

Inland Fisheries and Aquaculture in India for Sustainable Development Goals and Women Empowerment

Basanta Kumar Das, Piyashi DebRoy and Shreya Bhattacharya

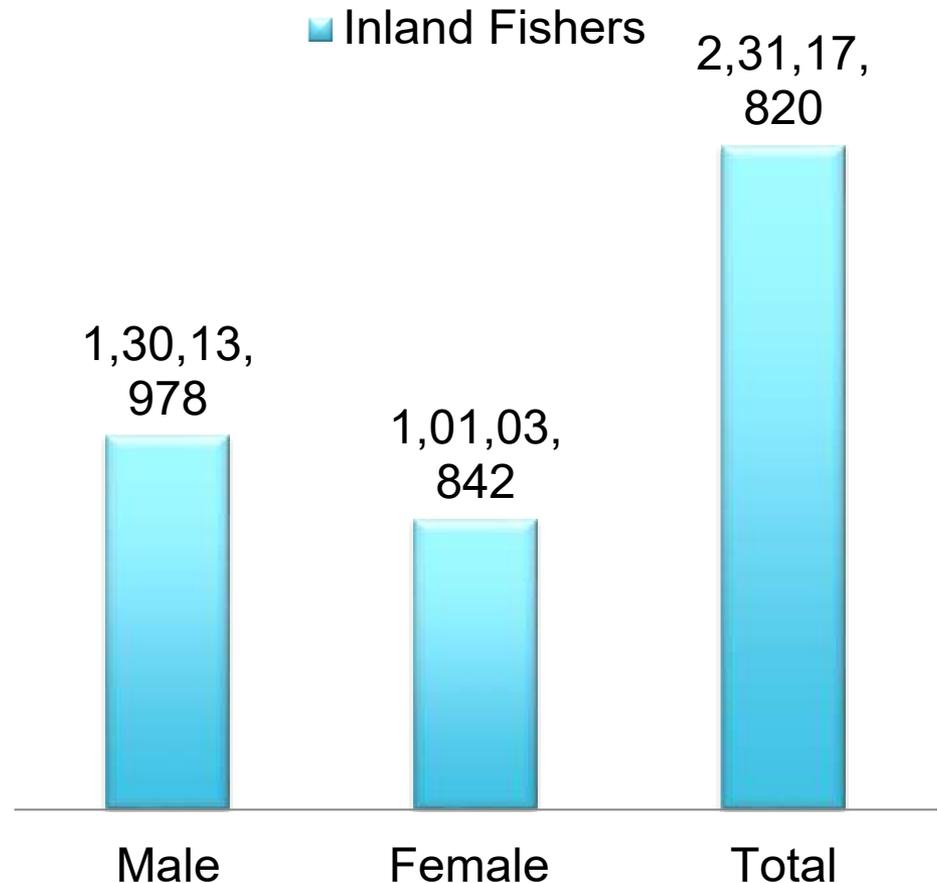
ICAR – Central Inland Fisheries Research Institute

Barrackpore, Kolkata – 700120, West Bengal, India

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.

Inland Fishers' Population



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

Artisanal or
traditional fisheries

Subsistence fisheries

Recreational
(sport) fisheries

- ***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 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



