

# Mahseer in recreational fisheries and ecotourism in India

Deepjyoti Baruah\* and Debajit Sarma

ICAR-Directorate of Coldwater Fisheries Research, Bhimtal-263136, Nainital, Uttarakhand, India

\*Corresponding author: deep\_baruah@rediffmail.com



A catch of 11.5 kg golden mahseer by Mr. Dorjee Sona from Yamne River in East Siang District during March 2016.

Mahseer, a large bodied potamodromous freshwater fish endemic to Asian rivers 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. The existence of such a mighty game fish in Indian water is depicted in Vedic times<sup>1</sup> in the writings of King Someswara (1127 AD) in his *Matsya Vinoda* on account of angling of mahseer with rod and line<sup>2</sup>. Angling of mahseer in the country was further pursued by the British, attracting the attention of anglers Beevan (1877), Thomas (1873, 1897), Dhu (1906, 1918, 1923) and Nevil (1915). The lakes of Kumaon hills were reportedly stocked with mahseer by Sir H. Ramsay during 1858 for sport fishing<sup>3</sup>. Codrington (1946) and McDonald (1948) wrote about its natural history and on special traits of fish from an angler's point of view. The adventures of the English in search of mahseer across the country was described by Ghorpade (1978). Kulkarni and Ogale (1979) who considered mahseer the noblest sport fish of India, a great favourite of anglers, both from India and overseas. Belonging to the carps, family Cyprinidae, India is home to 15

species out of 47 species of mahseer that exist in the world<sup>4</sup>. 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<sup>5</sup>.

Recreational fishing or 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 three common methods for capturing mahseer are fly fishing, spoon fishing and bait fishing, although recent innovations are reported. Fly fishing or fly casting method employs artificial fly to hook the fish with the help of rod and line. In spoon fishing, spoon like artificial metallic shining lures are used basically to fish 'heavier' waters where mahseer occurs. Bait fishing or bait casting is performed using both natural and artificial lures. The natural baits are earthworms, minnows and insects.



Today, recreational fishing is 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.

In this article, we have made an attempt to compile information on recreational mahseer fisheries in India. The Indian aquatic resources in the form of rivers, streams and lakes and the importance of the mighty mahseer as a game fish through the perspectives of active anglers and vision of stakeholders and researchers is highlighted herewith. In this context, the river systems of the Indian Himalayan 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 country. The river conditions are varied with different terrains of the Himalayas influencing fishing techniques<sup>6</sup>. Undoubtedly, one of the most successful ways to hook mahseer in these torrential rivers is also by floating on rafts downstream over a period of time enabling to access the remotest angling spots.

## Arunachal Pradesh

**Subansiri River:** This river of Arunachal Pradesh originates in the Himalayas and enters into India via Taksing of Upper Subansiri District, flowing down along the towns of Daporijo and Ziro, to enter into the vast wilderness of the lower valleys and finally terminating to meet the mighty Brahmaputra. Anglers among the sparse human habitation travel along the

river Subansiri as adventure enthusiasts in these picturesque mountains of Arunachal Pradesh, with crystal clear post monsoon waters coursing through them and home to the big fighting fishes *Tor putitora* (golden mahseer), *Neolissochilus* spp. (chocolate mahseer) and the *Bagarius bagarius* (goonch) as shown.

**The Siang River belt:** This river flows for 294 km through the hills before joining the Brahmaputra River in the plains. The Siang River belt is mostly inhabited by the Adi tribe and sub-tribes *Minyongs*, *Padams*, *Shimongs*, *Milangs*, *Pasis*, *Karkos*, *Ashings*, *Pangis*, *Tangmas* and *Boris*. Their life is closely mingled with nature where hunting and angling (*gekar* in Adi language) are some of their oldest traditional practices. Mahseer (locally *Ngocho*) is a favorite species for the anglers of the belt. A few of the preferred sites along the banks of river Siang are Bodak, Sigar, Raling, Kyiet, Berung, Sikabamin for angling due to the abundance of mahseer along with an accessible topography and water movement. Attention has been paid recently towards developing ecotourism in the Siang belt by arranging rafts, fish rods, tents and other basic amenities and in turn inviting innumerable tourists from different parts of the country.

