

# The Mighty Small Indigenous Fresh water Fish Species

About 450 of the fresh water fish species have been classified as small indigenous fresh water fish species (SIFFS). Although there is a lack of clear definition, but in general SIFFS are those which grows up to a maximum length of 25 – 30 cm. Around 216 SIFFS have been recorded from North East, 196 SIFFS have been recorded in the Western Ghats and 120 have been recorded from the Central India.<sup>1</sup> NBFGR has identified about 100 SIFFS not only as an important source of food and nutrition security but also supporting local livelihoods.

## THE SMALL INDIGENOUS FRESH WATER FISH SPECIES (SIFFS)

The National Bureau of Fish Genetic Resources (NBFGR) of India has recorded about 2,246 finfish species in India. Out of which around 765 have been identified as freshwater fish species. About 450 of the fresh water fish species have been classified as small indigenous fresh water fish species (SIFFS). Although there is a lack of clear definition, but in general SIFFS are those which grows up to a maximum length of 25 – 30 cm. Around 216 SIFFS have been recorded from North East, 196 SIFFS have been recorded in the Western Ghats and 120 have been recorded from the Central India<sup>1</sup>. NBFGR has identified about 100 SIFFS not only as an important source of food and nutrition security but also supporting local livelihoods. The ICSF and IFSI report (2010), suggests that small indigenous freshwater fish species (SIFFS) are a major component of the food basket of communities living close to freshwater bodies in India. This short review article highlights the potential of SIFFS in relation to food and nutrition security and poverty alleviation, issues and challenges and potential opportunities for promotion of SIFFS in the country.

## THE POTENTIAL OF SMALL INDIGENOUS FRESH WATER FISH SPECIES (SIFFS)

SIFFS are not only a rich source animal protein but also a vital source of micro-nutrients such as calcium, zinc, iron and fatty acids to the rural poor<sup>2</sup>. Studies have shown that bioavailability of calcium from SIFFS is on par with milk (Roos *et al.*, 2007) and indigenous knowledge about the health benefits of SIFFS is significant among the rural communities.



*Gummadi Pariga (Puntius sophore spp)*

Studies on SIFFS suggests that profits of SIFFS are usually on the higher side when compared to farming of large fish species. A study<sup>3</sup> on Chandania beel of West Bengal<sup>4</sup>

suggests that production of stocked fish species was exhausted within 30 – 60 days, but SIFFS were available throughout the year. In the same study, the production of stocked fish species was about 48.02 tonnes and valued around ₹ 21.91 lakhs. The production of SIFFS was about 20 tonnes and valued around ₹ 24 lakhs from the same water body. A study of SIFFS of eight wetlands in West Bengal suggests that the average annual income of fishers' from stocked fishes is ₹ 12,000 – 18,000 and SIFFS is ₹ 9,000 – 39,000.

These studies clearly indicate: 1) a year long, continuous supply of food and nutrition to local communities, 2) a year long, continuous livelihood and income generation opportunities for local fisher folk, 3) the profits from SIFFS is about three times of the profits from stocked fish species like the Indian major carps (IMCs), 4) the cumulative benefits of poly-culture (IMCs and SIFFS) is higher than monocultures of IMCs and other stocked fished species, and 5) SIFFS are far more resilient<sup>5</sup> and productive than stocked fish species. Unlike other commercial stock fish species, SIFFS are self-recruiting and does not need any investment every year. They can be maintained in small ponds even with a depth of 1 meter.<sup>6</sup>

There is a significant amount of traditional knowledge existing on the culture, management as well as human health and nutrition and ecological benefits of SIFFS, which is poorly documented. For instance, CIBA's has already documented about 80 indigenous traditional knowledge (ITK) systems related to fisheries. Indigenous communities build specially designed 'holding ponds' for rearing brood-stock of *Puntius sarana* and *Clarias batrachus*. Earthen pots are used for seed production of *Puntius sarana* at 24 Parganas (South) District, West Bengal. Indigenous communities in Manipur practice induced breeding of IMCs, administering herbal extracts.<sup>7</sup>

Affluent farmers are exclusively inclined towards culture of IMCs for large-scale production, owing to the training and information they receive, on the contrary small-scale farmers of Odisha and West Bengal have been already culturing SIFFS due to local preferences and thriving local markets for SIFFS, providing them both nutrition and livelihoods. Interestingly, women reported of an assured share of portion of food when SIFFS are cooked, which is not the case when bigger fish species are cooked.<sup>8</sup>

Another dimension which shall not be overlooked is that women in general sell SIFFS at the local markets, giving them direct access to income.