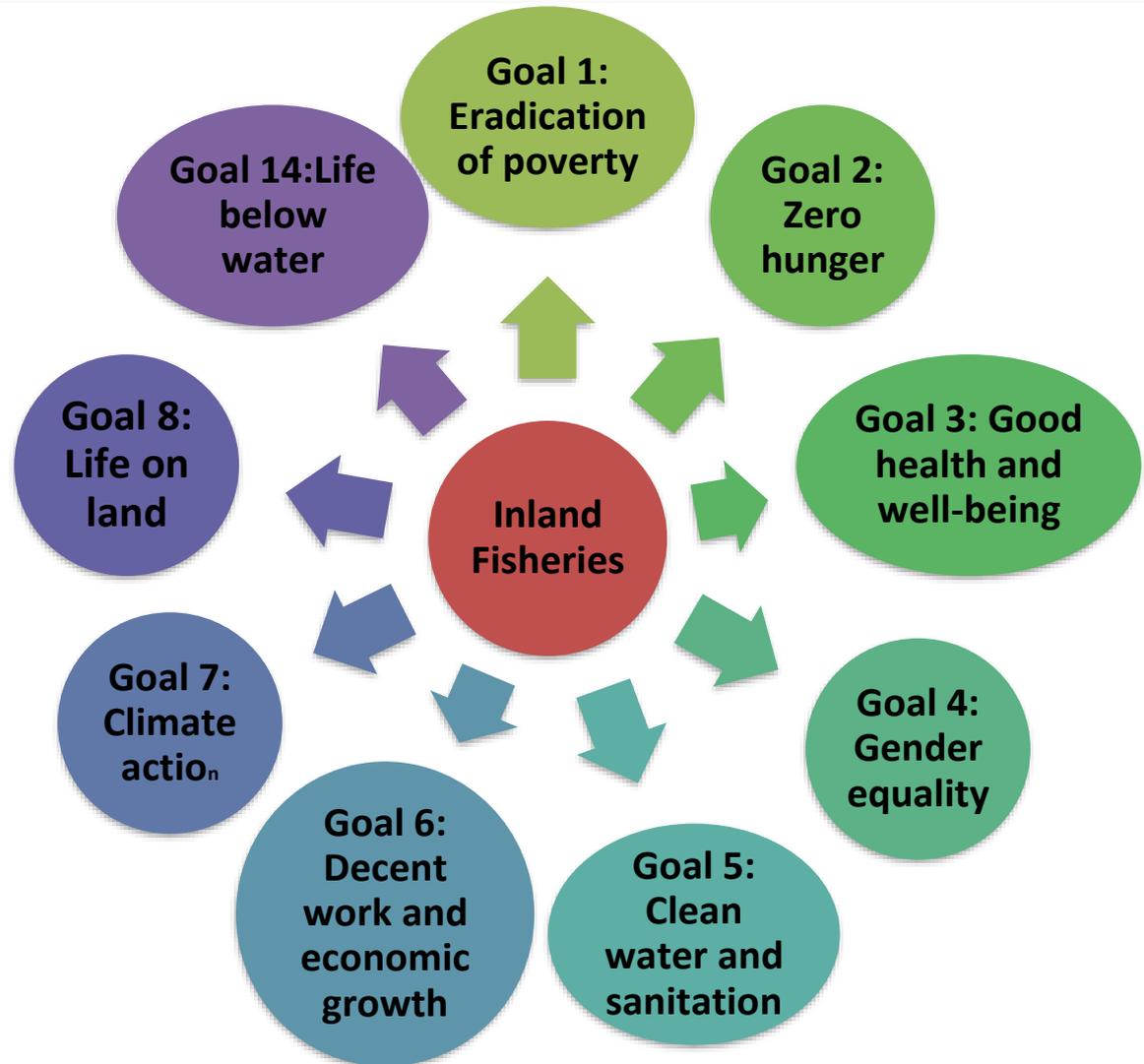
Fish for Nutritional Security:



- ❖ Important source of **Quality Animal Proteins**
- ❖ Rich source of **Micronutrients** (Minerals and Vitamins)
- ❖ Fish Oils- A rich source of PUFAs, especially w-3 PUFAs & DHA EPA
- ❖ Rich source of **Anti-oxidants**
- ❖ **Small indigenous fishes (SIFs)** are nutrient dense-rich source of **Micronutrients** (minerals and vitamins)
- ❖ Availability and affordability better for fish

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.





Riverine fisheries

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

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





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

Ranching for restoration

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



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

Wetland Fisheries



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)



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.