The Menchukha region is another angler's paradise, situated in West Siang District of Arunachal Pradesh, 180 kilometres northwest of headquarters Aalo and is only 29 kilometres away from Indo-China border. The Siyom River (locally known as Yargyap Chu) flowing through Menchukha township is home for the exotic and Indian trouts. Mr Dorjee Sona, an active angler from Menchukha, encountered golden and chocolate mahseer abundantly in the Yamne River, which flows from Upper Siang District and meets the mighty Siang River



A golden mahseer of 12.6 kg weight from the Subansiri River in November 2014.



A chocolate mahseer (*Neolissochilus stracheyi*) caught by diving in the Basar area of the Siang drainage.

near Ponging village. Anglers of the region have developed a community based anglers association "Arunachal Anglers" with an objective to strengthen the protection measures for the endangered group of fish – mahseer.

**Lohit River:** Angling and fishing camps in the 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 along the Lohit is Tezu situated at 27°55'N latitude and 96°10'E longitude. The angling and fishing season over the Lohit starts from October to April whereof the maximum temperature remains 20° C during the day.

**Pare River:** This river 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 km east of the state capital Itanagar. The Pare River harbours the golden mahseer and chocolate mahseer, says a young avid angler Mr Ngurang Neega from Sagalee town. The angler arranges angling expeditions for the visitors from neighbouring states Nagaland, Meghalaya, Sikkim, Assam and tourist from countries like Nepal and Bhutan. The competitions are done on the principle of catch and release and the fish are not harmed. The angling competitions have remained successful to associate the local community in promoting eco-tourism in an unrevealed place of Arunachal Pradesh.

**Kameng River:** The river Kameng in Arunachal Pradesh originates in Tawang District from a glacial lake below snow-capped Gori Chen mountain at an elevation of 6,300 metres asl. The river is known to harbour the mahseer in the upper and lower reaches as witnessed in the hooks of the anglers of the area. Catch and release angling competitions are organised on regular basis at places like Seppa, Nameri, Bhalukpong 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 in the recent era as reported by an angler Mr Biplab Chakraborty.

## Assam

**Jia Bhoreli River:** This river is one of the major south flowing tributaries of the Brahmaputra. The river harbours the legendary mahseers *Tor tor* (locally lao pithia), *Tor putitora* (locally sonali pithia), *Tor mosal* (locally lobura), *Tor progenius* (locally jungha pithia) and *Neolissochilus hexagonolepis* (locally boka pithia) which create a magnificent fishery in the foot hills of Assam and Arunachal Pradesh<sup>3</sup>.

The Assam Bhoreli Angling and Conservation Association (ABACA), situated at the banks of the Jia Bhoreli River at Nameri, Sonitpur District is one of those eco-camps set up for popularising adventure sports among the rural youth, angling on catch and release and create awareness on conservation of fish<sup>7</sup>. The camp presently sustains on organising angling, camping, rafting, trekking, bird watching, heritage and culture. The camp is also bestowed with breeding and seed production facilities for propagation of golden mahseer. Mr Gautam Tamuli, a life member of ABACA and once an active angler in the region for the search of mahseer during 1987-1995 was much appreciated in those days for his record catch of golden mahseer (*Tor putitora*) weighing 12 kg and 20 kg at Nameri Mukh, 17.4 kg at 17 Mile near Bhalukpong and a 12 kg golden mahseer at Old Nameri Mukh. His record catches can be witnessed today from the preserved teeth of some of those mahseer restored in his residence.

**Karbi Anglong and West Karbi Anglong:** These are the hills districts of Assam. The district with dense tropical forest and numerous tributaries of the mighty Brahmaputra has sultry temperature of 23° to 32° Celsius in summer and 6° to 12° Celsius in winter. The rivers are reported by Mr Chatra Pator



## Nagaland

(I/c SDFDO) to harbour many species of mahseer viz., *Tor tor*, *Tor putitora* and *Neolissochilus* spp. creating an immense potential for angling in these hilly districts of Assam. Some of those potential angling sites are (a) Koka at the banks of river Kopili with beautiful waterfalls (b) Amreng at the banks of river Amreng, provided with a tourist lodge and a heritage old British made bridge across the river (c) The Amtereng Dam site of Karbi Langpi Hydro project over river Karbi Langpi with the attraction of the reservoir (d) Siloni, a river island over the river Longnit attracting the anglers for day out.

