National Fisheries Policy, 2020

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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.

6.1 Marine Fisheries

The potential of the fisheries sector in general and the marine fisheries sub-sector in particular was recognized quite early in the Indian development planning. Apart from securing food and nutritional requirements of the population, marine fisheries also play an important role in trade and commerce, and in the process promote employment and livelihoods of coastal communities.

After the declaration of the EEZ in 1976, the sea area available to India is estimated at 2.02 million sq. km, a shelf area of 0.372 million sq. km, and a coastline of 8000+ km. With sovereign rights on the EEZ, India has also acquired the responsibility to conserve, develop and optimally harness the marine living resources within this area. The marine fisher population in India is estimated at 3.77 million, of which 0.93 million are active fishers. About 0.52 million people are engaged in fishing and allied activities, of which, 69 percent are women. Women are especially active in fish marketing where they constitute about 86 percent of the participants. *Vis-a-vis,* about 14 000 women are engaged in fish seed collection and an equal number in the shell collection activities. The marine fisheries sector as a whole is characterised by the predominance of small-scale fisheries.

6.1.1 Sustaining marine fisheries

The current Potential Yield (PY) of marine fisheries from the EEZ has been estimated as 5.31 mmt. The current yield (2018-2019) is 4.18 mmt, indicating the potential to increase the yield by 1.13 mmt. The under/unexploited resources are available in the 200 to 500-meter depth zone and in the oceanic waters. Except for the PY of 0.23 mmt of tuna and tuna-like fishes, many other resources in the oceanic waters are non-conventional fin and shellfishes such as myctophids and oceanic squids. For realising the full potential of 0.23 mmt of tuna and tuna-like fishes and the oceanic squids (0.63 mmt), the policy initiatives will be directed towards the improvement of the skills and capacities of the fishers to catch and land them in good condition. This initiative will be further complemented by providing assistance in the procurement of modern fishing vessels and gear and research and developmental inputs for locating the potential fishing grounds, improving post-harvest handling and creating value addition and ensuring food safety. However, considering the uncertainties in the estimates, there is a need for taking the precautionary approach in line with the global

standards regarding wild fish harvests and with sustainability and equity as the key principles.

With the focus on ensuring sustainability (ecological, economic, social, and institutional), the most immediate requirement would be the rationalization of fishing effort *vis-a-vis* the sustainability of the resources. This will ensure the economic viability of fishing operations. In the short-term, the aim would be to stop additional entry to the sector, and thereafter re-distribution of the effort to move towards equilibrium. An additional effort may be allowed only for under or unexploited resources, mostly in the oceanic waters. The other management measures will *inter-alia* include, input and output controls such as fishing days, area of operation, engine horsepower, gear size, minimum mesh size, minimum legal size (MLS) and development of national guidelines for MLS of commercially important species. These measures will be further supported with fleet plans and creating fisheries management areas to ensure that resource depletion is contained. The fisheries and related institutions will ensure the formulation of rebuilding/recovery plans for those fish stocks that are in a depleted or collapsed state. Such efforts will also be based on sea ranching and deployment of artificial reefs as management options for replenishing fish stocks and improving species diversity in vulnerable marine environments. A capacity appraisal framework will be prepared for fishing capacity based on the PY estimates and regular stock assessments will be carried out to allow for the identified fish stocks to be harvested on a sustained basis.

Efforts will be made towards mainstreaming biodiversity conservation in production processes; species-specific and zonal/area-specific management plans, including conservation of Ecologically and Biologically Significant Areas (EBSAs) and Vulnerable Marine Ecosystems (VMEs); protection of iconic and endangered and threatened (ETP) species; spatial and temporal measures for sustainable utilization of resources; and creation of fish refugia through consultative processes. Simultaneously, the Government will also undertake the review and periodic evaluation of the existing Marine Protected Areas (MPAs) and for providing legislative support to ensure that tenure rights of the traditional fishers are secured and their livelihoods are not impacted by such conservation measures.

The Ecosystem Approach to Fisheries Management (EAFM) will be implemented with due consideration of the well-being of all living and non-living constituents of the marine ecosystem and the social attributes and economic needs of the stakeholders. In the same vein, participatory management or co-management, which is recognized globally as one of the successful management systems for multi-stakeholder, multi-species and multi-fleet fisheries will be promoted. The examples set by Kerala, Tamil Nadu and Puducherry will be taken into account while promoting co-management in the country. Local, regional, inter-state and national fisheries councils would also play a key role in resolving conflicts among different groups of fishers and the norms for introducing these management measures will be worked out in consultation with all the concerned stakeholders in the sector.

Spatial and temporal closures have helped in sustaining the marine fish wealth of the country. To ensure that these management measures effectively improve the livelihoods of fishers, periodic reviews will be conducted, taking into account the best scientific information available, including a precautionary approach, and with the due engagement of fishers and other concerned stakeholders.

Presently, the coastal States/UTs have specific areas reserved (based on depth or distance from shore) for traditional fishers where mechanised fishing is not permitted. Such Territorial Use Rights for Fisheries or TURFs have proved to be useful in sustaining the livelihoods of artisanal fishers. The Government will continue to provide such support to artisanal fishers and in consultation with user groups, it will further consider increasing the area presently available to artisanal fishers in the territorial waters.

Management of fisheries will follow an integrated approach, blending traditional knowledge and science with business principles and effective engagement of both primary stakeholders, and also those engaged in ancillary activities to ensure that fisheries are ecologically and economically sustainable. Knowledge management will be an approach to foster quick and easy dissemination and availability of information on key attributes of the marine fisheries sector, such as resource abundance and distribution; real-time resource maps; productivity assessments; real-time Potential Fishing Zone (PFZ) advisories; and weather forecasts for the benefit of fishers. The use of Information Technology (IT) and Space Technology (ST) will be put to optimum use for harnessing the benefits in support of the fisher community.

Fishing in the offshore waters and the Areas Beyond National Jurisdiction (ABNJ) is both capital and technology-intensive. Private investments will be promoted in deep-sea fishing and processing to fully harness the potential of the marine fishery for inclusive development. Entrepreneurship development, availability of sound technology, Public-Private Partnership (PPP) arrangements and better leveraging of institutional finance for the marine fisheries sector will be encouraged. Besides, modalities will be worked out for the integration of the seafood processing and export sector with the deep sea fishing industry for the holistic development of the sector.

