



Mahseer in recreational fisheries and eco-tourism in India



ICAR-Directorate of Coldwater Fisheries Research
(Indian Council of Agricultural Research)
Bhimtal - 263136, Distt. Nainital, Uttarakhand

MAHSEER IN RECREATIONAL FISHERIES AND ECO-TOURISM IN INDIA

Compiled & Edited by:

Deepjyoti Baruah

&

Debajit Sarma



ICAR-Directorate of Coldwater Fisheries Research

(Indian Council of Agricultural Research)

Bhimtal – 263136, Distt. Nainital, Uttarakhand



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Compiled & Edited by:

Dr. Deepjyoti Baruah, Sr. Scientist, ICAR-DCFR, Bhimtal

Dr. Debajit Sarma, Principal Scientist, ICAR-DCFR, Bhimtal

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डॉ. जे. के. जेना

उप महानिदेशक (मत्स्य विज्ञान)

Dr. J. K. Jena

Deputy Director General (Fisheries Science)

भारतीय कृषि अनुसंधान परिषद

कृषि अनुसंधान भवन-II, पुसा, नई दिल्ली 110 012

INDIAN COUNCIL OF AGRICULTURAL RESEARCH

KRISHI ANUSANDHAN BHAVAN-II, PUSA, NEW DELHI - 110 0

Ph. : 91-11-25846738 (O). Fax : 91-11-25841955

E-mail: ddgfs.icar@gov.in



MESSAGE

The Indian Himalayas is endowed with natural scenic beauty, kaleidoscopic topography, diversified cultural heritage and rich biodiversity that attract tourists from all over the world. Endowed with a number of fast flowing rivers, streams and lakes, the pleasure of fishing in Indian waters is greatly enhanced by the scenic splendor of countryside with stumbling, rumbling and swirling down rugged mountain valleys, passing through awesome gorges, canyons, alternating with pools and fiery rapids, harbouring some of the country's finest game fish, the Mahseer.

Angling in India has already become a source of family recreation to people of all ages and socio-economic strata of the society. Besides recreation, sport fishing is also considered to help economic development in the region. Documenting and generating information on fish-based eco-tourism in the diversified aquatic resources of different states in India is commendable task undertaken by the ICAR-DCFR. The bulletin on "*Mahseer in Recreational Fisheries and Eco-tourism in India*" is expected to serve as base document for development of ecologically sustainable coldwater fisheries in the country. I congratulate the scientists of DCFR for their sincere effort in bringing out this valuable publication, which is expected to connect the anglers, stakeholders and the scientists for sustainable management of this important game and food fish.


(J.K. Jena)



के. एन. कुमार, भा. प्र. से
मुख्य कार्यपालक

K.N. Kumar, IAS
Chief Executive



राष्ट्रीय माल्यिकी विकास बोर्ड National Fisheries Development Board

पशुचलन, डेयरी एवं मत्स्य पालन विभाग
Department of Animal Husbandry, Dairying and Fisheries
कृषि एवं किसान कल्याण मंत्रालय, भारत सरकार
Ministry of Agriculture and Farmers Welfare, Government of India
स्तंभ संख्या - 235, पी.सी.एन.ए.एक्सप्रेसवे, काक-एल.पी.सी.एन.पी.ए. हैदराबाद-500 052
Pillar No. 235, P.N.R. Expressway, Post : S.V.P.N.P.A., Hyderabad-500 052
फ़ोन / Phone : 040-24015553; फ़ैक्स / Fax: 040-24015552/68
email : cenfdb@gmail.com Mobile : 9491872037; वेबसाइट: nfdb.gov.in

Message



Ecotourism is the harmonious combination of three components; nature, tourism and local community. Ecotourism, in concert with recreational fisheries in India can be a money spinner for our country. The recreational fish-based ecotourism has been successfully practised through sport fishing and angling, fish watching, together with river rafting, boating, trekking, bird watching, cultural heritage etc. in some parts of the country.

The rivers of the Indian Himalayas offer the remoteness and the promise of some of the wildest and most untapped fishing waters. Anglers travel a long distance in search of the big-sized fishes such as mahseer, trout and catfish in the upstream of the major river basins of the country. To that extent, documenting aquatic resources and sport fisheries in hill states and generating information on fish based recreational facilities are essential for development of holistic plans.

The present publication as the bulletin on *Mahseer in recreational fisheries and eco-tourism in India* will provide significant information on the resource status and management efforts of the popular game fish mahseer, to promote recreational fishery and fish based ecotourism in the coldwater areas of the country. I congratulate the Director and the scientists of the ICAR-DCFR for their endeavour in bringing out this bulletin.

Dated: 19.09.2016

(K.N. Kumar)



डॉ० ए० के० सिंह
निदेशक
Dr. A. K. Singh
Director



एक कदम स्वच्छता की ओर

भा.कृ.अनु.प.-शीतजल मात्स्यिकी अनुसंधान निदेशालय
ICAR-Directorate of Coldwater Fisheries Research

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Foreword

Angling or sports fishing is one of the most fascinating outdoor physical activities by the people of the country since time immemorial both for consumption and also as sports. Of late, it has become a form of eco-tourism promoting sustainable management of resource and consequently contributing to environmental conservation. Sport fishing is one of the leading adventure tourism activities across the world and the anglers travel to far distant places in order to satisfy their taste in angling anywhere and everywhere conferred with resources.

Himalayan rivers and streams of India particularly of Northeast India are home for mahseer fishes with excellent food and sports value. The people of the NE region residing near the bank of rivers and streams would be much benefited if the mahseer fish in connecting rivers is promoted. Knowledge and information on resource status and management efforts for such world famous game fish are in demand for recreational fisheries and developing eco-park or sanctuary. However, there is paucity of information on the present status of mahseer as a game fish in captivity or in natural aquatic bodies and their management strategies to promote recreational fisheries and fish based eco-tourism. Therefore, the present interactive meet and angling festival being organized by the ICAR-DCFR in aiming at discussing the R&D issues and strategies to develop a framework for sustainable management of mahseer fishes and their promotion as game fish in an eco-tourism platform.

In this context, our effort to bring out a bulletin entitled “*Mahseer fish in recreational fisheries and eco-tourism in India*” on the occasion of Interactive Meet for Scientist-Stakeholders, Entrepreneurs and Anglers, organized by ICAR-DCFR in collaboration with Jasingfaa Aqua Tourism Resort and Coldwater Fisheries Society of India during 1-2 October’ 2016 at Jasingfaa, Assam, owe an appreciation especially to the scientists of DCFR who have put their effort in bringing conservationists and stakeholders together for management of Mahseer for sustainable livelihood in perspectives.

अनुसंधान भवन, औद्योगिक क्षेत्र,
भीमताल, जिला-नैनीताल (उत्तराखण्ड)

Anusandhan Bhawan, Industrial Area,
Bhimtal - 263 136
Distt. - Nainital (Uttarakhand)

दूरभाष/Phone : 05942-247279, 247280, 247684

फैक्स/Fax : 05942-247693

गाँव/Gram : महसीर/Mahseer

ई-पत्र/E-mail : directo@dcfr.res.in;

dcfrin@rediffmail.com;
dcfrin@gmail.com

MAHSEER IN RECREATIONAL FISHERIES AND ECO-TOURISM IN INDIA

Mahseer is most popular game fish amongst anglers in India and known to be the toughest fighter amongst freshwater sports fish and is undisputed king of India freshwaters. Since angling was favourite pursuit of the British, Indian mahseer attracted the attention of anglers Beevan (1877), Thomas (1873, 1897), Dhu (1906, 1918, 1923) and Nevil (1915). The lakes of Kumaon hills were stocked by the fish by Sir H. Ramsay during 1858 (Walker, 1888) for sport fishing. Codrington (1946) and McDonald (1948) wrote about its natural history and on special traits of fish from an angler's point of view. Mahseer fishery maintains its fame among anglers in Britain. In the 1970s, three Englishmen travelled overland to India in search of Mahseer, fishing the water from Kashmir to Tamil Nadu for eight months until they found mahseer in waters of South Karnataka. This adventure was described by Ghorpade (1978). Kulkarni and Ogale (1979) considered mahseer the noblest sport fish of India, a great favourite of anglers, both from India and overseas.

Mahseer a large bodied potamodromous freshwater fish (Fig. 1) endemic to Asian rivers is flagship species of considerable economic, recreational and conservation interest. 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 (Sarma *et al.*, 2016).

Recreational fishing, a popular leisure activity, also called sport fishing, is fishing for pleasure or competition, in natural and man-made water bodies. Sport fishing is one of the most sought after adventure tourism activities and has a booming international business opportunity. The most common form of recreational fishing is done with a rod, reel, line, hooks and any one of a wide range of baits. The sport fishing tourism is now developing in India, accounting for 2.7 % growth in tourism sector providing 31 million jobs in India. Today foreign tourist arrival is growing at an average of 4.5 % contributing foreign exchange earnings to the tune of INR 1,35,193 crore in 2015 (Annual Report, Ministry of Tourism, 2015). There are three common methods for capturing mahseer: fly fishing, spoon fishing and bait fishing although recent innovations are reported:

- A. Fly fishing: Fly fishing or fly casting is a method where artificial fly is used to hook the fish with the help of rod and line.
- B. Spoon fishing: Spoons, like flies, are artificial metallic shining lures used basically to fish 'heavier' waters where mahseer occurs. Spoon fishing for mahseer is generally grouped into three major types, viz. heavy fishing, medium fishing and small fishing. In heavy fishing, the anglers look for big fish (above 13.5 kg). Mahseer fishing in rivers of northern India generally is of medium type. Small fishing is the most widely used angling for Mahseer as the other two methods are arduous and even risky.

