresting habitat degradation and increasing resilience against climate change through improved management measures and the adoption of new technologies wherever available.*
- *Minimizing negative impacts of the development of fishery-related infrastructure.*
- *Ensuring free movement of migratory fish species across dams and barrages constructed over rivers and their tributaries.*
- *Promoting landscape-to-seascape approaches to safeguard inland and coastal ecosystem.*

6.6.3 Protecting keystone species and iconic ecosystems

While promoting the development of sustainable fisheries, the policy will place emphasis on maintenance of the ecological integrity of the inland and marine environment, so as to ensure that there are no adverse effects on the endangered, threatened, or protected species. Mangroves, seagrass beds, and coral reefs are an integral part of the coastal marine ecosystems and provide a range of ecosystem services, including habitation for many fish species and marine mammals (e.g. dugong). Such ecosystems will be protected from anthropogenic impacts. Similarly, many endangered species also inhabit the rivers (Gangetic dolphins) and they will be protected to sustain their populations.

6.6.4 Regulating fish meal production and wild collection of juveniles

India is a new entrant in fishmeal production. All these years, fish meal was imported but now after meeting the domestic requirements, India is a net exporter of fish meal. A policy direction on fishmeal production and seed collection is also an urgent requirement for sustaining the sector. While usually concerned with aquaculture, fish meal and seed production, in reality, happens at the crossroad of capture and culture fishery and can affect both. The seed collected from the wild for stocking in farm ponds or for mariculture, affects the population of many other species that are discarded while retaining the target species. Fish meal production units, while on one hand have helped in productive utilization of 'trash fish' but in the process of proliferation of such units, fishing vessels are now using destructive gear to ensure that large catches irrespective of size and conservation status are harvested to meet the increasing requirements of the fish meal plants. Large quantities of fish meal produced in plants located in Karnataka also use small-sized sardines, which has a negative impact on the sustainability of the sardine population. Policy initiatives will discourage the use of edible fish species for such conversion. Further, R&D on the production of fish meal from alternative sources and sustainably harvested fisheries will be encouraged and the total fish meal requirement for all sectors (poultry, aquaculture, etc.) will be estimated to ensure a steady supply of quality fish meal.

6.6.5 Blue Economy and Marine Spatial Planning

The coastal and marine environment of India is one of the world's richest ecosystems with high productivity. The Blue Economy provides a great opportunity to access these natural resources and ensure food security and gainful employment, only if the resources are sustainably harvested and well-managed. India has developed a working definition of Blue Economy as - "Blue economy refers to exploring and optimizing the potential of the oceans and seas which are under India's legal jurisdiction for socio-economic development while preserving the health of the oceans. The Blue Economy links production and consumption to capacity and envisages an integrated approach to economic development and environmental sustainability. It covers both the marine, that is offshore resources, as well as

the coastal, that is onshore resources.” According to the present estimates, the size of Blue Economy in India measured in Gross Value Added (GVA) is INR 4.6 lakh crore in constant prices and INR 5.5 lakh crore in current prices in 2016-17.

The fisheries and aquaculture sector is emerging as a dynamic segment of the Indian economy and is positioned towards a significant growth trajectory in the coming period. Fisheries and aquaculture are also important constituents of Blue Economy initiatives. These initiative aims to promote investment and innovation in support of food security, poverty reduction, and the sustainable management of aquatic resources. The initiative takes an overall approach towards improving sustainable growth and management of aquatic resources, with special attention provided to the seafood value chain.

However, keeping in view of the competing demands for ocean space, the need for Marine Spatial Planning (MSP), which is an important tool for the implementation of the Blue Economy, assumes significance. With the growing demand for mineral and oil exploration/extraction from the seas, the increasing volumes of maritime commercial traffic and reservation of spaces for strategic defence purposes, the available space for fisheries is diminishing. Keeping these contemporary developments in view, the policy will emphasise on a sound MSP to ensure that all economic activities get their due space and in the process, conflicts are reduced. Where required, necessary research support would also be solicited from the Research Institutions.

6.7 Social Security & Safety Nets

6.7.1 *Securing small-scale fisheries and aquaculture*

The basic characteristic of Indian fisheries, both operating in the marine and inland waters, is the predominance of small-scale fisheries (SSF). A similar picture can also be seen in aquaculture where the majority of the fish farmers have very small holdings and raise fish in homestead ponds. This attribute of the sector has both prospects and problems. The prospects are in terms of employment generation, relatively moderate to the low requirement of capital, use of simple technology, etc. The problems are in terms of large numbers and being highly dispersed along the riparian tracts, in the rural hinterland and on the coastline creating a challenge for the creation of required infrastructure, hand-holding and extending knowledge and technology, marketing, monitoring, and the low capacity in investing and innovating, etc.

