

# FISH BASED ECO-TOURISM AS AN AVENUE FOR SUPPORTING LIVELIHOOD TO SCHEDULED CASTE POPULATION IN NORTHEAST INDIA

Recreational fishing in the recent times is considered as an intrinsic part of **Ecotourism** which involves travel to destinations where pristine fauna and cultural heritage are the primary attractions and can provide viable income-generating options for economic development for local communities and opportunity of education and activism among travelers, making them more passionate towards nature and its resources. It is a process of capturing fish for pleasure or competition in natural and man-made water bodies. The most common form of recreational fishing is done by angling with a rod, reel, line, hooks and any one of a wide range of baits. Recreational fishing has gained much popularity after adventure tourism and has a booming international business opportunity. An attempt has been made herewith to elucidate on various avenues of fish based eco-tourism practices or recreational fisheries for the Scheduled Caste population of Northeastern part of India by suitably harnessing the bountiful of aquatic resources in the form of rivers, streams and lakes alongwith the importance of the game fishes like the mighty mahseer, trout, catfishes and carps.

## 1. The game fishes of Northeast India

### 1.1 The mighty mahseer

**Mahseer** is a large bodied potamodromous freshwater fish, endemic to Asian rivers and is a flagship species of considerable economic and recreational interest. Mahseer is the most popular game fish amongst anglers in India as this fish is the toughest fighter amongst freshwater sports fish and is therefore known as the undisputed king of Indian freshwaters. Mahseer belong to three genus namely *Tor* (Gray), *Neolissochilus* (McClelland) and *Naziritor* (McClelland). However, genus *Tor* constitutes the bulk of mahseer and there are different opinions of the species of mahseer available under different genus. In this context, the river systems of the Northeastern region are worth mentioning which offer some of the most remote, pristine, wild and untapped resources harbouring mahseer and providing opportunity for fishing and recreation in the region. Anglers have reported catches of golden mahseer weighing 12.5 – 40.0 kg in these rivers.

River Kameng (Jia Bhoreli), river Subansiri, river Siang, river Yamne, river Pare, river Poma, river Lohit, river Dihang, river Dibang along the Arunachal Pradesh and Assam foothills are among the sparse human habitation river valley and anglers travel as adventure enthusiasts along these rivers, the home to the big fighting fishes *Tor putitora* (golden mahseer) (Fig. 2) and *Neolissochilus* spp. (chocolate mahseer) (Fig. 2). The life of the dwellers in these river valleys is closely mingled with nature and therefore attention has been paid recently towards developing ecotourism in these drainages by arranging rafts, fish rods, tents and other basic amenities and in turn inviting innumerable tourist from neighbouring states Nagaland, Meghalaya, Sikkim, West Bengal and tourist from countries like Nepal and Bhutan. The competitions are done on the principle of catch and release and the fish are not led to any injury during the catch. The angling competitions and festivals can be successful to associate the local community in promoting ecotourism in these unrevealed places of Northeastern region. The river Manas, a transboundary river in the



Himalayan foothills between southern Bhutan and Assam is another biggest river systems meeting the river Brahmaputra. It is reported that upper stretches of river Manas and its tributaries are predominantly inhabited by mahseer species viz., *Tor putitora*, *Tor tor* and *N. hexagonolepis*. Similarly, the hill districts of Assam namely Karbi Anglong, West Karbi Anglong and Dima Hasao with dense tropical forest and numerous tributaries of the mighty Brahmaputra harbours *Tor tor*, *Tor putitora* and *Neolissochilus* spp. creating an immense potential for angling in these hilly districts of Assam. Some of the potential angling river sites are the banks of river Kopili with beautiful waterfalls, the banks of river Amrenge provided with a tourist lodge and a heritage old bridge of the British era, the Amtereng Dam site of Karbi Langpi Hydro project over river Karbi Langpi with the attraction of the reservoir, river island Siloni over the river Longnit attracting the anglers for day out. Sikkim with its vast river systems is an anglers' delight where the mighty river Teesta and Rangeet provide ample scope for sport fishing of golden and chocolate mahseer. Angling has been an age old practice for the people of Mizoram and is performed on traditional means by simple hook and line for catching the locally available carps, catfishes, murrels and mahseer till date.