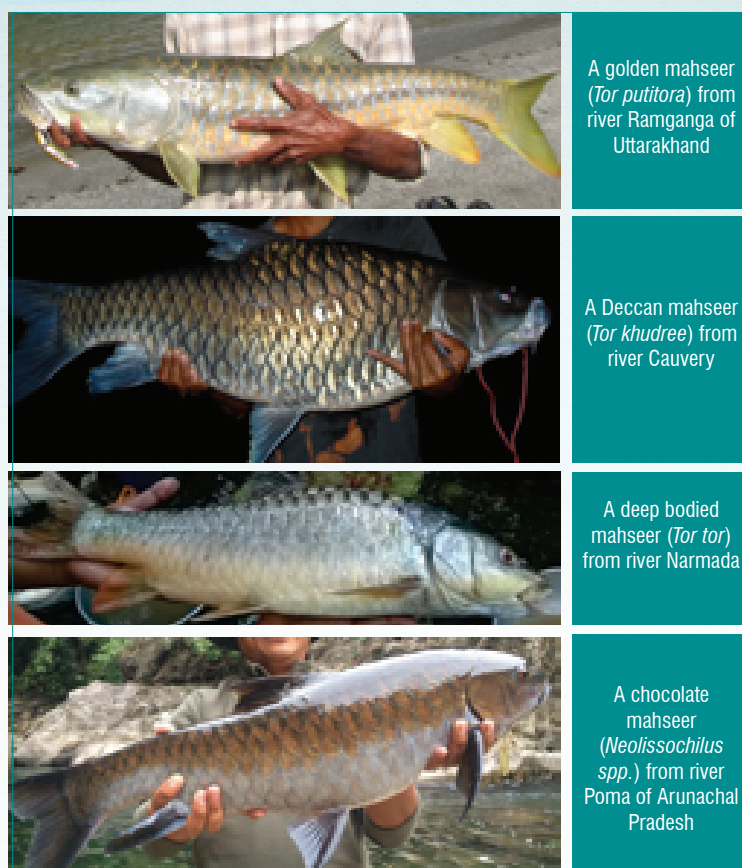


Fig. 1: Mahseer sport fishes of India

Photographs courtesy: Mr. Ashok Vashisht, Mr. Derek Dsouza, Dr. Sailendra & Mr. Dorjee Sona

- C. Bait fishing: Both natural and artificial lures are used in bait casting. The natural baits are earthworms, minnows and insects.

Today, recreational fishing is also coming up well with **Ecotourism** which is defined as “responsible travel to natural areas that conserves the environment, sustains the well-being of the local people, and involves interpretation and education”. Since 1980s ecotourism has been considered a critical endeavor by environmentalists, so that future generations may experience destinations relatively untouched by human intervention. Ecotourism typically involves travel to destinations where pristine fauna and cultural heritage are the primary attractions which can provide viable income-generating options for economic development for local communities. Moreover, ecotourism provides opportunity of education and activism among travelers, making them more passionate towards nature and its resources.

In this bulletin, we have generated and compiled information on recreational mahseer fishery in India and presented here state wise details. The importance of the mighty mahseer as a game fish in the Indian rivers, streams and lakes through the perspectives of active anglers and vision of stakeholders and researchers is highlighted.

ARUNACHAL PRADESH

River Subansiri: River Subansiri in Arunachal Pradesh originates in the Tibetan Himalayas and enter into India via Taksing of Upper Subansiri district. The river flows along the towns of Daporijo and Dumporijo, to enter into the vast wilderness of the lower valleys and finally terminating to meet the mighty Brahmaputra at Gerukhamukh. Anglers among the sparse human habitation along the river Subansiri find it adventure enthusiasts in these pristine mountains of Arunachal Pradesh, with crystal clear post monsoon waters coursing through them, and home to the big fighting fishes *Tor putitora* (Batra, 2009), *Neolissochilus* spp. (chocolate mahseer) and the *Bagarius bagarius* (goonch) as depicted in Fig. 2-13. The anglers mostly use two section medium heavy bait casting or spinning rod preferably 7 - 8 ft long and gripped handle, with multiplier reel 6500 C3 Abu Ambassador or Abu Garcia Cardinal spinning reel 6000 size attached to lures of Rapala floating plug J-13, little Cleo spoon 2/5 Ounce, Alligator spoon 26 gm and Mepps or Blue Fox No.5 spinner, as reported by an angler Mr. Naushad Ali.



Fig. 2: An angler with a catch of mighty golden mahseer in river Subansiri in November 2014

Photograph courtesy: Mr. Naushad Ali



Fig. 3: A brief on the river conditions and angling spots by the instructor



Fig. 4: Anglers fitting the rods, reels & lures



Fig. 5: Ready anglers for 5-days voyage for angling in river Subansiri



Fig. 6: Anglers rafting near a mahseer angling spot in river Subansiri



Fig. 7: Anglers rafting through the rapids of river Subansiri in 2014

Photographs courtesy: Mr. Naushad Ali



Fig. 8: Angling from a river bank



Fig. 9: Anglers casting from boats in river Subansiri

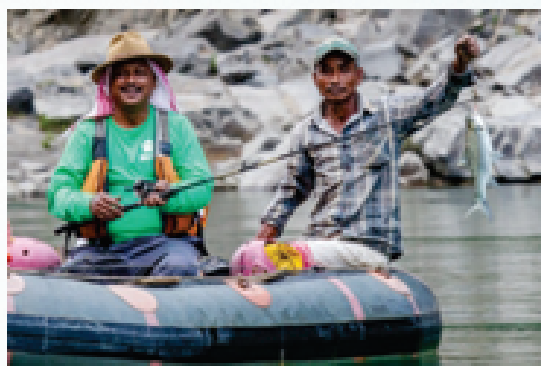


Fig. 10: Any angler's merriment with a catch from river Subansiri



Fig. 11: A golden mahseer of 18 kg weight from river Subansiri in November 2014

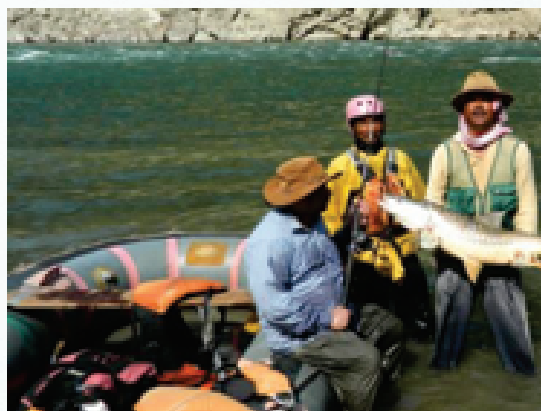


Fig. 12: A golden mahseer of 12.6 kg weight from river Subansiri in November 2014

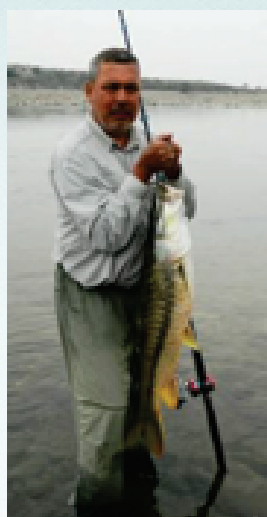
Photographs courtesy: Mr. Naushad Ali



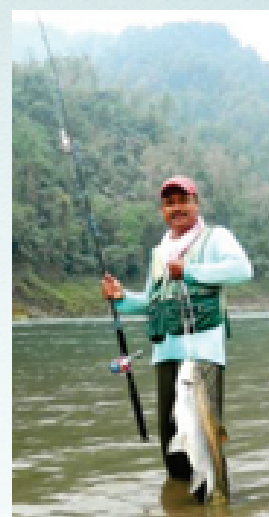
A chocolate mahseer of 7.6 kg weight (November 2013)



A chocolate mahseer of 5.7 kg weight (November 2014)



A golden mahseer of 7.2 kg weight (March 2014)



A chocolate mahseer of 6.0 kg weight (March 2014)

Fig. 13: Angler's delight with mahseer catches from river Subansiri, Arunachal Pradesh

Photographs courtesy: Mr. Naushad Ali

The Siang river belt: The river Siang flowing for 294 km upto joining river Brahmaputra receives perennial discharges of many streams through 10 main tributaries of the hilly terrain viz. Rigong-asi, Sigong, Plaisi, Niyikgong, Angong, Simang, Siyom, Sibokorong from the right and Yang-sang-chhu, Yamne from the left side. East Siang district is mostly inhabited by the *Adi* tribe which comprises of a large number of sub-tribe groups (*Minyongs, Padams, Shimongs, Milangs, Pasis, Karkos, Ashings, Pangis, Tangmas* and *Boris*). Hunting and fishing are one of the important activities of the tribal people of the belt. Their life is closely mingled with nature. They employed different traditional method for catching of fishes based on the topography of the fishing ground, the eco-morphology and behavior of the fish. Fishing by locals is done by poisoning, harpooning, catapults, fish nets, fishing rod and various other indigenous equipments. However, indiscriminate forms of catching the fish by the use of chemicals and electric fishing are banned by *Kebang* (local judiciary system) and local youth clubs. Angling (*Gekar* in *Adi* language) is one of the oldest traditional practices of the inhabitants residing the bank of Siang river basin. Fishes like mahseer (*Ngocho*) is favorite species for the anglers of the belt (Fig. 13). Though mahseer is available all along the stretch of river Siang, anglers prefer places like Bodak, Sigar, Raling, Kyiet, Berung, Sikabamin for angling due to its abundance, suitable topography and water flow pattern in the East Siang district. The Siang belt has a huge potential for building up entrepreneurship by developing ecotourism. Generally, innumerable tourist from different parts of the country and world prefer to visit the beautiful places of the Siang belt during winter preferably December to March. Rafting is preferred alongwith angling by the tourist. A few entrepreneurs have started entertaining tourist, by providing raft and fish rods with other accessories to promote fish based eco-tourism in the region. Overall, recreational fishery is yet to be arranged in a much organized manner in the Siang belt to generate much more revenue from the eco-tourism sector.

(Contributed by Mr. Shah Mustahid Hussain, Subject matter Specialist (Fisheries), KVK East Siang)

Menchukha township is another angler's paradise, situated in West Siang district of Arunachal Pradesh, 180 kilometres northwest of Aalo and is only 29 kilometres away from Indo-China border. River Siyom (locally known as Yargyap Chu) flows through Menchukha which provides a scenic view in the valley and is a home for the exotic and Indian trouts. According to Mr. Dorjee Sona, an active angler from Menchukha, informed that golden and chocolate mahseer are abundantly found in river Yamne which flows from Upper Siang district and meets the mighty river Siang near Ponging village. The river in its lower stretches of Siang belt harbours both the golden and chocolate mahseer. The angler use Abu Garcia 8ft (Heavy) rod and Abu Garcia 9 ball bearing reel with lures Mepps Spinner Golden, Size -5, and J13 fire tiger plugs to catch large size fish; maximum recorded size of golden mahseer weighing 11.5 kg (Fig. 14) and chocolate mahseer of 8.3 kg (Fig. 15). Anglers now work for conservation of mahseer by developing an anglers association known as "Arunachal Anglers". It is believed that community based angling will strengthen conservation efforts for the important group of fish – mahseer.



Fig. 14: A catch of 11.5 kg golden mahseer by Mr. Dorjee Sona from river Yamne in East Siang district during March 2016



Fig. 15: A catch of 8.3 kg chocolate mahseer (*Neolissochilus* spp.) from river Poma in Papumpare district of Arunachal Pradesh in the year 2016.

Photographs courtesy: Mr. Dorjee Sona

River Lohit at Tezu, Lohit district: Angling and fishing camps in river Lohit are famous for mahseer (*Tor putitora*, *Tor tor*, *Neolissochilus* spp.) and catfish (*Bagarius bagarius*) fishing and adventure sports. One of the major angling and fishing camps in river Lohit is Tezu situated at 27°55'N latitude and 96°10'E longitude. The Lohit river angling and fishing season starts from October to April. The maximum temperature is around 20° C during day time around the river Lohit angling and fishing season.