## ISSUES AND GAPS IN REALIZING THE POTENTIAL OF SIFFS

The government supported extension programmes across the country have been oriented towards promotion of IMCs, totally ignoring the SIFFS. The freshwater aquaculture of India is currently focused on intensive culture of only three IMCs and three exotic carps without any scope or space for SIFFS. Alarming, eradication of SIFFS from most of the natural and open water bodies in the name of scientific aquaculture became a common practice across the country. Flushing natural and open water bodies with IMCs and exotic species under intensive and limited-species composite fish culture maybe leading to systematic elimination of SIFFS.<sup>9</sup> Further, SIFFS have been tagged as weed species in culture ponds, which needs a thorough review and overhaul. There is a danger of tagging SIFFS as trash fish if the actual potential and contribution of SIFFS is not fully realized appreciated.

Currently, only a handful (3 IMCs and 3 exotic carp species) of fresh water fish species are commercially cultured in the country. About 87 per cent of freshwater aquaculture production in India is from only three species of Indian major carps (IMCs) - *Catla*, *Rohu* and *Mrigal*.<sup>10</sup> Currently, there no protocol existing in the country for promotion of SIFFS. Further, culture technologies for majority of the indigenous fish species, especially SIFFS is not only unavailable in India but also there is a general lack of interest among the government bodies and private agencies to promote them. There is a lack of information over package of practices for promotion of SIFFS among fish farmers in general and integration of SIFFS in poly and composite cultures in particular. Further, there is a lack of clear policy to regulate the flow and seepage of synthetic fertilizers and toxic pesticides into water bodies from agriculture lands, which could lead to mass mortality of fishes and other aquatic life from eutrophication.

There had been major data gaps not only with regards to SIFFS distribution, abundance, endemism, catch etc. but also there is lack of data pertaining to their economic value, contribution to food and nutrition security, local livelihoods, their role in poverty alleviation,



empowerment of the marginalized groups, especially women, and ecological functions. Data related to the production/catch of SIFFS is not recorded at the large/major landing centers as they are caught, sold and consumed almost exclusively locally. As a result, hitherto, they have remain invisible in the national statistics. Consequently, SIFFS have received insufficient attention in statistics, inland water fisheries policies and programmes of India, both at the national and state levels. Such invisibility has resulted in acknowledgement of their contribution and designing appropriate policies to prioritize the promotion and development of SIFFS in the country.

The ICAR-NBFGR-NATP (National Agriculture Technology Project), has initiated a project involving twelve research institutions for developing a germplasm inventory, evaluation and gene banking of freshwater fishes, with special focus on food and ornamental fish species of Western Ghats and the North East. However, such initiative should be implemented across the country, including the Eastern Ghats and Himalayan mountain ranges.

Studies suggest that there had been already a drastic decline in fish population across the sub-continent due to loss of habitat, pollution, overexploitation, large scale stocking of water bodies across the country with IMCs and other exotic species under government supported programmes, and other anthropogenic causes.<sup>11</sup> Hitherto, it is unclear about the contribution of such inland fish species in general and SIFFS in particular to local culture, food and nutrition security, income and livelihoods. Further, not enough work and investments have been made to study and sustainably manage the production systems (breeding grounds, habitat, etc.) of SIFFS, to tap their potential to ensure local food and nutrition security, income and livelihoods of the local communities, especially the indigenous communities in rainfed areas. Consequently, the potential of majority of indigenous freshwater fish species remains unexplored with regards to securing food and nutrition and contribution to local livelihoods and poverty alleviation.

### POTENTIAL OPPORTUNITIES OF SIFFS FOR FOOD AND NUTRITION SECURITY AND POVERTY ALLEVIATION

Both lab and field experiments have shown that SIFFS can be successfully cultured with IMCs under polycultures,

without any negative effect on production of IMCs commercially. SIFFS of *Amblypharyngodon mola (mola)*, *Puntius sophore (puti)*, *Osteobrama cotio (dhela)*, *Cirrihinus reba*, *Labeo bata (bata)*, *Gudusia chapra (chapila)*, can be successfully cultured along with IMCs. Further, few SIFFS can be also cultured successfully through captive breeding.

### PARTICIPATORY AQUATIC HABITAT CONSERVATION AND MANAGEMENT

The Bhandara Nisarga Va Sanskruti Abhyas Mandal (BNVSAM), Gondia district of Maharashtra, took up a unique pilot initiative of participatory conservation and development of aquatic habitat using traditional knowledge at 12 small water bodies in 2 districts of Bhandra and Gondia districts of Maharashtra in 2011. This initiative has been taken up in partnership with 12 traditional fishing cooperatives of both the districts covering an area of 281.80 ha. Aquatic habitat development involves ploughing of tank bed during summer season, transplantation and reintroduction of selected native aquatic plant species where they are lost, removal of exotic weeds like *Ipomoea fistulosa* under MREGS activities, promotion of indigenous fish species culture and biodiversity conservation. The impact of habitat development on indigenous fish production is presented in the table (1). The net profit of cooperatives has increased between 200 to 700 percent as they don't have to invest in stocking and feeding.

