MATSYA SAMPADA

Newsletter

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सत्यमेव जयते

Department of Fisheries
Ministry of Fisheries, Animal Husbandry & Dairying
Government of India

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MESSAGES

Shri Giriraj Singh
Hon'ble Minister, Ministry of Fisheries,
Animal Husbandry & Dairying

It gives me immense pleasure to launch the first edition of the Newsletter 'Matsya Sampada' brought out by the Department of Fisheries under my Ministry. The Newsletter would help stakeholders stay up-to-date with the latest information on government policies and programmes, upcoming events and progress of projects related to fisheries sector.

Recently, our government under the leadership of Honorable Prime Minister Shri Narendra Modi ji has launched a new Flagship Scheme i.e. the Pradhan Mantri Matsya Sampada Yojana (PMMSY) at an investment of Rs.20,050 crore for holistic development of fisheries sector in the country. Being the largest ever investment in fisheries sector, the PMMSY envisages an additional 70 lakh tons fish production, Rupees one lakh crores fisheries exports, generation of 55 lakh employment over next five years, etc.

Achieving the ambitious targets under PMMSY require enhancement of production and productivity, technology infusion, quality seed and feed, species diversification, etc. along with a collaborative and concerted efforts between the government and the stakeholders. All these endeavours call for an effective platform to quickly reach out to the stakeholders in disseminating new technologies, governmental policies and programmes and the Newsletter 'Matsya Sampada' is a step in the right direction.

I am confident, it would serve as one of the important medium for disseminating information among the stakeholders especially fishers, fish farmers, youth and entrepreneurs across the country.

I extend my compliments to Dr. Rajeev Ranjan, IAS, Secretary (Fisheries), Department of Fisheries for bringing out the first edition of 'Matsya Sampada' in a short span of time.

I take this opportunity to extend my best wishes to the stakeholders and readers.

Shri Pratap Chandra Sarangi
Hon'ble Minister of State, Ministry of
Fisheries, Animal Husbandry & Dairying

I am happy to inform that the Department of Fisheries is bringing out the Newsletter 'Matsya Sampada'. The launch of this Newsletter is timely and much needed to communicate the governmental policies and programmes in fisheries sector including the good works being done both by government as well as the private sector.

Fish is an important source of food and affordable nutrition especially to the coastal communities in our country. India with its vast fisheries resources both marine and inland offers immense opportunities for growth and development of the sector. The huge untapped potential for capture and culture fisheries can be optimally harnessed by policy and financial support. Towards this end, our government has recently launched the flagship scheme Pradhan Mantri Matsya Sampada Yojana (PMMSY) for sustainable and responsible development of fisheries sector. I am confident the Newsletter would also help in publicizing the various initiatives under PMMSY.

I am sure that the Newsletter will prove to be a wonderful platform for communication to all stakeholders. On this occasion, I would like to extend my appreciation to Dr. Rajeev Ranjan, IAS, Secretary (Fisheries) and his team for this initiative.

Dr. Rajeev Ranjan, IAS
Secretary, Department of Fisheries,
Ministry of Fisheries, Animal
Husbandry & Dairying

It gives me immense pleasure to introduce the first edition of the Newsletter, 'Matsya Sampada' published by the Department of Fisheries. The Newsletter is an outcome of our endeavour to inform and educate stakeholders about the latest policies, programmes and initiatives of the Government of India with regard to the sunrise fisheries sector.

'Matsya Sampada' is being published at a time when the Government of India has approved the Pradhan Mantri Matsya Sampada Yojana (PMMSY) at an investment of Rs 20,050 crore for the sustainable and responsible development of the fisheries sector in the country. The investment under PMMSY is the highest ever in the fisheries sector and by far the most important moment in the journey of the fisheries development. With an array of diverse and comprehensive interventions along the fisheries value chain, the Scheme is likely to take our fisheries sector to the next level.

I am confident that this Newsletter would serve as a useful platform for showcasing the best practices, latest developments and success stories in the fisheries sector in general and under PMMSY in particular.

I congratulate our team and appreciate their efforts in publishing the Newsletter.

From the Desk of Editorial Board

Welcome to the first edition of the Newsletter, 'Matsya Sampada' published by the Department of Fisheries. It is our constant endeavor to inform all stakeholders about the government policies and programs for the development of the fisheries sector in the country.

The fisheries sector is the fastest-growing one in India. It not only provides food and nutrition security but also gives employment and income to about 28 million people. The government of India has given a fillip to the sector by announcing a new Flagship Scheme i.e. the Pradhan Mantri Matsya Sampada Yojana (PMMSY) at an investment of Rs.20,050 crore.It requires a lot of effort to achieve the ambitious goals set by Government. Thus, an effective medium is required to interact with different stakeholders and highlight success stories across the country.

We believe that the Newsletter will be an authentic source of information about government policies and reforms in the fisheries sector. We give useful information in a concise manner to our readers. Also, the inspiring stories of individual farmers, entrepreneurs, and FPOs will certainly create a positive impact.

We appreciate the valuable guidance and suggestions of Secretary (Fisheries) in the selection of contents of the newsletter. We also extend sincere thank to officers/ officials of the department for the contribution in making the Newsletter. We are sure that the newsletter will be very useful to all our stakeholders.

FISHERIES SECTOR OF INDIA

The success of the Indian fisheries sector in recent years is worth celebrating. The gains of India's fisheries sector are due to collaborative and concerted efforts of both government and a vibrant private sector. The rapid growth of aquaculture, especially shrimp sector in the last one decade is one of the finest examples of contribution of private sector around the fulcrum of robust governmental policies and programmes. Today, we are the leading shrimp exporting nation in the world showing double digit growth. The immediate reports of overall export performance for the 2019-20 for shrimp sector are quite encouraging and it is expected that the growth of shrimp exports will surpass the achievement of 2018-19. While COVID-19 pandemic has posed challenges to the shrimp sector, the signs of rejuvenation are visible and Department is confident the shrimp sector will rebound in next few months.

While the fisheries sector brought cheers on many fronts, it also poses several challenges. The lives and livelihoods of our traditional marine fishers are intertwined with oceans and seas since time immemorial. Overcrowding in near shore waters threatens the sustainability of our marine fisheries resources. This calls for developmental interventions and an enabling regulatory framework that would facilitate spreading of fishing activities deeper into the Exclusive Economic Zone (EEZ).

Implementation of sustainable fishing practices, modernization of fishing vessels, comprehensive vessel monitoring system for assisting fishers during distress, fisheries management plans supported by robust regulatory and managerial framework are urgently required for responsible and sustainable marine fisheries management. Empowerment of our traditional fishers to optimally harness deep sea and oceanic resources, especially the tuna resources in EEZ and high seas which fetch high value in the international market is a priority area. Focused development of fisheries in Andaman and Nicobar Islands and Lakshadweep Islands is essential to optimally harness the resources and economically empower the fishers in these remote areas.

Marine fishing is considered as one of the riskiest professions straddled with risk to life. It is essential to show our traditional marine fishers' alternative livelihoods in order to gradually wean away them from the occupation of risky capture fisheries. Marine cage cultivation, seaweed cultivation, Recirculatory Aquaculture Systems, and Brackish water aquaculture offer promising options in this regard. Modernization of marine fisheries coupled with sustainable fishing practices would be a priority area for the government for the next five years.

Emerging concerns regarding antibiotic residues in shrimp needs to be effectively addressed in order to provide quality food and sustain exports. A system of seed and feed certification, accreditation of hatcheries, end to end traceability from 'catch to consumer' needs to be urgently put in place and vigorously implemented.

The rapid growth of culture fisheries has enhanced the sector's vulnerability to diseases. Aquatic diseases are trans boundary in nature. A regulatory framework for prevention, control and spread of aquatic animal diseases, prudent use of inputs in aquaculture, import of aquatic animal and their products and for meeting India's international obligations needs urgent

intervention. A robust network of Aquatic Animal Health Management that effectively addresses the emergence of new and trans-boundary aquatic diseases especially in aquaculture system would be a priority area for governmental support and intervention. The mitigation and control of aquatic diseases necessitates a coordinated and concerted effort between the center and states.

Interventions aimed at technology infusion and water management such as High-density aquaculture in ponds, Re-circulatory Aquaculture System (RAS), Bio-floc, aquaponics, cage culture etc. need to be promoted in order to harvest 'more crop per drop'. It is also essential to promote modern methods of fish cultivation and fishing through application of modern scientific methods. There is need to develop eco-friendly diversified fishing practices for responsible and sustainable fishing.

Reservoirs are usually called 'sleeping giants' whose potential is largely untapped. Stocking of reservoirs with quality fingerlings of suitable species, integrated development of reservoirs by creation of in-situ hatcheries and fingerlings rearing units for production of quality fingerlings, etc. along with cage cultivation are required for optimally harnessing the reservoirs.

There is considerable scope to raise incomes in fisheries sector by modernizing and strengthening the value chain. One of the key concerns is huge post-harvest losses and wastage which needs to be addressed urgently for enhancing the incomes of the stakeholders. Post-harvest hygienic handling of fish with efficient cold chain and storage are essential for enhancement of shelf life and providing quality fish to consumers. Fishing harbours and fish landing centres which are playing a vital role in ensuring safe landing, berthing and allied activities including institutional arrangements for their development and management are some thrust areas required to be addressed. Modern fish markets, processing units, value addition, transportation, branding, eco-labelling of fish from 'bait to plate' through creation of fish documentation and network system are essential for ensuring quality and increasing profitability in the post-harvest operations, improvement of the overall efficiency of the value chain and for benchmarking with global best practices.