Fig. 1: A catch of golden mahseer



Fig. 2: A catch of chocolate mahseer

## 1.2 The exotic trout

**Trout** is another group of fish mostly liked by anglers all over the world for its superlative sporting quality. The most sought after the trout group for sport fishing in natural water bodies are the brown trout (*Salmo trutta fario*) and rainbow trout (*Oncorhynchus mykiss*), all species of family

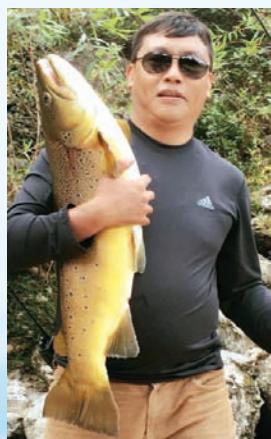


Fig. 3: The exotic brown trout as a sport fish in Northeast region

Salmonidae and thrive in rivers and tributaries in the colder regimes of Northeastern region. This species was introduced in India from Europe by British settlers around the beginning of the last century primarily for sport fishing or recreational angling. River Yargyap chu in Menchukha region in Shi Yomi district has been reported to harbor brown trout weighing 8-12 kg by avid anglers (Fig. 3). The upland natural lakes



and rivers of Tawang and West Kameng districts of Arunachal Pradesh along the Indo-China border can be a suitable home for the exotic rainbow and brown trout and therefore be an angler's paradise. Effort has been made by ICAR-DCFR to stock the upland lakes of Tawang district with young ones of exotic trout for generating avenues through fish based ecotourism for the local residents. Similarly, trout raceways have also been constructed at Nagaland in collaboration with Department of Fisheries, Govt. of Nagaland to promote and expand trout fisheries in the state.

### 1.3 The indigenous snow trout

The Schizothoracids, commonly known as snow trout accounts the major and important part of the capture fishery in the high altitudinal regimes of Northeast region. The most frequently encountered species of snow trout in the region are comprised of *Schizothorax richardsonii*, *Schizothorax plagiostomus* and *Schizothorax progastus*. One of the most selective methods for catching snow trout inhabiting the deeper pools and turbulent lotic water of eastern Himalayas are the noose and line method. This fishing device consists of a rod, reel, long line with nooses, rings, bait and weight (Fig. 4). Local residents keen in fishing mostly fabricate and operate this gear for their recreation. The average length of snow trouts was recorded as  $23.08 \pm 4.36$  cm with an average catch size in weight of  $136.3 \pm 116.34$  kg. This innovative practice of harnessing natural water resources was found to have immense importance to the nearby communities to earn their livelihood and recreation in mountainous terrain of the eastern Himalayas.



Fig. 4: Noose and line fishing of snow trout in upland water bodies of Northeast region

### 1.4 Carps, catfishes, featherbacks and others

The floodplain wetlands of Assam, locally known as beels are one of the prime sources of natural capture fishery pre-dominated by small fish species (*Puntius* spp., *Chanda* spp., *Mystus* spp., *Nandus*



Fig. 5: Women fishers of Assam with fishing gears

*nandus*, *Amblypharyngodon mola*), carnivorous catfish (*Bagarius bagarius*, *Wallago attu*, *Ailia coila*, *Sperata aor*, *Mystus seenghala*, *Ompok bimaculatus*), air-breathing species (*Heteropneustes fossilis*, *Clarias batrachus*, *Anabas testudineus*), murrels (*Channa punctatus*, *C. straitus*), featherbacks (*Notopterus notopterus*, *Chitala chitala*) and eels (*Monopterus cuchia*). The methods of fishing in the Brahmaputra drainage and floodplain wetlands are diverse and the gears used are mostly indigenous. These indigenous gears are mostly traditional and unconventional and have a tremendous economic impact in the rural sector for harnessing the nature for food and recreation. The most common fishing gears used



by the fisherfolk are the plunge baskets (*polo, juluki*), traps (*seppa*), lift nets (*porongi jal*), pole and line (*boroxi*), drift lines (*nol boroxi*) and these are equally operated by women during the day hours (Fig. 5) of the day. Traditional community fishing is also being organized in these beels in certain districts of Assam where local communities from different villages and localities assemble in a particular area and fish for an entire day (Fig. 6). None of the fishers in this event are fishermen by profession and fish for joy and merriment.



Fig. 6: Community fishing in Assam

## 2. Recreational fishing for conservation

The Assam Boreli Angling and Conservation Association (ABACA), situated at the banks of river Jia Boreli at Nameri, Sonitpur district, Assam is one of the eco-camps working on popularizing of adventure sports among the rural youth and create awareness on conservation of fish. The camp presently sustains on organizing angling, camping, rafting, trekking, bird watching, heritage and culture.