The Government will introduce new scheme(s) for enhancing the skills and capabilities of the artisanal fishers to undertake and popularize deep sea fishing, modernization of the existing deep-sea fishing fleet, introduction of new/improved indigenous deep-sea fishing vessels through fisher cooperatives/self-help groups (SHGs), on-board training and linkages to markets and export. While introducing these mechanisms/schemes, steps will be taken to ensure that such initiatives also comply with the rules and regulations set under the international instruments relating to fishing in the EEZ and the ABNJ.

Utilization of deep-sea resources in the EEZ and beyond will be considered not only in terms of resources available in the EEZ, but also infrastructure; technical wherewithal for vessel construction, survey and certification; human capacity development; a comprehensive and implementable set of rules and regulations, with a strong Monitoring, Control and Surveillance (MCS) regime; and availability of scientific and technical information on commercial fisheries resources, and the best fishing methods with which to target them. However, such initiatives will be subject to compliance with relevant provisions in the International Agreements/Arrangements concerning fisheries in the high seas and the ABNJ and with proper monitoring and communication mechanisms to safeguard coastal security and safety of fishers at sea.

The Government will develop a holistic resource utilization plan for the EEZ in consultation with the coastal State/Union Territory (UT) Governments, taking into consideration the requirements of coastal States/UTs and the special and unique needs of the two Island UTs, the Andaman & Nicobar and the Lakshadweep. At the same time, coastal States/UTs will also be urged to recognize that the area of EEZ between 12 and 200 nautical miles (nm) is a common resource managed by the Union Government and isolated fishing strategies by

them may lead to over-exploitation and inter-State/UT conflicts. An institutional mechanism will be set up and strengthened to reduce and manage inter-State conflicts as well as international conflicts, especially with the neighbouring countries for the management of marine fisheries. The Government will prepare and implement integrated coastal and Islands' fisheries development plans, which will help in enhancing the economy of coastal States/UTs and the Islands.

The key areas for immediate intervention would include:

- *Promoting deep-sea fishing and fishing in Areas Beyond National Jurisdiction (ABNJ) to tap under-exploited resources, through the use of appropriate and responsible technology and capacity building of stakeholders, especially the artisanal fishers, and encouraging investments to develop harvest and post-harvest facilities.*
- *Optimizing fishing effort and formulating and implementing management plans for the rebuilding of collapsed/degraded fish stocks.*
- *Developing conservation measures such as species-specific and zonal/area-specific management plans through consultative processes and preparing a holistic plan in a consultative manner for resource utilization in the EEZ.*
- *Promoting the adoption of EAFM and co-management approaches.*
- *Encouraging coastal States and UTs to increase the area reserved for non-mechanized fishing boat operators under the MFRAs.*
- *Facilitating knowledge management across the entire spectrum of the marine fisheries sector with the use of advanced IT technologies.*
- *Ensuring the safety of fishers and national security while developing deep-sea fishing and fishing beyond national waters.*

6.1.2 Monitoring, Control and Surveillance

The existing mechanisms in place for a sound and effective MCS regime for the marine fisheries sector need further strengthening, following the National Plan of Action on MCS (NPOA-MCS) adopted by the Government. Presently, the Government has an online uniform registration and licensing system (ReALCraft) to register all fishing vessels operating in the marine sector (artisanal, motorized, mechanized and non-mechanized). While monitoring of fish catch and effort and control of fishing through registration and licensing is in place, MCS activities will be further strengthened through greater engagement of the Department of Fisheries (DoF) of the maritime States/UTs, Coastal Marine Police and the Indian Coast Guard (ICG). Strengthening and improvements in MCS will be carried out in a phased manner by introducing chip-based smart registration cards, mandatory use of logbooks (both paper and electronic), and also through extensive use of space technologies and IT tools. The Central Government will work with the State/UT Governments to put in place a more effective MCS system and also assist in building up the skills and capacities of the MCS managers as also the role of the community in the implementation of the MCS functions.

The marine fisheries sector is characterized by a range of fishing vessels varying in design, construction material, size, engines and gear and area of operation. The legislation(s) relating to registration, survey and certification, mandatory carriage of identification documents and tracking equipment, penalties for violations of the aforesaid provisions, sea-safety and manning norms of fishing vessels are required to be updated to cater to the needs of the fisheries sector and also to meet the international standards and norms

prescribed by concerned agencies such as the Food and Agricultural Organization (FAO), the International Maritime Organization (IMO), the International Labour Organization (ILO), etc. While updating the existing rules and regulations it would also be necessary to introduce mandatory registration of boat-building yards, registration of fishing gear to ensure its accountability and reducing the loss of gear/ghost fishing, seaworthiness of fishing vessels, and phasing out of ageing and unviable fishing vessels.

India being a party to several International Agreements/Arrangements to deter, prevent and eliminate Illegal, Unreported and Unregulated (IUU) fishing, the Government will establish a sound mechanism both at the port and at sea to ensure that the Indian fishing fleet does not engage in any IUU fishing within its own EEZ and the ABNJ.

The key areas for immediate intervention would include:

- *Setting up an effective MCS system, following the NPOA-MCS, in coordination with the coastal States/UTs and other concerned Ministries/Departments. This will also include enhancing the skills and capacities of the MCS managers as also the role of the community in the implementation of the MCS functions.*
- *Promoting measures to curb IUU fishing by national and foreign fishing vessels.*

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/gravid 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.*

6.3 Aquaculture

6.3.1 Freshwater aquaculture

Today, India is the second largest farmed fish producer in the world, with an estimated area of. 2.48 million ha under ponds and tanks. It is estimated that the country produced about 7.7 mmt of farmed fish during 2018-19, contributing to about 80 percent of the inland fish produced in India and about 56 percent of the total fish production of the country. Though IMC species form the most favoured group of fishes for freshwater and contribute to the maximum production from aquaculture in India, other species such as *Pangasius* and *Tilapia* are also gaining ground and are popularly consumed in many parts of the country.

Although the first successful breakthrough in the transfer of composite fish farming technology to the farmers in the country took place during the mid-to-late seventies and ushered in the 'aquaplosion', subsequently, the technology expansion has been minimal. While there has been a horizontal expansion in the area under freshwater fish farming, vertical hikes have been limited, resulting in the average per hectare productivity being restricted to 3000 kg per ha. Quality seed production is limited to certain areas and supplementary feed use is also minimum. Farming practices have changed drastically, varying from region to region and mostly by the farmers' own initiatives and innovations. Though of advantage to the farmers, such changes have over time placed restrictions on sound planning, movement of inputs such as seed and feed, quality control, and spread of vectors and diseases.

