

RIVERINE FISHERIES OF INDIA

Abstract

The Indian river system is a vast and complex network of rivers and their tributaries that crisscross the entire country. It plays a crucial role in India's geography, culture, economy, and ecology. The sources of rivers are diverse, including glaciers, mountains, and precipitation. These rivers traverse a variety of terrains, spanning from the snow-covered Himalayas in the northern region to the peninsular plateaus in the southern region. Within the country, there are 14 significant rivers (with a catchment area exceeding 20,000 km²), 44 moderate rivers (with a catchment area ranging from 2,000 to 20,000 km²), and countless minor rivers (with a catchment area less than 2,000 km²). The Indian riverine system can be broadly categorized into two main groups: Himalayan Rivers, encompassing significant waterways like the Indus, the Ganges, and the Brahmaputra, along with their tributaries; and the Peninsular Rivers, divided into the East Coast (Mahanadi, Krishna, Godavari, Cauvery) and West Coast (Narmada and Tapi) rivers. Apart from these major rivers, India is also home to numerous other rivers, both big and small, which contribute to the diverse ecology and livelihoods of people living along their banks. The rivers of India host incredibly varied fish communities, supporting the sustenance and livelihoods of millions of individuals, particularly in rural regions. There are 999 freshwater species of fish in India, out of a total of 2801 species. However, the Indian river system faces various challenges, including pollution, over-extraction of water, encroachments, and climate change impacts. Conservation and sustainable management efforts are essential to safeguard these vital water bodies and ensure their well-being for future generations.

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I. INTRODUCTION

India is blessed with a vast and complex river system that plays a crucial role in the country's geography, economy, and cultural heritage. The importance of river-based fisheries in the nation's economy is significant, as they contribute to ensuring food availability, creating job prospects, and earning foreign currency through overseas trade. These rivers serve vital functions by providing water for domestic and industrial use, facilitating hydroelectricity production, and supporting inland fishing. Moreover, they deposit fertile soil in plains, form deltas, and serve as reservoirs for oil and gas. India's rivers mainly drain into either the Indian Ocean or the Arabian Sea, guided by the flow of water and the geographical characteristics of the region. The river system can be broadly categorized into two groups: the Himalayan Rivers, encompassing significant waterways like the Indus, the Ganges, and the Brahmaputra, along with their tributaries; and the Peninsular Rivers, divided into the East Coast (Mahanadi, Krishna, Godavari, Cauvery) and West Coast (Narmada and Tapi) rivers, complemented by numerous smaller rivers and tributaries forming an extensive network. Apart from being a crucial water source for agriculture and human consumption, these rivers hold immense cultural and religious significance in Indian society (Datta, 2011). Despite their immense potential, the riverine fisheries sector in India faces various challenges. Overfishing, habitat degradation, water pollution, and the construction of dams and barrages disrupting fish migration and breeding patterns pose significant threats to fish populations and the livelihoods of fishing communities. The government and various organizations are actively working to address these challenges and promote sustainable riverine fisheries practices. These efforts involve the establishment of fishery conservation zones, the promotion of aquaculture, capacity building for fisher folk, and the introduction of improved fishing gear and techniques. By addressing these issues, India aims to ensure the long-term sustainability of its valuable riverine fisheries (Sinha *et al.*, 2013)

II. RIVER BASIN

India's rivers encompass a total length of 45,000 km, spanning 113 river basins across an expanse of 3.12 million km². A substantial network of year-round rivers experiences significant seasonal fluctuations in discharge due to periodic rainfall and lengthy dry spells. The country is comprised of 14 major rivers (with catchment areas exceeding 20,000 km²), 44 medium rivers (catchment areas ranging from 2,000 to 20,000 km²), and countless minor rivers (catchment areas less than 2,000 km²) (Das *et al.*, 2012). The primary rivers in India include the Ganges (constituting 83% of the total), Brahmaputra, Brahmani, Cauvery, Godavari, Indus, Krishna, Mahanadi, Mahi, Narmada, Periyar, Sabarmati, Subar Iarekha, and Tapi. Together, these rivers comprise 83% of the country's drainage basin and contribute 85% of its surface flow. Notably, the Brahmaputra basin, Ganga, Indus, and Godavari basins collectively account for over half of India's surface flow. Meanwhile, the medium and numerous minor rivers originate from coastal mountain areas (Das *et al.*, 2007). India's drainage system can be classified into two main categories: The Himalayan rivers and the peninsular rivers, categorized by their flow direction into eastward and westward flowing rivers (Ayyappan, 2011). (Table.1)