A robust fisheries extension system is essential for dissemination of information and knowledge about the best practices as well as the schemes and programmes amongst the stakeholders. It is essential to formulate fisheries management plans along with regulatory framework towards effective fisheries governance to ensure sustainable and responsible development through an ecosystem approach.

Effective governance of the 'Blue Economy' is required to strike a sustainable balance between the utilization of marine fisheries resources for securing food security of the nation and livelihoods of coastal fisher communities on one hand and protection of marine ecosystems on the other.

In order to meet the compelling demands and to ensure a growth trajectory that fulfils the requirements of today and leaves an equally better fishery for tomorrow, it is necessary to develop a policy framework, which is based on the cardinal principles of equity and equality and adopts a people centric and participatory approach; mainstreams gender, and maintains inter-generational equity.

However, the full potential of the fisheries sector is yet to be realized due to critical gaps in quality inputs, fish genetics, investment, infrastructure, value addition, technological know-how and skilled manpower. In order to consolidate the fisheries sectoral gains, sustain growth and address some of the critical gaps in the sector in a sustainable, responsible, inclusive, and equitable manner, Government of India has launched the Pradhan Mantri Matsya Sampada Yojana (PMMSY) at an investment of Rs 20,050 crore for the sustainable and responsible development of the fisheries sector in the country.

Performance of fisheries sector

India is one of the largest fish producing countries in the world and shares 7.58% in the global production. The fish production in India has registered an average annual growth of 7.53% during last 5 years and stood at an all-time high of 137.58 lakh metric tons during the year 2018-19. The Gross Value Added (GVA) of fisheries sector in the national economy during the year 2018-19 stood at Rs 2,12,915 crores (current basic prices) which constituted 1.24% of the total National GVA and 7.28% share of Agricultural GVA. The Fisheries sector of India has shown impressive growth with an average annual growth rate of 10.88% (constant price: 2011-2012) during the year 2014-15 to 2018-19. The export of marine products stood at 13.93 lakh metric tons and valued at Rs.46,589 crores (USD 6.73 billion) during the year 2018-19 with an impressive average annual growth rate of about 10% in recent years.

The marine fisheries potential is estimated at 5.31 million tonnes as against present production of 4.17 million tonnes during the year 2018-19 (harnessing nearly 78% of the estimated potential) and its activities are spread along the country's vast coastline with 2.02 million square km Exclusive Economic Zone (EEZ) and continental shelf area of 0.53 million sq.km. Besides, India is also bestowed with varied inland fisheries potential resources in the form of rivers and canals (1.95 lakh km), floodplain lakes (8.12 lakh hectares), ponds and tanks (24.1 lakh hectares), reservoirs (31.5 lakh hectares), brackish water (12.4 lakh hectares), saline/alkaline affected areas (12 lakh hectares) etc., with estimated fish production potential of about 17 million tonnes as against production of 9.58 million tonnes during 2018-19 (harnessing only 56.3% of potential).

Fisheries and aquaculture remain an important source of food, nutrition, employment and income for millions, especially for the rural population. In fact, the sector provides livelihood to about 28 million fishers and fish farmers at the primary level and twice the number along the value chain. Fish being an affordable and rich source of animal protein, is one of the healthiest options to mitigate hunger and nutrient deficiency. It has immense potential to enhance incomes and usher in economic prosperity to stakeholders. The sector has immense potential to double the fishers and fish farmers' incomes as envisioned by government and usher in economic prosperity.

India has given sustained and focused attention to the fisheries sector through policy and financial support to accelerate its development in a sustainable, responsible, inclusive and equitable manner. Further, since majority of fisher folk directly depend on the sector, especially the small scale and artisanal fishers and continue to fall behind the national indices of socio-economic development, it is essential to provide requisite impetus towards amelioration of poverty and backwardness among these marginalized and vulnerable communities and promote their holistic development and welfare.

Pradhan Mantri Matsya Sampada Yojana (PMMSY)

Foreseeing the immense potential for development of fisheries and for providing focused attention to the sector, the Government in its Union Budget, 2019-20 has announced a new scheme, the Pradhan Mantri Matsya Sampada Yojana (PMMSY).

A scheme to bring about Blue Revolution through sustainable and responsible development of fisheries sector in India has been launched with highest ever investment of Rs. 20,050 crores, comprising of Central share of Rs. 9407 crore, State share of Rs 4880 crore and beneficiaries contribution of Rs. 5763 crore. PMMSY will be implemented over a period of 5 years from FY 2020-21 to FY 2024-25 in all States/Union Territories.

The scheme intends to address critical gaps in fish production and productivity, quality, technology, post-harvest infrastructure and management, modernization and strengthening of value chain, traceability, establishing a robust fisheries management framework and fishers' welfare. It would also address issues like low productivity in inland aquaculture, disease, sustainability of marine fisheries, sanitary and phyto-sanitary matters that impact the competitiveness of India's exports along with global bench marking.

Aims and objectives of PMMSY

(a) Harnessing of fisheries potential in a sustainable, responsible, inclusive and equitable manner

(b) Enhancing of fish production and productivity through expansion, intensification, diversification and productive utilization of land and water

(c) Modernizing and strengthening of value chain - post-harvest management and quality improvement

(d) Doubling fishers and fish farmers incomes and generation of employment

(e) Enhancing contribution to Agriculture GVA and exports

(f) Social, physical and economic security for fishers and fish farmers

(g) Robust fisheries management and regulatory framework

Implementation strategy

a) The PMMSY will be implemented as an umbrella scheme with two separate Components namely

(a) Central Sector Scheme (CS) and (b) Centrally Sponsored Scheme (CSS).

b) Under the Central Sector Scheme Component an amount of Rs. 1720 crores has been earmarked. Under the Centrally Sponsored Scheme (CSS) Component, an investment of Rs. 18330 crores has been envisaged with in turn is segregated into Non-beneficiary oriented and Beneficiary orientated sub-components/activities under the following three broad heads:

(i) Enhancement of Production and Productivity

(ii) Infrastructure and Post-harvest Management

(iii) Fisheries Management and Regulatory Framework

c) Majority of the activities under the Scheme would be implemented with active participation of States/ UTs. A well-structured implementation framework would be established for effective planning and implementation of PMMSY. This inter-alia includes creation of State Programme Units in all States/UTs & District Programme Units and Sub-District Programme Unit in high fisheries potential districts.

d) For optimal outcomes, 'Cluster or area-based approach' would be followed with requisite forward and backward linkages and end to end solutions. Suitable linkages and convergence will be fostered with other centre and state government schemes wherever feasible.

e) Thrust will be given for infusing new and emerging technologies like Re-circulatory Aquaculture Systems, Biofloc, Aquaponics, Cage Cultivation etc. to enhance production and productivity, quality, productive utilization of waste lands and water for Aquaculture.

f) Special focus on Coldwater fisheries development and expansion of Aquaculture in Brackish Water and Saline Areas.

g) Activities like Mariculture, Seaweed cultivation and Ornamental Fisheries having potential to generate huge employment will be promoted.

h) Focused attention would be given for fisheries development in Jammu and Kashmir, Ladakh, Islands, Northeast, and Aspirational Districts through area specific development plans.

i) PMMSY envisages promotion of high value species, establishing a national network of Brood Banks for all commercially important species, Genetic improvement and establishing Nucleus Breeding Center for self-reliance in Shrimp Brood stock, organic aquaculture promotion and certification, good aquaculture practices, end to end traceability from 'catch to consumer', May be difficult in the Indian set up. Global Standards and Certification, Accreditation of Brood banks, Hatcheries, Farms, residues issues and aquatic health management supported by a modern laboratory network.

j) PMSSY envisages development of Coastal fisher communities in a holistic manner through integrated modern coastal fishing villages with necessary infrastructure.

k) Collectivization of fishers and fish farmers through Fish Farmer Producer Organizations (FFPOs) to increase bargaining power of fishers and fish farmers is a key feature of PMMSY.

l) Aqua parks as hub of fisheries and aquaculture activities with assured, affordable, quality inputs under one roof, post-harvest infrastructure facilities, business enterprise zones, logistic support, business incubation centers, marketing facilities etc.

m) Insurance coverage for fishing vessels has been proposed for the first time. Annual Livelihood support for fishers during ban/lean period would be provided.

n) Well-structured extension support services are envisaged under PMMSY. Youth would be engaged in fisheries extension by creation of 3347 Sagar Mitras in coastal fisher villages. Besides, large number of Fisheries Extension Services Centers would be set up in private space to create job opportunities to young professionals.

o) Major investments in construction and modernization of Fishing Harbours and Landing centers for hygienic handling of fish, urban marketing infrastructure to deliver quality and affordable fish, development of state of the art whole sale fish markets, retail markets. E-marketing and E-trading of Fish etc.

p) Support will be provided for safety and security of fishers at sea, acquisition of technologically advanced fishing vessels for fishermen for promotion of deep-sea fishing, up gradation of Fishing vessels for improving the export competitiveness, communication and/or

tracking devices and Bio-toilets in fishing vessels.

q) Private sector participation, development of entrepreneurship, business models, promotion of ease of doing business, innovations and innovative project activities including start-ups, incubators etc. in fisheries sector.

