SMALL-SCALE INLAND FISHERIES :

An answer to livelihood and nutritional security in India

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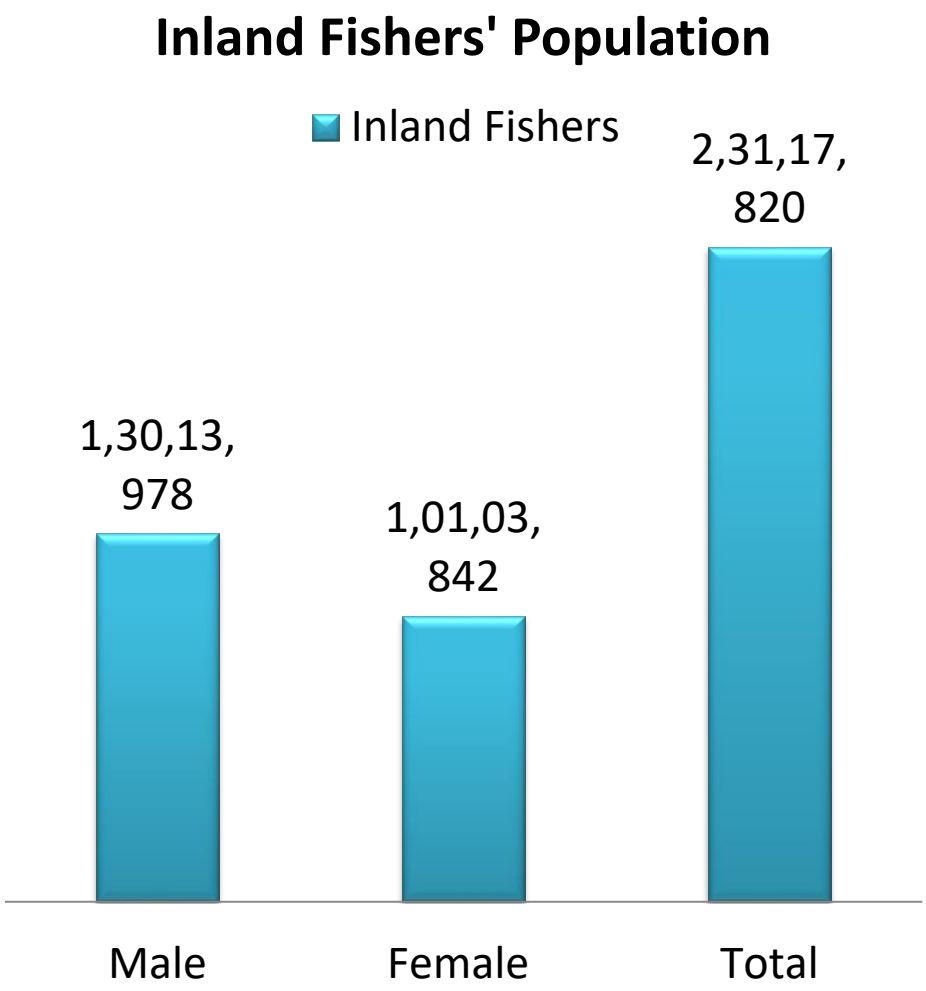
PREAMBLE

- Fisheries and aquaculture important sources of food, nutrition, income and livelihoods for hundreds of millions
- The sunrise fisheries sector contributes about 1.24% to National Gross Value Added (GVA) and 7.28 % to agricultural GVA (2015-16)
- About 2.31.17, 820 people are involved in inland fisheries out of which 43.7% are women.

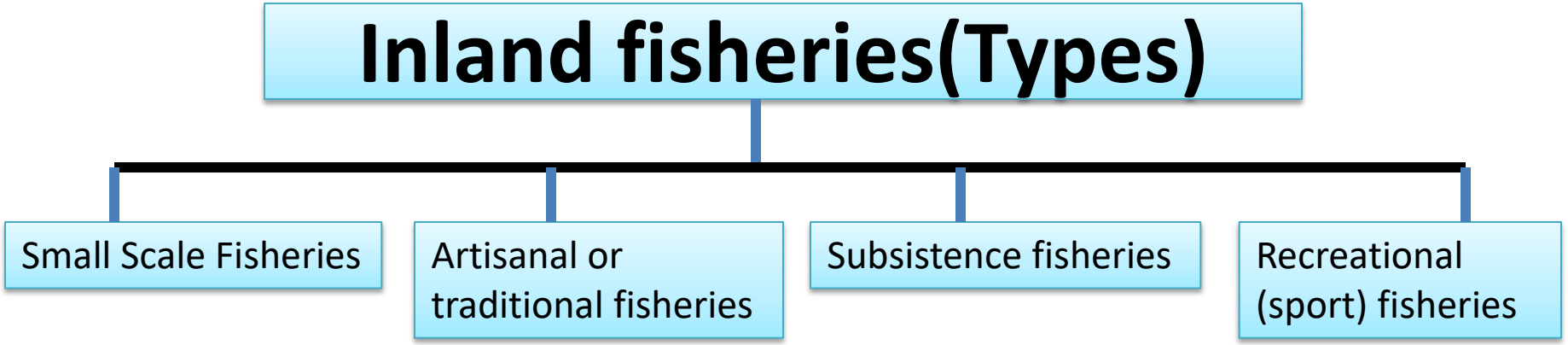


Source Handbook of Fisheries Statistics 2020

Indian Mythology and Inland Fisheries

- Fish and fisheries have been a part of Indian ethos as the country's ancient scriptures, legends and epics
- First incarnation of Lord Vishnu was fish –*matsyaavtar*
- Veda Vyasa, the author of Vedas and the great epic, Mahabharata was the son of a fisher woman.
- For many centuries, fishing has been an integral part of cultural

Inland fisheries(Types)



- ***Small-scale fisheries:*** In India, inland open-water fisheries are considered small-scale fisheries because they involve fewer amounts of energy and capital
- ***Artisanal fisheries or traditional fisheries:*** Almost synonymous with small-scale fisheries as individual fishing households use traditional techniques, and less capital to harness aquatic organisms from the inland waters.
- ***Subsistence fisheries:*** The unemployed poor people harvest fish or other aquatic organisms in close proximity with simple gear or with certain traditional measures to meet their basic needs of food security called subsistence fisheries
- ***Recreational (sport) fisheries:*** Recreational fishing or sport fishing is fishing for enjoyment, leisure, and recreation. It has neither related to commercial fishing nor subsistence fishing. It is now becoming very attractive to hobbyists and can be an opportunity for generating income for the fishermen's community.

Small-scale inland fisheries

- Plays a pivotal role in providing employment, income, food and nutritional security to a vast majority of the population.
- The culture-based fisheries, natural stocking and harvesting, enclosure culture (cage and pen culture) and capture fisheries, is generally small scale in nature and it provides a sustainable means to nutrition, food security, poverty alleviation and trade.
- Other ancillary activities such as net-making, boatbuilding, engine repair and maintenance, also provide additional employment opportunities of backward and marginal fishing communities.
- Cater to the livelihood of over 20million people in the country.
- Diverse in nature distinct from marine fisheries

Operationally small-scale fisheries in India in inland sector can be defined as a easy, individual or household(family) venture, entail low levels of technology and almost synonymously can be used as artisanal or traditional fisheries.