Despite being a global leader, the freshwater aquaculture sector in India has been highly conservative in terms of diversification of species and systems. Except for the introduction of pangasius and in recent period tilapia by innovative farmers and entrepreneurs, the sector has remained bound to the IMCs and the exotic carps. Similarly, integrated fish farming has also not moved away from the traditional turfs of West Bengal and some North-Eastern States to other areas where the potential exists. In the case of carps, production hikes are required from both horizontal and vertical expansion, thereby increasing the per hectare production and productivity of the water bodies.

Therefore, for increasing the contributions from the aquaculture sub-sector, the policy initiatives would largely focus on diversification and expansion of the species spectrum, by ensuring the availability of healthy stocking material of required species; introducing new field-tested technologies into the farming system (*e.g.* Biofloc, Re-circulatory Aquaculture System, Integrated Multi-trophic Aquaculture or IMTA, etc.); integration of fish with other

farming activities like livestock, poultry, dairy, horticulture, crop, etc.; accessibility to quality inputs in terms of seed and feed, extension and technical services for aquatic animal health and water quality management; setting up of Fish Farmer Producer Organisations (FFPOs); etc. Aquaculture has to also deal with the competing demand for freshwater from other users and policy interventions will be required to secure water resources for the fish farmers. With such reforms in place and without undermining sustainability, production hikes can be expected from freshwater farming in a shorter time span of 4-5 years.

Unlike freshwater aquaculture, fish farming in the colder reaches of the country has received much less attention. In spite of the massive Himalayan tract and the other mountain ranges offering high potential for raising fish, development has been limited to trout farming in certain areas of Himachal Pradesh and Jammu and Kashmir. With the improvements in road infrastructure, transport, power supply and communication in the hilly areas, the time has come to give a boost to trout farming in the medium to higher altitudes in the country. This thrust will allow utilization of the available resources for not only food supplies but also for increasing the employment opportunities in the mountainous regions of the country. The policy directives in this regard would be directed towards a thorough assessment of cold-water resources amenable for farming and preparation of a master plan for the development of cold-water fisheries and aquaculture in the country; replenishment of germplasm of rainbow and brown trout and also of common carp for farming in the lower altitudes of States such as Uttarakhand, Meghalaya, and Arunachal Pradesh and the possibility of introduction of other potential exotic species, including arctic char for stocking high altitude lakes; setting up of trout hatcheries and feed mills for easy availability of quality seed and feed. Besides, the development of farming systems, stocking of hill streams with rainbow and brook trout in the medium to higher altitudes can promote angling and angling-mediated tourism with homestays, which again will provide avenues of livelihoods for locals as also restoration and upkeep of the streams and other water bodies.

In the last six decades of developing modern fish farming practices in the country, production of quality fish seed in required quantities, and its nation-wide availability and accessibility remain a challenge. Seed production and distribution is still skewed with limited hotspots of seed production in the country. This is a major lacuna for the expansion and intensification of pond and enclosure-based aquaculture and also for culture-based and enhanced inland fisheries. Besides IMCs, commercial-scale production of other high valued species like pabda, singhi, native magur, climbing perch, scampi, crab, sea bass, mullet is yet to take place, restricting the farming systems to be largely carp-based or for pangasius farming.

Diversification will be the key to the next ‘aquaplosion’ in the country. It will not only enhance the spectrum of fin and shellfish species that can be commercially farmed but also reduce the dependence on limited species and enhance the economic viability of aquaculture. Genetic improvements in the agriculture sector have allowed farmers to raise high yielding varieties and increase their per hectare yield and thus also the income. A similar situation is yet to happen in the Indian aquaculture and genetic improvement is limited to a couple of species. Policy initiatives will provide thrust to the genetic improvement of commercially important species amenable for aquaculture and where required foster collaborative programmes with the private sector to hasten the process with due scientific protocols and processes.

While the technology for many species is available with the concerned Research Institute(s) of the Indian Council of Agricultural Research (ICAR), its commercialization is limited. In such

a situation, it is important for the research institutions to team up with the private sector and scale-up the process of commercialization so that the seed availability improves. In this regard, the seed-deficit areas in the country will receive priority. While doing so, it is also important to consider that quality seed is available to farmers at reasonable rates.

Policy initiatives will support the introduction of commercially viable seed production technologies of a large number of local species mentioned in the foregoing paragraphs either through national initiatives or the transfer of technologies from elsewhere. In this regard, the role of the ICAR Research Institutions and their collaboration with the private sector will be crucial to establish hatcheries, seed farms, and brood banks of various species in potential areas. While promoting diversification of species and seed production, policy initiatives will also ensure the availability of quality seed to farmers through the accreditation of hatcheries, seed certification and quality control. In the same vein, the Government will also ensure that quality and certified feed is made available to the farmers.

The key areas for immediate intervention would include:

- *Diversifying and expanding the species spectrum, by ensuring the availability of healthy stocking material of required species, suitable technologies and support services.*
- *Preparing a time-bound and action-oriented plan for seed production in the country, including setting up of seed banks.*
- *Revival of scampi (Macrobrachium rosenbergii) farming.*
- *Securing water resources for fish farmers and setting up of fish farmers' organizations.*
- *Promoting trout farming in the medium to higher altitudes in the country through assessment of cold-water resources amenable for farming and preparation of a master plan for the development of cold-water fisheries and aquaculture in the country.*
- *Enhancing support services such as the availability of quality seed and feed.*
- *Identifying potential areas and securing their availability and allocation for suitable aquaculture practices with necessary support services.*

6.3.2 Brackishwater aquaculture

Shrimp farming has been the most discussed and debated activity amongst aquaculture-based food production sectors in the last two decades. With a cycle of boom, bust and boom, shrimp farming has moved from the very traditional practices carried out in the estuarine tracts drawing water and seed from the high tide and raising short-term crops to a commercial set-up with high levels of per hectare production and productivity. The first cycle of the boom that started with the commercial-scale farming of tiger prawn (*Penaeus monodon*) did not last long. The White Spot Syndrome Disease (WSSD) and the December 2016 judgement by the Supreme Court brought a halt to the activities. The second cycle of the boom began with the introduction of the Pacific whiteleg shrimp *Litopenaeus vannamei* in the mid-2000 and brought in unprecedented hikes in production, making India the second-largest producer of whiteleg shrimp in the world. This production also increased the export earnings of the country.