Major impact, including employment generation potential

(a) Enhancing fish production from 137.58 lakh metric tons (2018-19) to 220 lakh metric tons by 2024-25.

(b) Sustained average annual growth of about 9% in fish production

(c) An increase in the contribution of GVA of fisheries sector to the Agriculture GVA from 7.28% in 2018-19 to about 9% by 2024-25.

(d) Double export earnings from Rs.46,589 crores (2018-19) to about Rs.1,00,000 crores by 2024-25.

(e) Enhancing productivity in aquaculture from the present national average of 3 tonnes to about 5 tonnes per hectare.

(f) Reduction of post-harvest losses from the reported 20-25% to about 10%.

(g) Enhancement of the domestic fish consumption from about 5-6 kg to about 12 kg per capita per year.

(h) Generate about 55 lakhs direct and indirect employment opportunities in the fisheries sector along the supply and value chain.

Intended beneficiaries: Fishers, Fish farmers, Fish workers, Fish vendors, SCs/STs/Women/Differently abled persons, Fisheries Cooperatives/Federations, Fish Farmer Producer Organizations (FFPOs), Fisheries Development Corporations, Self Help Groups (SHGs)/Joint Liability Groups (JLGs) and Individual Entrepreneurs.

Implementation framework:

Central Level: A Central Apex Committee (CAC) under the Chairpersonship of Secretary, Department of Fisheries, Government of India (GoI) with members drawn from relevant line Ministries/Departments/organizations of GoI including DoF will steer the overall implementation of the PMMSY including its monitoring and review.

A Project Appraisal Committee (PAC) comprising of domain experts and headed by the Chief Executive, National Fisheries Development Board (NFDB) will appraise and recommend the projects/proposals under the component of Centrally Sponsored Scheme sent by States and UTs for approval of the Department of Fisheries. A Project Monitoring Unit (PMU) will be set up within NFDB for monitoring the projects/activities of PMMSY on regular basis. Besides, the Department of Fisheries, GoI will also monitor and evaluate the implementation of the PMMSY periodically through a Project Monitoring and Evaluation Unit (PMEU) headed by Joint Secretary in the Department.

State/District Level: Under PMMSY well-structured Implementation framework would be created for effective implementation right up to District and sub-district level by creation of institutional mechanisms. State Programming Units, District Programme Units and Sub-district programme Unit would be created in some of the high fisheries potential districts based on a set of parameters. It is expected that these arrangements would give the much-needed focused attention and a mission mode direction to PMMSY. PMMSY envisages development of Fisheries Management Plans, Integrated District Fisheries Development Plans under the leadership of District Collector/Deputy Commissioner through a District Level Committee, which will be consolidated at the State/UT level into State Fisheries Development Plans, for effective planning; optimal utilization of resources and integrating with other schemes and programmes.

District Level Committee (DLC) headed by District Collector/ Deputy Commissioner at the district level will be respobnsible for the preparation and approval of Annual District Fisheries Plan, smooth implementation, supervision and monitoring of PMMSY. A State Level Approval and Monitoring Committee (SLAMC) headed by the Secretary in-charge of Department of Fisheries of State/UT will be responsible approval of the State fisheries plans, fisheries development proposals and overall responsible for smooth implementation, supervision and monitoring of PMMSY at State/UT level. Wherever considered essential, a District Program Unit (DPU) would be created with necessary support structure for assisting the district fisheries establishment and the DLC in implementation of PMMSY. Besides, wherever required, for assisting the DPU, necessary institutional arrangements at sub-district level would be created. The District's fisheries potential, fishers' population, backwardness etc. would be some of the criteria for identification of districts for establishing such institutional arrangements. At the State/UT level a State Program Unit (SPU) would be created with necessary support structure for assisting the State/UT fisheries establishment and the SLAMC in implementation of PMMSY.

Beneficiary Oriented Sub-components and activities under the Centrally Sponsored Components of PMMSY

A. Production and productivity enhancement

1. Development of Inland Fisheries and Aquaculture

1.1 Establishment of New Freshwater Finfish Hatcheries

1.2 Establishment of New Freshwater Scampi Hatcheries
1.3 Construction of New Rearing ponds including Biofloc
1.4 Construction of New Grow-out ponds including Biofloc
1.5 Inputs for fresh water Aquaculture including Composite fish culture, Scampi, Pangasius, Tilapia etc. (including Biofloc)
1.6 Establishment of need based New Brackish Hatcheries (shell fish and fin fish)
1.7 Construction of New ponds for Brackish Water Aquaculture including Biofloc
1.8 Construction of New ponds for Saline /Alkaline areas including Biofloc
1.9 Inputs for Brackish Water Aquaculture (including Biofloc)
1.10Inputs for Saline /Alkaline Water Aquaculture (including Biofloc)
1.11 Stocking of Fingerling (FL) in Wetlands
1.12 Stocking of Fingerlings in Reservoirs
2. Development of marine fisheries including mariculture and seaweed cultivation
2.1 Establishment of Small Marine Finfish Hatcheries
2.2 Construction of large Marine Finfish Hatcheries
2.3 Marine Finfish Nurseries
2.4 Establishment of Open Sea cages
2.5 Establishment of Seaweed culture rafts including inputs
2.6 Establishment of Seaweed culture with Monoline/ tubenet Method including inputs
2.7 Bivalve cultivation (mussels, clams, pearl etc.)
3. Development of fisheries in North-eastern and Himalayan States/UTs (besides the below activities, the North-eastern and Himalayan States/UTs will also be assisted under other sub-components/ activities envisaged under PMMSY that are common to all states/UTs).
3.1 Establishment of Trout Fish Hatcheries
3.2 Construction of Raceways
3.3 Inputs for Trout Rearing Units
3.4 Construction of New Ponds in Himalayan Region.
3.5 Establishment of Mini RAS for Cold water Fisheries
3.6 Establishment of Medium RAS for cold water fisheries
3.7 Input support for integrated fish farming (paddy cum fish cultivation, livestock cum fish, etc)
3.8 Establishment of Cages in cold water regions
4. Development of ornamental and recreational fisheries
4.1 Backyard Ornamental fish Rearing unit (both Marine and Fresh water)
4.2 Medium Scale Ornamental fish Rearing Unit (Marine and Freshwater Fish)
4.3 Integrated Ornamental fish unit (breeding and rearing for fresh water fish)
4.4 Integrated Ornamental fish unit (breeding and rearing for marine fish)
4.5 Establishment of Fresh water Ornamental Fish Brood Bank
4.6 Promotion of Recreational Fisheries
5. Technology infusion and adaptation
5.1 Establishment of large RAS
5.2 Establishment of Medium RAS
5.3 Establishment of small RAS
5.4 Establishment of Backyard mini RAS units
5.5 Installation of Cages in Reservoirs
5.6 Pen culture in open water bodies

B. Infrastructure and post-harvest management

6. Post harvest and cold chain infrastructure
6.1 Construction of Cold Storages/Ice Plants
6.2 Modernization of Cold storage /Ice Plant
6.3 Refrigerated vehicles
6.4 Insulated vehicles
6.5 Live fish vending Centres
6.6 Motor cycle with Ice Box
6.7 Cycle with Ice Boxes
6.8 Three wheeler with Ice Box including e-rickshaws for fish vending
6.9 Fish Feed Mills (mini)
6.10 Fish Feed Plants
7. Markets and marketing infrastructure
7.1Construction of fish retail markets including ornamental fish/aquarium markets.
7.2Construction of fish kiosks including kiosks of aquarium/ornamental fish
7.3 Fish Value Add Enterprises Units
7.4 E-platform for e-trading and e-marketing of fish and fisheries products

8. Development of deep sea fishing

8.1 Support for acquisition of deep sea fishing vessels for traditional fishermen

8.2 Up gradation of existing fishing vessels for export competency

8.3 Establishment of Bio-toilets in mechanised fishing vessels

9. Aquatic health management

9.1Establishment of Disease diagnostic and quality testing labs

9.2 Disease diagnostic and quality testing Mobile labs/ clinics

C. Fisheries management and regulatory framework

10. Monitoring, Control and Surveillance (MCS)

10.1 Communication and lor Tracking Devices for traditional and motorized vessels like VHF/DAT/ NAVIC/Transponders etc.

11. Strengthening of safety and security of fishermen

11.1 Support for providing safety kits for fishermen of Traditional and motorized fishing vessels (other than Communication and/or Tracking Device mentioned at 10.1 above)

11.2 Providing boats (replacement) and nets for traditional fishermen

11.3 Support to Fishermen for PFZ devices and network including the cost of installation and maintenance etc.

12. Fisheries extension and support services

12.1 Extension and support Services

13. Livelihood and nutritional support for fishers for conservation of fisheries resources

13.1 Livelihood and nutritional support for socio-economically backward active traditional fishers' families for conservation of fisheries resources during fishing ban/lean period.