Table 1: Profile of Major Riverine System in India

Riverine system	Name of the rivers	Approximate length (km)	States cover by river
The Himalayan Rivers(Extra Peninsular Rivers)			
Himalayan Ganges	Ganga	2,525	Uttarakhand, Uttar Pradesh, Jharkhand, Bihar, West Bengal
	Ramganga	569	Uttar Pradesh
	Gomti	940	Uttar Pradesh
	Ghagra	1080	Uttar Pradesh, Bihar
	Gandak	300	Bihar
	Kosi	492	Bihar
	Subernarekha	395	Bihar, Odisha, West Bengal
	Yamuna	1376	Uttarakhand, Haryana, Delhi, Uttar Pradesh
	Chambal	1080	Madhya Pradesh, Uttar Pradesh, Rajasthan
	Tons	264	Uttarakhand
	Sone	784	Uttarakhand
	Ken	360	Madhya Pradesh, Uttar Pradesh
	Brahmaputra	Brahmaputra, Dibang, Siang, Lohit, Manas, Buri, Dihang, Dhansiri, Koppili	4,000
Indus	Jhelum,	400	Jammu and Kashmir
	Chenab	330	Jammu and Kashmir, Himachal Pradesh
	Beas	460	Himachal Pradesh, Punjab
	Sutlej	1,450	Himachal Pradesh, Punjab
	Ravi	725	Jammu and Kashmir, Himachal Pradesh, Punjab
Peninsular Rivers			
East Coast	Mahanadi	851	Odisha, Madhya Pradesh
	Brahmani	799	Odisha, Bihar
	Godavari	1,450	Maharashtra, Andra Pradesh
	Krishna	1,401	Andra Pradesh, Karnat
	Cauvery	800	Karnataka, TamilNadu
	Pennar	597	Karnataka, Andhra Pradesh
	Bhima	861	Karnataka
West Coast	Narmada	1,322	Maharashtra, Gujarat, Madhya Pradesh
	Tapti	720	Gujarat, Maharashtra
	Mahi	583	Gujarat
	Sabarmati	371	Gujarat, Rajasthan

III. MAIN RIVERS SYSTEM IN INDIA

- 1. Ganga River System:** The Ganga System, encompassing a distance of 12,500 km, constitutes the largest river system in the country, with a total catchment area of 861,542 km² (Jhingran & Ghosh, 1978). Its span extends between 70% and 88.5% of longitude and 22° and 31°N latitude. This system drains the southern slopes of the Central Himalayas, traversing the states of Haryana, Uttar Pradesh (U.P.), Bihar, West Bengal, Madhya Pradesh, and Rajasthan. The main river, Ganga, originates from two sources, Gangotri and Alaknanda, at an elevation of roughly 6,000 meters above sea level (asl) in the Garhwal Himalayas (30°55'N and 79°07'E) in Uttarakhand. Initially flowing westward for 30 km, the river later turns southward. Over a span of 220 km, it carves through the Shiwalik hills and enters the plains at Haridwar. Subsequently, it meanders southeastward, navigating the vast 2,290-kilometer expanse of the Indo-Gangetic plains in Uttar Pradesh, the Bihar-Jharkhand-West Bengal region, until finally reaching the Bay of Bengal. Along its course, numerous significant and minor tributaries (such as the rivers Ramganga, Yamuna, Tons, Varuna, Gomati, Basu, Karamnasa, Thora, Ghaghra, Sone, Gandak, Pulpun, BurhiGandak, Man, Jumania, Kosi, and Gumani) converge with the Ganga. Beyond the Farakka barrage in West Bengal, the primary channel of the Ganga transforms into the Padma River, flowing southeasterly through Bangladesh, where it joins forces with the Brahmaputra (Jamuna) and Meghna rivers before ultimately emptying into the Bay of Bengal. The Ganga traverse's mountain ranges, valleys, plains, and a delta. Its speed and volume fluctuate throughout the seasons, surging with high speed and volume during the monsoons, moderating during the summer snow melt, and flowing at a reduced pace and volume in winter. Nevertheless, the Ganga maintains a constant, uninterrupted flow, providing sustenance for the communities that inhabit its path (Vishwambhar, 2021).
- 2. Brahmaputra River System:** The magnificent Brahmaputra River, often likened to an expansive freshwater sea of the North East, emerges from the snout of the Chemayungdung mountains near Tachhong (Tomchok) Khambab Chhorten. This revered source lies approximately 100 km to the Southeast of Lake Mansarovar, situated at an impressive elevation of 5150 meters (latitude 30° 31' N and longitude 82° 10' E). In Tibet, the Brahmaputra River, also known as Yarlung-Tsangpo, spans a distance of 1,625 km before entering India, where it travels for 918 km, and then extends through Bangladesh for 337 km. Eventually, it merges with the Ganga River and flows into the Bay of Bengal (Anon, 2000; Vass et al., 2011). Upon entering India, the river is called the Siang River as it meanders through the northeastern state of Arunachal Pradesh in a north-south trajectory, covering a length of 278 km. Its course cuts across the east-west ranges of the Himalayas, and as it enters the plains of Assam, it receives contributions from two major tributaries, Dibang and Lohit, near Oiramghat (Lakhimpur District). At this juncture, it adopts the name River Brahmaputra. Continuing its westward journey, it traverses the state of Assam for roughly 640 km until it reaches Dhubri, where it abruptly changes direction to the south and enters Bangladesh.