River Pare in Sagalee, Papum pare district: River Pare flows through Papum pare district along the small township of Sagalee situated at an altitude of 162 m asl between 27°14'N latitude and 93°61'E longitude, and located 29 kms east of the state capital Itanagar. The river Pare harbour the mighty golden mahseer and chocolate mahseer says a young and enthusiast angler Mr. Ngurang Neega from Sagalee town (Fig. 16-18). Apart from his regular college studies, he goes for angling and also arranges angling expeditions for the visitors from other states like

Nagaland, Meghalaya, Sikkim, Assam and even tourist from other countries like Nepal and Bhutan. Mr. Ngurang reported that the angling is done on catch and release principle and the fish are not caused any damage. His biggest ever catch weighed a 14 kg mahseer and the usual catch in his rod with Rapala J13 plugs is 10-12 kg. He broke his hook and line for more than 3 times in his effort to catch larger mahseer in the river since 2013. He enjoys the catch every month of the year and anticipates to conduct angling competitions in his hometown on the banks river Pare in the coming years to associate the local community for promotion of eco-tourism in this unrevealed place of Arunachal Pradesh.



Fig. 16: A catch of golden mahseer from river Pare

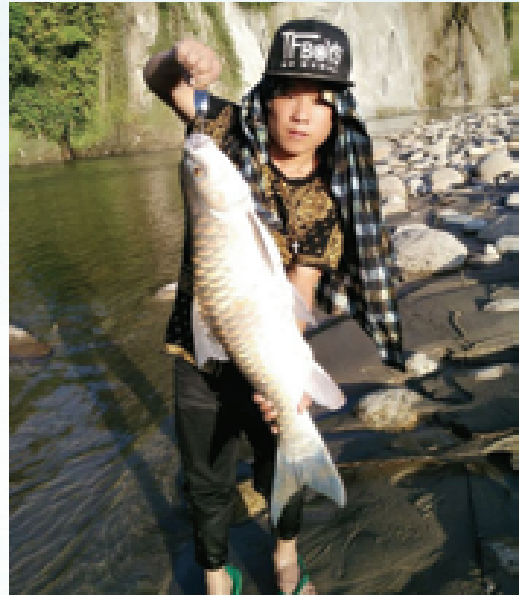
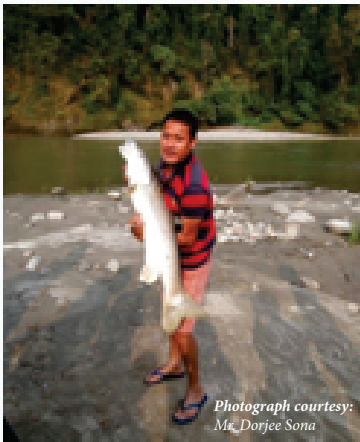


Fig. 17: A catch of chocolate mahseer from river Pare

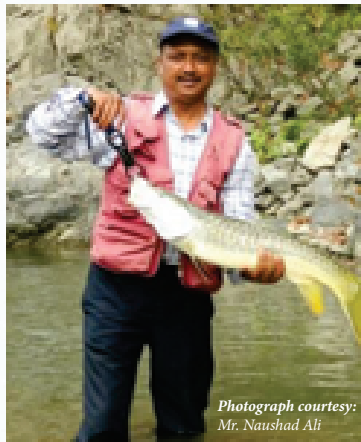


Fig. 18: Angling of *Tor putitora* in river Pare
Photographs courtesy: Mr. Ngurang Neega

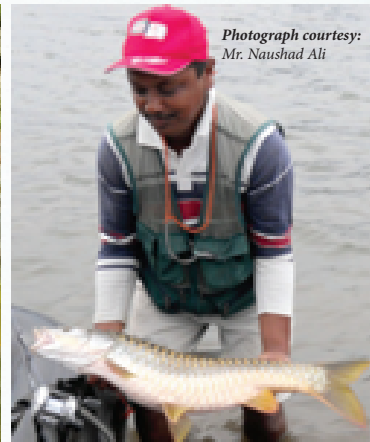
River Kameng: The river Kameng in Arunachal Pradesh and river Jia Bholeli in Assam in the eastern Himalayan mountains, originates in Tawang district from the glacial lake below snow-capped Gori Chen mountain at an elevation of 6,300 metres asl on the India-Tibet border and flows into the river Brahmaputra River near Tezpur, Assam. The river harbours the mighty mahseers both in the upper and lower reaches as witnessed by many anglers (Fig. 19-21) from their angling expeditions in the area. A catch & release competition was organized at Seppa situated between 27°36'N latitude and 93°04'E longitude of East Kameng district of Arunachal Pradesh, as a part of Kameng River Festival during 22nd and 23rd January 2016, organised by Itanagar based Neli's Sports Fishing Expedition team as reported by an angler Mr. Biplab Chakraborty. The angler could catch a chocolate mahseer weighing 1.6 kg (Fig. 22) during the competition with a Mirage II carbon Alloy IM 7, with braided line and Shimano bait casting reel and lures with joined plastic lures along with Mepps Aglia No. 4 spinner. In spite of a smaller sized catch, Mr. Chakraborty believes that the river harbours some of the bigger sized chocolate mahseer. The recent angling competition (Fig. 23) was organized with an 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, which due to illegal poaching, chemical poisoning, electrocution and dynamiting process has caused much damage.



Photograph courtesy: Mr. Dorjee Sona
Fig. 19: An angler with a 13 kg golden mahseer caught from river Kameng in April 2016



Photograph courtesy: Mr. Naushad Ali
Fig. 20: An angler with a 7 kg golden mahseer caught from river Kameng in October 2015



Photograph courtesy: Mr. Naushad Ali
Fig. 21: A golden mahseer caught in the rod of angler Mr. Naushad Ali from river Kameng



Fig. 22: An Angler with 1.6 kg chocolate mahseer in river Kameng in 2015



Fig. 23: Angling site in river Kameng

Photographs courtesy: Mr. Biplab Chakraborty

River Jia Bhoreli: The river Jia-Bhoreli is one of the major south flowing tributaries of river Brahmaputra with a major part of its catchment within Arunachal Pradesh where the river is known as Kameng. The river bounded by catchment area between longitudes 92° 00' E and 93° 25' E and latitudes 26° 39' N and 28° 00' N harbours the game fishes namely *Tor tor* (locally Jonga pithia), *Tor putitora* (locally Sonali pithia), *Tor mossal* (locally Lobura), *Tor progenius* and *Neolissochilus hexagonolepis* (locally Boka pithia) which fetches a magnificent fishery in the foot hills of Assam and Arunachal Pradesh (Sarma, 2009).

The **Assam Bhoreli Angling and Conservation Association (ABACA)**, situated at the banks of river Jia Bhoreli at Nameri, Sonitpur district is one of those eco-camps which was initially set up for convenience of the anglers and to promote eco-tourism in the region. The camp has 70 life members and 100 annual members (Mahanta *et al.*, 2015), and has a major objective to popularize adventure sports among the rural youth, and angling on catch and release basis to create awareness for conservation of fish (Borgohain, 2010). The camp at present offers sustainable livelihood to the local community through its various adventurous activities like angling, camping, rafting, trekking, bird watching, heritage and culture. The camp is also involved in research and educational activities. A hatchery was also commissioned in 2009 for breeding, seed production and propagation of golden mahseer in the camp. The administration of this camp is in Public-Private-Partnership (PPP) mode and the major sources of revenue are by means of providing accommodation and catering facilities, boat hiring charges, temporary membership, selling of souvenir and indigenous gift items (Mahanta *et al.*, 2015). It is believed that eco-tourism through establishment of such eco-camps will not only enhance environmental consciousness among people, but also promote a healthy way of living and sustainable rural livelihood development.

Mr. Gautam Tamuli, a life member of A(B)ACA and once an active angler in the region for the search of mahseer during 1987-1995 has recorded a catch of golden mahseer (*Tor putitora*) weighing 20 kg with his 10 gm Toby Black & Gold lure and Abu Cardinal reel taking 40 minutes of landing time at Nameri mukh (a junction of river Nameri and river Jia Bhoreli) in 1988. Further sharing his experiences in angling, he added a few recorded catches of golden mahseer weighing 17.4 kg at 17 Mile near Bhalukpong with Alligator silver lure and Ambassador 6000 reel with 20 minutes landing time; 12 kg golden mahseer at Nameri mukh by prawn bait and Ambassador 5500 reel; and a 12 kg golden mahseer at Old Nameri mukh by home-made plug/lure and Ambassador 6000 reel (Fig. 24). During those days, A(B)ACA organized angling competitions for the best catch among the anglers. Mr. Tamuli won the prestigious Henri Cup in the year 1988 unlike cash prizes in modern times, for the biggest catch of 20 kg golden mahseer by artificial lure among the three major rivers namely Jia Bhoreli, Subansiri and Manas. The teeth of some of the major mahseer catches (Fig. 24) are preserved at the residence of the angler and Proprietor of Brahmaputra Nursery at Tezpur.



Fig. 24: Catches of golden mahseer during 1987 – 1995 at river Jia-Bhoreli by angler Mr. Gautam Tamuli



Fig. 25: The teeth of the mahseer fishes being preserved by the angler caught from river Jia-Bhoreli during 1987-1995

Photographs courtesy: Mr. Gautam Tamuli

Jasingfaa Aqua Tourism Resort, Nagaon: Sport fishing is one of the leading adventure tourism activities in the country and to satisfy the passionate anglers, Jasingfaa Aqua Tourism Resort has been established at Nagaon (26° 21'N latitude and 92° 41'E Longitude) on 2nd October 2010 on the bank of a wetland named Mahrul beel, which itself is the home and visiting ground to various endemic and migratory birds (Fig. 26-28). The project and the resort is spread in the area of 15 acres and out of which 8 acres of land has numerous water bodies consisting varieties of fish available in Assam including the famous and endangered golden masheer. There are eleven numbers of ponds measuring

0.1-1.5 hectare area, stocked with fishes like grass carps, *Labeo* spp., *Cirrhinus* spp., catla, pacu, pengba, catfishes, *Semiplotus* spp. etc., and reared for the purpose of angling for the tourists round the year. Off late, the highly priced sport fish golden mahseer was introduced and reared specially for brood bank with an objective “Help golden mahseer to save biodiversity for humanity”. The resort is looking forward at how best to support local communities of the region to take care and protect their watershed so that generation to come will have the opportunity to know and enjoy encountering this majestic fish.