14 Insurance of Fishing Vessels and Fishermen

14.1 Insurance premium subvention for fishing vessels and Insurance premium for fishers

Non-beneficiary Oriented Activities under the Centrally Sponsored Components of PMMSY

A. enhancement of fish production and productivity

1. Development of inland fisheries and aquaculture

1.1 Establishment of Brood Banks (including seed banks for seaweeds)

1.2 Integrated Development of Reservoirs

1.3 Integrated Aqua Parks

2. Development of fisheries in the Himalayan and North-Eastern States/UTs

2.1 Support to states for import of germplasm

B. Infrastructure and post-harvest management

3. Development of fishing harbours and fish landing centres

3.1 Construction/Expansion of Fishing Harbours.

3.2 Modernization/Up-gradation of existing Fishing Harbours

3.3 Modern Integrated Fish Landing Centres

3.4 Maintenance of Dredging of existing FHs

4. Markets and marketing infrastructure

4.1 Construction of state of art whole sale fish market.

4.2 Organic Aquaculture Promotion and Certification

4.3 Promotion of Domestic fish consumption, branding, Fish mark, GI in fish, Himalayan Trout-Tuna branding, Ornamental fishes promotion and branding etc.

5. Development of deep sea fishing

5.1 Promotion of technologically advanced vessels to marine fishermen/fishermen groups through State/ UT Governments

6. Integrated modern coastal fishing villages

6.1 Integrated modern coastal fishing villages

7. Aquatic health management

7.1 Aquatic Referral Labs for Quality testing and Disease Diagnostics

C. Fisheries management and regulatory framework

8. Monitoring, Control and Surveillance (MCS)

8.1 Common Infrastructure for MCS including Hub stations, towers, IT based software, peripherals, networks and operations etc.

9. Fisheries extension and support services

9.1 Multipurpose Support Services - Sagar Mitra (performance based incentives along with requisite IT/Communication support like Tablet/mobile telephony etc. would be provided to Sagar Mitras)

Central Sector Scheme Sub-components/ activities with 100% central funding under the PMMSY

1. Genetic improvement programmes and Nucleus Breeding Centers (NBC).

2. Innovations and Innovative projects/activities, Technology demonstration including startups, incubators and pilot projects.

3. Training, Awareness, Exposure and Capacity Building.
4. Aquatic Quarantine Facilities.
5. Modernization of Fishing Harbours of central government and its entities.
6. Support to National Fisheries Development Board (NFDB), Fisheries Institutions and Regulatory Authorities of Department of Fisheries, Government of India and need based assistance to State Fisheries Development Boards.
7. Support for survey and training vessels for Fisheries Institutes including dredger TSD Sindhuraj owned by the DoF and GoI.
8. Disease Monitoring and Surveillance Network.
9. Fish data collection, fishers' survey and strengthening of fisheries database.
10. Support to security agencies to ensure safety and security of marine fishermen at sea.
11. Fish Farmer Producer Organizations/Companies (FFPOs/Cs).
12. Certification, Accreditation, Traceability and Labeling.

Ornamental fish keeping and its propagation has been an interesting activity for many people, which provide not only aesthetic pleasure but also financial openings.

Ornamental Fisheries Development in India: Supporting income, livelihood and employment generation

Global trade:

Out of the total 180 billion U$D fish trade, roughly 24 billion U$D accounts from ornamental fish (15%). Singapore is the first amongst the leading traders in Ornamental fish. India's share is less than 1 percentage despite its great scope for development.

Current Scenario in India:

Presently, the value of domestic Aquarium trade is estimated at about Rs.500 crore (2019-20), which provides livelihood support to around 5.0 lakh households. The export was valued at around Rs. 8.40 crore (2017-18), with an average increase of 11.6% per year. The main production centers are in Kolkata, Chennai, and Kochi. There are around 5,000 production units, mainly in West Bengal (55%), Tamil Nadu (30%), Kerala (5%), Maharashtra and other coastal States (7%), North East and Island States (3%). The size of ornamental fish production units is mainly small and cluster based. Its main market is metro and

major cities, where there are about 6,000 aquarium shops. The aquarium hobbyists are estimated at around 10 lakh (1.25% of urban house-holds).

Institutional support in recent past:

MPEDA with outlay of Rs.19.15 crore (during 2007 to 2014) for 579 ornamental fish production units, supported mainly in coastal states viz. Kerala (197 units) and Maharashtra (136 units).

DoF, NFDB under Blue Revolution Scheme (2006-2016) with expenditure of Rs.31.15 Crore supported West Bengal (Rs.10.84 Cr), Kerala (Rs.10.12 Cr), Tamil Nadu (Rs.2.91 Cr) and other states (Rs.10.19 Cr) to stimulate awareness among the States and farmers/entrepreneurs. Subsequently, in 2017-18 the Pilot project on ornamental fisheries development have been taken up under CSS-Blue Revolution Scheme with total project outlay of Rs. 61.89 crores (60% beneficiary share) covering West Bengal, Maharashtra, Tamil Nadu, Kerala, Karnataka, Assam and Bihar.

Estimated targets for Ornamental Fisheries:

India is considered as "sleeping giant" for its potential resources, which are yet to be explored. India has the capacity to grow at a rate of 40% in Ornamental fisheries. The targeted aquarium hobbyists in urban areas would be about 29 lakh households by 2025 (3% of urban house-holds), resulting domestic trade of Rs.4,717 Crore by 2025.

Proposed Initiatives:

Therefore, focused attention would be given towards development of Ornamental Fisheries in India. The development of Ornamental fisheries would be taken up in the mission mode. The activities are classified into four broad categories (each category includes several activities):

1. Production of ornamental fish in fresh water (setting up of production units- backyard hatchery & rearing units, integrated ornamental fish unit); and marine [establishment of Integrated hatchery for seed production, Backyard grow-out units (cluster-based) for seed rearing, Marine Ornamental Fish Demonstration Units], developing captive breeding and rearing units, etc.
2. Aquarium Fabrication, trade and marketing:- wholesale ornamental fish outlets in metro cities, retail outlets and aquarium shops, allied items etc.
3. Promotion of ornamental fisheries sector through demonstration, establishment of Public Aquariums/ Aqua-parks; demo units in public places like hospitals, educational institutions, railway stations, Government offices etc. and organizing aquaria shows, etc.
4. Skill development, trainings and capacity building Programmes.

Implementing Agencies

(i) Cooperative Societies, State/UT level Cooperative Federations/bodies

(ii) Ornamental Fish producers and marketing groups/ associations

(iii) Entrepreneurs/Companies, Public Private Partnership (PPP) and SPVs

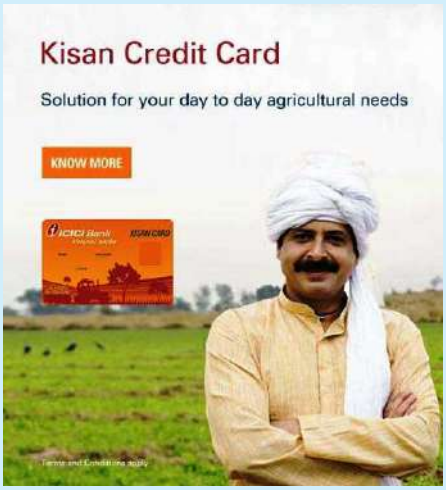
(iv) Central and State owned organizations, Boards and Panchayati Raj Institutions (PRIs).

Financial Resources:

(i) Rs. 576 Crore project cost under Pradhan Mantri Matsya Sampada Yojana (PMMSY)

(ii) Marketing infrastructure under FIDF (for Ornamental fish markets, etc.) as per need.

(iii) The Govt investments would catalyse the growth of Private sector to the tune of Rs 10,000 Cr



Kisan Credit Card

Fisheries sector is an important source of food, nutrition, and employment. It provides livelihood to about 25 million fishers and fish farmers at the primary level and more than the twice the number along the value chain. The sector has immense potential to contribute significantly to the national economy. The Government of India recognizes the need for short term credit facilities to fishers and fish farmers to meet their working capital requirements which will enhance the production and productivity, thereby leading to increased income of people, especially in rural areas.

Towards this end, the Government of India in the year 2018-19 announced extension of the facility of Kisan Credit Card (KCC) to fisheries and animal husbandry farmers to help them to meet their working capital needs. The KCC facility will help fisheries and animal husbandry farmers to meet their short term credit requirements of rearing of animals, poultry birds, fish, shrimp, other aquatic organisms and capture of fish.

The Reserve Bank of India (RBI) vide circular dated on 4th February, 2019 has issued detailed guidelines for extension of KCC facility to Fisheries and Animal Husbandry farmers. Fishers and fish farmers (Individual & Groups/Partners/Share Croppers/ Tenant Farmers), Self Help Groups, Joint Liability Groups, Women Groups are entitled to get the KCC facilities. The existing KCC holders will get the credit limit of Rs. 3 lakh including fisheries activities and new card holders will get Rs. 2 lakh exclusively for fisheries.

Under the scheme, interest subvention is made available for animal husbandry and fisheries farmers @ 2% per annum at the time of disbursal of loan and additional interest subvention @ 3 % per annum in case of prompt repayment as Prompt Repayment Incentive. All the eligible beneficiary from fisheries sector can approach any commercial bank, cooperative bank and RRB for availing the KCC facility after filling up of simplified one page form. State/Uts Fisheries Departments, Fisheries Cooperatives, SLBC and other stakeholders have an important role by taking district-wise targets for expansion of this facility by covering all eligible fishers and fish farmers.