CIFRI's Endeavour in Women Empowerment in Fisheries Sector



Women Empowerment

- *Women are the largest untapped reservoir of talent in the world.*
- *It is a process of personal and social change through which women gain power, meaningful choices and control over their lives.*
- *Empowerment is not something that can be done to or for women.*
- *Women are the agents of their empowerment.*



Gender role in small Scale Fisheries





**Effort in Canal
Fisheries
Development
under TSP at
Kalitala,
Hingalgunj,
Sunderbans**



Tribal Upliftment at Sagar Islands, Sunderbans

Gender Role : Moser's Theory of women's 'Triple role'

“Gender role” : activities performed by men and women in different situations and times and within the boundary of different cultures, classes, castes, ethnic groups etc.

The roles of men and women are shaped by various forces :
social, cultural, economic, environmental, religious and political

▪ **Moser introduces the idea of women's 'triple role', i.e.,** production, reproduction (household work and childcare), and community management role.

Production role



Fish seed collection, catching of fishes, processing and marketing of fish catch, making and repairing nets and gears, helping in the preparation for fishing trips and in unloading and sorting the fish

Reproduction role



Reproduction role of women involved in SSF: Women involves in household activities, income generation activities and spares time for self.

Community Role



The degree of participation in the community events which help them to gain knowledge and information leading their way towards empowerment