Small Scale Fisheries

- 95 percent of the world's inland fisheries catch in developing countries
- Almost 97% SSF located in developing countries
- Provide food security, livelihood, nutrition & social protection-safety nets
- 90-95% of SSF catch for direct local consumption
- Commercial capture fisheries value chain
- ~90% of all full-time and part-time fish workers employed in the small-scale sector
- ~50% are women
- Smaller environmental footprint

SSF: Opportunities for fisheries

- Reduce harmful fishing effort
- Positive action to rebuild depleted fisheries
- Cater to SGDs
- Remove harmful fishery subsidies, where possible
- Enhance effective area management for the Conservation of biodiversity
- Strengthen implementation of global agreements (Climate, pollution, etc.)
- Special focus on small-scale fisheries as an engine for food security, nutrition and livelihoods

Basic Characteristics of small-scale and large-scale inland fisheries in India

Characteristics	Small-Scale	Large-scale
Size of fishing vessel/engine	Non-motorized Small 3-7m <12 m	Motorized Large with high horse power engine
Type of craft/Vessel	Wooden boats, canoes, coracles, dingi	Trawlers, Big wooden motorized boats with deck
Fishing area/ground	Rivers, lakes, wetlands, creeks, channels, small reservoirs	Estuarine fisheries Cage culture in reservoirs
Fishing unit	Individual/ Family members/Small community group	Smaller to larger groups with specialized division of labour
Ownership	Craft/gear owner operated	Trawler or motorized boat owner, usually non-operators; share or cooperative ownership
Time/ Employment	Usually part time	Full time/ seasonal
Catch Disposal	Local market and household consumption	Sale to organized market
Utilization of catch	Fresh consumption	For consumption, Commercial dry fish production, fish meal
Technology/Knowledge	Traditional knowledge	Experience, manual and mechanized gears, motorized boats, Cage technology, Scientific knowledge
Factors of production	Labour intensive	Labour and capital intensive
Benefits	Direct consumption	Income, Profit and Tax

SWOT analysis: Inland fisheries

Strength

- Huge resource
- Diverse resource
- Rich biodiversity
- High fisheries potential
- Expertise for fisheries enhancement
- Management practices and enhancement technologies available
- Livelihood to resource poor
- Network of research organization, development and extension agencies

Weakness

- Open access
- Multiple ownership
- Lack of coordination among stakeholders
- Conflict of interest with stakeholders
- Lack of environmental considerations
- Unscientific management
- Inadequate manpower
- Policy implementation
- Non-evaluation of goods and services
- Less priority on HRD

SWOT analysis: Inland fisheries

Opportunities

- Substantial gap between the potential and actual fish yield
- Livelihood opportunities for resource poor
- The reservoir resource is likely to increase manifold in future
- Availability of under-exploited resources, especially canals
- Ornamental fisheries resources
- Scope for co-management for inclusive growth
- Women empowerment

Threats

- Restricted flow due to dams/anicuts
- Siltation: Closure of link channels
- Pollution: Habitat destruction
- Water abstraction: water stress
- Exotic and macrophyte proliferation
- Encroachment
- Unregulated and destructive fishing
- Declining fish diversity and catch
- Climate change

The hidden harvest

- The inland fisheries production is highly underreported.
- The proportion of hidden harvest (mostly for own consumption) is quite high.
- Hidden harvest ranges from approx. 5% (for commercial fishers) to 30% (for amateur fishing).

Sustainable Development Goals (SDGs) vis-a'-vis small-scale inland fisheries

In 2015, more than 190 world leaders committed to 17 Sustainable Development Goals (SDGs) -Inland fisheries can contribute to accomplish nine goals in a sustainable manner which will help to achieve a more prosperous, equitable, and sustainable world.

Fish production from inland open water resources

Resource	Resource size	Production	%
Rivers (km)	164 118	64 972	3.70
Canals (km)	64 972	64 481	3.67
Reservoirs (ha)	3 460 301	386 259	21.99
Floodplain wetlands (ha)	564 288	571 633	32.54
Estuaries (ha)	458 185	168 969	9.62
Lagoons (ha)	246 529	192 799	10.97
Lakes (ha)	30 551	33 890	1.93
Upland lakes (ha)	96 900	0	0.00
Others (ha)	146 730	273 760	15.58
Total		1 756 763	100.00

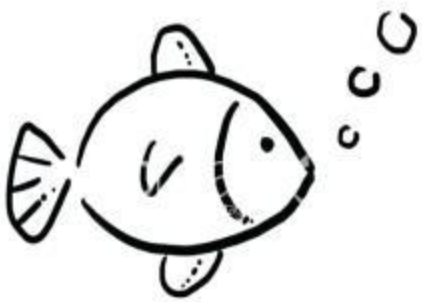
These are mostly fresh water in nature and supports both culture and capture fisheries

Riverine fisheries has immense contribution in livelihood and income generation of the small-scale fishers

Riverine fisheries

- Rivers are the richest fish genetic resources and habitat of precious fish germplasm, supporting vast biodiversity.
- Multi-species, multi-gear fish assemblage in these rivers support the livelihood of the fishers.

Challenges in Riverine fisheries

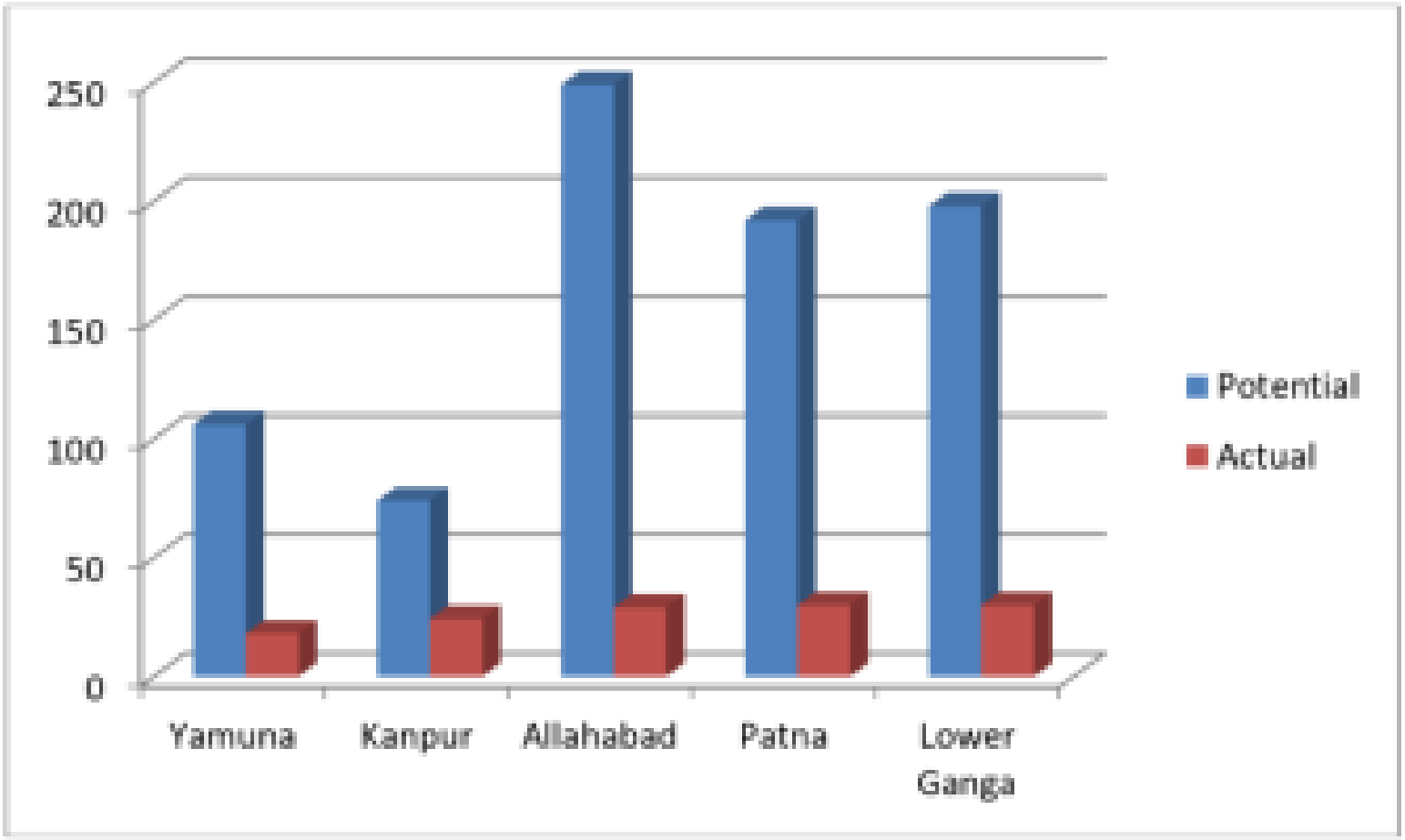


- Ownership issues due to 'common pool' nature of rivers
- Pollution due to heavy industrialization, Plastic pollution
- lack of control and regulation for juvenile fishing
- Absence of fishing rights
- Use of pesticides for fish harvesting
- Violation of fishing ban period, Over fishing
- Destructive fishing gears and methods Electro-fishing
- Destruction of fish seeds