Since fish is the prime attraction of the resort, angling competitions were organized annually at Northeast regional level, and the first ever angling was held on 10th July 2011 which

was participated by 70 anglers. Overwhelming response across the region resulted in increase of the participatory anglers to 75, 78, 85 and 107 numbers in the subsequent annual angling competitions (Fig. 29-32). Jasingfaa, also runs an angler's club with 86 members (Dec'2015); wherein a member need to enroll by paying a one-time membership fee of INR 1000.00. The non-anglers or the tourist can hire a traditional bamboo-made rod and line for angling in the ponds for a price of INR 50.00. This aqua tourism resort generates a revenue of INR 80,000.00-1,00,000.00 annually from angling sector only and provides employment to more than 40 numbers of local people, which is indeed a matter of bliss for the country.

(Contributed by Mr. Nava Kr. Gogoi and Mr. Kulen Das, Jasingfaa Aqua Tourism Resort, Nagaon)

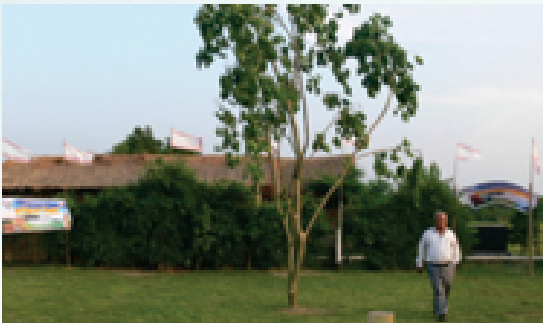


Fig. 26: A view of Jasingfaa Aqua Tourism Resort in its conceptualized stage for promotion of eco-tourism.



Fig. 27: A view of Mahrul beel adjoining Jasingfaa Resort and a hub of migratory birds

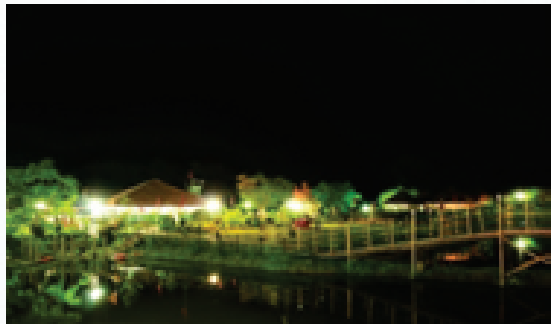
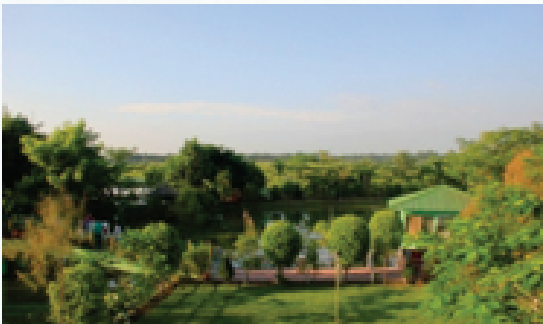


Fig. 28: Eco-parks of Jasingfaa Aqua Tourism Resort in day and night hours

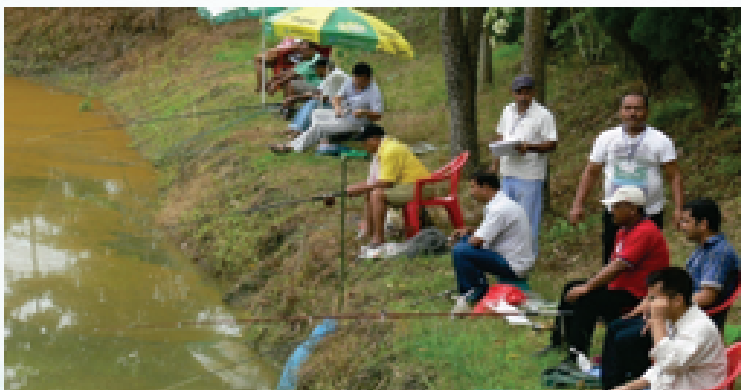


Fig. 29: An angling competition at Jasingfaa Aqua Tourism Resort



Fig. 30: Angling competition with carps in pond systems



Fig. 31: Association of scientist of ICAR-DCFR with Jasingfaa for promotion of sport fisheries



Fig. 32: Successful anglers during angling competitions at Jasingfaa with ICAR-DCFR scientist



Dima Hasao: Dima Hasao is among the hill districts of Assam situated between $25^{\circ}3'N$ and $25^{\circ}47'N$ latitude and $92^{\circ}37'E$ and $93^{\circ}17'E$ longitude. The major part of the hill is under Borail range with Thumjang as the highest peak (1866 m asl) followed by Hempeupet peak (1748 m asl). The other range is Khartheng from Dittokcherra to Garampani. Interestingly, the district of Dima Hasao is bestowed with tributaries of both Brahmaputra and Barak drainages. Some of the important rivers with reports of mahseer catch are from river Dehangi and Diyung of Brahmaputra and Jatinga of Barak basin. River Dehangi is a one of the preferred river for angling which provoked the District Councils to organize a River Angling Competition on 4th October 2015 (Fig. 33), for a group of 15 anglers from the Northeast region as reported by angler Mr. Biplab Chakraborty. Though none of the mahseer could be caught in the event but the anglers in particular were thrilled with the river trip. The river Dehangi has been reported to have inhabited by an important mahseer viz., *Neolissochilus hexastichus*, which is not encountered elsewhere.



Fig. 33: Anglers during an angling competition meet at Dima Hasao district



Fig. 34: A catch of 3 kg chocolate mahseer at river Diyung

Photograph courtesy: Mr. Biplab Chakraborty

Photograph courtesy: Mr. Sarbajit Thaosen

Mr. Sarbajit Thaosen, an academician and angler has mentioned his observations of landings of mighty chocolate mahseer at fish market of Haflong town, weighing 5-10 kg. The angler finds his taste in hooking mahseer (Fig. 34) in river Diyung and Thaisaling Howar in river Mahur, with the catch sizes varying from 500 gms to 3 kg in recent years.

Karbi Anglong and West Karbi Anglong: The two autonomous hills districts of Karbi Anglong and West Karbi Anglong is situated in the central part of Assam between 25° 33' N to 26° 35' N latitude and 92° 10' to 93° 50' E longitude. The district with dense tropical forest and numerous tributaries of the mighty Brahmaputra is covered with hilly tract and flat plains with a sultry temperature of 23° to 32° Celsius in summer and 6° to 12° Celsius in winter. The headquarters situated along the rivers of the districts are Bokajan (138m), Hamren (480m) and Diphu (186m), which are rich in natural beauty and throbbing with pristine tribal life. Due to the variation in topography, the hill and flat plain rivers are divided into two parts viz., the upper stretch and the lower stretch. The upper stretch of most of the rivers harbours many coldwater species and largely distributed by the mahseer i.e *Tor tor* and *Tor putitora*, and *Neolissochilus* spp. creating an immense potential for angling in these hilly districts of Assam. The other strong advantages for facilitating angling in the rivers of the districts are its accessible angling and fish watching sites, since the terrain of the hills have gentle slopes with picturesque environment. Some of those potential angling sites are (a) Koka at the banks of river Kopili near Amreng township, bestowed by beautiful waterfalls, where one can enjoy angling (b) Amreng at the banks of river Amreng, with a picturesque landscape and provided with a tourist lodge and a British made bridge across the river which offers a beautiful site for angling (c) The Amtereng Dam site of Karbi Langpi Hydro project over river Karbi Langpi, which is a nature's beauty with the water reservoir to attract nature loving anglers (d) Siloni, a river island over the river Longnit, where the forest department of Karbi Anglong has built a foot bridge to reach the island to attract the picnickers, children and anglers.

Mr. Rupsing Hanse, a prominent angler of village Harlongjove, Hamren sharing his experiences said that only a few people of the region set out for angling in search of food and sport and not for the means of livelihood. The angling materials used by anglers in earlier days were hand-made simple bamboo poles fitted by hooks and lines, which is now gradually replaced by modern rod with roller (reel) and improved lures. The angler recalls an angling competition held during 1996-97, organized by the authority of Karbi Anglong Autonomous Council (KAAC) at the junction of river Kopili and Amreng where the angler begged the second prize for a catch of a chocolate mahseer of 4.2 kg weight. Since then, angling competitions are seldom organized by local bodies, preferably in fish ponds and participated by a few numbers of anglers. He added that due to lack of awareness on sport fishing, the region lacks an arranged anglers' association or a registered society. Therefore, with the bountiful of resources, these two hill districts of Assam has an immense opportunity to promote recreational fisheries and eco-tourism, provided certain policies are framed and implemented based on the present issues with the concerted effort of the state departments, research organizations and local community.

(Contributed by: Mr. Chatra Pator, I/c Sub-Divisional Fishery Development Officer, Hamren, West Karbi Anglong district, Assam)

River Manas: The river Manas is a transboundary river in the Himalayan foothills between southern Bhutan and India situated 26°10' to 26°50'N Latitudes and 90° 00' to 91°00'E Longitudes is one of the biggest river systems meeting the Brahmaputra River from the north bank in Assam. It is reported that upper stretches of river Manas and its tributaries (Fig. 35) are predominantly inhabited by mahseer species viz., *Tor putitora*, *Tor tor* and *N. hexagonolepis*. Mr. Pranab Bora, retired Chief Secretary, Government of Assam and once an active angler while sharing his experiences on mahseer angling in river Manas, mentioned to have a record catch of a golden mahseer weighing 12.5 kg on 23rd December'1981 using a spin casting Daiwa reel of yarn 20 ld and copper coloured French made Eira spoon of 30 gms weight with a landing time of 35 minutes. Mahseer of size 2 – 2.5 kg was a usual catch during those days in 1970-71 at river Manas, and the lures often casted from wooden boats. He further spoke about Late Sanjay Deb Roy, the then a senior forest official and later retired as Principal Conservator of Forest, Govt. of Assam with whom he accompanied for a record catch of mahseer weighing 20 kg at river Manas. He also made several angling expeditions upstream up to Bhutan border for the search of mahseer.

(Contributed by Mr. Pranab Bora, Retd. Chief Secretary, Govt. of Assam)



Fig. 35: Angling in river Sankosh, a tributary of river Manas

Photograph courtesy: Mr. Naushad Ali

NAGALAND

Nagaland is endowed with abundant lakes, rivers, reservoirs, ponds and offers numerous sport fishes like golden and chocolate mahseer and other indigenous species to catch. The kaleidoscope diverse topography, culture and rich biodiversity the state attracts tourist from all over the world. The districts of Dimapur, Mokokchung, Wokha, Phek, Kiphire in particular has lot more potential for development of fish based eco-tourism. The important mahseer endowed rivers in these districts are Dhansiri and Intangki (Dimapur); Milak and Dikhu (Mokokchung); Doyang (Wokha); Arachu, Lanyi, Seidzu, Tesuru and Tizu (Phek); Zungki, Likhimro (Kiphire). Fishing rods, hooks, bait etc are hired from the shops near rivers and adjoining lakes or even tour operators may provide it at very reasonable charges in certain areas.