Under Atmanirbhar Bharat Abhiyan Package for COVID-19, Hon'ble Finance Minister on 14th May, 2020 announced to cover 2.5 crore new farmers including fishers & fish farmers under Kisan Credit Card (KCC) Scheme.

The Department of Fisheries, GoI has been making concerted efforts to cover all eligible fishers and fish farmers. The Department has been pursuing with all the State Governments/UTs and State Level Bankers Committee (SLBC) to sensitize and disseminate information amongst the fishers and fish farmers about KCC through special camps and other modes of communications. Besides, the State Governments/ UTs and State Level Bankers Committee (SLBC) have been requested to make a plan of action with annual targets for issuance of KCC to fishers and fish farmers in their respective States/UTs. Further, the Department of Fisheries, Government of India has been requested all States/UTs through a special drive for next two months i.e. from 10th June, 2020 to 10th August, 2020.

Fisheries and Aquaculture Infrastructure Development Fund (FIDF)

The Department of Fisheries, Ministry of Fisheries, Animal Husbandry and Dairying during 2018-19 has created a dedicated fund namely Fisheries and Aquaculture Infrastructure Development Fund (FIDF) with a total funds size of Rs 7522.48 crore to address the infrastructure requirement for fisheries sector. FIDF provides concessional finance to the Eligible Entities (EEs) including State Governments/Union Territories, State entities, cooperatives, individuals and entrepreneurs amongst the others for development of identified fisheries infrastructure.

The National Bank for Agriculture and Rural Development (NABARD), the National Cooperatives Development Corporation (NCDC) and all scheduled Banks are the Nodal Loaning Entities (NLEs) to provide concessional finance under the FIDF.

The Department of Fisheries under the FIDF provides interest subvention up to 3% per annum for providing the concessional finance by the NLEs at the interest rate not lower than 5% per annum with maximum repayment is over a period of 12 years inclusive of moratorium of 2 (two) years on repayment of principal.

On 23rd December, 2019, Shri Giriraj Singh, Hon'ble Minister for Fisheries, Animal Husbandry and Dairying, Government of India presided over a function held in Krishi Bhawan, New Delhi for signing of first tripartite Memorandum of Agreement (MoA) between the (i) Department of Fisheries, Government of India, (ii) NABARD and (iii) Government of Tamil Nadu for implementation of the Fisheries and Aquaculture Infrastructure Development Fund (FIDF).Among others, the Secretary, Department of Fisheries, Government of India, the Chairman, NABARD, Dr. J Balaji, Joint Secretary (Fisheries), Shri Sagar Mehra, Joint Secretary (Fisheries), Principal Secretaries and Secretaries in charge of fisheries of various States and other senior officials in the Department of Fisheries, Government of India were present on this occasion.

The Government of Tamil Nadu had signed the first Tripartite MoA for availing the initial concessional finance of Rs. 420 core from NABARD for development of three fishing harbours in the State namely, (i) Tharangampadi in Nagapattinam District, (ii) Thiruvottriyur Kuppam in Tiruvallur District and (iii) Mudhunagar in Cuddalore District. These fishing harbours once developed, will create safe landing and berthing facilities to large number of fishing vessels plying in the area, augment fish production in the regions, facilitate hygienic post-harvest handling of fish, stimulate growth of other fisheries related subsidiary economic activities, thereby creating employment opportunities for the local fishers and improving their economic status.

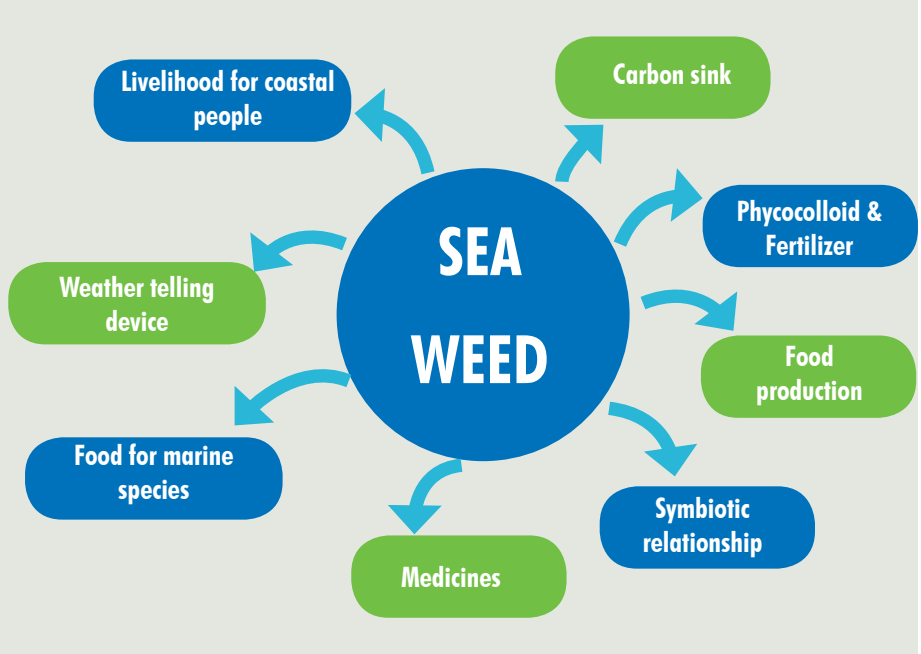
NABARD as one of the Nodal Loaning Entities (NLEs) provides concessional finance for development of fisheries infrastructure facilities through State Governments/State Entities under the FIDF. So far the project proposals for Rs. 1725.11 crore have been recommended for financing by the Nodal Lending Entities (NLEs) under the FIDF. The project proposals of Government of Tamil Nadu and Andhra Pradesh for development of fishing harbours in their respective States form the major part of these recommended projects. Two project proposals received from Private entrepreneurs under the category of innovative projects have also been sanctioned. Further, DoF is pursuing with State/UTs for submission of project proposals for creation and strengthening of fisheries infrastructure for the benefit of fishers and fish farmers and other stakeholders.

Sea weed culture in India

Sea weeds are the marine macro algae grows in the coastal waters and cultivated commercially in India. Sea weed resources exist in the coastal States /UTs viz; Tamil Nadu, Gujarat, Odisha, Andhra Pradesh, Maharashtra, Kerala and Lakshadweep and Andaman waters. In India there are about 844 species of which about 60 species are commercially important species and a few species like Kappphycus, Sargasum, Gracilaria, Gelediella etc are being cultivated in small scale. Seaweed Cultivation does not require land, fresh water, fertilizers or pesticides and can be grown in sea having clean water and low tidal action. Cultivation is best suited in gulf areas, which is the same place where natural seaweeds proliferate.

India is reported to have produced on an average 6.00 lakh tonnes of seaweed. It is estimated that seaweed can be farmed in around 2.0 lakh ha of the Exclusive Economic Zone (EEZ) and the rocky beaches, mudflats, estuaries and lagoons on the Indian coasts offer ideal habitats for seaweed farming. This provides great potential for India to augment the seaweed production and develop the seaweed based industries which provides scope for better livelihood option for fishers and others living in these coastal belts.

Seaweeds are rich in minerals, vitamins, trace elements and bioactive substances and are the renewable source of food, energy, chemicals and medicines. They are



also used as valuable source of raw material for industries like health food, medicines, pharmaceuticals, textiles, fertilizers, animal feed etc.

Other benefits of sea weed are that these plants absorb nutrients from seawater and grow under sunlight. The nutrients of the sea are transferred to terrestrial plants through seaweed fertilizer thereby increasing crop yield. Seaweed has the potential to start an organic agricultural revolution in India in the form of soil fertilization , growth of plants , yield of more flowers and fruits , reduce expenditure on insecticide and pesticide, vegetables and fruits produced from such organic agriculture are found to be good for human health and animal health and enhance employment of women.

Considering the scope for commercial farming of sea weeds in India, the Department of Fisheries (DoF) has included sub-components on sea weeds under the Blue Revolution scheme for promotion of sea weed cultivation and provided subsidy assistance to the coastal fisher folk and their associations for training, demonstration and farming of seaweed. Besides, DoF has also extended funding assistance to R&D Institutions like Central Salt & Marine Chemicals Research Institute (CSMCRI), Gujarat and Mandapam unit of Central Marine Fisheries Research Institute (CMFRI), Tamil Nadu, for training and demonstration programme on Seaweed farming.

The DoF has initiated actions for promotion of sea weed cultivation in a Mission mode approach under the Pradhan Mantri Matsya Sampada Yojana (PMMSY). This would not only enhance the sea weed production and the requirement of raw materials allied industries but also promote the socio-economic status of women Self Help Group (SHG) of fisher folks. Under the PMMSY, it is proposed to invest about Rs. 537 crores for the next 5 years which is expected to produce about 17.8 lakh tons (Wet weight).

It is possible that with an investment of under Rs. 1 Lakh, a poor coastal women folk can be empowered to earn over Rs. 20,000/- per month through sea weed farming.

Sea cage culture

Considering the negligible opportunities of additional fish production from the near shore area, the Government of India has decided to promote 'marine culture fisheries' and included the sub-components of 'Mariculture' under 'Blue Revolution' Scheme. Open sea cage farming is one of the eco-friendly farming activities under Mariculture which is being practiced in open sea where wave action is less. The fishes that are being cultured in cages are high value fishes; hence there is huge export demand for cage cultured fishes.