The first and foremost policy intervention required to secure SSF is: (i) to define the term ‘small-scale fisheries’ legally following international guidelines and national consultations. The other key areas for policy support are: (ii) designing incentives for small-scale operators to self-organize to carry out business; (iii) building skills, expertise, and entrepreneurship; (iv) assisting them to organize into self-help groups (SHGs)/cooperatives/fisher associations /FFPOs and scaling up their venture; (v) marking/allocation of natural and financial resources for SSFs; (vi) development of toolbox, especially for SSF women to pick up matching skills and resources; and (vii) improving resilience and social safety nets, particularly through the insurance of life, their craft and gear, and other assets from the vagaries of nature.

Policy support is also required to ensure full participation of the SSF in socio-economic developmental negotiations such as land and water-use policy, optimization of fishing capacity wherever required, alternative uses of marine and inland waters, etc. To do this it

is also essential that adequate information be collated on the contributions of SSF to the fisheries and aquaculture sector, which often remain hidden and unknown.

The key areas for immediate intervention would include:

- *Agreeing on the scope and attributes of SSF in order to define the sector.*
- *Ensuring full participation and engagement of the SSF in the socio-economic developmental negotiations.*

6.7.2 Meeting social security, gender equity and building resilience

The Government will consider continuing the current welfare measures and further strengthen them to provide adequate safety nets to the fisher community/fish workers in the country through the Direct Benefit Transfer Scheme (DBTS). Such measures will also include community welfare, insurance, housing, and other amenities for fishers.

Weather events of extreme nature such as storm surges, cyclones, rogue waves and floods will be considered as natural calamities. In the same vein, man-made disasters such as oil spills will also be considered as calamities and affected fishing communities will be provided with admissible support/assistance in the restoration of their livelihoods. In cases of loss of fishers' life at sea, procedures for compensation would be made easier so that the benefits to affected fisher families are provided within a reasonable time.

Migrants have become an important constituent of the labour force in the marine fisheries and aquaculture sectors. Traditionally, fishers from Tamil Nadu and Andhra Pradesh were migrating to other States to serve as labour on fishing vessels. However, in recent years, migrants from hinterland States/areas such as Assam, Bengal and Bihar are working on marine fishing boats and aquaculture farms. With inadequate skills and the lack of identification records, such migrant workers are risking their lives for the sake of livelihoods. The policy initiatives will streamline the process for engaging such migrant labour, including the provision of training in working on fishing boats, maintenance of their record, and insurance benefits at times of injury or fatality at sea. Similarly, those working on fish farms and hatcheries and processing plants will also be provided with decent working conditions.

The positive impacts of the fishing ban on the health of fish stocks have been voiced by a large section of stakeholders. Some coastal States and stakeholders have also voiced the need for increasing the ban period from the present span of 61 days. Keeping in view the beneficial effects of the ban and cooperation of stakeholders, the Government will further, strengthen the existing compensatory package available to fishers during the period of the fishing ban. This will not only promote increased engagement of stakeholders in the conservation of resources but also help in rejuvenation and restoration of fish stocks that have been showing signs of decline/depletion.

Fisheries cooperatives have gained momentum over the years and in some States/UTs, such cooperatives have demonstrated their success. Fisheries cooperatives can best serve the community if they adopt good business models that would include both harvest and post-harvest functions. The Government will further facilitate and strengthen fisheries cooperatives and FFPOs through skill development and technical and financial support, wherever necessary. The cooperatives will also be encouraged and strengthened in carrying out a science-based approach to address fisheries and climate-related issues.

The availability of institutional credit for the fishermen for purchase of fishing implements and crafts has often proved very difficult, and the risky nature of returns has resulted in many fishers falling into the debt trap of private financiers and intermediaries. In order to remedy this situation, the Government will consider providing public finance to fishers with liberal terms and conditions. Similarly, the policy will aim at bringing the fishing assets such as gear and craft under the purview of insurance. This will help the fishers in offsetting the losses in times of natural calamities and other acts beyond their control. Similarly, for aquaculture farmers, the policy will aim at providing crop insurance and also the insurance of their assets such as aerators, water pumps, etc.