It is estimated that the country has about 1.24 million ha of land in the coastal areas amenable for shrimp farming. The positive development in the last decade is that shrimp farming has now moved from the traditional farming areas of the east coast also to the west coast. Gujarat stands out as an excellent example of this development. The stakeholders in the sector are a mix of big entrepreneurs largely dealing with the input

manufacturing (seed, feed, health supplements, etc.) and the shrimp farmers whose average holdings are around 3-4 ha. Some of the entrepreneurs also have integrated facilities, with large-sized farms, running into hundreds of hectares.

Such productive utilisation of coastal land, which otherwise has limited economic use, will be promoted for aquaculture through suitable land-leasing policies and provision of the infrastructure that would be required for setting up of farms, hatcheries, etc. These infrastructure facilities *inter alia* would include access roads, electric and fresh water supplies and drainage facilities, and other incentives, wherever necessary.

Unlike freshwater aquaculture, the brackish water shrimp farming industry is highly developed in terms of seed, feed and growth promoters and over the years, the industry has set up excellent distribution channels for input supplies and also the collection of harvested produce for supplying to the processing sector. The involvement of multi-nationals has also catalysed the process to the benefit of the sector.

Coastal aquaculture that includes brackish water shrimp farming and other aquaculture activities in the coastal areas of the country are supported by the Coastal Aquaculture Authority Act, 2005, which is mandated to ensure sustainable farming practices that do not adversely impact the ecology and environment of the coastal areas of the country. The Rules and Guidelines framed under the Act, provide necessary guidance to the sector for setting up of shrimp farms and their operation.

However, all said, the shrimp industry runs a big risk of farming restricted to a single species (*L. vannamei*), which too is of exotic origin. This situation does not auger well for a billion USD industry. The asset size of the shrimp industry producing seed, feed, processing, and other input supplies has grown manifold and the overwhelming dependence on a single species puts the industry at high risk. The phenomenal success of the whiteleg shrimp has made tiger prawn a forgotten species and there has been hardly any attempt in the last decade and a half to revive the tiger shrimp. Similarly, the farming of *Penaeus indicus*, a native species has never gained prominence.

Therefore, there is an urgent need for species diversification and reducing the risks that the industry is facing now. The policy directives in this regard will aim at the revival of tiger shrimp and standardisation of the hatchery and farming technologies for *P. indicus*. The inclusion of finfishes such as sea bass, milkfish and mullets, etc. will widen the species spectrum. In this regard, the non-traditional species such as bivalves will also be considered and their role as filter-feeder will enhance the sustainability of the farming practices. Further, policy initiatives will also aim at improved biosecurity and health management, provision of additional quarantine facilities, and promotion of Best Management Practices (BMPs)/Good Aquaculture Practices (GAP) if farming practices are to remain sustainable.

Management of wastewater arising out of aquaculture operations is a major issue and the policy will be directed towards supporting the creation of infrastructure that can reduce the quantities of contaminants before the wastewater enters the creeks or the coastal waters. For small aquaculture holdings, common effluent treatment systems will be supported so that their farming remains viable and profitable. The use of seaweeds and mussels and other cultivable species of molluscs will be promoted to cleanse the water before it enters the open water systems. Pacific whiteleg shrimp farms set up in the inland areas will not be permitted to use seawater.

The key areas for immediate intervention would include:

- *Promoting species diversification through the revival of tiger shrimp, P. indicus and inclusion of finfishes such as seabass, mullets, etc.*
- *Supporting domestication of tiger shrimp and P. indicus and moving towards the production of specific pathogen-free germplasm.*
- *Facilitating further expansion of shrimp farming for productive utilisation of coastal areas, creating employment, and enhancing food and nutritional security.*
- *Improving biosecurity and health management, total disuse of banned antibiotics, provision of additional quarantine facilities, and promotion of BMPs/GAP.*

6.3.3 Mariculture

The Government of India, recognizing that the demand for seafood would be increasing year after year and also realizing that the marine capture fisheries alone might not be able to meet the additional seafood demands, has initiated the development of mariculture in the coastal areas of the country. Based on the potential areas available for mariculture development in the country, the annual production of 4-8 mmt has been projected.

As mariculture development in the country is in a nascent stage, the policy initiatives would be manifold, starting with the development of a blueprint of suitable sites/areas along the Indian coastline with a leasing policy following a Marine Spatial Planning (MSP) approach. This would allow for setting up a process of identification of suitable species for farming in a particular area and also the allocation of space on a priority basis to small and traditional fishers for open sea cage farming. Commercial-scale production of seed of potential species and their cage farming may be promoted in specifically identified ocean spaces, in particular in waters beyond 12 nautical miles, but with adequate safeguards and without affecting normal fishing, shipping and other maritime activities.

On the Indian coastline, which is more or less straight with large areas exposed to surf and tidal influence, cages have to be set up in open waters, exposing them to the elements of nature, as opposed to sites which are located in bays, coves and sheltered areas and are less vulnerable to high winds and currents. Therefore, one of the key requirements to popularize mariculture would also be the availability of sturdy cages and their moorings that can withstand the harsh marine environment.

While sufficient progress has been made in the development of technologies for breeding and larval rearing of a number of candidate species (*e.g.* cobia, silver pompano, Indian pompano, orange-spotted grouper, emperor sea-bream, John's snapper and vermiculated spinefoot, green and brown mussels and edible oyster), the availability of quality seed in sufficient quantities would kick-start the activities on a larger-scale and also make farming cost-effective. The role of R&D and industry is prime in this regard to cater to the needs of the mariculture farmers and entrepreneurs. Policy initiatives will provide the required support for the promotion of commercially viable seed production technologies, developing brood banks for candidate species and hatcheries to scale-up the seed production and availability to meet the requirements of the farmers. The PPP will also play an important role in the entire mariculture developmental process.

To ensure that mariculture is promoted in a congenial and environment-friendly manner, the policy would also ensure that through appropriate guiding documents, issues like access to fishing ground and encroachment of fishing areas are addressed so that it does not lead to conflict between fishers and mariculture farmers. Similarly, it would also be ensured that

carrying capacity studies and environmental impact assessments are undertaken for promoting sustainable mariculture in the coastal waters of the country.

The key areas for immediate intervention would include:

- *Preparing a blueprint for the development of mariculture taking into account areas suitable for Mariculture within and outside the territorial waters, suitable species, leasing policy, and support services in consultation with the coastal States and UTs.*
- *Promoting setting up of brood banks and commercial-scale hatcheries for seed production.*
- *Supporting R&D for cage fabrication that is based on local technology and is cost-effective to meet the requirements of the local fishers.*

6.3.4 Seaweed farming

Like aquaculture and mariculture, an untapped potential also exists in seaweed farming in the country. Globally, demand for seaweed is increasing for hydrocolloids, cosmetics and food supplements, and also as a potential biofuel source. This sub-sector offers immense scope of value creation along the value chain and can contribute significantly to the economy in the coastal areas of the country.