Considering the importance and scope of the Mariculture the Department of Animal Husbandry, Dairying & Fisheries (DADF) had sanctioned a pilot project entitled "Open sea floating cage demonstration farm for R & D in marine finfish and shell fish production" to the Central Marine Fisheries Research Institute (CMFRI) at a project cost of Rs.237.37 lakh in 2005 with an aim of demonstration of culture of fin fishes and shell fishes in floating cages in the sea of both east and west coast.

The National Fisheries Development Board (NFDB), Hyderabad functioning under the Ministry has provided financial assistance of Rs. 114.73 lakh to CMFRI for implementation of a Technology Upgradation project on demonstration of open sea cage farming in 14 locations along the coasts of almost all the maritime States in India on pilot basis. Based on the successful implementation and outcome of the pilot projects, it was recommended for establishment of open sea cage farming across the country.

The DADF has formulated a document on Mission Mariculture-2022 with the main objectives of enhancing fish production from marine sector. It is proposed to promote the Mariculture including open sea cage culture activity in all the maritime States and UTs on priority basis with the active participation of maritime States/ UTs and fishers. Sea cage farming involving the local fishermen community can be promoted as SHG activity to make cage farming attractive and profitable.

DADF has organized National Consultation Meets on Mariculture and Open sea cage culture development with the various stake holders of the sector and organizations. Considering the shortage of fish seed being a critical input for open sea cage farming in the country, very recently, the DADF in collaboration with CMFRI has taken up two projects for fish seed production of Cobia and Pompano to meet the national requirement and extended financial assistance to the extent of Rs. 8.88 crore to the Mandapam and Vizhinjam units of CMFRI.

Financial assistance in the form of subsidy was also provided to fisher community of Ratnagiri in Maharashtra and Rameswaram in Tamil Nadu for undertaking open sea cage farming through the Associations / Societies of marine fishers including the Cobia Fisherman Welfare Association, Rameswaram in Tamil Nadu for farming of cobia in open sea cages with the technical support of CMFRI.

It is very important to involve the local community and frame suitable policy and guidelines for mariculture.

Health Benefits of Consumption of Fish

Fish and seafood products are not only good sources of rich nutrients and minerals but also help one improve one's immune system.

In these desperate times, like never before, people are worried about their health and consequently are searching for approaches to support their immune system. Eating a balanced diet, getting enough sleep, and exercising daily are important tools for overall health and wellness. Now more than ever with the COVID-19 outbreak, we have to discover approaches to boost our immune system as much as possible. Making sure the inclusion of a diet that is high in immune-boosting nutrients is one way that can take an active role in maintaining the human health and wellness. A healthy immune system will not stop a person from getting COVID-19, but a stronger immune system may provide a better chance to fight against diseases and viruses. Fish is a nutrient-packed food that reduces inflammation with vitamins A, B, and D, as well as omega-3 fatty acids and minerals such as calcium, selenium, phosphorus, iron, zinc, iodine, magnesium and potassium.

The key nutrients found in a variety of fish and seafood that work together in keeping human immune system functioning properly:

I. Omega-3 fatty acids – Omega-3 fatty acids EPA + DHA play important roles in supporting the immune system. Seafood omega-3s help reduce inflammation in the body and support healing. Different species of seafood offer different amounts of omega-3 fatty acids. Fish with the highest Omega-3 levels include salmon, herring, anchovies, oysters, sardines, and trout.

II. Protein – Protein plays a role in the body's immune system, especially for healing and recovery. Seafood contains a high-quality protein that includes all of the essential amino acids for human health, making it a complete protein source.

III. Vitamin A – Vitamin A helps regulate the immune system and protect against infections by keeping skin and tissues in the respiratory system healthy. It also is known as an anti-inflammation vitamin because of its critical role in enhancing immune function. Oily fish like salmon, king mackerel, cod, tuna are good sources of vitamin A.

IV. B Vitamins – B vitamins such as B2, B6, and B12 all help keep the immune system working properly by regulating inflammation while promoting red and white blood cell development to keep the oxygen flowing while fighting against disease. Seafood, both fish and shellfish have a variety of B-vitamins.

V. Vitamin D – Vitamin D plays an important part in the innate antimicrobial (an agent that kills microorganisms) response which helps keep the immune system functioning properly. Seafood options that have a good source of vitamin D include sardines, salmon, herring and tuna.

VI. Iodine – Iodine is the fuel that powers all metabolic activity in the body. Since the immune system relies on the proper functioning of the metabolism to stay healthy, iodine is useful in making sure your immune response is active. Iodine is found in a good quantity of seafood like cod, scallops, lobster, sea bass, and shrimp.

VII. Magnesium – Magnesium aids in regulating immune cell development. Fish like salmon, mackerel and halibut all contain magnesium.

VIII. Selenium – Selenium is an antioxidant that helps to lower oxidative stress levels in the body, which in turn reduces inflammation and enhances immunity. All seafood has selenium, tuna, sardines, clams, halibut, and shrimp are all good options to consider.

IX. Potassium and calcium – Potassium indirectly controls calcium and immune cell signaling. Sardines, salmon and shrimp all have sources of calcium whereas fish with good sources of potassium include halibut, tuna, cod and snapper.

X. Zinc – Zinc helps the immune system work properly and may help wounds heal. It's found in cells throughout the body. It helps the immune system

fight off invading bacteria and viruses. The body also needs zinc to make proteins and DNA, the genetic material in all cells. Shellfish like oysters, crab and lobster are a good source of zinc.

No one food or supplement can prevent illness, but the immune system can be supported by including these key nutrients found in fish on a regular basis. Healthy nutrition is also vital when it comes to offering protection from many health problems including chronic disease. It is recommend to regularly eat fish and seafood for optimal wellness of all physical and mental functions of the body.

Strengthening extension services in fisheries and aquaculture sectors

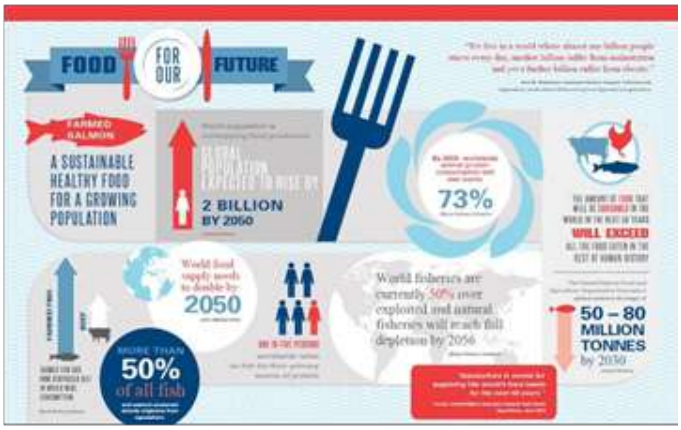
Achieving the goal of a world free of hunger and malnutrition by 2030 as defined by the UN Sustainable Development Goal (SDG 2), requires a food system transformation that will effectively and sustainably use all its production components (HLPE, 2017).

Fisheries and aquaculture development shall be considered within this context as it offers opportunities for realization of this goal. Considering the role of fisheries sector in eliminating food and nutritional security, the Government of India has prioritized the aquaculture and fisheries sector by establishing an independent Fisheries Ministry at the federal level.

However, interpreting policies related to aquaculture and fisheries into achievement on the field necessitates dedicated implementation approaches. A strong fisheries extension support system is required to transfer research and technologies from lab to the fishers. In fisheries, extension is often represented as the weakest link. Fisheries sector is characterized by two distinct sub sectors namely the marine capture fisheries, and aquaculture.

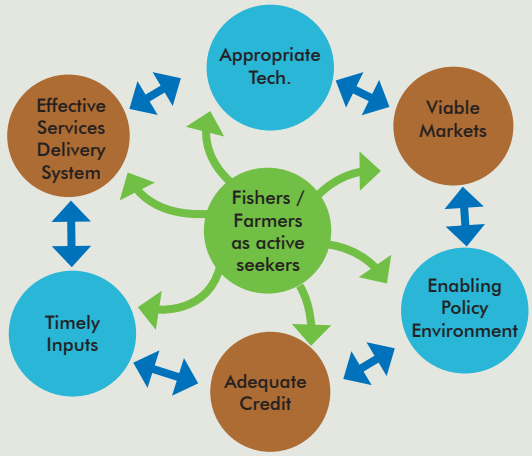
Marine fisheries sector, being a common / open access regime, the de facto ownership being vested with the state, is characterized by absentee management. The extension system or even research system, has played very little role in technology transfer that has taken place in the form of motorization / mechanization in marine sector. In the case of aquaculture, extension services are more similar to crop and livestock sector where the resources are mainly individual properties. Here the dominant paradigm of aquaculture extension is that of conventional TOT approach which has been mainly organized around the Fish Farmers Development Agency (FFDA) and Brackish water Farmers Development Agency (BFDA) since late 1970s though other agencies such as MPEDA, ICAR Institutes / SAUs, KVKs, NGOs, private input manufacturers and consultants are involved.