Table – 1: The impact of habitat development on indigenous fish production at six intervention sites

Village Name	Production (kg) Before Intervention	Production (kg) After Intervention	% Increase
Motha Talo Arjuni	120	249	208
Ghanod Gaon Talao	98	630	643
Zari Talao	30	231	770
Nimbodi Channa Bakti	62	190.2	307
Sawartola Gaon Talao	20	42	210
Bandhya Talao Nimgaon	56	220	393

The habitat development however failed at one of the 12 tanks due to proliferation of Tilapia (*Oreochromis niloticus*) an exotic fish infamous for prolific breeding and omnivorous nature. It was found that this fish population continue destroying the tank environment.

Source: Rajankar, M. 2019. Aquatic Habitat Development – A Community Approach. LEISA India.

SIFFS are hardy in nature and adapt easily to shallow water conditions and can thrive without any supplementary feed, which makes them perfect choice for small-scale, low-input, inland fisheries especially in the rainfed areas. SIFFS can be cultured in ponds as small as kitchen pond of an area 0.05 ha with a density of 150 – 200 to 100 – 200 per ha depending on the species. Given the survival rate is 80 percent this is enough to secure food and nutrition security of a family.

### **ODISHA GOVERNMENT TO INTRODUCE SMALL FISH IN WOMEN AND CHILD DEVELOPMENT PROGRAMMES**

In a landmark project the government of Odisha has introduced SIFFS (mohurali) in the diet of school children at five schools and destitute pregnant and lactating women at a Swadhar home since 2018. The Odisha government has directed the state missionary to introduce SIFFS in the mid-day-meals of all the state-run-schools managed by the SC and ST Development and Women and Children Development Departments in the entire thirty districts of the state. Odisha Government is also focusing on production of SIFFS to meet the demand in the future. "SIFFS culture has been initiated in six blocks of Balasore, Mayurbhanj and Jagatsinghpur districts and SHGs as well as individual fish farmers are encouraged to culture SIFFS in private and community ponds.

*Rout, H.K. 2018. Small Fish as Nutrition add-on in Odisha's Mid-day-Meal. The New Indian Express, India. 23, Nov, 2018.*

SIFFS have been proved to be a major source of food and nutrition security of rural and economically disadvantaged segments of the society. Further, SIFFS are known to provide a yearlong, continuous livelihood and income generation opportunities for local fisher folk. Therefore, the issues of silent hunger and poverty prevalent among the disadvantaged segments of the society can be addressed through an appropriate policy, institutional and programme interventions related to SIFFS.

The low-lying fallow water bodies and water bodies less than hectare have been left mostly unutilized in majority of the country. Should they be brought under need-based aquaculture with SIFFS, it may be possible to

ensure not only food and nutrition security but also improve local livelihoods and conserve the indigenous fish diversity and their natural habitats.

### **MAJOR STEPS FORWARD**

In the above background there is need for:

- More research and data on amount of catch and economics of SIFFS,
- Further refinement of culture technologies pertaining SIFFS in a participatory manner, in collaboration with indigenous communities that have been already known for mastering the SIFFS culture technologies,
- More research on traditional rights and regimes associated with access to SIFFS and benefit sharing mechanisms,
- Prescription of inclusion of SIFFS in the diets of women and children under the women and child development programmes,
- Promotion and prioritizing traditional fishers and Beel co-operative societies,
- Integrated aquatic habitat conservation and management through community partnership should be prioritized over just yield,
- Designing an appropriate policy and institutional framework, and other associated support systems for mainstreaming SIFFS cultures,
- Establishing appropriate market linkages and building necessary infrastructure to support SIFFS markets.
- Prioritizing the conservation of indigenous fish diversity and their natural breeding grounds and habitats through appropriate, inclusive policy and institutional interventions, in partnership with local communities.

### **ABOUT THE AUTHORS**

Kanna K. Siripurapu, Young Professional Fellow at Revitalizing Rainfed Agriculture Network (RRAN).

Manish Rajankar, Bhandara Nisarga Va Sanskruti Abhyas Mandal (BNVSAM), Arjuni Morgaon, Dist. Gondia, Maharashtra, India.

### **PHOTO COURTESY**

Nemani Chandrasekhar, WASSAN – RRA Network

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