There are about 844 seaweed species in India with standing stock of about 58,715 mt. Seaweeds are abundant along the Tamil Nadu, Gujarat and Diu coasts and around the Lakshadweep and Andaman & Nicobar Islands. Rich seaweed beds occur around Mumbai, Ratnagiri, Goa, Karwar, Varkala, Vizhinjam and Pulicat in Tamil Nadu, Andhra Pradesh and Chilka in Orissa. However, continuous, indiscriminate, and unorganized harvesting has resulted in the depletion of the natural seaweed resources.

While the initial trial of seaweed farming was carried out during the early and mid-1980s, the activity is yet to popularize. Unlike other fisheries activities, local demand for seaweed for food purposes is non-existent. Nearly the entire domestic seaweed production is used in the industrial sector and therefore, the production would necessitate strong backward and forward linkages. The policy would ensure that such linkages are developed while ready-to-use technologies and other inputs are made available.

Suitable areas for seaweed farming have been identified by the Research Institutions in the country along the coastline of Gujarat, Diu, Lakshadweep, Tamil Nadu, and Andhra Pradesh. To promote seaweed farming and attract the fishers, initially, seaweed seedbanks that rely on sexual reproduction methods, complementing the presently adopted widely popular vegetative/asexual propagation methods can be set up on the Tamil Nadu coast where maximum seaweed farming is being currently carried out. Later, it can be extended to the coasts of Gujarat and other places along the coastline. The species that can be promoted on a larger-scale is *Kappaphycus alvarezii* and potential varieties of indigenous seaweeds (agarophytes and alginophytes).

The offshore waters also offer opportunities for raising seaweeds, especially in the Integrated Multi-Trophic Aquaculture Systems (IMTA) where finfish species such as cobia can be raised along with seaweeds. While moving towards large-scale seaweed farming, the harvesting of seaweed from the wild would be discouraged, unless sustainable management plans are in place.

Seaweed farming would be instrumental in creating livelihoods for fisher and other rural women. Women would be encouraged to form self-help groups/cooperatives/producer's associations to undertake seaweed production and processing through training, access to public finance, and marketing support.

The key areas for immediate intervention would include:

- *Promoting seaweed farming along the coastline, both seaward and land-ward, in the offshore waters and also in the Integrated Multi-Trophic Aquaculture (IMTA) systems.*
- *Setting up seaweed seed banks along the coastline to provide the raw material for raising the seaweed.*
- *Providing necessary wherewithal to attract fishers for seaweed farming.*
- *Supporting fisherwomen and other women from coastal areas to take up seaweed farming.*
- *Encouraging entrepreneurs to set up small and medium processing units to prepare products from seaweed.*
- *Facilitating the marketing of the produce to catalyze the industry.*

6.3.5 Ornamental fish farming

Ornamental fish is a relatively small but active component of the international fish trade. Maintaining an aquarium is a very popular hobby and the global trade of ornamental fishes is estimated at US$ 18-20 billion per year. India, owing to its diverse biological resources, has a great variety of commercial and potent ornamental fish resources. There are about 374 freshwater species and over 300 marine species suitable for the ornamental fishery.

While the value of the domestic market for the ornamental fishery is estimated at about Rs. 500 crores, the activity is limited to some specific areas in West Bengal, Tamil Nadu, Maharashtra, North-eastern States and the Islands. The policy would encourage setting up of domestic units to enhance the production of ornamental fishes, development of end-to-end supply chain and maintenance of habitats to boost rural livelihood. The policy would also encourage consumer education on the benefits of maintaining an aquarium and encourage the installation of aquaria in public institutions. Women and youth will receive focus through appropriate interventions.

Presently, it is estimated that about 85 percent of the ornamental species are harvested from the wild, chiefly from the hill streams of the North-eastern States or the prime coral habitats located along certain stretches of the coastline and the two Island Territories. As these wild-sourced species command higher price, the pressure on their harvesting is substantial and increasing. Policy interventions will ensure that such resources are optimally harvested and necessary controls will be put in place to ensure the sustainability of the wild ornamental germplasm.

The key areas for immediate intervention would include:

- *Setting up of end-to-end supply chain for ornamentals.*
- *Facilitating sourcing of broodstock from abroad.*
- *Encouraging commercial-scale operators for breeding and distribution of larvae to rearing households with buy-back arrangements.*

- *Promoting aquaria in homes and work places.*
- *Building entrepreneurship in rural women and youth in setting up medium and small-scale ornamental enterprises.*
- *Supporting medium and small-scale enterprises in building aquaria and other paraphernalia for the development of ornamental fisheries.*

6.3.6 Productive utilisation of inland saline soils

The area under salt-affected soils in the country is estimated to be about 6.73 million ha (mha) with the States of Gujarat (2.23 mha), Uttar Pradesh (1.37 mha), Maharashtra (0.61 mha), West Bengal (0.44 mha) and Rajasthan (0.38 mha) together accounting for almost 75 percent of the saline and sodic soils in the country. The other States where such resources exist include Punjab and Haryana. Irrational use of irrigation canal water for irrigation purposes is considered to be one of the major causes of soil salinization. Saline soils not only bring down productivity but also render the soil useless for agriculture and other purposes such as construction, etc. However, field-tested technologies are available for the utilization of such lands through farming of fin and shell fishes. Such technologies have already shown potential in saline areas of Haryana, Punjab, Rajasthan and UP where farmers have been successful in raising black tiger shrimp (*P. monodon*) and Pacific whiteleg shrimp, *L. vannamei*. Unlike coastal saline areas, there is also a negligible environmental impact as the inland saline areas have little alternate uses. However, the disposal of wastewaters from aquaculture would need due consideration to prevent any long-term impacts.

The key policy initiative would entail the identification of potential areas and their allocation for aquaculture; imparting best technologies to the farmers, including the sustainable use of groundwater wherever required; extension support and hand-holding; introduction of potential finfish species such as sea bass and mullets for risk reduction; sound mechanisms for treatment and disposal of wastewater from aquaculture; and establishing forward and backward linkages for the supply of seed and feed of species such as Pacific whiteleg shrimp, mullets and seabass and subsequent assistance in the marketing of the produce. Where larger areas suitable for farming in saline soils are available, the development of Special Aquaculture Zones through PPP arrangements would also be considered.