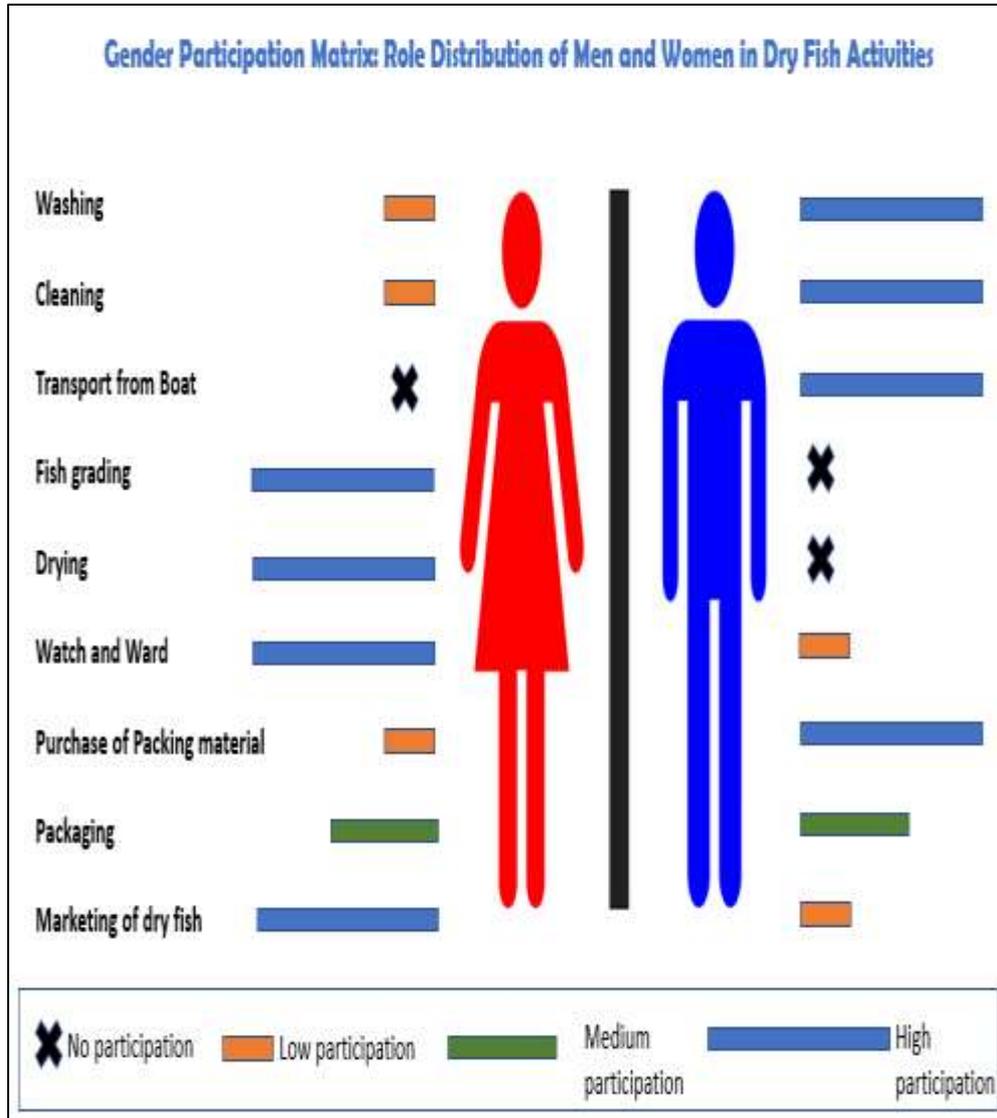


Community based Fisheries Enhancement Effort in Sidhabari, Asansol

Drudgery and Occupational health hazards women involved in Fisheries



Gender participation matrix of Men and women in dry fish activities in Sundarbans

