



STATUS OF FISHERIES DEVELOPMENT IN MADHYA PRADESH: THE HEART OF THE INDIA

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ABSTRACT

Inland fisheries resources of Madhya Pradesh state are vast and varied and contain one of the richest diversity in India. It includes five river basins and extensive network of irrigation canals, manmade reservoirs, ponds and tanks. Madhya Pradesh possesses 4.03 lakh hectare water area in form of large, medium and small irrigation reservoirs, ponds and tanks, out of which 3.37 lakh hectare water area (about 83.62%) of the reservoirs and 0.66 lakh hectare water area (about 16.38%) of the village ponds and tanks. Around 3.94 lakh ha (about 97.77%) water area has been brought under fish culture. The State possesses five river basins namely the Narmada, Tapi, Ganga, Mahi, Godavari and their tributaries. River Narmada is the life line of Madhya Pradesh. River system and their tributaries form a network of 17088 kms. Major tributaries of the Ganga and Yamuna rivers are Chambal, Betwa, Ken, Sone and Sindh originate to the State. Madhya Pradesh occupied the sixteenth position in fish production in the Country, thus contributing 13% annual growth rate from last three years. Madhya Pradesh is pioneer in fish seed production. It produces 100.19 crores (2014-15) of fish seed instant of 33.97 crores (2000-01) annually and proves its existence in top 10th position in the Country. This is possible after establishment of 65 low cost Chinese hatcheries for hatching the eggs of IMC and EMC and 696 nos. of nurseries for rearing of spawns with a total water area of 970.79 ha in both rural and semi urban areas of the State. It is not only lessened dependence on natural riverine fish seed, but is also enabled the state to produce pure strain fish seed. In the present study we are trying to focus on status of fisheries development in Madhya Pradesh and find out the more scope and possibilities in fisheries sector within the state.

KEYWORDS: Madhya Pradesh, Inland Fisheries, Reservoirs, Rivers, Ponds, Chinese etc.

INTRODUCTION

The fisheries sector has been recognized as a powerful income and employment generator as it stimulates growth of a number of subsidiary industries and is a source of cheap and nutritious food, with high potentials for diversifications of farming practices, rural and livelihood development, export earnings as well as tourism (Das, 2013). India has vast inland water resources in the form of rivers and canals (0.2 million km), Reservoirs (3.1 million ha), ponds and tanks (2.2 million ha) offering tremendous scope for fish production. India ranks second to China in inland capture fisheries (FAO, 2001). Fisheries sector is a source of livelihood for people engaged in fully, partially or in subsidiary activities, pertaining to the sector. It is an integral component of rural development programme, requirement of capital investment is relatively low and gestation period is very short. Moreover, it is gaining importance; due to its potential for employment

generation. It caters to the needs of socio-economically weaker and backward fishermen community, who constitute the poorest section of the society. The end product is also an important and nutrient rich food commodity.

Department of Fisheries has taken various innovative steps to encourage sustainable fish production from reservoirs and village ponds/tanks. It is also giving adequate emphasis on the conservation of fish biodiversity. Department is committed to encourage the management of fisheries resources with adequate emphasis on various welfare measures for poor fishers and also making serious efforts to introduce appropriate technologies for improving per hectare fish production from the reservoirs and ponds/tanks. It is expected that the new initiatives undertaken by the department in recent years, which would act as a necessary engine for scaling new heights and grown up of new vistas in the

State. Availability of genetically improved seeds of Indian Major Carps (IMC), Exotic Major Carps (EMC) and establishment of brood bank for pure strain seed production are the prime objectives of the department.

MATERIAL AND METHODS

A survey was conducted between April, 2014 and September, 2015 to assess current and future prospects of commercial fish farming in Madhya Pradesh using semi structured questionnaires that were administered personally to respondents (i.e. commercial fish farmers, fish seed producers and fisheries officers). Data collection included the following: aquaculture production statistics; fish feed/seed availability as well as institutional and regulatory policy frame work supporting aquaculture development. Other relevant information was obtained from the Department of Fisheries (DoF) headquarters and provincial fisheries offices. List of fishes were collected from the survey report of Das and Jha, 2014 and reevaluated through using www.fishbase.org and IUCN red list status, 2015 for conservation status. Microsoft Excel was used to prepare graphs and tables.