The key areas for immediate intervention would include:

- *Identifying potential areas and allocating them to farmers for taking up suitable aquaculture practices with necessary support services on a cluster basis.*
- *Facilitating availability of quality seed and feed to farmers taking up shrimp farming in saline areas.*
- *Supporting training and skill development of farmers and also in the marketing of the product.*

6.3.7 Maintaining aquatic animal health and biosecurity

Since the late seventies when scientific fish farming practices gained roots in the country, the growth of aquaculture has been phenomenal. Besides general health management concerns of the farmed species, the Epizootic Ulcerative Syndrome (EUS) in freshwater fishes and the White Spot Syndrome Disease (WSSD) in shrimp aquaculture have been the main causes of large-scale mortalities in the country in the past. Since aquaculture is poised

for much higher growth in the coming years and meet the food and nutritional needs of the population, it is also essential that all aspects of the farming system, including health management, are adequately taken care of.

In recent times, the intensification of farming practices, the unplanned introduction of exotic aquatic species and unregulated transboundary movement of live aquatic animals have been the main reasons behind many epidemics such as the WSSD. Further, inadequate scientific knowledge and lack of skills and capacities in handling such contingencies have compounded the problem.

Although many remedial measures and protocols and practices have been developed in recent years in tackling aquatic animal health issues, yet more concerted efforts encompassing good farm management practices, improved skills and capacities of the farm managers and workers, a national aquatic animal health monitoring and reporting mechanism, disease prevention and control preparedness, prioritized research requirements for aquatic animal health management, sound prophylactic and disease control measures, sanitary and phyto-sanitary aspects, improved capacity in decision-making in 'Import Risk Assessment' and finally effective community networking is necessary to improve the situation.

The key areas for immediate policy interventions would include:

- *Setting up of early warning system, conducting risk assessment, establishing surveillance and contingency plans and sound reporting on the occurrence of disease outbreaks.*
- *Strengthening national and state regulatory capacities.*
- *Promoting best practices for the management of aquatic animal health.*
- *Establishing Infrastructure in terms of quarantine facilities (in the public sector) and aquatic animal health laboratories and diagnostic capabilities in both the public and private sectors.*
- *Fostering research and developmental needs (including the development of PPP in aquatic animal health management).*
- *Establishing mechanisms for regional coordination to reduce the risks of transboundary issues in aquatic animal health management.*
- *Building capacities (Human Resource Development) at all levels.*
- *Strengthening of the network for fish disease and health monitoring network with the active participation of ICAR Institutes, State DoFs and Colleges of Fisheries.*
- *Setting up sound mechanisms for networking and information dissemination.*

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 MFRAs have come into existence from the early 1980s and barring a few States/UTs, the MFRAs were in place by the mid-1990s. Keeping in view the fact that most of the MFRAs 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 MFRAs 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 MFRAs 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 Intuitions 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.

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Acronyms

ABNJ	Areas Beyond National Jurisdiction
BMPs	Best Management Practices
CICEF	Central Institute of Coastal Engineering for Fishery
CIFNET	Central Institute of Fisheries Nautical and Engineering Training
DBTS	Direct Benefit Transfer Scheme
DoF	Department of Fisheries
EAFM	Ecosystem Approach to Fisheries Management
EBSAs	Ecologically and Biologically Significant Areas
EEZ	Exclusive Economic Zone
ETP	Endangered, Threatened and Protected
EUS	Epizootic Ulcerative Syndrome
FAO	Food and Agricultural Organization of United Nations
FFPOs	Fish Farmers Producers Organizations
FHs	Fishing Harbours
FLCs	Fish Landing Centres
FRP	Fibre Reinforced Plastic
FSI	Fishery Survey of India
FVC	Food Value Chain
GAP	Good Aquaculture Practices
GHGs	Green House Gases
GVA	Gross Value Added
HACCP	Hazard Analysis Critical Control Point
ICAR	Indian Council of Agricultural Research
ICG	Indian Coast Guard
ILO	International Labor Organization
IMBL	International Maritime Boundary Line
IMC	Indian Major Carps
IMO	International Maritime Organization
IT	Information Technology
IUU	Illegal, Unreported and Unregulated Fishing
MCS	Monitoring, Control and Surveillance
MFAH&D	Ministry of Fisheries, Animal Husbandry & Dairying
MFRAs	Marine Fishing Regulation Acts
MLS	Minimum Legal size
MMT	Million Metric Tons
MPAs	Marine Protected Areas
MSP	Marine Spatial Planning
NFP	National Fisheries Policy
NIFPHATT	National Institute of Post-Harvest Technology and Training
NM	Nautical Mile
NPOA-MCS	National Plan of Action for Monitoring, Control & Surveillance
PFZ	Potential Fishing Zone
PMMSY	Pradhan Mantri Matsya Sampada Yojana
PPP	Public Private Partnership
PY	Potential Yield
SHGs	Self-Help Groups
SSF	Small-Scale Fisheries
ST	Space Technology
TURFs	Territorial Use Rights for Fisheries
UTs	Union Territories
VMEs	Vulnerable Marine Ecosystems
WSSD	White Spot Syndrome Disease

***

Baseline Scenario[1]

A. General Setting

Parameter	Value
Area of the country (Million sq. km)	3.29
Population (Million)	1210.19
Total number of urban households* (Million)	80.33
Total number of rural households* (Million)	168.08
Average household size* (Urban) (Person)	4.9
Average household size* (Rural) (Person)	4.6

*** National Population Census 2011**

Fisheries Sector in Indian Economy

Grass Value Addition (GVA) and Growth Rate (%) (Constant Price: 2011-12)				
Years	GVA of fisheries Sector (Rs. in crore)	National GVA (Rs. in crore)	Y-O-Y Growth Rate(Fisheries Sector)	Y-O-Y Growth Rate(National)
2009-10	61,269	71,31,836	3.53	6.86
2010-11	64,663	77,04,514	5.54	8.03
2011-12	68,027	81,06,946	5.20	5.22
2012-13	71,362	85,46,275	4.90	5.42
2013-14	76,487	90,63,649	7.18	6.05
2014-15	82,232	97,12,133	7.51	7.15
2015-16	90,205	1,04,91,870	9.70	8.03
2016-17	99,627	1,13,28,285	10.45	7.97
2017-18	1,14,248	1,20,74,413	14.68	6.59
2018-19	1,28,011	1,28,03,128	12.05	6.04
Source: National Statistical Office, Ministry of Statistics and Programme Implementation, Government of India				