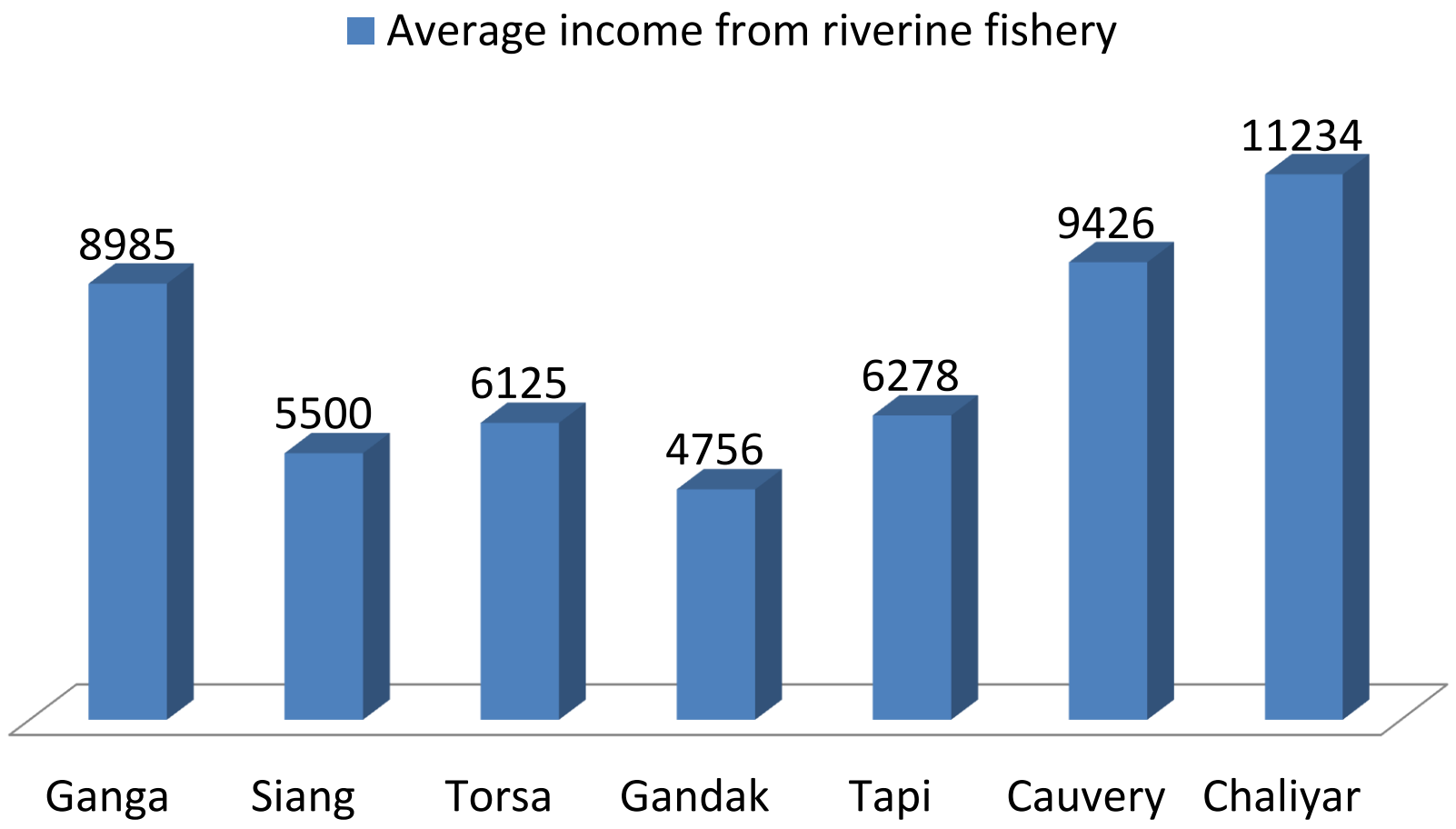
SSF in rivers

- 14 major rivers: catchment >20,000 sq km, 44 medium rivers: catchment 2000-20000 sq km, numerous small rivers and streams: catchment <2000 sq km
- Entirely Small Scale Fisheries (SSF) with low CPUE
- Multiple multi-mesh gear fishery: gill nets, seine net, barrier nets, hook & line, trap, etc
- Breeding ground for most freshwater fishes
- Source of spawn and brooders for aquaculture: subsistence fishery

Fish yield potential and actual yield in rivers



Riverine fisheries vis-a’-vis income generation



Major factors affecting fisheries of rivers

Construction of dams, barrages, anicuts

Siltation

Breeding run of migratory fishes affected

Decline of Hilsa catch in river Ganga			
	Allahabad	**Buxar**	**Bhagalpur**
Pre-Farakka barrage	**48.4 (1955-72)**	**149.63 (1952-54)** **33 (1963-72)**	**4**
Post-Farakka barrage	**0.96 (1975-94)**	**9.88 (1975-96)**	**0.73**

Pollution

- Municipal sewage,
- Industrial sewage,
- Thermal pollution,
- Heavy metals,
- Pesticides,
- Plastics,
- Other forms of pollution

Destructive fishing operations: Juvenile fishing

The most destructive gear

Bag net in all the zones

Small mesh gill net

Shooting net

Shore Siene net

Lift net

Barrier net

Bag net (Binti jal) bye catch in Hooghly mainly consist of very small juveniles of prized fishes like hilsa, Topse, etc

Different forms of prawn seed collection net operated in Hooghly estuary

Massive destruction of fish larvae and juveniles occurs in Hooghly estuary during catching of *Penaeus monodon* seed by Meen jal

Invasion of exotics in rivers

- Modified river habitat: establishment of exotics
- Contributed 47.74% of the total catch in Yamuna at Allahabad
- 07 exotic fish species, *H. molitrix, A. nobilis, C. Idella, C. carpio, C. gariepinus* and *O. niloticus*, *P. disjunctivus* have been recorded from the river Ganga
- Maximum number of the exotic fish species has been recorded from the middle stretch: Varanasi to Narora.

Tilapia (*Oreochromis niloticus*)

Pterygoplichthys disjunctivus

Ranching for restoration

- **Ranched >65 lakh advanced fingerlings produced from in situ stocks of IMC ranched in Ganga during 2018-22**

Hilsa fisheries development

- Established Hilsa ranching station at Farakka
- Ranched brood Hilsa (3200) in river Ganga above Farakka and caught at Patna after 30 years
- Hilsa conservation guidelines developed and provided to Govt. of West Bengal
- Provided scientific inputs for fish pass design at newly constructed navigational canal at Farraka

River E-Flows Estimation

- E-flow assessment for Mahanadi, Kathajodi, Teesta for key fish species
- River Mahanadi: Estimated flow of 15080 cusec and 50232 cusec for breeding of *Rita rita* and *Tor putitora,* respectively
- River Kathajodi: Estimated discharge of 20,000 cusec for migration of fish species at Naraj barrage.
- River Teesta: Estimated discharge of 532 cusec for migration of Chocolate Mahaseer

Reservoirs: The Sleeping giant in Inland fisheries

Reservoir Fisheries

Reservoirs are the major resource where fisheries enhancement tools can be applied for the production of animal protein and can, **combat poverty and mal-nutrition** of the country.