Women constitute about 69 percent of the total workforce in post-harvest activities in the fisheries sector. Besides raising families, women play important roles in retailing fish, fish drying, shell collections, net mending and other value addition activities through women SHGs. There are now increasing examples of women also participating in fishing activities. The Government will continue to support its contributions to the roles played by women and will further enhance support by way of forming women cooperatives; women-friendly financial support schemes; good working conditions that would include safety, security and hygiene at FHs and FLCs; transport facilities for retail marketing; encouragement to take up small-scale fishing, value-addition activities; and also facilitate their active engagement in fisheries management, including co-management structures, wherever they are set up.

In the same vein and following its commitment to inclusivity, the policy directives will also support the fisheries and aquaculture-related livelihoods of the Lesbian, Gay, Bisexual, Transgender, Queer and Two-Spirited and Other Identities (LGBTQ2+).

Keeping in mind the dwindling marine fisheries resources, additional/alternative sources of livelihoods will be essential for the vast number of fisher communities spread all along the coastline. Mariculture and eco-tourism are considered important in this regard and both offer good potential for additional/alternate sources of livelihoods.

In recent times, the incidences of Indian fishers crossing the International Maritime Boundary Line (IMBL) have increased. This increase is attributed to many reasons, one of them being the redefining of the IMBL on the basis of the judgment given by the Permanent Court of Arbitration at The Hague. To reduce such incidents, the Government will consider providing necessary awareness and training to fishers so that the crossing of IMBL is avoided.

Further, the establishment of vessel building yards and construction of fishing vessels has been an unregulated activity in the country, leading to the construction of poor quality vessels that compromise key attributes such as stability, optimum space for fish holds, crew accommodation, and provisions for kitchen and toilets. With the increasing use of Fibre Reinforced Plastic (FRP), the chances of building poor quality boats by such yards have amplified. The policy will voice the need for enlarging the scope of the Marine Fishing Regulation Acts (MFRAs) of the maritime States/UTs to include registration of the vessel building yards, an annual survey of fishing vessels for seaworthiness, routine inspection of communication & safety appliances through IRS/similar Technical Organizations, standard design specifications for fishing vessels, construction material and procedures for continuous monitoring and control of vessels construction by the Central and State Governments.

The key areas for immediate intervention would include:

- *Continuing and enhancing community welfare measures for the uplift of the fisher community/fish workers and ensuring a safety net.*
- *Recognizing the migrant workers working in fisheries and aquaculture and providing a necessary safety net to them.*
- *Enhancing assistance to fishers for effective participation in conservation and management measures.*
- *Facilitating and strengthening fisheries cooperatives and FFPOs through organizational and skills development and technical and financial support, wherever necessary.*
- *Providing easy access to fishers and farmers to obtain institutional credit and exploring the scope of insurance for fishing assets.*
- *Encouraging women participation in fisheries through women cooperatives/SHGs/FFPOs, targeted schemes and improving the workplace environment.*
- *Promoting livelihood options to encourage fishers reducing their dependence on over-harvested resources, improving vessel design and navigational awareness building to avoid accidental crossing of maritime boundaries.*

6.8 Fisheries Governance

6.8.1 Regulating the sustainable and wise-use of inland and marine resources

Keeping in view the developments in exploitation of the resources in waters beyond 12 nm, there is an urgent need to enact comprehensive legislation for the regulation of fishing by the national fleet in the EEZ and the ABNJ. Comprehensive legislation is also required from the fact that it would clearly set the agenda for the nodal agency responsible for the management of EEZ and it would be easier for the fishers to follow a set of clear regulations and for the MCS agencies to implement them.

Marine fisheries in India are dynamic with continuous changes in practices and resource harnessing. The MFRA have come into existence from the early 1980s and barring a few States/UTs, the MFRA were in place by the mid-1990s. Keeping in view the fact that most of the MFRA were adopted before the adoption of key International Agreements/ Arrangements (1982 UNCLOS, 1992 UNFSA, 1995 FAO CCRF), the policy will support updating the existing rules and regulations for governing fisheries in the MFRA and also aligning them with International Instruments/Arrangements to ensure that they cover all aspects of fisheries management. This will be carried out by the preparation of a Model Bill for consideration of the coastal States/UTs.