The Assam region's Brahmaputra valley is bordered by the sub-Himalayan mountain ranges of Bhutan and Arunachal Pradesh to the north and northeast, the Nagaland Hills to the east and southeast, and the Hills zone (Assam) and Meghalaya to the south, while the plains of Bangladesh extend to the west. These mountains and hills give rise to numerous fast-flowing streams and rivers that eventually converge with the

Brahmaputra. In the northeastern part of India, the river is joined by 42 significant tributaries—27 on the northern bank and 15 on the southern bank. These rivers intersect the valley, forming various floodplain wetlands called beels, which emerge from the river's meandering course and/or tectonic shifts. Notably, a number of the tributaries on the north bank, such as Subansiri, Jiabharali, and Manas, originate from Himalayan glaciers in their upper reaches, including Dibang and Lohit, Jiadhah, Ranganadi, Puthimari, and Pagladia (Bhattacharjya et al., 2017).

3. **Indus River:** The Indus River, one of the largest rivers globally, originates from Mount Kailas (5182 m asl) within the Gangdese range in southern Tibet. As it courses through the tectonically dynamic zones of Karakoram in Tibet, Ladakh Himalaya, and Nanga Parbat in the western syntaxis of the Himalaya, geological, geomorphological, and geophysical examinations of Tibet, Ladakh, and the Indus fan sediments propose that the Indus's precursor was a converging drainage system that filled the Ladakh Himalayan basin until roughly *45 million years ago. After regional elevation shifts during the early Miocene epoch (<26 million years ago), the modern westward-flowing course of the Indus River was established (Clift et al., 2001; Sinclair and Jaffey, 2001). Covering about *1 million km² and spanning approximately *3000 km from its source to its mouth, the catchment area of the Indus River ranks it as the 12th largest river on Earth. In the initial *470-km stretch, the Indus flows through Tibet and Ladakh Himalaya before carving its way through the Nanga Parbat Haramosh Massif (NPHM), where it alters its trajectory and starts flowing southwestward. On its journey, the Indus is joined by fourteen major tributaries that significantly contribute water and sediment. Among these are the Senge and Gar in Tibet, Zaskar, Suru, Shyok, Shigar, Gilgit, and Kabul in the Higher Himalaya, as well as Gomai, Kurram, Jhelum, Chenab, Ravi, Beas, and Sutlej in the Punjab plain of Pakistan. Noteworthy locations along the course of the upper Indus valley to downstream include Nyoma, Upshi, Leh, Nimu (Indus-Zaskar confluence), Khalsi, and Dah Hanu in Ladakh, Skardu (confluence with Shigar), Jaglot (confluence with Gilgit), Attock, Dera Ismail Khan, and Hyderabad in the Indus plain of Pakistan (Kumar & Srivastava, 2018).