Mr Rupsing Hanse, a prominent angler of village Harlongjove, Hamren sharing his experiences recalled his prize winning catch of a chocolate mahseer weighing 4.2 kg during 1996-97. The angler further added that with these bountiful of resources, both the hill districts of Assam has an immense potential for 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.

**Manas River:** This river 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 Longitude. It is one of the 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*. Mr Pranab Bora, once an active angler, mentioned to have a record catch of a golden mahseer weighing 12.5 kg in 1981 with a landing time of 35 minutes. Mahseer of size 2.0-2.5 kg was a usual catch during those days in 1970-71 at river Manas. He further spoke about Late Sanjay Deb Roy, the then a senior forest official to hook a 20 kg mahseer at Manas River.

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 of the state attracts tourist from all over the world. 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). To promote tourism through sport fishing and to create awareness to conserve the indigenous and endemic fish species of the State, an Anglers Association Nagaland (AAN) organises angling festival, angling competitions and special days like World Fish Migration Day in lakes, large ponds and reservoirs belonging to local communities and individuals of the area.

## Sikkim

Sikkim with its vast river systems is an anglers' delight where the mighty Teesta River and Rangeet provide ample scope for mahseer. Some of the important confluences of major rivers within Sikkim which forms the hotspot to hook the mighty mahseer as reported by an angler Mr Ian Christopher are (i) Singtam Town - river Teesta and Rani River (ii) Rorathang Town - Rorathang River and Rani River (iii) Rangpo Town - Rorathang River and Teesta River (iv) Jorhang Town - Rangeet River and Rambang River (v) Teesta Town - Teesta River and Rangeet River. Angling is mostly done during the

**Table 1: Specification of fishing equipment used by few representative mahseer anglers in India.**

State	River	Angler (s)	Major species of mahseer	Biggest catch sizes (kg)
Arunachal Pradesh	Subansiri	Mr. Naushad Ali	<i>Tor putitora</i> , and <i>Neolissochilus</i> spp.	5.7-18.0
	Siang and tributaries	Mr. Dorjee Sona	<i>Tor putitora</i> , and <i>Neolissochilus</i> spp.	8.3-11.5
	Pare	Mr. Ngurang Neega	<i>Tor putitora</i> , and <i>Neolissochilus</i> spp.	10.0-12.0
Assam	Kameng	Mr. Biplab Chakraborty	<i>Tor putitora</i> , and <i>Neolissochilus</i> spp.	1.6-13.0
	Jia Borelli	Mr. Gautam Tamuli; Mr. Naushad Ali	<i>Tor tor</i> , <i>Tor putitora</i> , <i>Tor mosal</i> , <i>Tor progenius</i> and <i>Neolissochilus hexagonolepis</i>	20.0
	Manas	Mr. Pranab Bora	<i>Tor putitora</i> , <i>Tor tor</i> and <i>N. hexagonolepis</i>	2.0-20.0
Nagaland	Dhansiri, Intangki, Milak, Dikhu, Doyang, Arachu, Lanyi, Seidzu, Tesuru, Tizu, Zungki, Likhimro	Anglers Association Nagaland	<i>Tor putitora</i> , and <i>Neolissochilus</i> spp.	Not determined
Sikkim	Teesta and Rangeet	Mr. Ian Christopher	<i>Tor putitora</i> , and <i>Neolissochilus</i> spp.	3.0-24.0
Meghalaya	Pools and sanctuaries	Mr. Bhutto Marak	<i>Neolissochilus</i> spp.	1.0-5.0
Mizoram	Rivers of Kolodyne drainage	Local residents	<i>Neolissochilus</i> spp.	Not determined
Uttarakhand	Mahakali, Saryu	Mr. Mohan Rayal	<i>Tor putitora</i>	15.42 kg
Peninsular India	Narmada, Cauvery	Mr. Derek Dsouza	<i>Tor khudree</i> <i>Neolissochilus</i> spp.	Data not available



Mr Ian Christopher angling mahseer in the Rangeet River, Sikkim.

pre and post monsoon seasons and the major mahseer encountered in these rivers are the golden mahseer and chocolate mahseer.

## Meghalaya

**Fee fishing:** 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 fishing practice for recreation. Rich in chocolate mahseers 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.

## Mizoram

Angling, as a whole is 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 etc till date. Md Mintul Ali, Scientist of KVK Mamit identifies some of the potential larger water bodies for recreational fisheries as Palak, Tamdil, Rungdil and Rengdil lakes and Serlui reservoir. Recent study has shown that the rivers of the state viz., Chhimitupui, Mat, Serlui and Tuiriial harbour a variety of mahseer species viz. *Tor tor* and *Neolissocheilus hexagonolepis* as stated by the Department of Fisheries, Govt. of Mizoram.