CIFRI's Experience

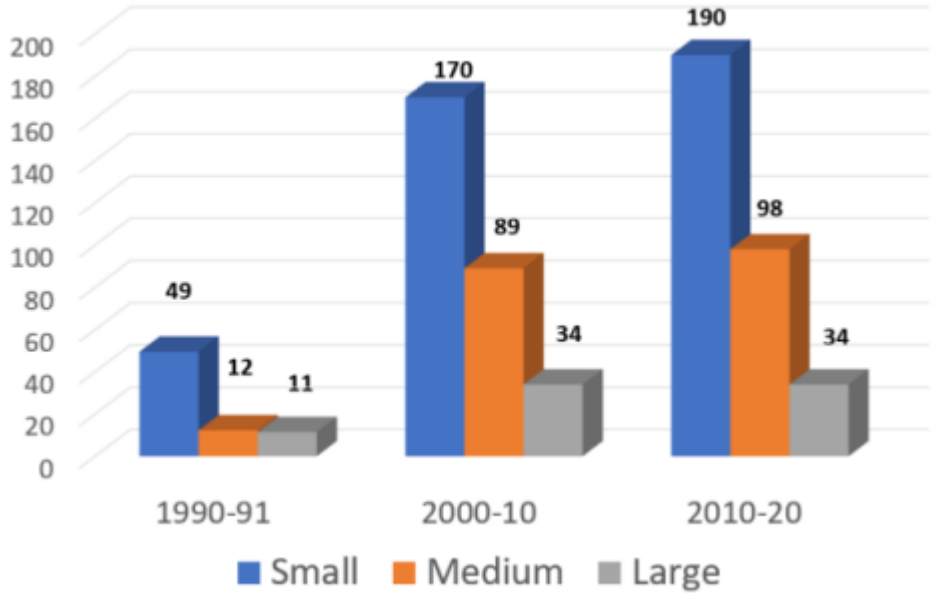
- Implementation and adoption of enhancement protocols developed by CIFRI in reservoirs resulted in significant increase in fish yield in reservoirs of Jharkhand, Chattishgarh and UP reservoirs.
- The study of 9 medium reservoirs of Chhattisgarh shows that the fish yield has increased by about 143 % after the adoption of culture based fisheries in the period 2010-11 to 2015-16. (combined production increased from 709.52 MT to 1012 MT).
- The annual fish yield showed an increasing trend from 38.48 t (2007) to 121.446 t (2015) in Jargo reservoir, Uttar Pradesh.

Need in Reservoir fisheries:

- Transfer of management rights of all manmade waterbodies to State Fisheries Department(s) / organizations, to bring all such open water bodies under scientific management and efficient governance framework
- Promotion of cage culture in reservoirs
- Production optimization through culture based fisheries in small and medium reservoirs and integrated approach for development of large reservoirs

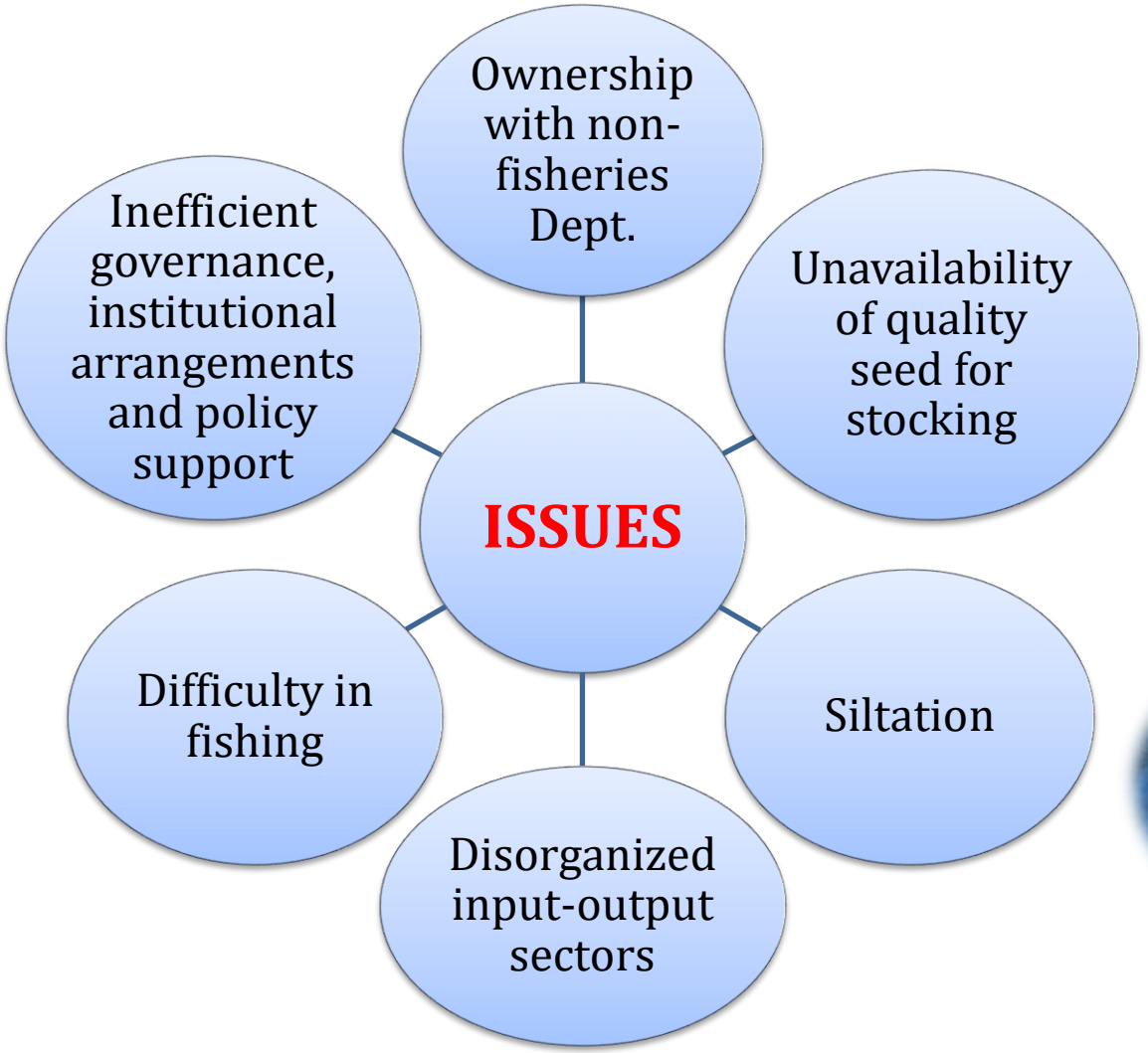
Present yield and potential yield from the reservoirs

Category	Area (ha)	Present yield* (kg/ha)	Potential Yield (kg/ha)	Potential Production (kg/ha)
Small (<1000 ha)	1 272 821	190	500	636 411
Medium (1000-5000 ha)	575 290	98	250	143 823
Large (>5000 ha)	1 612 190	34	150	241 829
Total	3460301		-	1 022 062