Similarly, there is a need to prepare a Model Bill for Inland Fisheries and Aquaculture, which the States/UTs can either use for repealing their existing Acts or for amending them to make them contemporary and complying with the topical requirements.

The key areas for immediate intervention would include:

- *Updating the existing rules and regulations for governing fisheries in the MFRA and also aligning with International Instruments/Arrangements.*
- *Regulation of fisheries in the 12-200 nautical mile area of the EEZ.*
- *Preparing a 'Model Bill' for Inland Fisheries and Aquaculture, which the States/UTs can use either for repealing their existing Acts or amending them.*

6.8.2 Institutions

Building community institutions: A prerequisite for successful resource management is the appropriate specification of property rights *i.e.* who owns the resource, who is responsible for conservation, who receives the gains from resource use, etc. In India, the issue of ownership is *de facto* ambiguous. While the Government as a representative of the State owns the resource, the community also asserts its traditional right to ownership. One way to legitimize both the positions is through co-management. The States of Kerala and Tamil Nadu and the UT of Puducherry have now set up co-management structures at different administrative tiers (village, district, state), including a charter of their rights, and duties and have also provided the legal/administrative support. Policy directives will aim at taking forward such initiatives to the other inland and coastal States/UTs.

Consolidating input and output supply channels: Knowledge of the supply channel is the key to any business organization. In an ideal setting, the production unit should have full knowledge of the quality and quantity of intermediary goods, which they can consume to produce final output in the market. Fisheries productions take place in a boat or a farm. However, they have little control over the intermediary goods. For example, boat-building yards do not have standard specifications, which can ensure that fishers are getting value for their money and an aquaculture farm has little control over the seed and feed that he procures from other sources. At the same time, fishers and farmers are often in a vacuum over the final destination of their product and so on. Resultantly, every participant in the value chain follows a myopic production strategy or works in a 'silo' which neither optimizes their value creation nor ensures the sustainability of the resources. The policy will promote the creation of a value chain with a fishing boat/farm at the centre through standard specification and contracting. To ensure that the community owns the value chain, setting up of fisher/farmers cooperatives/FFPOs/co-management bodies will be encouraged.

Developing a single-window system: The new institutional reform in the form of setting up a Department of Fisheries under a separate Ministry of Fisheries, Animal Husbandry & Dairying has created a scope of increasing the focus on the sector. However, in terms of the Allocation of Business Rules, the mandate of the new Department has not been enhanced thus limiting its potential. Given the multiple dimensions of the fisheries activities (interaction between human and nature; land-scape to sea-scape; local, regional, international rules; food and employment security; vulnerability to external forces; international effort in controlling fisheries production through trade regulations; etc.), the new Department needs to be developed as an umbrella agency focusing on governance, coordination and policy setting (in its area of Business) and harmonization amongst the States/UTs for effective fisheries governance.

Achieving the above would require a set of specialized agencies to be set up under the Department to carry out focused activities covering R&D, MCS, Trade, International relations, development, etc. This in other words would also require convergence thus bringing the scattered institutions under different Ministries and Departments within the purview of the new Department. Moving forward in this regard, the policy will aim at creating a 'Ministry of Fisheries and Maritime Affairs' that will cater to the growing needs of the sector *per se* and in the process also enlarging the sector's contributions to the overall goal of Blue Economy as envisaged by the Government.

Within the Department of Fisheries, the existing four fisheries Institutions (Fishery Survey of India [FSI], Central Institute of Fisheries Nautical and Engineering Training [CIFNET], Central Institute of Coastal Engineering for Fishery [CICEF] and National Institute of Post-Harvest

Technology and Training [NIFPHATT]) need to be reviewed in terms of their mandate, functions and utility. Similarly, the National Fisheries Development Board (NFDB) also need to be reviewed to see how all these institutions can be re-aligned or if required merged for effective management of the manpower and resources and bring in the required economy of scale. Establishing a 'Directorate General of Fishing and Maritime Affairs', combining the five organisations will provide the necessary institutional support and the desired thrust to the development of the sector in the coming decade and beyond.