IV. EAST COAST RIVER SYSTEM

The intricate river system along the eastern coast of Peninsular India is a convoluted network of rivers, with the Mahanadi, Godavari, Krishna, and Cauvery as its main constituents. The cumulative length of this river system is around 6,437 km. Its vast drainage encompasses the entirety of Peninsular India, extending from the western flanks of the Western Ghats in the west to the Bay of Bengal in the east. Additionally, it covers the southern portions of Central India, which includes the Chhota Nagpur hill ranges (Mishra, 2017).

1. **River Mahanadi:** The term 'Mahanadi' is a combination of the Sanskrit words "Maha" (meaning great) and "Nadi" (meaning river). Within India's river network, the Mahanadi River stands out as the third largest in the peninsular region. Encompassing a vast catchment area exceeding 132,000 km², it originates from the Bastar Hills in Chhattisgarh, traverses through diverse geological formations of the Eastern Ghats and surrounding areas, and ultimately converges with the Bay of Bengal through various branches along the coastlines of Cuttack and Puri districts in Odisha. Its length spans approximately 860 km. The states of Maharashtra, Chhattisgarh, Jharkhand, and Odisha

share their drainage basin (800 30'- 860 50' E and 190 20'- 230 35' N). More specifically, the basin is distributed across Chhattisgarh (75,136 km²), Odisha (65,580 km²), Jharkhand (635 km²), and Maharashtra (238 km²). Possessing an annual runoff of 50×10⁹ m³ and a peak discharge of 44,740 m³ s⁻¹ (Kumar et al., 2013), the river plays a pivotal role in the regional water flow dynamics. An important landmark on the Mahanadi River is the Hirakud Dam, built in 1957 near the city of Sambalpur (Mahapatra, 2003). Where the Mahanadi River meets the Bay of Bengal, it, along with the Brahmani River, forms a substantial delta. The chief points of convergence with the Bay of Bengal are Paradeep and Nuagarh (Devi estuary). The Mahanadi's primary tributaries encompass the Suktel, Jeera, Jonk, Ibb, Ong, and Tel rivers. Additionally, there are numerous seasonal rainfed streams colloquially referred to as "nallahs" (Radhakrishna, 2001).

2. **Krishna River:** The River Krishna flows across peninsular India, moving from west to east. Its source lies in the vicinity of Mahabaleshwar, precisely at Ondishi village near Wai, where an elevated water spring stands at 1372 meters. Following its path that extends over a complete distance of 1440 km, the river eventually converges with the Bay of Bengal. Along its journey, 280 km runs through Maharashtra, 440 km courses through Karnataka, and the remaining 720 km flows across the states of Telangana and Andhra Pradesh (Koushlesh et al., 2021).
3. **River Godavari:** The Godavari River claims the distinction of being the largest among peninsular rivers and ranks as India's third largest, trailing the Ganga and Brahmaputra rivers in size. Its origin is near Nasik in Maharashtra, where it emerges from an elevation of 1067 m. As it meanders through Maharashtra, Telangana, Andhra Pradesh, and Puducherry, it eventually finds its way into the Bay of Bengal. Regarding its tributaries, the most substantial is the Pranhita, which covers approximately 34.87% of the drainage area. Other notable right bank tributaries encompass Pravara, Manjira, and Maner, contributing about 16.14% to the overall coverage. Meanwhile, significant left bank tributaries include Purna, Pranhita, Indravathi, and Sabari, jointly covering nearly 59.7% of the basin's total catchment area. The remaining 24.16% can be attributed to the Godavari River itself, distributed across its upper, middle, and lower reaches (Koushlesh et al., 2021).
4. **River Cauvery:** The Cauvery River holds a significant position in southern India, encompassing a complete drainage area of 81,155 km² that spans across the states of Karnataka, Kerala, Tamil Nadu, and the Union Territory of Puducherry. Its source originates from Talakaveri in the Brahmagiri Hills within the Western Ghats mountain ranges. The river traverses Karnataka and Tamil Nadu, covering a distance of around 800 km before ultimately flowing into the Bay of Bengal at Poompuhar, Tamil Nadu. What distinguishes the Cauvery River from other major rivers in India is its unique distinction of hosting the highest number of endemic fish species. This is attributed to the diverse habitats present along its course, particularly within the Western Ghats biodiversity hotspot (Koushlesh et al., 2021).