## 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.

**River Mahakali:** The confluence of river Mahakali and Saryu at Pancheshwar along the Indo-Nepal border is one of the least fished but the best known mahseer (*Tor* spp.) rivers in Kumaon region of Uttarakhand. Rafters can indulge in adventurous white water river rafting with fishing in this water.

**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 Ramganga:** The best places to locate golden mahseer for angling along the Ramganga River are Machula bridge and Van Ghat pools.

## Himachal Pradesh

Himachal Pradesh is endowed with numbers of fast flowing rivers and streams in the name of Beas, Sutlej, Ravi, Tirthan, Sainj, Uhl, Baspa, Pabar, Lambadug, Giri, Rana, Nugal Gai, Baner, Bata etc., originating from glaciers, rumbling and swirling along the rugged mountain passing through awesome gorges, canyons, alternating with pools and fiery rapids. Mahseer is one of the major fish available in these streams along with exotic and indigenous trout and an array of catfishes. Each year a large number of anglers both from home and abroad visit the state in the pursuit of age-old art of angling. Fishing in these streams is regularized under the State Fisheries Act, where the anglers are provided with a fishing license and are charged with nominal fees for angling. A few of the lucrative mahseer grounds in Himachal Pradesh are at Kangra valley, Sari Marog (confluence of the Binwas tributary with the river Beas), Mandh-Khad confluence, Lambagaon pool, Neogal confluence, Chamba pattan, Kuru pool, Dehra and Pong dam reservoir and Gaura.

## Jammu and Kashmir

In Kashmir valley, mahseer has been the major fish having socio-economic and recreational significance. Efforts are being made for the development of mahseer sport fisheries by the Department of Fisheries, Govt. of J&K 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).

## Peninsular India

Anglers on the lookout for the mahseer can also try their luck in the rivers of the Indian peninsula – Godavari, Cauvery, Krishna and Mahanadi – almost throughout the year (except



Lures for mahseer.



during the monsoons). In Karnataka, the lure of the Cauvery proves difficult to resist for anglers – it is probably the best river for sport-fishing in peninsular India.

**Cauvery River:** In Karnataka, Galibore, Bheemeshwari and Doddamakali are amongst the important fishing camps along the Cauvery. 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. The major species of mahseer that can be spotted at the angling sites of the Cauvery is *Tor khudree*. Much effort has been made by Wildlife Association of South India (WASI) and Coorg Wildlife Society (CWS) for the protection of the habitat of mahseer and the adjoining pristine stretches of the river. Licenses are issued to anglers for fishing strictly on 'catch-and-release' as told by angler Mr Derek Souza.

**Chalakydy River:** This river, the 5th longest river in Kerala, harbours *Tor tor* as one of its important fish species<sup>8</sup>. The river with its importance for its reservoirs and adjoining townships provides ample scope for development of mahseer angling<sup>9</sup>. The Wayanad mahseer, *Neolissochilus wynaadensis* is another species in the larger streams of the region<sup>10,11</sup>.

## Fish sanctuaries

Fish sanctuaries 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 (West Jaintia Hills) over the Amlayee River where 1.5 km of its stretch is 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 Chibok River (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 Bugai River (South Garo Hills) based on the richness of chocolate mahseer, (iv) Wachi Wari fish sanctuary (West Garo Hills) over Simsang River 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 Simsang River 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. Seeing the encouraging results, 'wari' at Rombagre, Selbagre were established and within a span of five years, this concept has



An angler with a chocolate mahseer caught in the Pare River.





An angler with a 7 kg golden mahseer caught from the Kameng River in October 2015.

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.

## Mahseer 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 these endangered fish - 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 Kumaon lakes viz., Nainital, Bhimtal, Naukuchiatal and Sattal and tanks such as Nal Damayanti. Similarly, the districts of Tawang, Lower Dibang valley, Papumpare and Upper Siang in Arunachal Pradesh are best known for bestowing numerous numbers of lakes having multidimensional importance for angling, scenic beauty, bird watching and hill trekking etc. Ward's lake, Jarain pitcher plant lake and Thadlaskein Lake at Meghalaya, Dighalipukhuri at Guwahati, Machchiyal in Himachal Pradesh are others which offer excellent sites for development of fish watching spots together with other recreational amenities like boating, children's park, food courts etc.