Growth Rate (%) of Grass Value Addition(GVA) (Constant Price: 2011-12)				
Years	Fisheries Sector (%)		National (%)	
	Y-O-Y Growth Rate	Average Growth Rate	Y-O-Y Growth Rate	Average Growth Rate
2009-10	3.53		6.86	
2010-11	5.54		8.03	
2011-12	5.20	**5.27**	5.22	**6.32**
2012-13	4.90		5.42	
2013-14	7.18		6.05	
2014-15	7.51		7.15	
2015-16	9.70		8.03	
2016-17	10.45	**10.87**	7.97	**7.16**
2017-18	14.68		6.59	
2018-19	12.05		6.04	
Source: National Statistical Office, Ministry of Statistics and Programme Implementation, Government of India				

[1] ***All data is pertaining to http://dof.gov.in/statistics and Handbook of Fisheries Statistics 2018 published by the Department of Fisheries, Ministry of Fisheries, Animal Husbandry and Dairying, Government of India unless otherwise mentioned.***

B. Inland Fisheries

Parameter	Value
Resources	
Rivers and Canals (km)	2,01,495.65
Small, Medium & Large Reservoir (Number)	9,058
Small, Medium & Large Reservoir (Ha)	35,24,724.18
Tanks and ponds (Ha)	24,78,263.21
Brackish water (Ha)	11,60,162.50
Beels (Ha)	4,24,850.93
Oxbow Lakes (Ha)	1,17,800.45
Derelict Water (Ha)	2,30,136.38
Other than Rivers and Canals (Ha)	3,00,724.52
Total water bodies excluding rivers and canals (Ha)	82,36,662.17
Fish Production in 2017-18 (Million tonnes)	8.90

C. Marine

Parameter	Value
Resources	
Length of Coastline (Km)	8,118
Exclusive Economic Zone (Million sq. km.)	2.02
Continental shelf area (approx.) (Million sq. km.)	0.53
Landing Centres	1,547
Fishing villages	3,477
Fisherfolk population	**3,774,577**
Fishing resources (potential yield)	
Demersal (mainland) (Tonnes)	2,298,281
Pelagic (mainland) (Tonnes)	2,631,827
Lakshadweep (excluding oceanic) (Tonnes)	14,490
A&N Islands (excluding oceanic) (Tonnes)	43,794
Oceanic (for entire EEZ) (Tonnes)	2,30,832
Others (Tonnes)	91,369
Total potential yield (Tonnes)	**5,310,593**
Employment	
Active fishermen (Number) (2016)	**927,081**
Fishing allied activities (Number) (2016)	**521,745**
Total engaged in fishing and allied activities (2016)	**1,448,826**
Registered deep sea going fishing vessels (2019) (Number)	**53**
Registered **motorized non-mechanical** (Number)	**136,920**
Registered **motorized mechanical** (Number)	**66,198**
Registered **non-motorized** (Number)	**65,876**
Total registered fishing vessels (Number)	**269,047**
Fish Production in 2017-18 (Million tonnes)	**3.69**

D. Fisher population

S.No.	States/UT's	Fishermen Population		
		Total	Marine	Inland
1	Andhra Pradesh	14,47,529	5,17,435	9,30,094
2	Arunachal Pradesh	24,015	-	24,015
3	Assam	25,24,106	-	25,24,106
4	Bihar	60,27,375	-	60,27,375
5	Chhattisgarh	2,20,355	-	2,20,355
6	Goa	10,545	12,651	-2,106
7	Gujarat	5,58,691	3,54,992	2,03,699
8	Haryana	1,18,455	-	1,18,455
9	Himachal Pradesh	11,806	-	11,806
10	Jammu & Kashmir	17,396	-	17,396
11	Jharkhand	1,40,897	-	1,40,897
12	Karnataka	9,74,276	1,57,989	8,16,287
13	Kerala	10,44,361	5,63,903	4,80,458
14	Madhya Pradesh	22,32,822	-	22,32,822
15	Maharashtra	15,18,228	3,64,899	11,53,329
16	Manipur	47,711	-	47,711
17	Meghalaya	16,567	-	16,567
18	Mizoram	6,289	-	6,289
19	Nagaland	7,958	-	7,958
20	Odisha	15,17,574	5,17,623	9,99,951
21	Punjab	7,591	-	7,591
22	Rajasthan	57,260	-	57,260
23	Sikkim	581	-	581
24	Tamil Nadu	12,83,751	7,95,708	4,88,043
25	Telangana	8,62,221	-	8,62,221
26	Tripura	7,761	-	7,761
27	Uttarakhand	8,352	-	8,352
28	Uttar Pradesh	39,00,005	-	39,00,005
29	West Bengal	32,36,261	3,68,816	28,67,445
30	A&N Islands	25,941	26,521	-580
31	Chandigarh	524	-	524
32	Dadra & Nagar Haveli, Daman & Diu	40,016	15,836	24,180
33	Delhi	617	-	617
34	Ladakh	22	-	22
35	Lakshadweep	6,518	27,934	-21,416
36	Puducherry	1,07,272	50,270	57,002
Total		2,80,11,649	37,74,577	2,42,37,072
	Total population of India			**1,37,13,60,350**
	Fishermen (% of total population)			2.04
	Marine fishermen (% of fisher population)			13.48
	Inland fishermen (% of total population)			86.52