V. WEST COAST RIVER SYSTEM

The river system along the western coast encompasses the slim strip of land in Peninsular India situated to the west of the Western Ghats mountain range. This system consists of the catchment areas of the Narmada and Tapti rivers in the northern part, along

with the drainage of Gujarat. Serving as the key rivers in this region are the Narmada and Tapti Rivers. Additionally, other rivers have their origins in the Western Ghats. Although they are relatively short, these rivers maintain a year-round flow. Collectively, the total length of all the rivers within this western coast system amounts to approximately 3,380 km.

- 1. River Narmada:** The most prominent westward-flowing river in the nation, the Narmada, originates from the Maikala highlands near Amarkantak in the Shahdol district of Madhya Pradesh. Its drainage basin covers the northernmost region of the Deccan plateau. Stretching over a total length of around 1,312 km, it courses through Madhya Pradesh for approximately 1,077 km, forming the borders between Maharashtra and Madhya Pradesh, and Maharashtra and Gujarat (for roughly 35 km and 39 km, respectively). Afterward, it proceeds through Gujarat for about 161 km before eventually merging with the Gulf of Cambay (Arabian Sea) near Broach (Gujarat). During its entire journey, the Narmada River is nourished by 41 significant tributaries. Among these, 22 originate from the south bank (21 in Madhya Pradesh and 1 in Gujarat), while the remainder stems from the north bank (18 in Madhya Pradesh and 1 in Gujarat). The comprehensive catchment area of the Narmada River spans about 94,235 km² (Koushlesh et al., 2021).
- 2. River Tapti:** The Tapti River, also known as Tapi, commences its course in the Vindhya mountains within the Satpura range of Madhya Pradesh. Its ultimate destination is the Arabian Sea, where it converges with the Gulf of Cambay in Gujarat. Stretching across a distance of 724 km, the river flows westward, traversing and draining the regions of Madhya Pradesh, Maharashtra, and Gujarat (Koushlesh et al., 2021).

VI. FISHERIES OF INDIAN RIVERS

India is recognized as a mega-diverse country due to its extensive land area and its location within the tropical zone (Nelson et al., 2016). It harbors considerable biodiversity and hosts a significant portion of the world's species. Specifically, it holds 7.6% of mammalian species, 12.6% of avian species, 6.2% of reptilian species, 4.4% of amphibian species, 11.7% of piscine species, and 6.0% of flowering plant species (Stephen et al., 2015). India's rivers play a vital role in this biodiversity, boasting some of the planet's most varied fish populations, which play a crucial role in nourishing and supporting the livelihoods of millions of people, particularly in rural regions (Vass et al., 2011). The country is home to a total of 999 freshwater fish species, contributing to a global count of 2801 species (Froese and Pauly, 2021). The diversity of fish species in rivers is contingent upon multiple environmental factors, including river dimensions, surface area, annual river discharge, water temperature, water depth, water circulation, channel structure, substrate, and climatic conditions (Proff and Zimmerman, 2010). In 1822, Francis Hamilton conducted the first comprehensive study documenting the fish diversity of Indian rivers, describing 269 fish species in the Ganga (now Ganges River) and the subcontinent's tributaries (Hamilton, 1822).

- 1. Ganga River:** The Ganga is the most holy river of India and this one is home to a huge variety of fish, which are relied on by thousands of people for their livelihoods. It's one of India's most popular riverine fishing grounds. This means that the river can support a wide range of fish species, from cold-water to warm-water species. The Gangetic Plain alone is home to about 11% of India's 522 endemic fish species (Das et al., 2021). Between 2017 and 2020, ICAR-CIFRI studied fish and fishing in the Ganges River. They