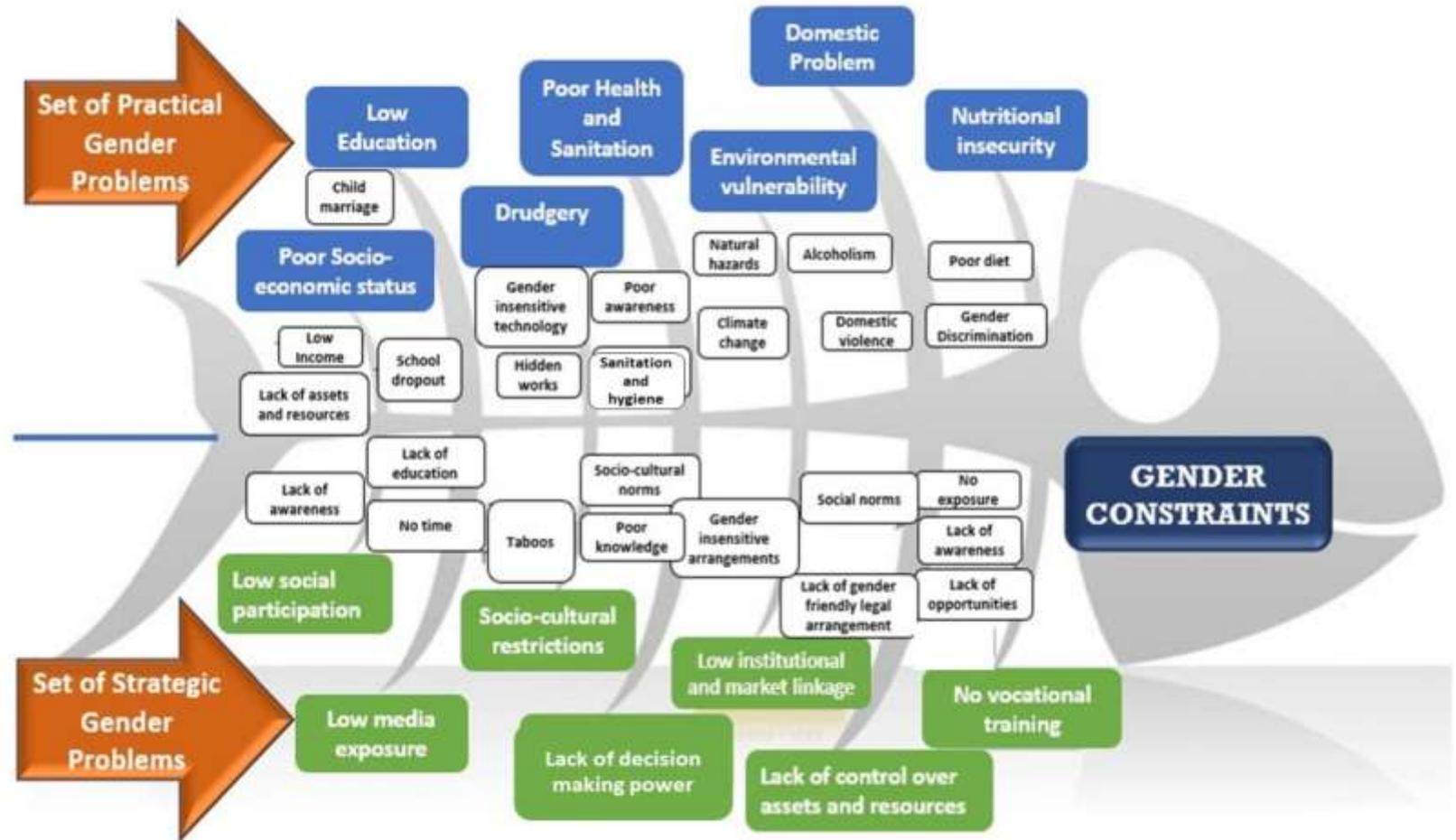


Percentage distribution Occupational health risks among fisherwomen

Occupational Health risks	Gender		Persons χ^2 value
	Male	Female	
Cuts/Fall	47	53	$\chi^2 = 17.481, P < .05$
Cold	51	49	
Musculoskeletal injuries	37	63	
Eye problem	42	58	
Palpitation and nausea	26	74	
Skin burn or skin diseases	18	82	
Pricks and bites	34	66	
Snake/insect/Crab/Scorpi on bite	57	43	
Taken away by tiger/crocodiles			

A case study in Sundarbans shows (n=100) that Fisherwomen are likely to suffer more from the occupational health risks as compared to the male fishers.

Fishbone diagram that attempts to highlight the constraints along with their root