Angling in Nagaland has become a mode of recreation to people of all ages and socio-economic strata of the society as well as a source of economic upliftment in the region. Such an example is set by one of the Anglers group of the state namely “Anglers Association Nagaland” (AAN) which was formed on 15th September, 2013 with the motto of “*Where Passion meets Conservation*”. The association is affiliated to All India Games Fishing Association (AGFA) with 500 registered members. The main objective of AAN is to promote tourism through sport fishing and to create awareness to conserve the indigenous and endemic fish species of the State (Fig. 36). AAN has so far successfully organized events like Tzuzha angling festival at Doyang reservoir and angling competitions in Eco Lake, Evergreen Lake, Vanhope Resort, Carp and Carp Zani, Bobo pond, and Lavi Lake etc. The association observed the World Fish Migration day (Fig. 37) for the first time on 10th June 2016 at Noune Resort, Dimapur for highlighting the importance of mahseer and the activities associated with the fish for socio-economic development. The angling competitions also generate revenue for the local community as these events are mostly organized in lakes and large ponds which belong to communities and individuals of the area.



Fig. 36: Anglers of “Anglers’ Association of Nagaland” with their mahseer catches



Fig. 37: Organizing Fish Migration Day by AAN



Fig. 38: Participation in angling competitions by AAN members

Photographs courtesy: Anglers' Association of Nagaland

The enthusiast members of AAN also participate in several events and competitions of the region such as The Dehangi River Angling Competition, North East Angling Competition at Jasingfaa Aqua Tourism Resort, Nagaon, Assam (Fig. 38).

The association also plans to conduct a few upcoming events in the year 2016 like “Clean water body drive” in river Chate of Dimapur, for restoration of natural habitat to mahseers. Awareness programmes shall be conducted among the dwellers near to major rivers in Nagaland like Zungki, Tizu, Avankhung, Doyang reservoir, Dhansiri, Shilloi lake etc for conservation and further propagation of the mahseer fish.

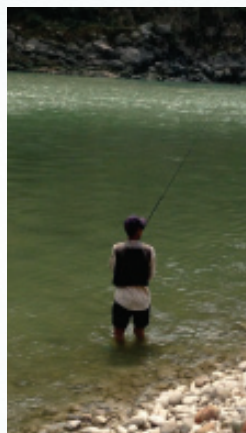
(Contributed by Mr. Imti Sunep, District Fisheries Officer, Mokokchung, Govt. of Nagaland)

SIKKIM

Sikkim with its vast river systems is an anglers' delight where the river Teesta and Rangeet provide ample scope for mahseer (Fig. 39-41). Some of the major confluences of rivers within Sikkim are enriched with the mighty mahseer as reported by an angler Mr. Ian Christopher which are (i) Singtam town - river Teesta & river Rani confluence (ii) Rorathang town - river Rorathang & river Rani confluence (iii) Rangpo town - river Rorathang & river Teesta confluence (iv) Jorhang town - river Rangeet & river Rambang confluence (v) Teesta town - river Teesta & river Rangeet. Angling is mostly done during the pre and post monsoon seasons - the season dates depend on the monsoon arriving early or late. The major species of mahseer encountered in the rivers of Sikkim are the golden mahseer and chocolate mahseer. The angler reported that mahseers are hooked on their upstream run for breeding during mid of February to 1st week of April, end of June to 1st week of July and downstream movement after breeding during mid week of August to 1st week of October.



Fig. 39: Mr. Ian Christopher angling mahseer in river Rangeet at Sikkim



The anglers use artificial lures in the form of spinners and plugs. A major catch of mahseer witnessed by Mr. Ian Christopher in his 15 years of experience was a 24 kg fish which was landed at the confluence of the river Teesta and Rangeet. The angler further reported for an average size of 3 to 14 kg mahseer in Sikkim with his personal record catch of 12 kg. The angler with his team has developed a website [www.hookthemall](http://www.hookthemall.com) for the visiting tourist and also to make aware to the local communities in their active participation in catch and release programme of mahseer for conservation.



Fig. 40: Mahseer angling in river Teesta at Rangpo

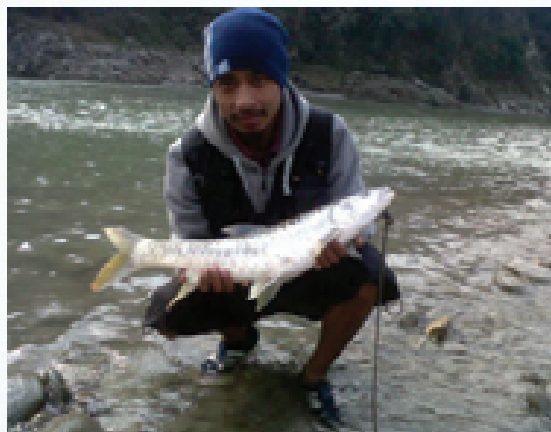


Fig. 41: A catch of golden mahseer in river Reshi at Kumrek

Photographs courtesy: Mr. Ian Christopher

MEGHALAYA

Fee fishing: Meghalaya is literally the 'Abode of clouds' connected to Borail range, an offshoot of Himalayan Mountain and located to the Northeast region of the country. The name itself explains the climatic trend and great beauty of the state with undulating hills and valley. The state, predominantly inhabited by the Khasis, Jaintias and Garos are fascinated for angling as their common traditional fishing practice for recreation and livelihood security. The state bestowed with numerous pristine rivers, streams and lakes and home for the chocolate mahseer (*Neolissochilus hexagonolepis* and *N. hexastichus*), trouts and catfishes offers tremendous scope to develop aqua tourism spots for recreation. Entrepreneurs, from Khasi hills in particular, have started venture of fishing on payment basis (fee fishing) in their own ponds and tanks on daily or weekly basis, operated during the month of May to October. Fishing competitions are also being organized once or twice in a year keeping a prize money of INR 15,000/- to 1, 000,000, witnessed so far. Fee fishing is very common in Myllem, Smit, Mairang, Umsning and Laitlyngkot of Khasi hills (Fig. 42-45). The table below shows an example of fee fishing criteria in Myllem area.

Table 1: General guidelines for anglers for fee fishing in Myllem area.

Time	6 am - 5.00 pm
Days	6 days (Sunday closed)
Fishing rod	One ticket for one Fishing rod
Duration	Whole day (Rs. 150.00/rod) Half day (Rs. 100.00/rod)
Bait	Any Kind of bait is allowed
Prohibited for Anglers	Use of Chemicals, Alcohol, intoxicants, swimming and throwing waste around fishing pond
Age	No age bar but children are allowed only with parents

INTACH, 2010 categorized angling under adventure tourism and rated as one of the important component that can make Meghalaya an attractive destination for adventure sports both nationally and internationally. The major strengths in developing aqua tourism in the state are its natural beauty and tribal tradition, abundance of game fishes, local participation in fish conservation and entrepreneurship development, good transport and communication facilities and pleasant climate.

(Contributed by Dr. Rupak Nath, Dr. (Mrs.) S.M. Kharbuli and Dr. R. N. Bhuyan, St. Anthony's College, Shillong)

The fish sanctuaries: Under Meghalaya State Aquaculture Mission (MSAM), a small dam is proposed to be constructed across rivers and streams and a distance of about 200m upstream and 100m downstream of the dam is declared as sanctuary where fishing of any kind is prevented. Many local communities, Societies, Self help Groups etc. have come forward and join hands with the Department to turn this dream into reality. Till date, about 54 nos. of



Fig. 42: Fish farm for fee fishing in Myllem, Khasi Hills



Fig. 43: Fee fishing in Rtiang, Khasi Hills



Fig. 44: Angling competition at Ward's Lake, Shillong



Fig. 45: Angling competition in Meghalaya

Photographs courtesy: Dr. Rupak Nath, Dr. (Mrs.) S.M. Kharbuli and Dr. R. N. Bhuyan

these Fish Sanctuaries are under different process of implementation. These sanctuaries are to preserve and enhance the aquatic bio-diversity, provide breeding and feeding ground, protect the species, increase the abundance of threatened species, restoration of the diminishing stock and serve also as a tourist spot to benefit the rural people and improve their livelihoods. Some of functional fish sanctuaries of the state are mentioned below:-

Amlayee mahseer fish sanctuary, Nongbareh (West Jaintia Hills): The Amlayee mahseer fish sanctuary (Fig. 46) is a classic example of micro-management over river Amlayee where 1.5 km of its stretch is being protected for chocolate mahseer (*Neolissochilus hexagonolepis*). The river is one of the tributaries of river Umngot which is actively participated by the visitors during October-November for sport fishing with the concept of “catch and release”.

Asim Bibra fish sanctuary (East Garo Hills): River Chibok is a tributary of river Simsang and is bestowed with various ‘wari’ - a sanctuary in local dialect, right from the origin of the river. Mr Jackariash R. Marak, an elderly man from the village, claimed to have 11 such Community Conserved Areas namely *Chiphot bibra*, *Rabdik wari*, *Miteramabata*, *Maktrakigol*, *Degasia*, *Mandrang wari*, *Ringpleng wari*, *Kalbong*, *Dinran wari*, *Rongguang* and *Jakpigok* on the river. The 146 household of the village contributes a sum of INR 20.00 per year to celebrate a community fishing event (Fig. 47) in the month of March or April, and with an objective to conserve the God gifted aquatic hotspots for development of livelihood ways.



Fig. 46: Amlayee mahseer fish sanctuary at Nongbareh



Fig. 47: Angling competition in a fish sanctuary

Photographs courtesy: Mr. David Kharwanlang

Deku Dobagre fish sanctuary (South Garo Hills): River Bugai is a popular river in the district of South Garo Hills because of its richness in aquatic biodiversity. The villagers of Deku Dobagre have taken initiatives in preserving the fish diversity specially the mahseer in the river (Fig. 48) by involving several SHG groups, formation of a Fish Sanctuary Management Committee as well as participation of local communities with an objective to promote fish based eco-tourism in the region.



Fig. 48: Angling practices in rivers of Meghalaya



Wachi Wari (West Garo Hills): Wachi Wari is also a fish sanctuary created newly on the river Simsang and is reported to be densely populated by chocolate mahseer and other species of mahseer (Fig. 49). The site also provides ethnic beauty for an ideal picnic spot and the local community is benefited from the revenue generated from the visitors. The tourists can enjoy swimming along with the fishes and watch the fishes by feeding them.