looked at 20 different landing sites and recorded 190 different fish species in 23 orders, 65 different families, and 97 different genera (CIFRI, 2020). Of the 190 species, 104 were fresh water, while the rest are usually found in estuaries, seas, and freshwater habitats. The study also found 42 commercially important species with high market prices. Most of the species were food fish, while ornamental fish made up 36% of the species and sport fish made up 3%. The Ganga supports a wide variety of fish species that are important for commercial purposes. These encompass prominent carp species (*Labeo rohita*, *L. calbasu*, *Catla catla*, and *Cirrhinus mrigala*), lesser carp species (*Labeo fimbriatus*, *L. bata*, and *Cirrhinus reba*), various catfishes (*Wallago attu*, *Mystus aor*, *M. tengara*, *Clarias batrachus*, and *Heteropneustes fossilis*), clupeids, murrels (*Channa species*), feather backs (*Notopterus notopterus* and *N. chitala*), mullets (*Mugil corsula*), freshwater eel (*Anguilla*), and prawns (*Macrobrachium malcolmsonii* and *Palaemon lamarii*). Additional fish present in the Ganga include *Pangasius*, *Silonia silonda*, *Gudusius chapra*, *Bagasius*, *Eutropiichthys*, and *Vacha* (Datta, 2011). During 2016-19 a total of 190 fish species (182 indigenous and 8 exotic) belonging to 133 genera, 62 families, and 23 orders from upper Ganga (Harsil) to the river mouth of Hooghly estuary (Frasergani).

2. **Brahmaputra River:** The Brahmaputra, a significant transboundary river flowing through northeastern India, was the subject of a study by Motwani et al. (1962), who detailed the fish variety within the Assam region. They identified 126 species from 26 families, with 41 species holding notable commercial importance for fisheries. In the Indian segment of the Brahmaputra, there are 42 fish landing centers, with Uzanbazar (Guwahati) standing out. The river's economically significant fish species include Indian major carps (*Labeo rohita*, *L. catla*, *Cirrhinus mrigala*, *L. calbasu*), minor carps (*L. gonius*, *L. bata*, *L. dero*, *C. reba*), catfishes (*Wallago attu*, *Mystus seenghala*, *M. aor*, *Rita rita*, *Pangasius pangasius*, *Bagarius bagarius*, *B. yarelli*, *Eutropiichthys vacha*, *Ompok pabda*, *Clupisoma garua*, *Ailia coila*, *Setipinna phasa*, *M. tengara*, *M. bleekari*, *M. cavasius*), featherbacks (*Chitala chitala*, *Notopterus notopterus*), Hilsa (*Tenualosa ilisha*), and other species like freshwater prawns (*Aspidoparia morar*, *Gudusia chapra*, *Barilius barilius*, *Puntius spp.*, *Colisa spp.*, *Macrobrachium spp.*).

The fishery scenario in the Brahmaputra River in Assam has undergone changes in terms of both catch volume and species composition. The majority of landings now consist of small, miscellaneous fish groups (40-50%), and the small-sized cyprinid species, *A. morar*, has emerged as the dominant fish across major landing centers, indicating less favorable conditions for larger fish species (Borah et al., 2014; Yadav et al., 2022). Distinct variations in fish species distribution have been noted along different stretches of the river in Assam.

3. **Indus River:** The majority of the Indus River system is situated within Pakistan, while its five tributaries - Jhelum, Chinab, Ravi, Beas, and Sutlej - originate from the western Himalayas. Commercial fishing is absent in the upper reaches of these rivers. In these regions, typical fish species include *Salmo trutta fario*, *Oncorhynchus mykiss*, *Tor tor*, *T. putitora*, *Schizothorax spp.*, *Labeo dero*, *Gara gotyla*, *Botia spp.*, *Nemacheilus spp.* The Beas and Sutlej Rivers harbor native carp and catfish species, akin to those in the Ganga River. However, in the Jhelum River in Jammu and Kashmir, there is active commercial fishing. The caught species in this area encompass *Schizothorax spp.*, *Labeo dero*, *L. dyocheilus*, *Crossocheilus latius*, *Puntius conchoniis*, various types of *Cyprinus carpio*

(both *C. carpio communis* and *C. carpio specularis*), loaches, and *Glyptothorax* spp. (Datta, 2011).

4. **Mahanadi River:** Some significant commercially important fish species in the Mahanadi River include *Catla catla*, *Labeo rohita*, *L. gonius*, *L. fimbriates*, *L. calbasu*, *L. bata*, *Cirrhinus mrigala*, *C. reba*, *Notopterus notopterus*, *N. chitala*, *Channa gachua*, *Channa punctatus*, *Channa striatus*, *Clarias batrachus*, *Heteropneustes fossilis*, *Wallago attu*, *Tor mosal*, *Ompok bimaculatus*, *Mystus tengara*, *Silonia silonia*, and others. Even the exotic silver carp (*Hypophthalmichthys molitrix*) is present in the Mahanadi River. The Mahseer fish (*Tor mosal*), locally known as Kudo, holds significant importance due to its prevalence. Hilsa is confined to the lower reaches and, along with major carp and catfish species, contributes to a profitable fishery (Datta, 2011).