Increase in fish yield(kg/ha) over the years

Issues in reservoir fisheries



Management strategies

Ecosystem based Fisheries Management

Culture based fisheries in small reservoirs

Enclosure culture: In medium and large reservoirs

Stock enhancement in medium and large reservoirs

Environment enhancement: FADs, habitat conservation

Species enhancement: food niche based diversification; conservation

Wetland Fisheries

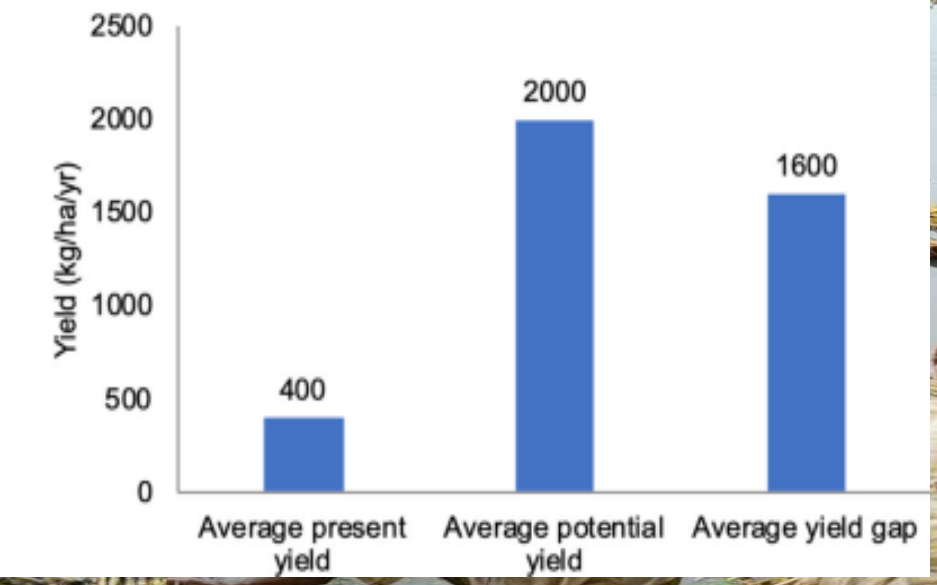
Floodplain wetlands (locally known as *beel/baor/haor*/ox-bow/chaur) are highly productive and breeding and nursery grounds for a number of aquatic organisms including commercially important fishes

Present need:

- **Conservation and restoration of ecological integrity of important natural wetlands**
- **Promotion of culture based fisheries in identified floodplain Wetlands**
- **Ensuring easy availability of quality seed for stocking of wetlands**

Challenges in Wetland fisheries

- Ownership issues due to 'common pool'
- Conflict with agriculture sector
- Encroachment
- Loss of river connectivity
- Governance and institutional arrangements
- Lack of awareness in use of sustainable fish production
- Water Abstraction



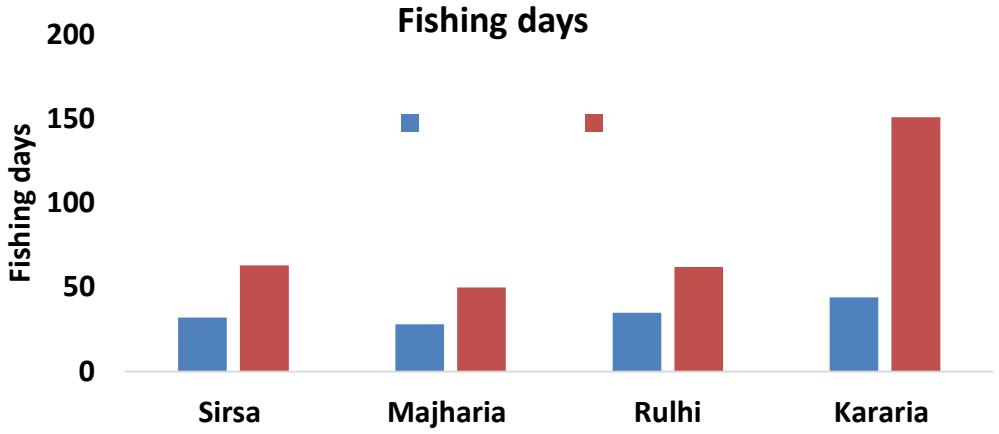
Fish yield status, potential yield and gap from the floodplain wetlands

Stride in fish yield through technological interventions in Oxbow lakes of Bihar

Strategies for realization of production potential

- Institutional arrangement (Organization of fisher's community)
- Habitat management (Macrophyte management, de-siltation, link channel)
- Fisheries management (Mesh size regulation, closed season, regulation of destructive fishing)
- Technological interventions (CBF, enclosure culture, land-based nursery)
- Supply chain management (Input and output linkages)
- Capacity and skill development (Awareness, training, exposure visit)

Wetland	Fish yield	
	Before project Kg/ha/yr	After project Kg/ha/yr
Sirsa	190	290
Majharia	60	87
Rulhi	75	131
Kararia	180	470



The interventions have brought considerable change in the attitude of fishers towards co-management and mobilized them for adoption of scientific wetland fisheries management besides enhancing fish yield and livelihood.

Grass carp model for macrophyte choked wetlands

- Pen culture of grass carp was successfully demonstrated in Beledanga, wetland (74ha) in a participatory mode under ICAR-CGIR (Window 3) program.
- The grass carp model was implemented to utilize macrophyte resources and also to check macrophyte proliferation
- 985kg of advanced fingerlings were produced in pens in 60 days and released in the wetland.
- The fishes weighing 0.7-1kg were harvested post 6 month of release

Canal Fisheries/ Fisheries in derelict waters

Canals are the second most important (26%) source of irrigation covering 17.0 mn ha in India. The total length of the canal is 1,26, 334 km. These resources are often exploited for small-scale fisheries, but the harvest from these canals are not taken into account of inland fisheries production.

Issues:

- No standard technology is available for canal fishery in Indian context.
- Conflict of interest between the agriculture and fisheries is the major challenge in canal fisheries development

Hence, ICAR-CIFRI has introduced viable management practices in selected canals of Sundarbans with the objective to provide livelihood support to the rural populace.

Socio economic condition of Inland fishers

Literacy rate

Resources	Literacy %
Reservoirs	63.32
Wetlands	65.23
River	79.10
Total	**70.70**

Income Status of fishers (Rs/Yr)

Resources	Enterprise					
	Fishery	Labour	Agriculture	Business	Any other	Total
Reservoir	20078.42	8510.39	3795.22	2638.48	1649.33	34696.43
wetland	9868.54	3279.49	1440.36	2575.80	218.75	15164.23
River	13207.32	6580.68	4127.04	7013.04	383.04	31311.12
Overall	16005.36	6920.40	3568.44	4533.36	891.96	30690.96
% of Total	**52.15**	**22.55**	**11.63**	**14.77**	**2.91**	100.00

Governance and Institutional arrangement in small-scale inland open water fisheries in India

Fisheries governance is the sum of the legal, social, economic and political arrangements used to manage fisheries.

❖Fisheries in India is under state list and governed by the various state fisheries acts.

❖Inland fisheries in India governed by two models i.e. welfare based model and revenue based model.

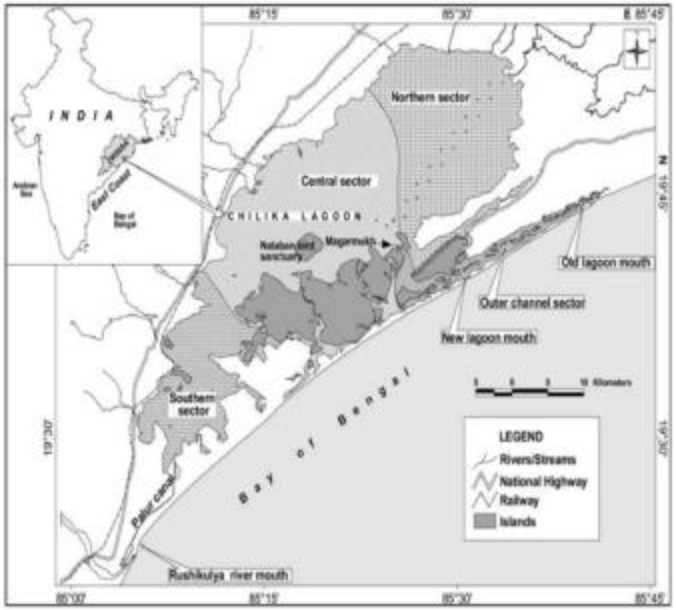
❖Revenue based model: tanks, ponds allover India, wetlands & reservoirs mainly of Uttar Pradesh, Assam and some other states.