The Fisheries sector also deals with a range of institutions that fall within the purview of coastal State/UT Governments (DoF), Central Government (MFAH&D, Ministry of Agriculture & Farmers Welfare, Ministry of Home Affairs, Ministry of Commerce & Industry, Ministry of Environment, Forest & Climate Change, Ministry of Water Resources, River Development & Ganga Rejuvenation, Ministry of Power, Ministry of Defence, Ministry of Earth Sciences, etc.) and scientific bodies. This pluralistic governance structure necessitates strong coordination between the MFAH&D and the Coastal States/UTs on one hand and different Ministries/Departments of the Union Government on the other. Further, similar cooperation between the States/UTs and within the State/UT will also be essential to ensure that fisheries and aquaculture are sustainably managed. In this regard, the policy will aim in placing a mechanism to allow for better coordination between all concerned agencies through Inter-Ministerial/Department Committees and other coordinating bodies.

There is also the long-standing demand of the aquaculture sector to consider it at par with agriculture so that it can enjoy the benefits of reduced tariffs and taxes, allocation of water, power and other support facilities available to the agriculture sector. Aquaculture, like agriculture, is also a primary activity engaged in food farming and, therefore, a level-playing field will encourage its expansion and support the country in meeting its food and nutrition requirements. Further, the policy support will be provided to meet the requirements of credit access, insurance, and strengthening of the value chain from farm to fork.

Besides creating a level-playing field with the agriculture sector, the Policy will also aim to seamlessly integrate with the activities in the agriculture and allied sector that can benefit fishers and fish farmers and help them in doubling their income.

Capacity building: Institution building in the fisheries and aquaculture sector also necessitates that the people who operate the sector are capable in terms of their basic education, and training and periodic in-service enhancement of their knowledge base and technical re-orientation. While the sector has grown manifold in all respects, from production to value-generation, the capacities of women and men who manage the sector remain at a fairly low-level. This analysis stems from various parameters such as the organisation of the service, cadre-building, induction-level and in-service training opportunities, career opportunities, advanced training, etc. and the fisheries and aquaculture sector lies at the bottom *vis-à-vis* other primary production sectors such as agriculture, and veterinary and animal husbandry. To match the thrust that the sector has received in the recent period in terms of the availability of funds, expansion of its responsibilities and production targets to meet the food and nutritional requirements of the country, it is essential to prioritise and enhance the capacity building requirements of the human resources that operate the sector.

The key areas for immediate intervention would include:

- *Encouraging and facilitating setting up fisheries co-management structures in the States/UTs.*
- *Encouraging community ownership over the supply chain.*
- *Encouraging integrated end-to-end supply chain involving ancillary activities.*
- *Exploring the means to set up a set of specialized sections under the Department to carry out focused activities such as R&D, MCS, Trade, International relations, development, etc. for convergence of activities as well as ease of business through a single-window system.*
- *Moving towards the establishment of a Ministry of Fisheries and Maritime Affairs and a Directorate General of Fisheries and Maritime Affairs*
- *Developing a blueprint to build the capacities of the staff that man the fisheries sector in the country.*
- *Bringing aquaculture at par with agriculture.*

6.8.3 HRD and entrepreneurship

Since independence, while fisheries transformed from a subsistence activity to a vibrant commercial activity, entrepreneurship of fishers and other stakeholders (both upstream and downstream) has undergone little change. The activities and the organization of the sector remain sticky resisting change. Policy interventions in this regard will include steps towards training, capacity building as well as up-gradation of technological skills of traditional fishers and fish farmers in moving from artisanal fishing/farming to more economic and efficient means of carrying out their profession.

To fully gain from the benefits of commercialization of fisheries and aquaculture, entrepreneurial skills of fishers and fish farmers will be developed encouraging them to increase their reach in the fisheries value chain and other requirements of a modern fisheries sector. The Colleges of Fisheries established across the country can play a role in this. Besides, some of the R&D Institutions can also take up dedicated programmes for building entrepreneurship of stakeholders at different levels.

The key areas for immediate intervention would include:

- *Engaging fisheries R&D and education institutions in training, capacity building, development of management plans by improving their customer orientation.*

6.8.4 Data-base

Sound data is a key pre-requisite to sound policy formulation. With the fisheries sector growing manifold in the last 4-5 decades, mechanisms for data collection and their collation has lagged behind. While data on marine fish landings is collected regularly following internationally accepted methodologies and protocols, the same is not happening in other sectors. Except for the five-yearly census carried out for the marine fisheries sector, similar information is also not available for inland fisheries, including aquaculture. Barring the information available through research publications, systematic coverage of biological aspects and socio-economical attributes of the communities/related stakeholders is little.