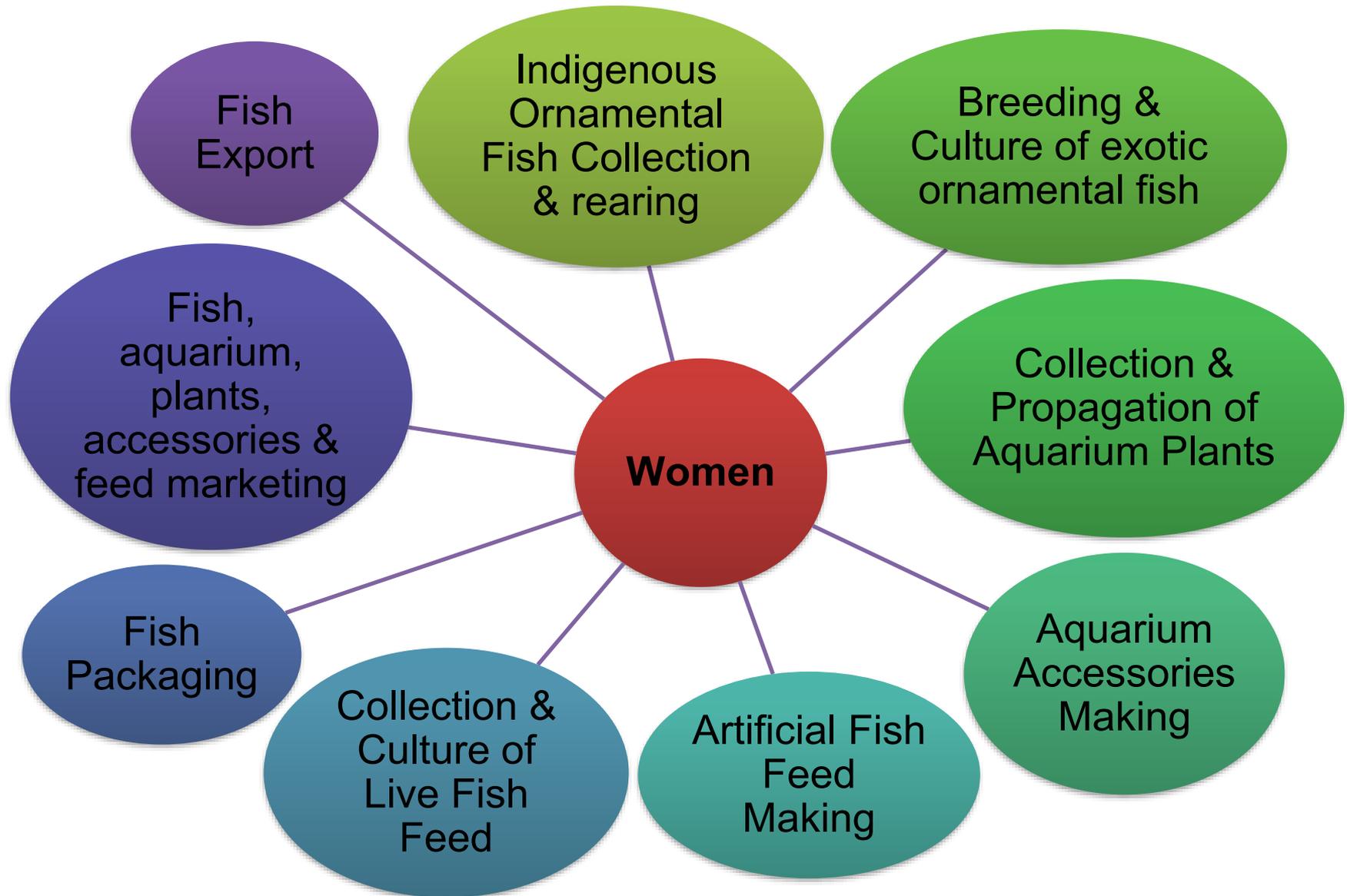
Intensive Interaction with Fisherwomen at Kochukhali, One of the remotest islands of Sundarbans

Ornamental Fishery



- *ICAR-CIFRI Distributed inputs of inland ornamental fisheries for supporting livelihoods of 211 women in Bengal, Odisha and Jharkhand*

Works done by Women in Ornamental Fisheries





Selection through Cooperatives, NGOs, Rotary service projects, DFOs etc.



Awareness about ornamental fisheries sector



Training in CIFRI



Exposure visit in ornamental fish farm



Hand holding demonstration



Initial Setting of unit



Input distribution



Monitoring and visit of units



Care and husbandry



Seed production and rearing



Selling

The process of ornamental fisheries unit establishment with hand-holding support from ICAR - CIFRI

Women in Ornamental fisheries



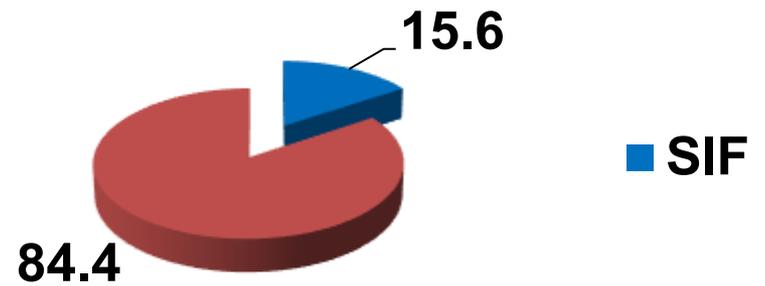
Women in Ornamental fish marketing



Women in Fish marketing



Contribution of SIF marketing/Vending to income of a Household





SIF culture in Hapa in Gardanmari, Burdwan with active participation of tribalwomen



Net distribution in Sagar Islands



Thank You