While the River Mahanadi hosts a variety of potential ornamental fish species, some examples include *Anabas oligolepis* (Bleeker), *Anabas testudineus* (Bloch), *Barilius bendelisis* (Ham.), *Barilius barna* (Ham.), *Barilius barila* (Ham.-Buch.), *Barilius vagra* (Ham.), *Chanda nama* (Ham.), *Chanda ranga* (Ham.), *Xenentodon cancila* (Ham.), *Puntius sophore* (Ham.), *Parluciosoma daniconius* (Ham.-Buch.) *Pseudeotropuis atherinoides* (Bloch), *Puntius chola* (Ham.), *Puntius dorsalis* (Jerdon), *Puntius gelius* (Ham.), and others (Kumar et al., 2013).

5. **Krishna River:** The Krishna River, recognized as one of India's prominent rivers, provides a habitat for a diverse assortment of fish species. Here is a compilation of some prevalent fish types discovered in the Krishna River: *Catla* (*Catla catla*), *Rohu* (*Labeo rohita*), *Mrigal* (*Cirrhinus mrigala*), *Common Carp* (*Cyprinus carpio*), *Silver Carp* (*Hypophthalmichthys molitrix*), *Grass Carp* (*Ctenopharyngodon idella*), *Snakehead Murrel* (*Channa striata*), *Walking Catfish* (*Clarias batrachus*), *Indian Major Carp* (*Labeo calbasu*), *Giant River Catfish* (*Sperata seenghala*), *Gizzard Shad* (*Dorosoma cepedianum*), *Indian Glassy Fish* (*Parambassis ranga*), *Ompok Catfish* (*Ompok bimaculatus*), *Indian River Garfish* (*Xenentodon cancila*), *Smooth-coated Otter* (*Lutrogale perspicillata*), and more.
6. **Godavari River:** Between the years 2018 and 2020, a comprehensive study conducted in the River Godavari reported a total of 104 fish species belonging to 37 families. The sampling was conducted at 11 selected locations, encompassing both freshwater and estuarine areas (CIFRI, 2020). The dominant family observed was Cyprinidae, accounting for 33 species, followed by Bagridae (6) and Cichlidae (4). The study also revealed the presence of six exotic species, namely *Ctenopharyngodon idella*, *Oreochromis mossambicus*, *Oreochromis niloticus*, *Clarias gariepinus*, *Cyprinus carpio*, and *Pterygoplichthys disjunctivus*, along with two Endangered species, *C. magur* and *Silonia silonia*, and four Near Threatened species, *Anguilla bengalensis*, *Chitala chitala*, *Ompok bimaculatus*, and *Wallago attu*. The commercial catch during the study included important species such as IMCs (Indian Major Carps), *Labeo fimbriatus*, and various catfishes like *Sperata seenghala*, *S. aor*, *Silonia childreni*, *Pangasius pangasius*, *P. takree*, and *Wallago attu*. Additionally, the catch also comprised miscellaneous fishes like *Osteobrama* spp., *Oxygaster* spp., *Notopterus notopterus*, *Cirrhinus reba*, *Puntius* spp., and others. In the estuarine regions, common observations included *Chelon parsia*, *Mugil cephalus*, *Lates calcarifer*, *Thryssa* spp., *Pseudosciana coibor*, *Arius* spp., and *Gerres* spp.

It was noted that during the monsoon season, hilsa fish were the targeted species in the estuary, but their presence was not recorded beyond Rajahmundry (Koushlesh et al.2021).