Bearing the above in mind and acknowledging the fact that the availability of sound data continues to be a weak link in the development framework, policy initiatives will focus on creating mechanisms for data collection that ensures adequate coverage of the various

facets of the sector, is timely and reliable, data collection mechanisms are transparent and access to data is smooth and unhindered. The Ministry of Statistics and Plan Implementation (MoSPI) will be requested to carry out 'Situation Assessment Surveys' for fishers and fish farmers on a regular basis. A national-level platform, to be hosted in the Department of Fisheries, Ministry of Fisheries, Animal Husbandry and Dairying, will be created to oversee the fisheries data acquisition process and provide necessary incentives to the agencies that would contribute to data collection, collation, and dissemination. The Department of fisheries will also serve as the repository of such database.

The key areas for immediate intervention would include:

- *Developing a national-level platform to oversee the process and provide necessary incentives to the agencies that would contribute to data collection, collation, and dissemination.*

6.8.5 Delivering knowledge and extending technical support

India has one of the most extensive network of fisheries R&D institutions in the world. The eight Fisheries Institutions under the ICAR umbrella; the six R&D Institutions under the MFAH&D, including a quasi-judicial body, the Coastal Aquaculture Authority; three institutions under the Marine Products Export Development Authority; four Institutions under the Ministry of Earth Sciences; and the 30 Colleges of Fisheries located in different States/UTs concerned with marine fisheries provide an unparalleled mass of experienced human resource for fisheries and aquaculture development in the country. Their coverage with respect to the disciplines and geography is extensive.

The ICAR Fisheries Institutions have been at the forefront of fisheries research and developmental initiatives from the very beginning of their establishment. Popularisation of composite fish farming of the IMC and exotic species (silver carp, grass carp and common carp) and seed production technologies leading to the first 'Blue Revolution' in the country during the late seventies owes largely to the extension services and hand-holding made available to fish farmers through the All India Coordinated Research Project of the ICAR and the setting up of the Fish Farmers Development Agencies (FFDAs) by the then Ministry of Agriculture and Cooperation throughout the country. Similar developments took place in the farming of air-breathing fishes, brackishwater aquaculture and reservoir fisheries development. In the marine sector too, the ICAR Institutions are playing a stellar role, including the regular provision of marine fisheries data through a dedicated sampling methodology, setting bench-marks for the minimum-legal size of commercial species that can be harvested, stock assessments, completing the life-cycle of many commercially viable fish species for mariculture, five-yearly census of the marine fisheries sector, improved post-harvest technologies, new boat designs and quality control.

However, today, when major hikes are envisioned from the aquaculture sector and capture fish production needs to be sustained at optimum levels, the expected role of the fisheries institutions assumes greater significance. Technologies that meet the immediate needs of the practitioners at the grassroots level are the need of the day. A balance between basic science and adaptive research is necessary. The need for extension services and hand-holding is felt much more than before. In other words, research has to move ahead of development so that the outcomes are absorbed in the developmental process as it happened in the past. The R&D Institutions also have to forge a stronger relationship with the private sector and work in tandem to optimise the resources and also shorten the period of transfer of technology from lab to land. Policy initiatives will aim at further

strengthening the interface and linkages between research and development. Policy measures will ensure accountable R&D and their assimilation in fisheries development and governance.

Knowledge dissemination up to the last mile will be one of the key objectives of the policy. With increasing literacy rates and the ever-increasing use of the internet and smartphone, knowledge dissemination will be largely carried out through virtual platforms, making them not only fast and cost-effective but also ensuring that no one is left behind. Policy interventions would focus on establishing IT-based knowledge 'hub and spokes' for collection, collation, and processing of information that could be made available on a real-time basis to the fishers and fish farmers. It would also be ensured that such information provided to the end-users is in vernacular so that assimilation becomes easier. In the marine sector, the provision of 'Sagar Mitras' being promoted by the Department of Fisheries would be a useful contact point for the stakeholders.