Fig 7 Establishment of a mahseer hatchery at Nagaland

The camp also restores a breeding and seed production unit for propagation of golden mahseer with the technical guidance from ICAR-DCFR, Bhimtal. Catch and release angling competitions are being organized on regular basis at places like Seppa, Nameri, Bhalukpong with a major objective to promote conservative angling with rod and reel and to spread awareness for protection of the river system along with its natural habitat specially the local species (*pithia* and *shil ghoria*), which due to illegal poaching, chemical poisoning, electrocution and dynamiting process has caused much damage in the recent era. Anglers Association Nagaland (AAN), on a similar line, organizes angling festivals and competitions and celebrates special days like World Fish Migration Day to promote tourism through sport fishing and to create awareness to conserve the indigenous and endemic fish species of Nagaland (Fig. 7). Natural lakes, large sized ponds and reservoirs belonging to local communities and individuals of the area are mostly entrusted to organize such occasions. Some of the important mahseer endowed rivers in the districts of Nagaland are Dhansiri and Intangki (Dimapur), Milak and Dikhu (Mokokchung), Doyang (Wokha), Arachu, Lanyi, Seidzu, Tesuru and Tizu (Phek), Zungki and Likhimro (Kiphire).

## 3. Fee fishing in Meghalaya

Meghalaya is literally known as the 'Abode of clouds' with the fame of having the highest rainfall on earth and this makes the state full of aquatic resources. The state is predominantly inhabited by the Khasis, Jaintias and Garos who are fascinated for angling as their common traditional practice for recreation. Rich in chocolate mahseer namely *Neolissochilus hexagonolepis* and *N. hexastichus*, local entrepreneurs from areas Myllem, Smit, Mairang, Umsning and Laitlyngkot of Khasi hills have ventured into fee fishing for

anglers allowing fishing in their own ponds and tanks on payment basis. Fishing competitions are also being organized once or twice in a year in these areas and the winners are awarded with prize money. Effort has been made in Meghalaya to popularize angling as an important ingredient of tourism along with other adventure sports such as rafting, water sports, mountaineering, trekking biking, paragliding, hot air ballooning etc.

### 4. Fish sanctuaries

Sanctuary is termed as a place of safety, a nature reserve where endangered and threatened species are cared for and fishing prohibited. Fish sanctuaries (*Wari* in local dialect) are under implementation in Meghalaya under Meghalaya State Aquaculture Mission (MSAM) with an objective to conserve and enhance the aquatic bio-diversity and to promote untapped and underprivileged places as tourist spots to benefit the local rural people. A few of these functional fish sanctuaries of the state are (i) Amlayee mahseer fish sanctuary at Nongbareh



Fig. 8: Fish sanctuaries at Meghalaya

(West Jaintia Hills) over river Amlayee where 1.5 km of its stretch is being protected for chocolate mahseer (*Neolissochilus hexagonolepis*) and at the same time inviting visitors for active participation in sport fishing on the concept of 'catch and release' angling (ii) Asim Bibra fish sanctuary over river Chibok (East Garo Hills) where community fishing event is celebrated every year with an objective to conserve the God gifted aquatic hotspots for development of livelihood ways (iii) Deku Dobagre fish sanctuary established over river Bugai (South Garo Hills) based on the richness of chocolate mahseer (iv) Wachi Wari fish sanctuary (West Garo Hills) over river Simsang providing an ethnic beauty for an ideal fish watching platform for chocolate mahseer by feeding them (v) Songkal Wari fish sanctuary (West Garo Hills) on river Simsang between two main towns Tura and Williamnagar, where any visitor can view thousands of mahseers swimming in shoal based on the concept of in-situ aquatic life conservation (Fig. 8). Seeing the encouraging results, 'wari' at Rombagre, Selbalgre were established and within a span of five years, this concept has reached to more than hundred in the area. This has led to the population of mahseer on the rise in Meghalaya following the practice of catch and release by the anglers. Females are not too far behind in the state and undoubtedly have the most number of female anglers anywhere in India.

### 5. Fish watching

Fish watching platforms have gained much momentum in the recent times as this practice is considered to have multiple positive benefits to human health. Keeping fish in tanks and ponds also facilitates in-situ conservation of some of the endangered fish like mahseer. Many of the upland lakes, religious and protected tanks, stretches of rivers and streams, pools are examples of fish watching spots. Mahseer can be best watched in the upland lakes namely Saly and Mehao of Lower Dibang