(Contributed by Mr. David Kharwanlang, Principal, MSFR&TI, Mawpun, Meghalaya)

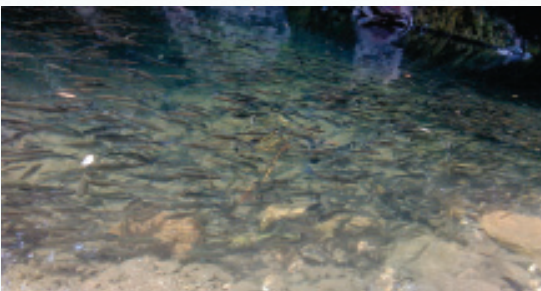


Fig. 49: Mahseer as seen in fish sanctuaries of Meghalaya

Photographs courtesy: Mr. David Kharwanlang

Songkal Wari, West Garo Hills: The mahseers at the Songkal Wari, on river Simsang situated between latitude - 25°30'51.16" and longitude- 90°12'8.60"E in Meghalaya has a near perfect refuge, says Mr. Bhuto Marak-an angler of Meghalaya. A dozen of small streams and springs form the tributaries of river Simsang, where the angler witnessed the once dwindling numbers of mahseer now to have grown from few hundreds to some thousands (Fig. 50). On any day, tourists, as well as passengers on transit between two main towns Tura and Williamnagar, can walk down the stairs to the viewing platform and see thousands of mahseers swimming like a shoal of mackerels as in marine water, in circles. They are wild, free and roam in thousands, as the fishes are protected and fed well, says a lady who runs a small tea vending shop nearby and sells puffed rice packets to the tourists. Within the radius of 2 kms of Songkal Wari at Rombagre, the local community added two such pools for the in-situ conservation of mahseer, all teeming with countless fishes. But the challenge to the conservation efforts continues, as rogue elements from nearby villages and far-off places make ceaseless attempts to poach, lured by the premium placed on Mahseer. A decent catch fetches more than INR 500.00, for a kilogram, on spot buying which means a week's supply of bare necessities for rogues. "It's a constant struggle; we have to be on vigil 24/7. The moment we let down our guard, a loud bang reverberates our hills" adds a village elder. The district administration is also aware of these problems and has started to crack down on poachers and banned illegal methods of fishing. Incompleteness of education and poverty makes the lure of money so alluring that they are inextricably trapped in employing every conceivable means to earn their daily square meal, fair or foul. This aberration puts a great deal of pressure on the protection of these threatened species of fishes on one hand and also to find a source of alternative to mitigate the recurring issue of employment and income for the young men.

The pleasant news of the success story of in-situ fish conservation at Songkal Wari, Rombagre, spread like uncontrollable wildfire throughout the state of Meghalaya and beyond. People came to see from far and wide and felt enchanted with what they saw. Some were motivated to replicate the model. Within five years of the introduction of this concept of in-situ aquatic life conservation, almost every village, with a decent size stream and river, has started its own conservation pool. The latest count indicated more than hundred such pools.

Another example is set at Selbalgre, which is about 7 kms from Rombagre, and about 18 kms from Tura, on the way to Williamnagar, has banned fishing on the small stream that meanders through the middle of the village. The glaring results have started showing, despite the lack of pools with respectable depth, in which fishes feel comfortable and protected. Juveniles of mahseers are now easily spotted everywhere in the 2 km stretch, adjacent to the village. The villagers residing along the River Ganol near Tura town are also now inspired and have also formed a conglomeration of 7 villages to give access only to leisure anglers and banned all forms of destructive methods of catching fish.

On week-ends, people throng these rivers. Leisure anglers and picnic parties from nearby neighborhoods and villages make a beeline for these spots. It's a kind of boom for this once bleary-eyed sleepy village of Rombagre. Awakened by the influx of local tourists, the lady vendor prepares for the day's business with decent expectation. "We are always looking for avenues to bring in more tourists" says Bulbul A. Sangma, a member of the village committee.

“We have introduced yet another unique activity where tourists are being encouraged to enter the water and swim with the mahseer, mix with them as friends and not as food objects, take photographs, approach them and feel their presence in the wild”, he added. Mr. Sangma further speaks that “Efforts are on to introduce, catch and release by angling activity, but that would require skill development and training and we aim to seek assistance from the district office of the government fisheries department in the nearest future”.

The mahseer at Sonkhal Wari has to keep a date with destiny. It has to migrate upstream to spawn in the shallow aerated rocky beds. So at dawn during the start of monsoon, when conditions are just right, anglers of all ages lie in wait in the rapids above. But it's a ritual that defines their very existence, nature's tradition that would prove costly for many as most of them will never make it back. The ultimate sacrifice, their strength in numbers, most of them will end up on the dinner table across Garo Hills. But with many conservation projects in place in Meghalaya, the population of mahseer is on the rise again, the cult followers of angling in Meghalaya have raised a notch above. Females are not too far behind in the state of Meghalaya, and undoubtedly have the most number of female anglers anywhere in India. Small sweet balls on rod and line locally called as *Bundia* are being the most preferred method. Skillful exponents of the art of fishing, that in almost all the major rivers of Khasi Hills and Jaintia hills, the entire fish population was almost decimated. This on the other hand has had some positive effects too. It has given birth to a small group of ethical anglers who practice catch and release. Angling groups and forums are trying to spread the message of ethical fishing, conducting occasional workshops and awareness campaigns. Therefore from the success of these fish reserves, one can say that “Man cannot live alone but co-exist with the otherwise beautiful and symbiotic nature Period”!

(Contributed by Mr. Bhuto Marak, Angler from West Garo Hills, Meghalaya)



Fig. 50: A mahseer fish sanctuary of Meghalaya

Photograph courtesy: Mr. Bhuto Marak

MIZORAM

Angling, as a whole is an age old practice for the people of Mizoram, performed on traditional means by simple hook and line for catching the locally available carps, catfishes, murels etc. There are no such organized associations in this sector so far. As spoken by Md Mintul Ali, Scientist, KVK Mamit, some of the potential large water bodies for upgradation of recreational fisheries in the state are the Palak, Tamdil, Rungdil and Rengdil lakes and Serlui reservoir. The rivers (Fig. 51) of the state also harbour a variety of game fishes which can be utilized for the development of the sport fisheries in the state (Karmakar *et al.*, 2007). The rivers of the state namely Chhimtuipui river (Champhai district) and Mat river (Serchhip district) can offer very good opportunity for cold water fishery development. Recent study has shown that Chhimtuipui river, Mat river, Serlui river and Tuirial river harbours variety of mahseer species viz. *Tor tor*, *Tor mosal* and *Neolissocheilus hexagonolepis* (Department of Fisheries, Govt. of Mizoram, 2015).



Fig. 51: A view of river Tlang in Mizoram harbouring mahseer

UTTARAKHAND

Fishing in Uttarakhand has been an awesome experience for those who try for mahseer fishing. Some of the important locations known for sport fishing and eco-tourism are given below.

Kumaon region: In Kumaon, the river Mahakali, along the Indo-Nepal border, is one of the least fished but the best known mighty mahseer (*Tor spp.*) rivers. It demands a long trip to reach the best parts and pays in broken tackle and big fish when landed.

Pancheshwar: Pancheshwar is accessed from Abbott Mount and Lohaghat in east Champawat district in Kumaon and offers the majestic golden mahseer from river Mahakali at its confluence with river Saryu, and is best fished before the rains and after October. An **international angling competition** is held every year in this place in the month of March. In eastern Almora district, magnificent mahseer pools are found in Kopote, down to Tanakpur in **Champawat**, on the Saryu and Sarda rivers. **Rameshwar**, at the confluence of river Saryu and the eastern Ramganga river, a little beyond Pancheshwar and, Baramdeo are known to be the best spots. Located on the banks of the famous Mahakali river in Kumaon, the Pancheshwar



Fig. 52: Eco-camps at Pancheshwar



Fig. 53: Rafting at Pancheshwar



Fig. 54: A prized catch of golden mahseer from Pancheshwar



Fig. 55: A prized catch of golden mahseer from river Mahakali

Photographs courtesy: Mr. Prashant Bisht

Fishing Retreat offers one of the best locations with the best luxury facilities available as spoken by angler, Mr Prashant Bisht (Fig. 52-55). The retreat is a paradise for bird watchers and for anglers to catch the golden mahseer. Rafters can indulge in adventurous white water river rafting with fishing. Another anglers association in the region are the Himalayan Nomadic Anglers run by Mr Shyam Gurung provide specific fishing tour itineraries, customised depending on the individual requirements of angling groups.

River Kosi: River Kosi in Corbett National Park is witnessed with bountiful of golden and chocolate mahseers. Betalghat and Chhara are the best angling sites in Kosi river.

River Asi Ganga: Another prime spot for **fishing in Uttarakhand** is on the river Asi Ganga near **Uttarkashi** and **Dodital**, the lake at the head of Asi Ganga, offer rich pickings of trout. It's not just mahseer and trout that lure anglers to Himalayan waters but also the giant goonch (catfish), which lurk in deceptively small pools.

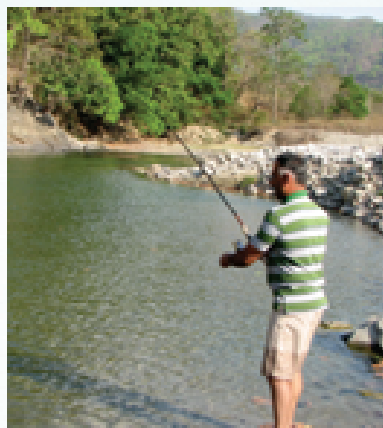
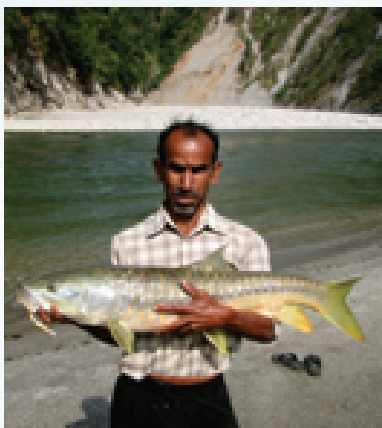


Fig. 56 & 57: A catch of mighty golden mahseer by angling at river Ramganga

Photograph courtesy: Mr. Ashok Vashisht



Fig. 58: A catch of mighty golden mahseer at Ramganga

Photograph courtesy: Mr. Derek Dsouza

River Ramganga:

The best places to locate golden mahseer along the river Ramganga (Fig. 56 & 57) are Machula bridge and Van Ghat pools.

Garhwal region: In Garhwal, the western Ramganga (Fig. 58) outside the Corbett Tiger Reserve is the prime hunting ground of the goonch and the Indian trout. In spring this area turns into a prime angler's dream. The confluence of the Western Nayar and the Ganga at Vyas Ghat, Garhwal, is best fished immediately before the rains. The fishing in this area extends from the Junction to the confluence of the Eastern Nayar and the Ganga below Lansdowne.