ABOUT MADHYA PRADESH

After India's independence, Madhya Pradesh state was created with Nagpur as its capital: this state included the southern parts of the present day Madhya Pradesh and north eastern portion of today's Maharashtra. In 1956, this state was reorganized and its parts were combined with the states of Madhya Bharat, Vindhya Pradesh and Bhopal to form the new Madhya Pradesh state with Bhopal as its capital; the Marathi speaking Vidarbha region was removed and merged with the then Bombay State. This state was the largest in India by area until 2000, when its south-eastern Chhattisgarh region was made a separate state (Wikipedia, 2015).

Madhya Pradesh literally means "Central Province" and is located in the geographic heart of India, between latitude 21.2°N-26.87°N and longitude 74°02'-82°49' E. The state straddles the Narmada River, which runs east and west between the Vindhya and Satpura ranges; these ranges and the Narmada are the traditional boundary between the north and south of India. The state is bordered on the west by Gujarat, on the northwest by Rajasthan, on the northeast by Uttar Pradesh, on the east by Chhattisgarh and on the south by Maharashtra (Wikipedia, 2015).

RESOURCES

Madhya Pradesh possesses 4.03 lakh hectare water area in form of large, medium and small irrigation reservoirs, ponds and tanks, out of which 3.37 lakh hectare water area (about 83.62%) of the reservoirs and 0.66 lakh hectare water area (about 16.38%) of the village ponds and tanks. Around 3.94 lakh ha (about 97.77%) water area has been brought under fish culture, in which 3.32 lakh ha (about 84.26%) water area of the reservoirs and 0.62 lakh ha (about 15.74%) water area of village ponds and tanks (DoF, 2015).

The Inland Fisheries resources of Madhya Pradesh state are vast and varied and contain one of the richest diversity in India. It includes five river basins and extensive network of irrigation canals, man-made reservoirs, ponds and tanks. The State possesses five river basins namely the Narmada, Tapti, Ganga, Mahi, Godavari and its tributaries. River Narmada is the life line of Madhya Pradesh. In the State river system and their tributaries form a network of 17088 kms. The major tributaries of the Ganga and Yamuna i.e. Chambal, Betwa, Ken, Sone and Sindh originate to the State.

During the last few years, this state has made considerable progress in the field of fish seed production and fish culture with the sustained efforts of the State Government and active participation of Fish Farmers/Fishermen's at the grass root level. It has been possible to increase fish production in the State from 48844.60 tonnes (2000-01) to 109121.18 tonnes (2014-15), with an average annual growth rate of 13% from last three years (DoF, 2015). It is expected that by way of implementation of schemes for increasing production of fish per unit water area and development of new farms in freshwater sector and adaptation of modern technology in Cage Culture and mechanization of a large number of crafts to harvest more fish round the year from fishing areas. The state would succeed in bridging the gap between demand and supply of fish in the State by the end of the tenth year plan period. The advancement of the State in fisheries sector can be gauged by receiving the rewards from the different welfare measures for the uplift meant of fishing community, who are the prime contributors to production.

Table-01: Inland Fishery resources of Madhya Pradesh, India (2000-01 to 2014-15).