Fig. 9: Fish watching platforms for tourist and visitors at aquaculture farms



valley; lake Ganga in Papumpare district of Arunachal Pradesh. Ward's lake, Jarain Pitcher Plant lake and Thadlaskein lake in Meghalaya are other such lakes which offer excellent sites for development of fish watching spots together with other recreational amenities like boating, children's park, food courts etc. Similarly, the man-made tanks and natural water bodies in Assam can be developed for fish watching with multidimensional importance for angling, scenic beauty, bird watching and trekking etc. The residing communities of the region can preserve these aquatic bodies by prohibiting undesired human intervention of any kind and this generates the opportunity in promoting recreational fisheries by stocking candidate fish species for fish watching and making a lucrative venture for young entrepreneurs (Fig. 9). Jasingfaa Aqua Tourism Centre, situated in Nagaon district of Assam is one such leading example to set up a fish based adventure tourism activities in the country with blissful amenities to satisfy the passionate anglers, bird and fish watching. Off late, the highly priced sport fish golden mahseer was introduced with the aegis of ICAR-DCFR, Bhimtal and reared specially for brood banking and fish watching with a motto "Help golden mahseer to save biodiversity for humanity" and with an objective to protect the fish under controlled conditions so that generation to come will have the opportunity to know and enjoy encountering this majestic river fish (Fig. 10). Angling festival and special workshops on angling tips are being arranged regularly in the centre (Fig. 11).



Fig. 10: Fish watching deck at Jasingfaa Aqua Tourism Centre, Nagaon



Fig. 11: Angling festival at Jasingfaa Aqua Tourism Centre, Nagaon

## 6. Aquatic homestays and fishing

Homestays are a common site these days in the hilly states of the country. Such homestays are also integrated with fisheries for recreation in the northeastern part of India, especially in the Ziro valley of Arunachal Pradesh. Cottages are being constructed over the ponds and tanks preferably of bamboo and tourists are provided with rods and lines to fish in the ponds and tanks (Fig. 12). The catch is harvested at a price and is served on the plates for the tourists. This integration of homestays with fishing provides an additional income for the local residents through fisheries. The common species kept for fishing are the *Ctenopharyngodon idella* (grass carp), *Catla catla* (catla), *Cyprinus carpio* (common carp), *Hypophthalmichthys molitrix* (silver carp) and catfishes. This avenue is gaining much momentum in hill locked areas of northeast India.



Fig. 12: Aquatic homestays for recreation and angling



## 7. Rice-fish integration

The traditional practice of rice-fish farming (locally called Aji-Ngyii) is another self-supporting system in the Apatani Plateau situated at 1572 m msl in Ziro valley, Arunachal Pradesh. The most favoured fish species are the strains of common carp, scientifically known as *Cyprinus carpio specularis* (Mirror carp), *C. carpio communis* (Scale carp) and *C. carpio nudus* (Leather carp) for integration with local rice varieties *Ampu*, *Mipya*, *Pyapu* and *Eylang*. This system of farming is not only a viable, environment friendly and low-risk activity for livelihood but also play a crucial role in recreation among the rural folk. Women of the valley are mostly engaged with the sowing and harvesting of the crop (Fig. 13). Fishes hiding in the trenches and dug outs are being harvested alongwith paddy and are consumed locally. The integration of this fish not only provides an additional income to the community but also brings happiness and merriment in catching the fishes as a part of their recreational activity. This is a unique feature in the entire country where fish is integrated for the purpose of recreation apart from livelihood and the model can be similarly replicated in other rice growing areas of Northeast region especially Assam.



Fig. 13: Women in rice-fish farming at Ziro valley

## Conclusion

The Northeastern India has tremendous potentiality for recreational fisheries together with the tourism sector. The type of ecotourism developed in the country on fish angling and fish watch has both as outlined has positive indirect and direct consequences towards the conservation of fishes. In this context, mahseer has been recognized as 'state fish' in 7 states of India because of its fame for its magnificent colour, fighting skills and sizes. The other major fish available in these streams and lakes are the exotic and indigenous trout and an array of catfishes and carps with socio-economic and recreational significance. Each year a large number of anglers both from home and abroad visit the region in the pursuit of age-old art of angling.



Rafters can indulge in adventurous white water river rafting with fishing in this water. Fishing in these streams is required to be regularized under the State Fisheries Act for framing long term conservation strategies for management. The anglers may be guided by professional tour operators for enabling them to access the remotest angling spots with local hospitality. The visitors may be provided with a fishing license on 'catch-and-release' by charging a nominal fee for angling which in turn will generate revenue for the host state as well as help in preventing the illegal methods of fishing in these resources. Furthermore, integration models of rice-fish farming and aquatic home stays may further be promoted in other states of the region to invite more of the tourist inflow benefiting the local communities with income and employment.



Fig. 14: Fish seed ranching for rehabilitation of Golden and Chocolate Mahseer in natural systems

### Technical Pamphlet

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