❖Welfare based model: River fisheries allover India, wetlands & reservoirs in Bengal and Kerala, large reservoirs of Madhya Pradesh, Medium and Large reservoirs of Chhattisgarh.




Guidelines for restoration of Chilka fishery

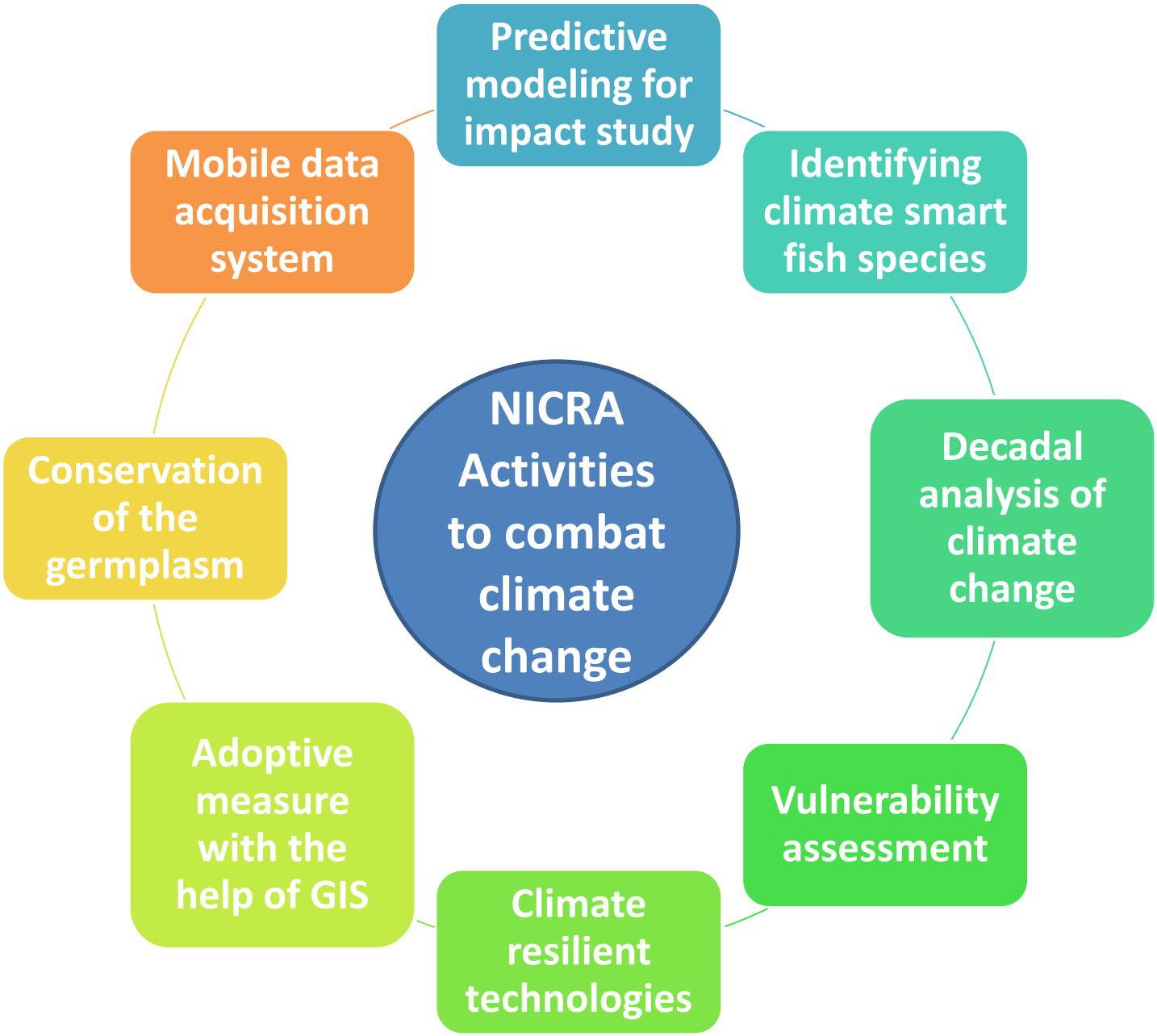
- Chilka lake supports livelihood of 0.2 million fisherfolk
- ICAR-CIFRI conducted thorough decadal research investigations on Chilka ecology and fisheries
- Restoration guidelines and recommendations were provided to the CDA
- Effective hydrological intervention during 2000 (by opening outer channel) revived and restored fisheries
- Sixfold increase in average annual landing (528%) and CPUE (465%)
- Increased Fish and shell fish diversity from 68 to 97 species
- New records of 56 species post hydrological intervention



Strengthening of resource poor fishers

- Culture based fisheries (CBF) is the most common and reliable technology for flood plain wetland & reservoir fisheries development
- Huge quantity of large size fish seed (Advanced fingerlings) are required for successful operation of CBF.
- *In-situ* raising of fish seed in enclosure (pen) is the most important options for acquiring required advanced fingerlings.

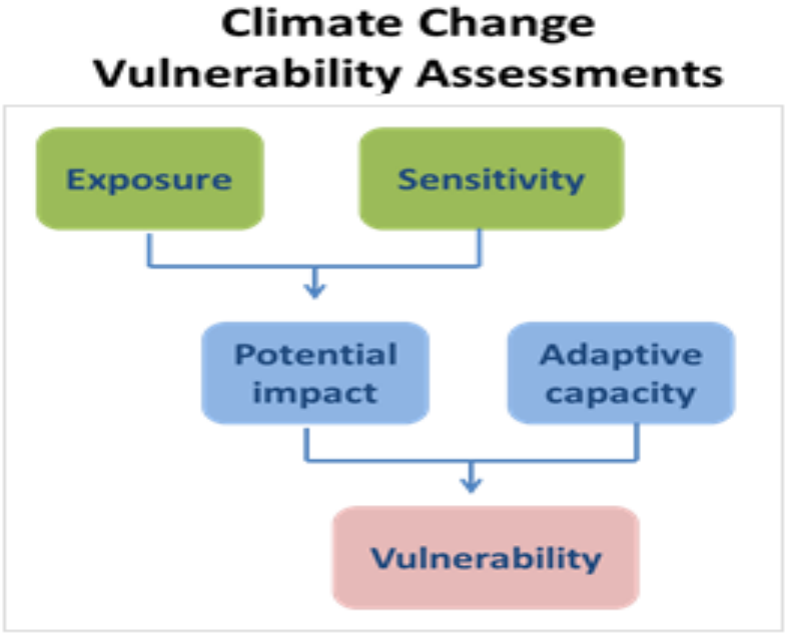
Climate change and disaster management

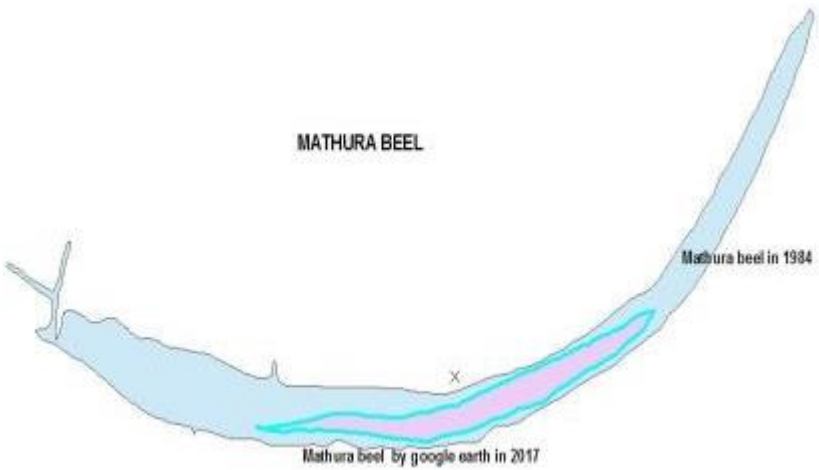


Climate change impact on SSF

Vulnerability assessment:

- Ecological vulnerability
- Species vulnerability
- Reproductive vulnerability
- Geomorphological vulnerability
- Socio-economic vulnerability





MITIGATION & ADAPTATION STRATEGIES

- Rebuilding wild stocks and improving fisheries governance;
- Diversification and fostering alternative livelihood activities;
- Disaster preparedness and response;
- Aquaculture development and ecosystem based adaptation: adjusting fishing pressure to sustainable levels
- Setting catch limits based on changes in recruitment, growth, survival and reproductive success or gear types.
- Adoption of scientific CBF, cage and pen culture with diversified species based on food niches and species spectrum

CRPS demonstration at Vembanad lake

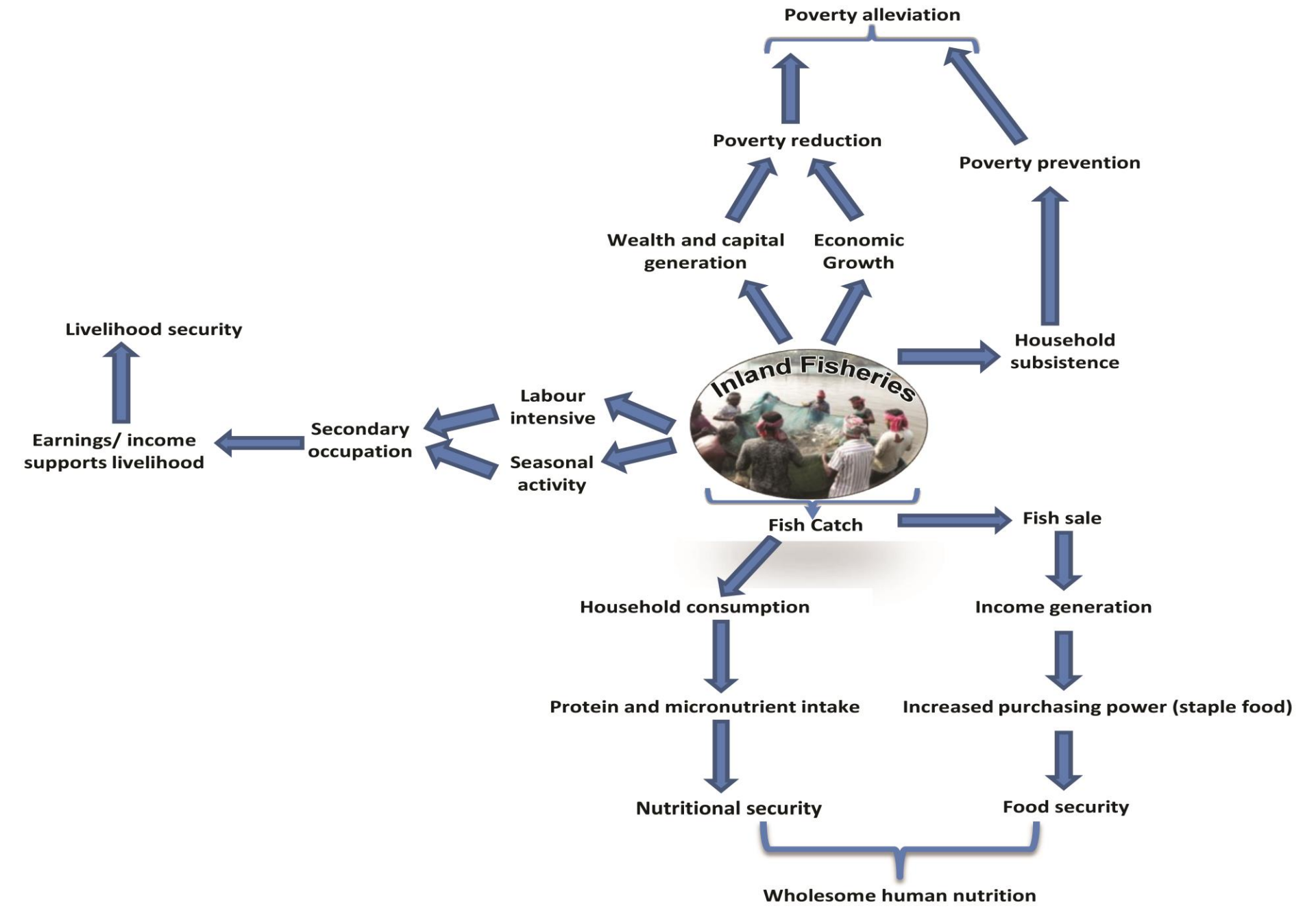
Stations: *Thycaattussery and Muhamma*

Species: *Villorita cyprinoides* (Thycaattussery, *Etroplus suratensis* (Muhamma)

- Culture period : 12 months
- Quantity harvested : 2000 Kg
- **Pen culture of clams could withstand the adverse impact of devastating flood during July-August 2018.**

How Small-scale inland fisheries contribute in livelihood and Nutritional Security?

- ***Employment:*** In India, a total of 2,31,17,820 fishers, fish farmers and fish workers are involved in inland fisheries.
- ***Income:*** Inland fisheries provide cash income to the fishing households.
- ***Food and nutrition:*** Self-consumption is the most direct contribution of inland fisheries in food security.
- ***Poverty reduction:*** As a part of multiple-activity livelihood strategy, people are engaged in inland fisheries activities that help to generate income, employment



Role of inland fisheries in Livelihood security, Food and nutritional security and Poverty alleviation

Constraints & Challenges

- Unequal power relation to other sectors in terms of socio-economy-political space
- Overfishing
- Scattered distribution, diverse management regime & weak governance
- Lack of credit support
- Weak or defunct Cooperative societies
- Competition for lease of water bodies between fishermen and contractors (in Uttar Pradesh)
- Lack of alternative livelihood
- Declining share of fishers in consumer rupee
- Access to higher education and basic healthcare
- Pollution, environmental degradation, climate change impacts and natural and human-induced disasters

Other cross cutting issues in inland fisheries

- **Introduction and regulation of exotic species**

Regulated entry of exotic aquatic species as per the existing National laws/ rules and adequate biosecurity protocols for import, breeding and farming is needed

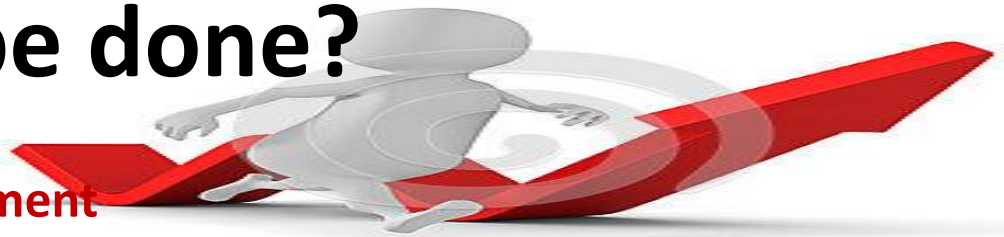
- **Disease Surveillance**

Strengthening of disease surveillance and reporting system with inbuilt provisions to identify and contain any emerging diseases is necessary

- **Fish markets and trade**
- Promotion of fish as health food to Increase domestic demand for fish and fish products
- Strengthening marketing infrastructure and modernization

of fish marketing and trade

What else can be done?