S. No.	Financial Year	Water Area available for Fish Culture			Water Area in under Fish Culture		
		Village Ponds/Tanks	Irrigation Reservoirs	Total	Village Ponds/Tanks	Irrigation Reservoirs	Total
1	2000-01	0.59	2.25	2.84	0.34	2.03	2.37
2	2001-02	0.60	2.28	2.88	0.35	2.09	2.44
3	2002-03	0.63	2.30	2.93	0.37	2.13	2.50
4	2003-04	0.69	2.33	3.02	0.42	2.16	2.58

5	2004-05	0.50	2.50	3.00	0.42	2.48	2.90
6	2005-06	0.53	2.50	3.03	0.45	2.49	2.94
7	2006-07	0.53	2.71	3.24	0.46	2.69	3.15
8	2007-08	0.53	2.79	3.32	0.46	2.77	3.23
9	2008-09	0.56	2.87	3.43	0.50	2.85	3.35
10	2009-10	0.56	2.88	3.44	0.50	2.86	3.36
11	2010-11	0.62	2.93	3.55	0.57	2.91	3.48
12	2011-12	0.63	3.14	3.77	0.58	3.12	3.70
13	2012-13	0.64	3.34	3.98	0.60	3.29	3.89
14	2013-14	0.65	3.36	4.01	0.61	3.31	3.92
15	2014-15	0.66	3.37	4.03	0.62	3.32	3.94

*Source: Department of Fisheries, Annual reports 2000-01 to 2014-15.

ADMINISTRATIVE SETUP

Realizing the importance of fisheries in the economy of the State, the government of Madhya Pradesh has established the Department of Fisheries on 30th May, 1964 an independent department renamed Fishermen Welfare and Fisheries Development Department in 2012. Before (01st November, 1956) that department was works under the administrative setup of agriculture and in fisheries division the technical and administrative officers were known as Fisheries Development Officer. After 1961 it was renamed as Chief Fisheries Officer (CFO). The Minister of Fisheries is in charge of the department. The department is implementing the government policies and schemes through the Directorate of Fisheries, which is working under the administrative control of the department. The directorate is headed by the Director of Fisheries, who assists his work by 4 Joint Directors, 13 Deputy Directors, 45 Assistant Directors, 458 Other Fisheries Officers, 217 permanent fourth class and 147 daily basis staff (DoF, 2015).

The state is divided into 52 Districts and 313 fishery blocks (2014-15). The entire administrative set up in the district level works in close cooperation with the Panchayati Raj Institutions headed by the Chief Executive Officer of the Zila Parisad. Organization is now provides employment to approximately 77,811 fishermen's of 2,067 fishermen cooperatives as harvester of the catches.

The department of fisheries has established a Corporation under in it. Madhya Pradesh Fisheries Federation (MPFF), a fisheries cooperative established on 05th May, 1987. It headquarter is located in Bhopal. Activities include looking after culture aspects and marketing of fish and by products. Under the federation, there are 05 fish hatcheries (Water area 22.50 lakh ha), 197 fish farms/rearing areas (Water area 394.36 lakh ha) and also monitor the 18 large reservoirs (Water area 2.08 lakh ha) for fishing, management and marketing. Its mandate was modified to include development of infrastructural facilities to the sector. The MPFF has constructed the fishing landing centers and acquired insulated transport vehicles for marketing the fish.

The Government of Madhya Pradesh has a unique policy due to which majority of the water bodies throughout the state are leased out to local fishermen cooperatives under the apex body of fishermen's cooperatives in the State, The federation become a self supported organization with various activities within and outside the State with a pledge for the socio-economic upliftment of the backward fishermen community of the State. Federation is managed by a Board of Directors headed by honorable minister of fisheries as the chairperson. By dint of efficient management the organization now provides employment to approximately 9,677 fishermen's of 183 fishermen cooperatives as harvester and commission agents for marketing of the catches and other fishery products. About 170 staff serves in the Offices of MPFF. Some of the major activities of MPFF include the Reservoir management, ensuring the welfare schemes for fishermen's, Group personal accident insurance scheme for active fishermen, centrally sponsored Saving cum Relief Scheme for the Inland Fishermen, Training Scheme of MPFF for fishermen under different schemes.

A separate board is formed by Govt. of Madhya Pradesh on 21st May, 2012 named as Fishermen Welfare Board at Bhopal for the development of traditional and religious fishermen for effective management and implantation of welfare and development related issues, formation of new schemes, reevaluation of old schemes etc. The multifaceted activities under taken by the department of fisheries, Madhya Pradesh for increasing fish production up to the fullest potential in the state has made Madhya Pradesh the highest inland fish producer and the number one major carp fish seed producer in the country.