Jasingfaa Aqua Tourism Centre: This centre, situated in Assam, is a leading example to set up a fish based adventure tourism activities in the country bliss with the amenities to satisfy the passionate anglers, bird and fish watching. Of 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. Angling festival and special workshops on angling tips are being arranged regularly in the centre.

## Conclusion

India has tremendous potentiality for mahseer recreational fisheries in many states, provided the tourism sector is developed to the expected level starting from identifying the potential areas followed with formulation of effective policies and guidelines for entrepreneurship development and supported with ancillary services. 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 mahseer. In this context, mahseer has been recognised as the 'state fish' in 7 states of India and has all the qualities to become a 'national freshwater fish' because of its fame for its magnificent colour, fighting skills and sizes<sup>12</sup>.

## Acknowledgement

The authors highly acknowledge the contribution made by renown avid Anglers Mr Derek Dsouza, Mr Naushad Ali, Mr Dorjee Sona, Mr Ngurang Neega, Mr Ian Christopher, Mr Biplab Chakraborty, Mr Gautam Tamuli, Mr Prashant Bisht;



Entrepreneurs Mr Nava Kr. Gogoi, Mr Ashok Vashisht and Mr Bhuto Marak; Academicians Mr S.M. Hussain, Mr Kulen Das, Dr. Sailendra, Dr. Rupak Nath and Dr. R. N. Bhuyan; Fisheries Officers Mr Chatra Pator, Mr Imti Sunep, Mr David Kharwanlang; Officers Mr Pranab Bora in providing the much valued information and sharing the photographs in preparation of this manuscript. The support received from the Director, Nodal Officers, Technical and Staffs of the institute are immensely thanked.

#### References:

1. Hora, S.L. 1951. A Sanskrit work on angling of the early twelfth century, *Nature*, 167: 778.
2. Hora, S.L. 1953. Knowledge of ancient Hindus concerning fish and fisheries of India 4., *Fish in Sutras and Smriti literature*, *J Asiat Soc Lett.*, 110: 63–77.
3. Walker, W. 1888. Angling in the Kumaon lakes.
4. Sarkar, U.K., Mahapatra, B.K., Saxena, S.R. and Singh, A.K. 2015. Mahseer in India: An overview on research status and future priorities. *J. Ecophysiol. Occup. Hlth.*, 15(1 & 2): 45–52.
5. Sarma, D., Singh, A.K. and Akhtar, M.S. 2016. Mahseer in India: Resources, captive breeding, propagation, policies and issues, ICAR-DCFR Publication, Pp 1-168.
6. Baruah, D. and Sarma, D. 2016. Mahseer in recreational fisheries and ecotourism in India. *Bulletin. No, 26, ICAR-DCFR, Bhimtal, Nainital, Uttarakhand.*
7. Borgohain, A. 2010. Sustainable development through angling tourism rehabilitation and conservation efforts. Paper presented in the National Workshop on "Mahseer in India: Resources, breeding, propagation, conservation, policies and issues" organized by ICAR-DCFR, Bhimtal at Guwahati during 22-23 December 2014.
8. Ajithkumar, C.R., Remadevi, K., Thomas, K.R., Biju, C.R. 1999. Fish fauna, abundance and distribution in Chalakudy river system, Kerala, *J. Bombay Nat. Hist. Soc.*, 96(2): 224-254.
9. Jayaram, K.C. 2005. The Deccan mahseer fishes: their ecostatus and threat percepts, *Rec Zool Surv India, Occ Paper No. 238.*
10. Day, F. 1873. On some new fishes of India, *Journal of the Linnean Society of London*, 11: 524-530.
11. Ali, A., Dhanukar, N., Philip, S., Krishnakumar, K. and Raghavan, R. 2014. Distribution, threats and conservation status of the Wayanad mahseer, *Neolissochilus wynaadensis* (Day, 1873) (Teleostei: Cyprinidae): an endemic large barb of the Western Ghats, India, *J of Threatened Taxa*, 6(5): 5686-5699.
12. WWF Report. 2013. Mahseer conservation in India Status, Challenges and the Way Forward.



A prized catch of golden mahseer from the Mahakali River at Pancheswar in 2016.