In overall scenario, there are many challenges in the present extension system that hinder providing adequate technical support and related services for advancing fisheries development. These challenges call for different extension approaches and strategies by multiple agencies both public funded, civil society organizations and private



agencies. Considering the fact that more than half of the existing inland aquatic resources and potential coastal area are yet to be brought under scientific aquaculture development, the Department of Fisheries under Ministry of Fisheries, Animal Husbandry and Dairying has underscored the importance of robust extension system by earmarking separate allocation for extension services and activities.

Desirable Aquaculture Extension System



An innovative extension approach has been envisaged under PMMSY scheme for all the coastal fishing villages with deployment of multipurpose workers 'Sagar Mitras' for providing multiple support services to the marine fishermen, undertaking fish catch documentation, etc.

Extension services would also include awareness and information regarding fishing, making the community aware about different Government schemes; setting up different demonstrations; innovative support through a Farmer Friend at Village Level; Support to Creating Essential Infrastructure; Documentation of success stories etc. (preparation and dissemination); Training of farmers for maximum period of 21 days: Inter-state, Within state, within district in close coordination with Department of Fisheries; Mobilization of farmer groups of different types including Farmer Interest Groups, Women Groups, Farmer Organizations, FFPOs, Commodity Organizations, and Farmer Cooperatives etc; Development of technology packages on electronic form to be shared through IT network; Designate expert support from SAU / KVK at district level; Organization of field days and Machua / Matsya Gosthis to strengthen research – extension – farmer linkages in each fishing/ fish farming season; assessment, refinement, validation

and adoption of frontline technologies and other short term researchable issues through KVKs and other local research centres; Implementation of extension activities through Agri-Entrepreneurs trained under Agri-Clinic scheme; Information sharing on High tide -Low tide, Use of Mobile application etc.

All out efforts will be made to ensure that each Krishi Vigyan Kendra has an expert on fisheries 'Matsya Visheshagya'. Further, Department of Fisheries, GoI will work in close coordination with ICAR institutes for transfer of technology from lab to land i.e. Aqua Technology Transfer. PMMSY will support establishment of aquaculture extension service centers in inland fisheries sector as well.

Fishing ban for sustainable management of marine resources

Conservation of fish resource is essential to protect overexploitation, maintaining sustainability in production and to secure livelihood of traditional fishermen in the long term. Spatial and temporal closures are one of the effective management tools to protect the spawners during peak spawning season and giving respite to the benthic fauna from intense trawling.

The Government of India has been enforcing the Uniform Ban on Fishing in the Exclusive Economic Zone (EEZ) since the late nineties for conservation and effective management of fishery resources, which is successfully implemented with participation of the maritime States and all stakeholders including fishers, fish workers and their associations. The uniform ban on fishing coincides with monsoon periods, when seas are rough and fishing is risky. Therefore, it is also helping the safety of small scale fishers during rough monsoon season.

The Uniform Ban on Fishing in the EEZ was initially implemented for 45 or 47 days, which was periodically reviewed by the expert committees primarily for assessments of its effectiveness. Based on the recommendations of the Committee of Experts and in consultation with the maritime States the period of the Fishing Ban was extended from 47 days to 61 days in the year 2015. Coinciding with the ban imposed in the EEZ, the coastal States/Union Territories (UTs) have also been implementing the similar duration of ban in the Territorial Waters under their jurisdiction.

This year, the COVID-19 pandemic has created an unprecedented situation, where the country had to come to a standstill (lockdown) on 24.3.2020 at a very short notice. This decision of the Government was highly essential to contain the spread of the disease. As a result of the lockdown, fishing was also suspended from 24.3.2020 till 09.4.2020 i.e., for a period of 17 days, resulting in the layoff of the vessels as also the large number of workers directly associated with fishing and those who are engaged in different activities along the value chain. The Department has received representations to amend the period of fishing ban in the current year, as the lockdown had impacted the fishers and fishing activities.

This Department vide Order dated 25 May 2020 decided to revise the ban period from 61 days to 47 days, and made it applicable in the East coast: from 15 April – 31 May 2020 and in the West coast: from 15 June – 31 July 2020.The traditional non-motorized units are exempted from the Uniform Ban on Fishing in the Indian EEZ. It has also been clarified by the Department that this amendment in the period of fishing ban is applicable for the current year and would not set any precedent for the future.

A decision to restrict the uniform ban on fishing for a period of 47 days has been taken by the Government after due consideration of the fact that the fishing efforts have been significantly reduced in the current year due to restricted fishing activities in view of Covid-19 pandemic and also considering the opinion of the Technical Committee set up by the Government of India to 'Review the duration of the Ban Period and to Suggest Further Measures to Strengthen the Conservation and Management Aspects' for marine fisheries. In the event of the uniform ban being enforced as per the regular dates, the total period of ban on fishing will be for 78 days during the year 2020, besides low fishing activities being undertaken this year due to unprecedented situation.

Sustainable Use of Resources

The sustainable use of the resources and conservation has always been at the core of the policies and programmes of the Department of Fisheries and the Government of India has never made any attempt

to distance itself from these core values on which the very survival of the resources remains. The Government's decision to reduce the ban period to 47 days is based on careful consideration of all the issues and the current situation that has been brought about by the corona virus pandemic (COVID-19). Taking into account the suspension of fishing for the initial 17 days of lockdown (from 24.3.2020 till 09.4.2020), and the period of Uniform Ban on Fishing (47 days), fishing would remain banned for a total period of 64 days in this year of 2020, which is higher than the usual period of 61 days being implemented since the year 2015.

As per the reports of the Technical Committee of Experts, almost all tropical species have a prolonged spawning season lasting for 6 to 7 months with one or two peak spawning in a year. The spawning peaks occur during different months for different species, and a common time period covering spawning period of most of the tropical fish species is unidentified. However, adopting the precautionary measures, it is advisable to adopt the seasonal closure through implementation of uniform fishing ban, so as to help the stocks to recover. The seasonal closure of mechanised fishing has certainly helped to keep in check the increasing annual fishing efforts apart from giving respite to different habitats. Based on the reports of the experts that many commercial fish species have protracted and staggered breeding period, a closure of 64 days for fishing is appropriate for rejuvenation and revitalisation of the fisheries resources.

Safety and Security of Fishermen

With regard to safety of fishermen due to rough weather, the Government has been taking adequate precautions and not allowing fishing vessels to venture out when the seas are rough based on the weather alerts and advisories issued by the Indian Meteorological Department (IMD). Such measures would be further strengthened by ensuring that the vessels going out for fishing have adequate provisions for safety and communication. The revised dates and duration of Uniform Fishing Ban of 47 days in Indian EEZ implemented vide Order dated 25.5.2020 are the same dates/ duration, which was implemented by the Union Government prior to 2015 based on the recommendations of the Technical Committee and in consultation with maritime States/ UTs.

One of the major concerns that the Government has been seized with is the loss of livelihoods during the lockdown period and the uniform ban on fishing on the East Coast that followed immediately after the restrictions on fishing activities were removed. This prolonged restriction on fishing has not only impacted the livelihoods of the lakhs of fishermen but also has impacted the nutrition security of a large segment of the population in both coastal areas as well as in the North-Eastern States.

Optimizing feed management strategies in Aquaculture

It is now internationally accepted that the increased supply of fish products required to meet global demand cannot be sourced from wild fisheries, which are either stagnant or declining. To meet the food demand, nations around the world have continuously developed and improved technologies and management, especially feed and feed management practices, to increase production volumes and efficiencies for a range of aquatic organisms in an environment of limiting natural resources. Providing farmers with well-balanced feed at cost-effective prices is a prerequisite to profitable aquaculture production. Much of the aqua-feeds used are either produced on-farm or by small-scale semi-commercial feed manufacturers, and improvements to the quality and preparation of these feeds are likely to bring about improved productivity and cost savings. In semi-intensive and intensive aquaculture systems, feed costs typically account for between 40 and 60 percent of production costs. In order to ensure profitability, it is imperative that farmers have access to good quality feeds at reasonable prices, and that they optimize their feed use by instituting appropriate on-farm feed management practices. Farmers need to be provided with simple tools to monitor farm production indices

(e.g. feed conversion efficiency and growth rate) and training on how to take corrective actions. The use and efficacy of automated feeding systems needs to be established, and the use of feed tables, feed and production records needs to be promoted. In India the introduction of stocking large fish, together with supplementary feeding, was a notable shift in farming practice.

The profitability of a commercial farming operation is of paramount importance to the farmer. Adopting appropriate feed management strategies is instrumental in ensuring that feed use is optimized and that the highest economic returns are available to the farmer. While maximum growth rates will be attained by feeding to satiation, over- or under-feeding will result in feed inefficiencies and, in the case of over-feeding, increased levels of farm effluents. Underfeeding manifests itself in lowered growth rates and increases in size heterogeneity in the population as hierarchies develop. Optimization of feeding strategies requires farmers to calculate appropriate ration sizes and feeding rates, feeding frequencies, and feeding times that take into consideration the endogenous feeding rhythms of the farmed species. Farmers using commercially manufactured feeds are often but not always supplied with feeding tables, and are provided with technical support to assist them in determining ration sizes and feeding schedules.