7. **River Cauvery:** The river's water resources are extensively utilized, with numerous reservoirs, anicuts, and barrages constructed along its course. Throughout the river, except in the deltaic stretch, one can find game fishes like Tor khudree and T. mussullah. In terms of commercial fisheries, the river supports carps such as Tor spp., Barbodes carnaticus, B. dubius, Neolissocheilus wynaadensis, Puntius pulchellus, and Labeo kontius. Additionally, catfish species like Glyptothorax madraspatanum, Mystus spp., P. pangasius, Wallago attu, S. childreni, and Silurus wynaadensis are also present (Datta, 2011).
8. **River Narmada:** The Narmada River houses a varied array of fish species, encompassing Notopterus notopterus, Catla eatla, Cirrhinus mrigala, Cirrhinus reba, Labeo bata, Labeo boggut, Labeo calbasu, Labeo dyoeheilus, Labeo filmbriatus, Labeo gonius, Labeo pangusia, Labeo rohita, Tor tor, Tor putitora, Barilius barila, Barilius bendelisis, Parliciosoma danieonius, Aoriehthys aor, Mystus bleekeri, Mystus eavasius, Mystus vittatus, Rita pavementata, Ompok pabda, Ompok bimaculatus, Wallago attu, Clupisoma garua, Eutropiichthys vacha, Silonia silondia, Bagarius bagarius, Xenentodon cancila, Chanda nama, and numerous others (CIMFRI, 2009). The primary investigation carried out by Rao et al. (1991) in the river's western area, spanning Punasa, Omkareswar, Mandleswar, and Barwani, cataloged 84 fish species sourced from 45 genera, 20 families, and 6 orders. Additionally, Bhakta et al. (2020) completed a thorough review of the river Narmada and its tributaries' finfish diversity, pinpointing 196 species inhabiting both freshwater and brackish water environments. These species were classified into 14 orders, 51 families, and 126 genera. Notably, the Cypriniformes order demonstrated the highest diversity with 78 species, followed by Perciformes with 47 species, Siluriformes with 32 species, and Clupeiformes with 15 species. It's important to mention that they also recorded the presence of two endangered species, Tor khudree and Tor putitora, within the river system.
9. **River Tapti:** Between 2017 and 2020, ICAR-CIFRI conducted a comprehensive study on the fisheries of the River Tapti. The study confirmed the presence of 80 different types of finfish, which belong to 10 orders, 25 families, and 53 genera (CIFRI, 2020). Notably, the research also revealed the occurrence of 5 exotic fish species from various zones of the river, namely Cyprinus carpio, Hypophthalmichthys molitrix, Oreochromis mossambicus, O. niloticus, and Pangasianodon hypophthalmus. The initial survey of fish diversity in the River Tapti was carried out by Karamchandani and Pisolkar in 1967, where they reported a total of 52 species belonging to 30 genera and 14 families. When the results of the CIFRI (2020) study were compared with the findings of the first study, it was observed that 6 species, namely Barilius barila, Barilius evezardi, Indoreonectes evezardi, Labeo fimbriatus, Labrogonius, and Salmostoma balookee were not reported in the recent study. On the other hand, CIFRI (2020) recorded the discovery of 35 new fish species in the River Tapti during the period of the survey from 2017 to 2020.

VII. CONCLUSION

In conclusion, the rivers of India are an invaluable asset that profoundly influences the nation's geography, culture, and livelihoods. These waterways have played a pivotal role in

shaping India's history, providing essential resources for agriculture, transportation, and sustenance. The river system is divided into the Himalayan Rivers and the Peninsular Rivers, each contributing uniquely to the diverse ecosystems and socio-economic fabric of the regions they traverse. However, India's rivers face numerous challenges, including pollution, overexploitation, habitat degradation, and disruptions from dam constructions. These issues threaten the health of river ecosystems, biodiversity, and the well-being of millions of people who depend on these water bodies for their daily needs. Efforts are being made to address these challenges through conservation measures, pollution control, and sustainable water management practices. Initiatives to revive and rejuvenate rivers, such as the cleaning of the Ganges (Ganga Action Plan), have been launched to restore the ecological balance and cultural significance of these waterways. Recognizing the importance of rivers, the government and various organizations are working towards holistic river management, community involvement, and the promotion of eco-friendly practices. Balancing the conservation of rivers' ecological integrity with the need for economic development is a critical task for a sustainable future. By preserving and protecting India's rivers, we can ensure the continued provision of water resources, support for agriculture, biodiversity conservation, and the preservation of cultural heritage. Collaboration among stakeholders, public awareness, and responsible water use are key to safeguarding these lifelines for present and future generations.

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