E. Fisheries production and utilization

States/UTs wise Inland and Marine Fish Production during 2014-15 to 2018-19 (in lakhs Tonnes)																
S.No.	State/UT's	2014-15			2015-16			2016-17			2017-18			2018-19		
		Inland	Marine	Total	Inland	Marine	Total	Inland	Marine	Total	Inland	Marine	Total	Inland	Marine	Total
1	Andhra Pradesh	15.03	4.75	19.79	18.32	5.20	23.52	21.86	5.80	27.66	28.45	6.05	34.50	33.92	8.75	42.67
2	Arunachal Pradesh	0.04	0.00	0.04	0.04	0.00	0.04	0.04	0.00	0.04	0.04	0.00	0.04	0.05	0.00	0.05
3	Assam	2.83	0.00	2.83	2.94	0.00	2.94	3.07	0.00	3.07	3.27	0.00	3.27	3.31	0.00	3.31
4	Bihar	4.80	0.00	4.80	5.07	0.00	5.07	5.09	0.00	5.09	5.88	0.00	5.88	6.02	0.00	6.02
5	Chhattisgarh	3.14	0.00	3.14	3.42	0.00	3.42	3.77	0.00	3.77	4.57	0.00	4.57	4.89	0.00	4.89
6	Goa	0.03	1.15	1.18	0.05	1.07	1.12	0.04	1.14	1.18	0.06	1.18	1.24	0.05	1.15	1.20
7	Gujarat	1.11	6.98	8.10	1.12	6.97	8.10	1.17	6.99	8.16	1.34	7.01	8.35	1.43	6.99	8.42
8	Haryana	1.11	0.00	1.11	1.21	0.00	1.21	1.44	0.00	1.44	1.90	0.00	1.90	1.80	0.00	1.80
9	Himachal Pradesh	0.11	0.00	0.11	0.12	0.00	0.12	0.13	0.00	0.13	0.13	0.00	0.13	0.13	0.00	0.13
10	Jammu & Kashmir	0.20	0.00	0.20	0.20	0.00	0.20	0.20	0.00	0.20	0.21	0.00	0.21	0.21	0.00	0.21
11	Jharkhand	1.06	0.00	1.06	1.16	0.00	1.16	1.45	0.00	1.45	1.90	0.00	1.90	2.08	0.00	2.08
12	Karnataka	2.23	4.00	6.23	1.69	4.12	5.81	1.59	3.99	5.57	1.88	4.14	6.03	1.98	3.89	5.87
13	Kerala	2.02	5.24	7.26	2.11	5.17	7.28	1.61	4.31	5.93	1.48	4.14	5.63	1.66	5.49	7.14
14	Madhya Pradesh	1.09	0.00	1.09	1.15	0.00	1.15	1.39	0.00	1.39	1.43	0.00	1.43	1.73	0.00	1.73
15	Maharashtra	1.44	4.64	6.08	1.46	4.34	5.80	2.00	4.63	6.63	1.31	4.75	6.06	1.00	4.67	5.68
16	Manipur	0.31	0.00	0.31	0.32	0.00	0.32	0.32	0.00	0.32	0.33	0.00	0.33	0.32	0.00	0.32
17	Meghalaya	0.06	0.00	0.06	0.11	0.00	0.11	0.12	0.00	0.12	0.12	0.00	0.12	0.13	0.00	0.13
18	Mizoram	0.06	0.00	0.06	0.07	0.00	0.07	0.08	0.00	0.08	0.08	0.00	0.08	0.07	0.00	0.07
19	Nagaland	0.08	0.00	0.08	0.08	0.00	0.08	0.09	0.00	0.09	0.09	0.00	0.09	0.09	0.00	0.09
20	Odisha	3.36	1.33	4.70	3.77	1.45	5.21	4.55	1.53	6.08	5.34	1.51	6.85	5.07	2.52	7.59
21	Punjab	1.15	0.00	1.15	1.20	0.00	1.20	1.33	0.00	1.33	1.37	0.00	1.37	1.36	0.00	1.36
22	Rajasthan	0.45	0.00	0.45	0.42	0.00	0.42	0.50	0.00	0.50	0.54	0.00	0.54	0.56	0.00	0.56
23	Sikkim	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

24	Tamil Nadu	2.40	4.57	6.98	2.43	4.67	7.09	1.97	4.72	6.69	1.85	4.97	6.82	1.62	5.13	6.75
25	Telengana	2.68	0.00	2.68	2.37	0.00	2.37	1.99	0.00	1.99	2.70	0.00	2.70	2.94	0.00	2.94
26	Tripura	0.65	0.00	0.65	0.69	0.00	0.69	0.72	0.00	0.72	0.77	0.00	0.77	0.76	0.00	0.76
27	Uttarakhand	0.04	0.00	0.04	0.04	0.00	0.04	0.04	0.00	0.04	0.05	0.00	0.05	0.05	0.00	0.05
28	Uttar Pradesh	4.94	0.00	4.94	5.05	0.00	5.05	6.18	0.00	6.18	6.29	0.00	6.29	6.62	0.00	6.62
29	West Bengal	14.38	1.79	16.17	14.93	1.78	16.71	15.25	1.77	17.02	15.57	1.85	17.42	15.88	1.82	17.70
30	A and N Islands	0.00	0.37	0.37	0.00	0.37	0.37	0.00	0.39	0.39	0.00	0.39	0.40	0.00	0.41	0.41
31	Chandigarh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
32	D&Nagar Haveli	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
33	Daman and Diu	0.00	0.32	0.32	0.00	0.23	0.23	0.01	0.23	0.24	0.00	0.24	0.25	0.00	0.24	0.25
34	Delhi	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01
35	Lakshadweep	0.00	0.13	0.13	0.00	0.16	0.16	0.00	0.30	0.30	0.00	0.21	0.21	0.00	0.22	0.22
36	Puducherry	0.06	0.42	0.47	0.07	0.47	0.54	0.04	0.46	0.50	0.07	0.42	0.50	0.07	0.45	0.52
India		66.91	35.69	102.60	71.62	36.00	107.62	78.06	36.25	114.31	89.02	36.88	125.90	95.82	41.76	137.58
Source: Department of Fisheries, State Govt. / UTs Administration																

Annual per capita consumption of fish and shrimp[E] (Urban) (Kg)	3.00
Annual per capita consumption of fish and shrimp[E] (Rural) (Kg)	3.24
Number of urban household consumes fish[E] (Million)	16.87
Number of rural household consumes fish[E] (Million)	44.54

E = estimated from the Handbook of Fishery Statistics 2018 and national Population Census 2011.

File No.j-17001/5/2020-Fy
Government of India
Ministry of Fisheries, Animal Husbandry and Dairying
Department of Fisheries
*****

Dated: 31st December, 2020
Krishi Bhawan, New Delhi

OFFICE MEMORANDUM

Subject: 'Draft National Fisheries Policy' – inviting comments from stakeholders -reg.

The undersigned is directed to refer to the **Draft National Fisheries Policy** attached herewith. The comments of stakeholders are invited on the above-mentioned 'Draft National Fisheries Policy' by 20.01.2021. The comments may be sent through e.mail or by post on the following address:

Joint Secretary (Fisheries)
Department of Fisheries,
Ministry of Fisheries, Animal Husbandry & Dairying
Room No. 490, Krishi Bhawan,
New Delhi-110 001
E.mail: jsfy@nic.in

31/12/2020
(Dr. P. Pual Pandian)
Fisheries Development Commissioner (i/c)

Senior Technical Director (NIC), Ministry of Fisheries, Animal Husbandry & Dairying, Krishi Bhawan, New Delhi; with request to upload the copy of 'Draft National Fisheries Policy' on the website.

Copy to:

1. Sr. PPS to Secretary, D/o Fisheries
2. PPS to JS (Fisheries)