Those farmers who are using farm-made feeds and purchase feed ingredients from suppliers are less likely to have access to the information that they need to determine how they should design their feeding regimes. In the absence of this information, farmers will find it difficult to determine appropriate feed rations, and in many respects, they are more likely to adopt inappropriate feeding strategies. Many farmers are not keeping adequate production records; relatively simple farm data such as stocking rates, mortality, feed use and water quality were not always being recorded. In the absence of this data it is difficult for farmers to assess and monitor the efficacy of their production systems and to determine whether changes to their management strategies have demonstrable improvements on production efficiencies. There is a clear need to train farmers in feed management practices, promote the use of feed tables and ensure that farmers maintain adequate feed and production records.

Innovative farmers develop their own feeding strategies to optimize feed use. For example, in Andhra Pradesh, India, the majority of Indian major carp farmers reported that they spread their farm-made feeds at fixed points in their ponds. Simply placing their mash feeds in this manner resulted in much of it being dispersed in the water column and being wasted. More innovative farmers employed a "bag feeding" method in which the feed mixtures were placed in bags that were located throughout the pond. Demand feeding results in higher growth rates, improved feed ingestion rates, and higher retention rates because less feed is lost to the water column. Other innovative feed management practices reported by the carp farmers in Andhra Pradesh included the development of restrictive feeding regimes, in which the fish are left unfed for one day in every ten days – a practice that is designed to reduce feed costs and stimulate compensatory growth. Carp farmers in Andhra Pradesh have also developed "break feeding schedules" in which feed rations are split into two rations, delayed by 20 minutes. The practice allows the dominant fish to be fed to satiation during the first round, and the smaller fish to reach satiation during the second feed round. As the practice improves satiation levels across the entire culture population, it promotes minimal size variations at harvest.

Additional strategies include 1) the use of feeding enclosures to make it easier to apply floating feeds and prevent feed wastage, and 2) cooking selected mash feed ingredients that are high in starch (e.g. broken rice) to promote gelatinization, increase digestibility and nutrient availability. Evidently, the role that the innovative farmers play in improving on-farm feed management practices is an important one, and mechanisms need to be developed to promote and communicate these innovations to other farmers.

Innovative project on High Density Fish Culture under RAS Mode Integrated with Vegetable Cultivation Designated as "Backyard RAS".

The "Backyard RAS" technology developed by National Centre for Aquatic Animal Health, Cochin University of Science and Technology was adopted by National Fisheries Development Board (NFDB), Ministry of Fisheries, Animal Husbandry and Dairying, Hyderabad for nationwide dissemination with subsidy under CSS - BR guidelines of innovative activities in aquaculture.

The Backyard RAS occupies 45 m2 having 2 m depth, conical bottom with 180 slope towards the center reaching to a pit of 30cm2 attaining depth of 3.3 m at the center. The system is operated with four air injectors of 0.5HP capacity providing sufficient oxygen to the system and circulation of water to have the sludge accumulated in the middle to be pumped out intermittently using a 0.5 HP slurry pump, removing the nutrient rich water usable for agriculture. Another pump of the same capacity lifts water to an overhead tank to bring it back through three trickling filters attaining both nitrification and denitrification. The system with total bio-security coverage and under preventive health care strategy is supported with an emergency aeration system to protect the fish stock during power failure. The system is developed in such a way that it does not cause any sort of environmental perturbation, and the slurry generated forms manure for the integrated vegetable cultivation. The system can be managed by women facilitating additional income to the family.

During the first phase, NCAAH, CUSAT could establish 71 RAS units in Kerala and two demonstration units in Hyderabad, one in the campus of NFDB and the other with NIRD&PR.

One of the beneficiaries out of 48, Smt. Lisha Mathew, Puthukkunnath (H), who had received financial assistance of Rs. 8,40,000 established two such units and demonstrated outstanding performance of the system registering earning of Rs. 8, 40,000.0 during a period of one year with effect from 25-11-2018. During this period total production of 7200Kg fish biomass could be achieved fetching an income of Rs. 14,50,000 The system registered FCR of 1.11 with total cost of production touching Rs. 6,10,000.

This achievement is an outcome of the keen interest taken by the farmer in maintaining and running the system in accordance with the guidance given by NCAAH, CUSAT, besides the financial support of NFDB.

Successful farming of Pengba at Bhadrak By Mr. Kailash Parida- Progressive farmer from Thaila village, in Bhadrak district of Odisha

Mr Kailash Parida is a 46 year old progressive farmer from Majhi Sahi, Thaila village, in Bhadrak district of Odisha, India took seven village ponds on lease (total 2.5 ha) with the help of "Village Council" and started fish farming. The Project Team from ICAR-CIFA, Bhubaneswar has come to Thalia with the demonstration project to popularise grow-out culture of minor carps in Bhadrak district with funding support from NFDB, Hyderabad. Mr Parida participated in one of the training programme organised by the Project Team. He was enrolled as an adopted farmer under the project and one pond 0.32 ha was adopted for major and minor carps multi-species grow-out demonstration. While catla, rohu and mrigal were the IMC components, silver barb and pengba (Osteobrama belangeri) included as minor carp components. ICAR-CIFA has introduced pengba in culture system of few farmers in West Bengal from where highly positive feedback received on its performance and high market price. Based on this feedback, pengba was included as a component species in the demonstration programme.

At the time the Project Team met Mr. Parida, he has already undertaken certain pond preparation measures. The pond had only 40 cm water at the beginning. He had applied 100 kg of mohua oil cake to kill all fishes from previous stock amounting around 15 kg (no predatory fishes) and sold it out. After 14 days of mohua oil cake application, 35 kg lime ($CaCO_3$ @ 100 kg/ha) was applied in the pond. Basal fertilization was carried out after three days of liming with thirty five kg of mustard oil cake fermented for 3 days before application. The pond had 70 cm water depth by that time. A total of 60 kg of fingerling (approximately 5000 fingerling of average of 10-12 g body weight) of catla, rohu and mrigal were released. At this stage only the Project Team had met Mr Parida.

After finding the pond preparation measures to be in order, the team went ahead with stocking total of 4400 fry (@ 14000/ha of minor carps and Indian major carps in equal amount in August, 2019. Considering the 7-8 months of culture period, the higher stocking density was used. Silver barb and pengba at equal ratio constituted the minor carp component. Mustard oil cake of 15 kg was soaked for 4 days to which 15 kg of beaten rice and 30 g of vitamin mixture were being added to prepare the dough feed. This amount was given once in every five days directly. Bag feeding was also occasionally used. Gill net was covered in the pond to avoid bird predation. Mr Parida has followed the advice on pond and water quality management.

During last visit to his farm in February, the Team has seen different species. Excellent growth of 450-550 g was observed in pengba from his pond which is excellent considering the 7-8 months culture period. The average body weights of others were catla of >500 g, rohu and silver barb of 250 g each while mrigal was 300 g. Mr. Parida had started harvesting bigger fish from December onwards. By March this year, he has harvested and sold all the fishes in phases except pengba which he has transferred to adjacent pond and waiting for market opportunity. Due to restriction in the travel during the COVID-19 pandemic, on site data could not be collected from this pond. However, the harvesting data were collected from Mr. Parida over phone. He has sold approximately 800 kg fishes of which 40% (320 kg) were catla, while the rest 480 kg were rohu, mrigal and silver barbs. Besides, he is expecting sale price of Rs 300-350/kg for pengba.

Success story of Open sea cage farming in Tamil Nadu

Cobia Aquaculture Fishermen Welfare Association (Regd), Verkodu, Rameswaram, Tamil Nadu has submitted a proposal for under taking open sea cage farming in Rameswaram to the Director of Fisheries, Government of Tamil Nadu and the same was recommended and forwarded to the Department of Fisheries / NFDB for extending subsidy assistance for establishment of 10 open sea cages for Cobia farming at an estimated cost of Rs.49.70 lakh. The proposal was examined as per the approved guidelines and an amount of Rs. 19.88 lakh was sanctioned and released towards establishment of 10 open sea cages for Cobia farming at Rameswaram including capital cost and working capital.

Various components for which assistance provided are Cages (10 nos of 6 meter dia), mooring, nets, cobia seeds, feed, transportation, labour charges, boat hiring charges, harvesting charges, monitoring expenses etc. The Cobia Aquaculture Fisherman Welfare Association took up sea cage farming in ten cages. The cages of 6m diameter and 3.5m depth were fabricated and floated by them with the technical assistance of ICAR-CMFRI. The capital and operational costs including the charges for the fabrication of the cages, cost of feeds and managing the sea cage farm were borne by Department of Fisheries / NFDB under the scheme of Blue Revolution. A total of 6400 fingerlings of hatchery produced cobia seed by ICAR-CMFRI were supplied and stocked in the cages for farming.

The District Collector, Ramanathapuram flagged of the harvest. About one ton of cobia fish was harvested on the day. The length of fish harvest ranged from 48 to 62 cm and weight from 1.0 to 2.3 kg. The harvested fish was marketed at a farm gate price of Rs.270 / kg. The harvest made by the SHG under the financial support of NFDB has generated an interest in the fishermen community of the area to initiate sea cage farming of cobia. As this activity was demonstrated with the involvement of local fishermen, they could understand various fisheries activities involved in open sea cage farming and developed interest for undertaking such activities by other fishermen. Thereby, the fishing pressure on trawl fishing could be reduced and the marine fisheries can be managed sustainably through such type of diversified fish farming practices.

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