FISHERIES

According to the ZSI Performa 215 species of fishes found in Madhya Pradesh and Chhattisgarh, out of which 35 fishes are economically important and 17 fish species are endangered species e.g. *Notopterus chitala*, *Tor tor*, *Tor putitora*, *Tor mosal*, *Tor khudree*, *Mystus punctatus*, *Clupisoma batri*, *Rita pavementatus*, *Ompok bimaculatus*, *Ompok pabda*, *Labeo dussumieri*, *Anguilla bengalensis*, *Silonia childreni*, *Rita chrysea*, *Eutropiichthys vacha*, *Garra gotyla* and *Raiamas bola*. Unawareness of the public and various other factors like pollution, over exploitation, disease and climate change

etc. are the major factors of diversity reduction. So to avoid this there is need to conserve our water resources, so that in future we can utilize it. But after the segregation of the Chhattisgarh from Madhya Pradesh a survey was carried out by Das and Jha, 2014 stated that 136 fish species are found in natural water bodies of the state, out of which more than 58 fish species are having ornamental values, 4 species are comes in endangered category and 13 species are in near threatened category (Fig-02). Survey revealed the occurrence of 136 fish species belonging to 10 orders, 28 families and 77 genera (Table-04, Fig-01).

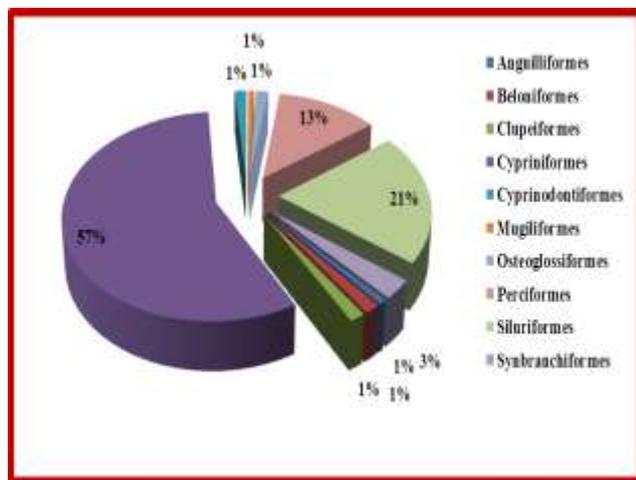


Fig.-01: Order wise fish species % composition of Madhya Pradesh, India.

HIGHLIGHTS ON FISHERIES DEVELOPMENT IN THE STATE

FISH SEED PRODUCTION

Madhya Pradesh is the pioneer in fish seed production. It is producing 10018.82 lakh fish seeds annually (Table-02) and proves their existence in top 10th positions in the Country (DoF, 2015). This is possible after establishment of 65 low cost Chinese hatcheries for hatching of eggs of Indian Major Carps (IMC) in rural and semi urban areas of the State. It is not only lessened dependence on natural riverine fish seed, but also enabled the state to produce pure strain fish seed within the State.

FISH PRODUCTION

The present fresh water fish production of state is poised for a quantum jump from 48844.60 tons to 109121.18 tons within 1.5 decades, which will make the state self sufficient in fresh water fish consumption (DoF, 2015). Madhya Pradesh occupied the sixteenth position in fish production in the Country. It also has the highest domestic demand for fish and fishery products in the Country and contributing 13% of annual growth rate from last three years. The production of fish from inland water and stocking in reservoirs from the last fifteen years are given in Table-02 and 03.

Table-02: Fish and Fish Seed Production in Madhya Pradesh, India (2000-01 to 2014-15).