HIMACHAL PRADESH

Himachal Pradesh is endowed with numbers of fast flowing rivers and streams originating from glaciers, rumbling and swirling along the rugged mountain passing through awesome gorges, canyons, alternating with pools and fiery rapids. The icy-streams harbour country's richest cold water fish fauna including world famous mahseer, array of catfishes and trout. Each year a large number of anglers both from home and abroad visit the state in the pursuit of fishing and practice age-old art of angling with varying degree of success (Department of Fisheries, Himachal Pradesh). The major rivers flowing through the state include - Beas, Sutlej, Ravi, Tirthan, Sainj, Uhl, Baspa, Pabar, Lambadug, Giri, Rana, Nugal Gai, Baner, Bata etc. Mahseer is one of the major fish available in these streams along with exotic trout, *Nemacheilus* spp, *Barilus* spp, Schizothoracids, *Crossocheilus* spp, *Glyptothorax* spp. etc. Fishing in these streams is regularized under the State Fisheries Act. The important river sites for mahseer angling are depicted in Table. 2.

Table. 2: Important river sites for mahseer angling in Himachal Pradesh

River Name	District	Stretch	Approx. Length in Kms.
Beas-Binwa	Kangra	Seri Mulag to confluence of Binwa with Beas	05 Km
Beas-Kunha	Kangra	Harsipattan to confluence of Kunha with Beas	10 Km
Beas	Kangra	Chambapattan	05 Km
Beas	Kangra	Kuran	05 Km
Beas	Kangra	Dehra-Gopipur	10 Km.
Beas	Kangra	Baner	05 Km
Giri	Solan/Sirmaur	Kargnoo to Sataun	70 Km
Source: www.himachal.nic.in			

Angling rules and regulations are strictly followed in the state. Anglers are provided with a fishing license and with the specificity in the size catch. Coldwater fishing is closed from 1st November to last day of February each year whereas the warm water fishing is banned from 1st June to 31st July for spawning needs of the fish. The fees for fishing in the water is quiet nominal as reflected in the Table. 3.

Table 3: License Fees for Angling

Type of Water	License Fees	Fishing Tackles
Trout Waters	INR 100/- Daily	Artificial Baits
General Water	INR 40/- Daily	Rod, Line and Hard Line
Source: www.himachal.nic.in		

Kangra valley: Kangra valley is situated in the lap of the mighty Dhauladhar ranges and is bestowed with numerous snow-fed streams. This valley is a home of the proverbial mighty mahseer (*Tor* spp.) to which effect a fairly large account of evidence is available from the vivid accounts of various anglers interested in big sized fish. The river Beas and the Pong Dam reservoir provide attractive fish grounds to the anglers. Although there are many places and rivers and streams where mahseer is available, the following sites are considered the best.

Sari Marog: This place is the confluence of the Binwas tributary with the river Beas and is known for harbouring majestic size of golden mahseer, with deeper pools and hiding places. The approach is via Palampur, Andretta and Jaisinghpur. From Sari Marog village, a 3 km footpath leads to the spot, which entails a steep and a breathtaking climb of about 45 minutes.

The stretch between Harsi Pattan and Nadaun: There are numerous sites on this stretch, easily accessible from the Palampur-Bhawarana-Thural road. The famous spots are the Mandh-Khad confluence, Lambagaon pool, Neogal confluence near Alampur and Ambter, 2 km above Nadaun.

Chamba Pattan: This place is accessible from Jwalamukhi and after travelling for 8.5 km, this locality offers three good spots, viz. the Chamba, Pattanpool and Kaleshwar sites situated opposite to Chamba Pattan village and the Uppar Chamba Pattan run. All these places offer safe mahseer catches and cannot be fished in one day.

Kuru: Kuru pool is the confluence of a small stream with the river Beas, joining about 1 km above the Kuru village and forming a small bay, above and below which exceptional catches have been experienced. The access to this place is through a 3 km footpath from Dehra-Jwalamukhi road.

Dehra and Pong dam reservoir: Pong reservoir from Dehra to the Dam proper offers excellent fishing for mahseer almost round the year when fishing is open. The Pong reservoir can be approached from Pathankot via Jassur, from Chandigarh via Talwara, and from Dharmasala via Dehta and Nagrota Surian.

Gaura: The area of Ashni stream upto its confluence with the river Giri, falling in Solan and Sirmour district, provides enjoyable fishing opportunities. Near Solan, about 30 km away, across the Giri bridge, is Gaura, once known for its huge golden mahseer. The place offered good spot to the erstwhile Patiala rulers and their British guests. Even today, Gaura, apart from bring a scenically beautiful place, offers good prospects for mahseer fishing. Another spot is the stretch of river Yamuna from Naught ferry crossing downstream in Ponta Sahib.

JAMMU AND KASHMIR

In Kashmir valley, mahseer has been the major fish having socio-economic and recreational significance. But in recent years the fish has come under threatened category of fish species and are now rare in catches with dangers posed by construction of series of dams, barrages/ weirs across the rivers on one hand and over-exploitation on the other. While unrestrained fishing and disparaging fishing devices have adversely affected the riverine population, the construction of dams are acting as physical barrier to this migratory species, tending to prevent their access to their usual breeding and feeding grounds.

However, the Department of Fisheries, Govt. of J&K took up its rehabilitation and a Mahseer Fish Seed Farm at Anji (Reasi) was established where quality fish seed of this species is being produced and stocked in the potential water bodies to promote the mahseer sport fisheries in the State. The proposals for development of mahseer sport fisheries in areas of Tawi river (Jammu), Ujh stream, Ravi river (Kathua), Tawi river (Udhampur), Poonch River (Poonch), Rajouri Wali Tawi (Rajouri), Salal reservoir, Nallah Rud, Ans, Chenab, Pouni Nallah (Reasi) did not mature to the expected level due to constraints of resources. However, the seed produced at Anji is being regularly stocked in mahseer streams for up gradation of the livestock.



A view of river Jhelum

KARNATAKA

In Karnataka, Galibore, Bheemeshwari and Doddamakali are amongst the important fishing camps along the Cauvery River. The tourism and the forest departments of Karnataka are jointly running the Cauvery Fishing Camps. Anglers from all over the world pay their annual visit to these exclusively reserved stretches to pit their wits against the mahseer while non-anglers revel in nature's bounty. There are two species of mahseer that can be spotted at the angling sites of river Cauvery, viz., the *Tor khudree* and *Tor mussullah*. Realizing the need to safeguard the habitat of the mahseer and the adjoining riverine stretches of forest, Wildlife Association of South India (WASI) set up temporary fishing camps in these areas in mid-seventies. For the past thirty years, the organization is involved in the protection of this reserved stretch of the Cauvery river. Coorg Wildlife Society (CWS) also provides membership driven angling stretches, and issue licenses to anglers to fish. Infact, most of the poachers have been rehabilitated and are employed as guides and guards by WASI and CWS to patrol the river stretch at the fishing camps as spoken by angler Mr. Derek Dsouza. The Department of Fisheries under Govt. of Karnataka offers licenses to anglers to fish as well, particularly in village stretches and lakes. In the light of decreasing sizes and number of good specimens, 'catch-and-release' practice has been adopted, thus giving a fresh lease of life to the mighty mahseer (Fig. 59-62). A lot of temple pools are also protected for mahseer viewing and feeding. Channels like Nisargadama are also protected under its stretch to conserve mahseer. The local communities residing near to these places are benefited from anglers and fish lovers by opening of small business shops, supply of meals and selling other accessories of day to day life.

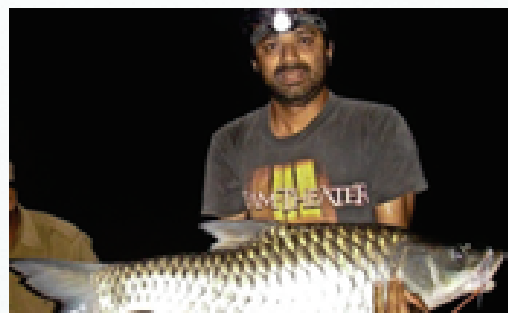
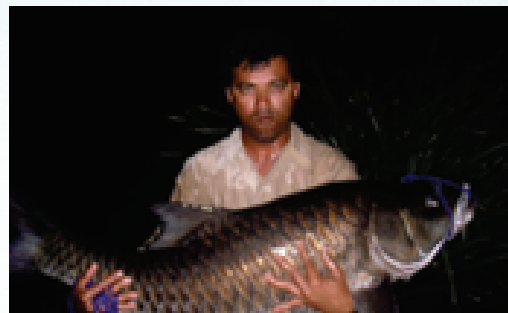
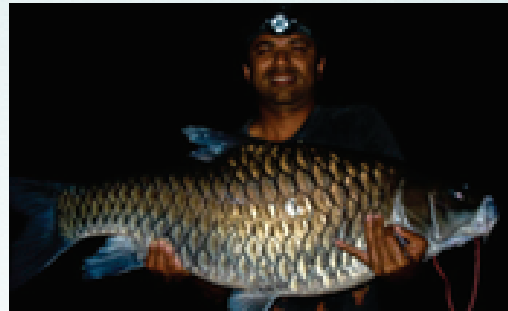


Fig. 59-62: Blue and orange fin mahseer from Galibore during 2010 to 2012

Photographs courtesy: Mr. Derek Dsouza

MAHSEER WATCHING : A CONCEPT OF ICAR-DCFR

Fish may be beneficial to human health not just by eating them, but watching them. Fish watching has multiple positive physiological benefits like greater drops in blood pressure, stable heart rates, better moods and relaxation etc as per reports from several researchers. Many of the upland lakes, religious and protected tanks, river streams and pools are examples of fish watching spots which not only attracts tourists but also indirectly facilitates in-situ conservation of the some of the endangered fishes like the mahseer. Such kinds of fish watching spots are served in many tourist sites of the country. Upland lakes such as Nainital, Bhimtal, Sattal, Naukuchiatal, Khurpatal, Shyamtal, Deoriatal, Hemkund, Roopkund, Kagbhushandital, Kedartal, Sahastratal in Uttarakhand, situated at an altitude ranging from 1200 to 5050 m are some of the best spots where one can find fish to watch. Mahseer (*Tor tor* and *T. putitora*) can be best watched in the Kumaon lakes viz., Nainital, Bhimtal, Naukuchiatal and Sattal and tanks such as Nal Damayanti (Fig. 63 & 64). Similarly, the Tawang and Upper Siang districts of Arunachal Pradesh are recorded with numerous numbers of lakes which can give a multidimensional importance as angling, scenic beauty, bird watching and hill trekking etc. More number of lakes and tanks with an eco-tourism importance in Northeast region are Mehao lake (1640 m asl) and Sally lake (435 m asl) in Lower Dibang Valley district, Lake Mechuka (1829 m) in West Siang and Lake Geker Sinyi/Ganga Lake (750 m asl) in Papumpare district of Arunachal Pradesh, Ward's lake (1496 m asl) at Shillong, Dighali pukhuri (56 m asl) at Guwahati, Cole park and Padum pukhuri at (48 m asl) at Tezpur, Joysagar and Gaurisagar tanks (95 m asl) at Sibsagar, Jarain pitcher plant lake and Thadlaskein Lake near Jowai (1380 m asl). Many such lakes and tanks are scattered and may be located near the roadside and others at some trekking distance. These types of water bodies offer excellent sites for development of sport fisheries and fish watching spots together with other recreational facilities like boating, children's park, food courts etc.