- **Human resource development**

Training and capacity building of the fishers and line department officials –based on their needs

- **Institutional finance (Credit & Insurance)**
- **Governance and Institutions**

Fisheries sector need to be recognized as legitimate stakeholders in rivers, wetlands and reservoirs

- **Water use/budgeting and Management Policy**

Recognizing minimal right to water for fisheries , considering it primary food production sector.

- **Introduction and regulation of exotic aquatic species**

Regulated entry of exotic aquatic species as per the existing National laws/ rules and adequate biosecurity protocols for import, breeding and farming is needed necessary

- **Fisheries cooperatives**

Strengthening of fisheries cooperatives by ensuring good governance, business, accuntibility and values

- **Research and development linkages**

Fisheries Sector Development : Schemes

2015-16
Blue Revolution Scheme

Rs 3000 Crores from 2015-16 to 2019-20 for Development of Fisheries Sector

2018-19
Fisheries and Aquaculture Infrastructure Development Fund (FIDF)

Rs 7522 Crores
Fund for providing concessional finance for Fisheries And Aquaculture Infrastructure

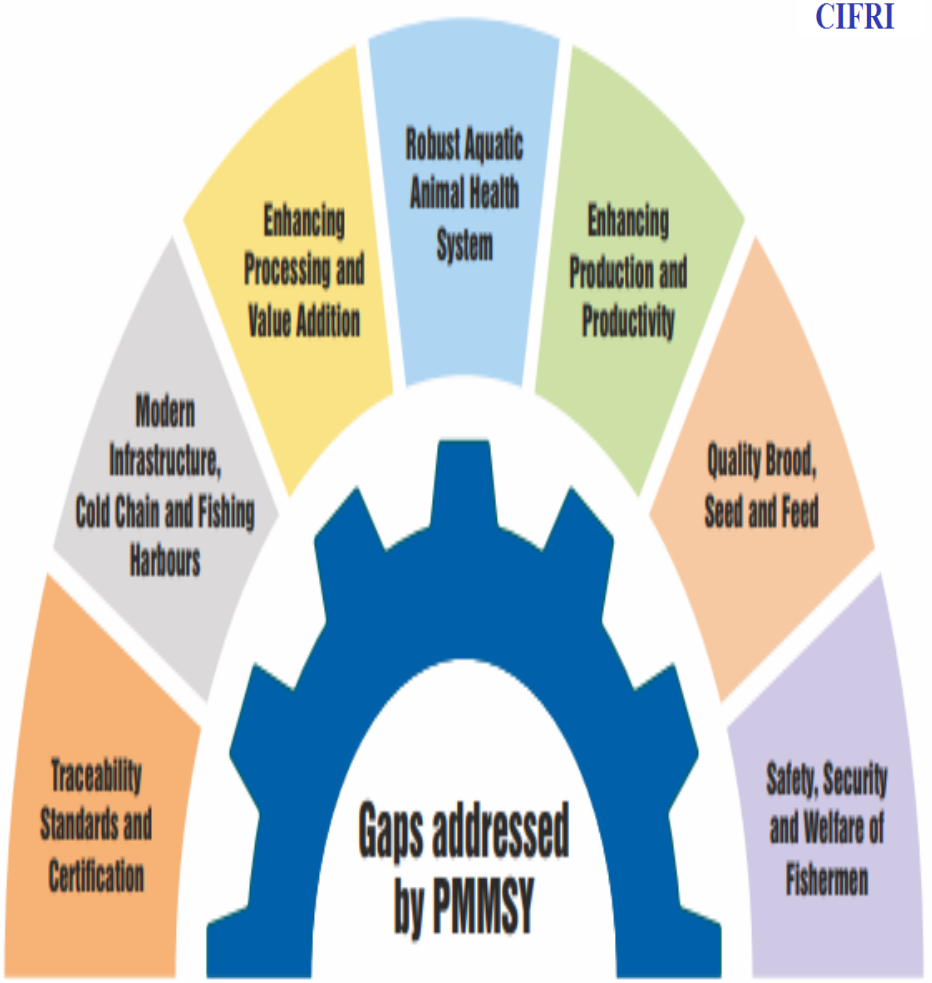
2020-21
Pradhan Mantri Matsya Sampada Yojana

Rs 20050 Crores
Investment for Sustainable and Responsible Harnessing of Fisheries Potential, Strengthening and Modernizing value chain & Robust Regulatory Framework

Key Reforms and Initiatives under PMMSY

CIFRI

- Enhanced investment in value chain
- Technology infusion
- Policy support
- Financial inclusion
- Productive utilization of land and water
- Alternative livelihoods and Entrepreneu
- Development of cluster-based approach



Convergence with other schemes

Some of the identified central schemes for linkages and convergence frameworks envisaged under PMMSY with the schemes/sub-schemes being undertaken by Ministries/Departments include the below mentioned:

- (a) **Sagarmala Programme** of the Ministry of Shipping for fishing harbours/fish landing centers and any other admissible activities.
- (b) **Pradhan Mantri Kisan Sampada Yojana** of Ministry of Food Processing Industries for post-harvest and cold chain facilities etc.
- (c) **Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS)** for ponds construction and water bodies development etc.
- (d) **Rastriya Krishi Vikas Yojana** and other schemes of Ministry of Agriculture and Farmers Welfare for pond construction and other admissible activities.
- (e) **National Rural Livelihoods Mission** for admissible activities and marketing.
- (f) Schemes of Department of Commerce for modernization/construction of fishing harbours and other admissible activities, promotion and doubling of fisheries exports, certification, traceability, branding, etc. in association with MPEDA
- Kisan Credit Card (KCC) of Ministry of Agriculture and Farmers Welfare to meet the working capital requirement of fishers and fish farmers for production and productivity related activities.

PMMSY Promotes 'Atmanirbhar Bharat' &'Make in India'

- Modernization of Fishing vessels
- Low cost indigenous fishing vessels
- Mother Vessels

•Atmanirbhar Bharat: Self Employment Generation about 55 lakhs

FUNDING PATTERN

1. Central Sector Scheme Component

- The entire project/unit cost will be borne by the Central government (i.e. 100% central funding).
- Wherever direct beneficiary oriented i.e. individual/group activities are undertaken by the entities of central government including National Fisheries Development Board (NFDB), the central assistance will be up to 40% of the unit/project cost for General category and 60% for SC/ST/Women category.

2. Centrally Sponsored Scheme (CSS) Component:

a) Non-Beneficiary oriented activities –Centre 60% and State 40% of the total project cost

b) Beneficiary orientated activities : –

- Governmental Assistance (Center + State) :
  - General Category - 40% of the project cost
  - SC/ST/Women - 60% of the project cost
- The Governmental Assistance will be shared between Center and States as below
  60:40 General States
  90:10 North Eastern and Himalayan states
  100% UTs

Governmental assistance (center+state) for the activity livelihood support for fishers during ban/lean period would continue as per existing Blue Revolution Scheme shared in the ratio of 50:50

States/UTs	Contribution
General States	Centre share Rs. 1500 + State share Rs. 1500 + Beneficiary share Rs. 1500= Rs. 4500/-year
NE & Himalayan States	Centre share Rs. 2400 + State share Rs. 600 + Beneficiary share Rs. 1500 = Rs. 4500/-year
Union Territories	Centre share Rs. 3000 + Beneficiary share Rs.1500 = Rs.4500/-year

Voluntary Guidelines for Small-scale fisheries guidelines

- ***Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication***
- Guidelines stand out is that they go beyond fisheries and highlight the rights of fishers and fish workers. In sum, they are about people, not just about fish.

• Governance of SSF is complicated. The available and fragmented laws on fisheries may be updated, revised and integrated. Valuation of goods and services is may be done to convince the planners and policy makers regarding the importance of SSF in inland openwaters. People's participation, community husbandry, resource conservation policy, research, capacity building, awareness and sensitization is needed for better regulatory framework to manage SSF in a sustainable way.


Thank You