The key areas for immediate intervention would include:

- *Enhancing knowledge management through improved data management policy, last mile extension services and Inter-Ministerial cooperation.*
- *Strengthening R&D linkage in the fisheries sector for the viable and speedy development and dissemination of technologies/management practices for sustainable fisheries and aquaculture.*

6.9 Regional/International Commitments

6.9.1 Encouraging regional cooperation

The Indian sub-continent is surrounded on the west by the Arabian Sea and on the east by the Bay of Bengal. Together, the two seas form part of the upper Indian Ocean. On the west coast, India shares its maritime boundaries with Pakistan and the Maldives, while on the east coast, the boundaries are shared with Sri Lanka, Bangladesh, Myanmar, Thailand and Indonesia. In some cases, it is not only the shared maritime boundaries but also shared ecosystems, such as the Gulf of Mannar and Palk Bay between India and Sri Lanka; Sundarbans between Bangladesh and India; and the Myeik (Mergui) Archipelago in the Andaman Sea. Both the Arabian Sea and the Bay of Bengal harbour migratory as well as straddling fish stocks, such as tuna and tuna-like species, sharks and Spanish mackerels. As situations necessitate, the Government will foster strong regional cooperation in the management and sustainable utilization of the resources, including conservation of species/stocks, wherever necessary.

Cooperation in the safety and security of fishers is also necessary. The upper Indian Ocean, especially the Bay of Bengal and in recent years the Arabian Sea has also witnessed high numbers of adverse weather events and every year many fishers lose their lives or suffer extreme hardships. Further, cooperation in the field of marine fisheries through bilateral arrangements as also by participating in the regional fisheries and environment bodies will be enhanced. Such cooperation will facilitate managing shared resources and shared ecosystems; harmonization of policies and programmes aimed at optimized harvesting of trans-boundary resources; safeguard of human rights, in particular for fishers straying in waters of other countries.

Indian fishers are widely recognized in other countries in the region for their skills, industrious nature and the ability to work under challenging conditions. As a result, more

and more fishers from India are now finding employment in the fishing fleets of other countries. On many occasions, Indian fishers have been apprehended in neighbouring countries, as while fishing they unknowingly stray into the EEZ of other countries, making it difficult for the Government to secure their release through normal channels. The policy will lay the guidelines for the fishers ensuring that who are willing to take employment in the fisheries sector in other countries have adequate skills and knowledge of working in alien seas and go through formal Government approvals.

With regard to international commitments, it will be the endeavour of the Government to fulfil its obligations and support the global agenda of meeting the Sustainable Development Goals, in particular Goal 14- Life Below Water.

6.9.2 Positioning India as a leader in the region

The global trend in fisheries is such that the credibility of a country in managing its fisheries is becoming a determinant of its trade potential. Looking at the fishing nations commended for their fisheries management, such as Australia, Norway, New Zealand and other countries, this is achieved through a two-way process. First, countries set up management regimes, which were rated highly by the international community, and their efficacy is captured in different indicators. Second, they became the leading exporters of knowledge. By becoming knowledge exporters, they further cemented their credentials of good management. *Vis-à-vis*, India has an array of scientific institutions with excellent capacity but no exposure or sound recognition beyond national borders. Due to a lack of international exposure, Indian scientists rarely feature in global debates and global agenda that shape the future of global fisheries and aquaculture. To stimulate the national R&D set up, a policy is required to encourage their participation first in the regional organisations and ensuring regional leadership through multi-country training, collaborative research programmes, etc. Once regional leadership is established then the areas should be expanded further. For example, to start with South Asia, then to Asia and Africa and so on. Supporting regional organizations and taking leadership in such organizations will be necessary for this, as it will demonstrate the seriousness of the country.

6.10 Way Forward

The narrative in the foregoing paragraphs lists policy interventions under 10 themes and 28 topics covering various aspects of fisheries and aquaculture development in the country. While some topics are of standalone nature, many others are crosscutting and would have to be dealt with simultaneously. Implementing policy interventions in a highly diverse sector such as fisheries and aquaculture and coupled with a large population of stakeholders is undoubtedly a long-drawn process and daunting on the face of it but is not insurmountable. A systemic process detailing the action points under each of the 28 topics in the form of an 'Implementation Plan', and piloting some of the actions to demonstrate their viability would be undertaken. The schemes and programmes listed under the Pradhan Mantri Matsya Sampada Yojana (PMMSY) provide the necessary budgetary support to take up most of the policy initiatives. Regular monitoring and mid-term evaluation would be an essential part of the implementation strategy. It would be useful to build confidence and trust of the stakeholders, especially the fishers and fish farmers, from the beginning itself so that they become active partners in the process and join hands with the Government in this long due task of implementing the National Fisheries Policy.

Finally, it is envisaged that while the present time-frame of the National Fisheries Policy has been kept as ten years, however, its successful implementation will ensure the flow of benefits to the successive period also.