Fig. 63 & 64: A fish watching spot at Nal Damayanti tank near Bhimtal

Mahseer eco-park concept is a new dimension to the eco-tourism where nature lovers can get to see world famous game fish in a particular place similar to the concept of bird watching, tiger watching etc. Dr. Debajit Sarma, Principal Scientist of ICAR-DCFR, Bhimtal while promoting the concept stated that mahseer has been recognized as 'state fish' in 7 states of India and is having all the qualities to become a 'national freshwater fish' because of its magnificent colour, fighting skills and sizes (WWF Report, 2013). ICAR-DCFR has been promoting this concept of mahseer watching and developed several eco-park (Fig. 65 & 66) and sanctuaries in Uttarakhand (Sariyatal; Lake view Resort, Kherna), in Meghalaya (Nongmahir), Arunachal Pradesh (Mehao lake) etc.



Fig. 65: Inauguration of eco-park at Sariyatal in Uttarakhand



Fig. 66: Mahseer seed ranching at Mehao lake for promotion of eco-tourism

THE ANGLERS' GEARS AND EQUIPMENTS

Angling or sport fishing is catching fish with the use of an angle or a hook. The hook is usually attached to a fishing line, which is tied to a fishing reel and the fishing rod. The method of catch is by luring the fish with a bait on the. Baits can be of naturally alive or dead animals like worms, insects, earthworms and maggots or artificial substances simulating real bait. There are three types of angling – spinning, fly fishing and bait fishing. Mahseers take on lures and thus



Fig. 67: Rods for mahseer angling
Photograph courtesy: Mr. Naushad Ali

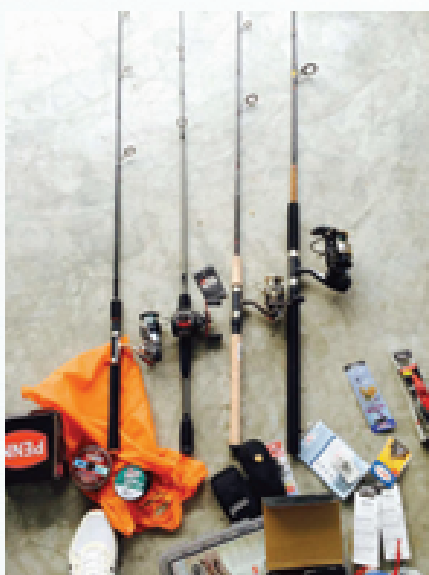


Fig. 68: Fishing equipments used by anglers (Arunachal Pradesh anglers' report)
Photograph courtesy: Mr. Dorjee Sona

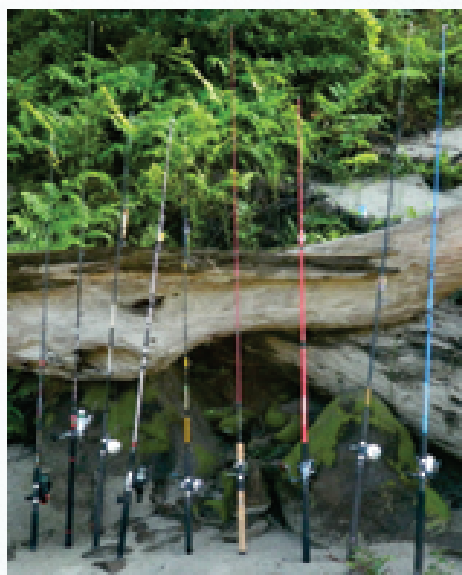


Fig. 69: Fishing gears used by anglers (Assam anglers' report)
Photograph courtesy: Mr. Naushad Ali



Fig. 70: An angler with his gear and a mahseer in river Subansiri

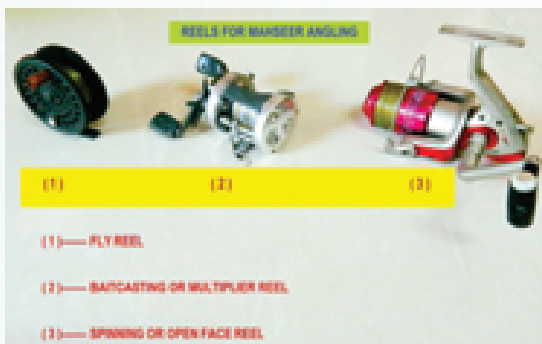


Fig. 71: Reels used in mahseer angling



Fig. 72: Lines used in mahseer angling



Fig. 73: Spoons used in mahseer angling



Fig. 74: Spinners used in mahseer angling

Photographs courtesy: Mr. Naushad Ali



Fig. 75: Plugs used in mahseer angling

Photograph courtesy: Mr. Naushad Ali



Fig. 76: A shop with angling equipments at Arunachal Pradesh

Photograph courtesy: Mr. Ngurang Neega

Mr. Ashok Vashisht, an active angler, says angling mahseer is something which requires patience as one has to sit on the bank, cast bait and wait and wait. It requires casting and retrieving the lure hundreds of time, most of the times in hot sun. The angler prepares himself for angling with a typical setup of a spinning rod (Fig. 67-70), a fixed spool reel (Fig. 71), about 10-20 lbs (breaking strength), monofilament (Fig. 72) and finally a lure at the end. During operation, the angler needs to open the “bail arm” of the reel, cast far, turns the handle and the bail arm closes and starts retrieving again. Lures are chosen according to the water and the fish you target. Lure fishing covers with (a) Spoons {Fig. 73} (b) Spinners {Fig. 74} (c) Plugs of all kind {Fig. 75 & 76}.

Mahseer are not easy to catch, though they are the top predators and eat almost anything; by far they are one of the most intelligent amongst other sport fishes and they are very wary to see a fishing line. The mighty mahseer can go after several dough baits being dropped in water, yet when dough bait is wrapped around a hook and line and thrown into the water, it seem to disappear. The thrill of mahseer ripping a line off the reel, holding the rod high and running along the banks of the river, the exhilarating moments are only to be experienced. Many are the stories written, where anglers have fought the mighty mahseer and lost it at the last minute. All stories are true, the ‘Mighty Mahseer’ remains the favourite fish on many anglers’ bucket list. Mr. Derek Dsouza, an angler while sharing his vast experiences in angling mentions about some of the equipments used in search of mahseer in the country and abroad. For fly fishing, a 10 wt. rod is recommended; for spinning a heavy to extra heavy rod; and for bait fishing, 5 to 6 lb test curve rods are recommended. Monofilament Mustad Wish is the best contender for the mighty mahseer, with its UV coating and strong abrasion resistance. Mustad Fluorocarbon leader can go a long way as well. There are no better hooks than the Mustad range. If an angler is using spoons, lures with Mustad Saltism 4x (crimped barbs) or the Kaiju Singles 7x (recommended) are to be seriously considered and for bait anglers, the Big Red and the Hoodlums work the best. The angler is associated with the Mahseer Trust (www.mahseertrust.org) working in Asia to prove a safe haven for mahseer.

Overall, an angler set off for an angling expedition (Fig. 77-80) must be well equipped with particulars such as hook, line, sinker; rod, reel, spear, net, trap, gaff, wader, spinner, float, spoon,

tackle box, bait/lure (natural or artificial), bite indicator, weighing balance, rucksack, sunscreen, head torch (with batteries), camera .



Fig. 77 & 78: Basic amenities in a camp site during an angling expedition



Fig. 79: An evening camp fire during an angling expedition



Fig. 80: Patience waiting for a fish during an angling competition

Photographs courtesy: Mr. Naushad Ali

Anglers Ethical Code

(Do's and Don'ts in fish angling)

Do's:

1. Use suitable rod, reel and line for the fish targeted.
2. Always use lures of single inline hooks, or barbless trebles and avoid trebles.
3. Bring the fishes to the bank slowly and comfortably while fighting or playing the fish.
4. Always use a landing net with a rubber made mesh if possible.
5. Always use strong pliers to de-hook the fish.
6. Always unhook the fish in water.
7. Always use a moist and cool mat underneath to unhook a fish out of water.
8. Always consider safety measures in taking a photograph in water.
9. Always use the ramp method while releasing a fish back into water, i.e. while releasing, the fish is turned upside down and the fish corrects itself within 3 seconds, or else hold the fish upstream till it is able to correct its position and swim away.
10. Always keep the fish in water till the time a photograph is ready to be shot.
11. Always keep the photographic equipment ready.
12. Always handle the fish with wet hands.
13. Ensure to carry all necessary documents viz., fishing licenses / permits in a water proof bag.
14. Ensure to carry all necessary accessories for a pleasant angling trip.

Don'ts:

1. Do not drag the fish out of water.
2. Do not take the fish out of water for an extended period of time.
3. Do not drop the fish.
4. Do not unhook the fish outside water.
5. Do not put your hands or fingers under the gill covering and lift the fish.
6. Do not use a lip gripper to hold the fish.
7. Do not try to force the hook out if the fish has swallowed it deep, instead cut the line nearest to the hook and release the fish.
8. Do not rub the fish against any material such as T-shirt or a holding cloth, towel, leaves etc so that the slime on the fish is retained.
9. Do not release invasive species back into the water body.
10. Do not fish in any restricted or protected area.

(Contributed by Mr. Derek Dsouza, Mahaseer Trust)

CONCLUSION

Although there is tremendous potentiality of angling tourism in many sites, yet it has not developed to the expected level till date. There is an urgent need to identify the sport fishery areas, policy formulation for sport fisheries including development of platform for promotion. Entrepreneurship development for promotion of fish based eco-tourism with supportive and ancillary service is a far cry. National and international publicity, awareness and marketing strategies for promoting angling tourism are important sectors that need immediate attention for its development. The type of ecotourism developed in the country based on fish angling and fish watch has both, as outlined, positive indirect and direct consequences towards the conservation of mahseer. Possibly, the population of mahseer on account of angling and recreation has not fallen below the critical level, sustaining support to recreational fisheries, ecotourism and mahseer conservation appears a viable approach through development of suitable policies and guidelines.



Fig_81: ICAR-DCFR initiatives in seed ranching for rehabilitation of golden mahseer at Nainital Lake

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ICAR-Directorate of Coldwater Fisheries Research

(Indian Council of Agricultural Research)

Bhimtal - 263136, Distt. Nainital, Uttarakhand

Website: www.dcfrr.res.in

E-mail: director@dcfr.res.in; dcfrin@rediffmail.com

Phone: 05942-247280, 247279; Fax: 05942-247693