S. No.	Financial Year	Fish Seed Production			Fish Production		
		Target	Achievement	%	Target	Achievement	%
1	2000-01	5,410	3,397.15	62.79	57,000	48,844.60	85.69
2	2001-02	5,410	3,593.06	66.42	57,000	47,457.00	83.26
3	2002-03	5,410	2,631.82	48.65	57,000	42,168.20	73.98
4	2003-04	5,410	3,844.13	71.06	57,000	50,818.30	89.15
5	2004-05	5,410	3,345.92	61.85	64,000	62,060.28	96.97
6	2005-06	5,410	4,386.28	81.08	62,000	61,076.18	98.51
7	2006-07	5,000	4,939.11	98.78	66,000	66,043.18	100.07
8	2007-08	5,200	4,551.92	87.54	68,500	61,581.49	89.90
9	2008-09	5,400	5,235.22	96.95	69,000	68,465.93	99.23
10	2009-10	5,600	4,791.07	85.55	70,000	66,118.92	94.46
11	2010-11	5,700	6,198.74	108.75	72,000	66,677.64	92.61
12	2011-12	6,700	7,540.07	112.54	74,000	75,404.75	101.90
13	2012-13	6,700	7,980.11	119.11	74,000	85,234.00	115.18
14	2013-14	8,680	9,630.81	110.95	94,000	96,257.75	102.40
15	2014-15	8,680	10,018.82	115.42	94,000	109,121.18	116.09

*Source: Department of Fisheries, Annual reports 2000-01 to 2014-15.

Table-03: Stocking of Fish Seed in Madhya Pradesh, India (2000-01 to 2014-15).

S. No.	Financial Year	Stocking of Fish Seed		
		Target	Achievement	%
1	2000-01	4,229	3,272.38	77.38
2	2001-02	4,229	3,471.56	82.09
3	2002-03	4,229	3,012.64	71.24

4	2003-04	4,229	4,202.72	99.38
5	2004-05	5,372	4,437.37	82.60
6	2005-06	5,311	4,871.19	91.72
7	2006-07	5,400	5,845.93	108.26
8	2007-08	6,000	5,293.77	88.23
9	2008-09	6,150	6,007.78	97.69
10	2009-10	6,296	5,489.62	87.19
11	2010-11	6,400	6,614.90	103.36
12	2011-12	7,692	7,674.86	99.78
13	2012-13	7,692	8,535.20	110.96
14	2013-14	8,096	8,980.34	110.92
15	2014-15	8,096	9,324.95	115.18

*Source: Department of Fisheries, Annual reports 2000-01 to 2014-15.

DIVERSIFICATION OF FISHERIES

Diversification of fish culture practices; Magur (*Clarias batrachus*), Sambhal (*Channa sp.*), Mahaseer (*Tor tor*), GIFT Tilapia (*Oreochromis niloticus*), Jayanti Rohu (*Labeo rohita*- The improved rohu (selective breeding), popularly named as “Jayanti”, as it was named in the year 1997 i.e. 50 years of Indian independence (Swarna Jayanti), has been released to several hatchery owners so that they can provide better quality seed to the fish farmers, that’s why known as “Jyanti”), Amur Common Carp (*Cyprinus carpio haematopterus*-Amur River basin to southern China), Roopchanda (*Piaractus brachyomus*), Chital (*Chitala chitala*), Freshwater Prawn (*Macrobrachium rosenbergii*) and Ornamental Fishes such as Koi Carp, Golden Carp, Milky Carp, Platinum Gold and Red Cap Oranda Gold are culturing in Dahod and many other reservoirs and fish farms of the state.

CAGE AND PEN CULTURE

Various steps have been taken to improve the fish production of the state from reservoirs. In this direction first Cage culture unit was installed in Kaliasot Reservoir by the departmental fund in 1992. A project was undertaken by Dr. Praveen tamot, Head of the Department, Department of Zoology, Govt. MVM College, Bhopal in 2006 on Cage Culture in Reservoirs and successfully done cage culture of Magur (*Clarius bataracus*) in Cages installed in Hilali reservoir, Vidisha. They got a good production of the cat fishes. Even further steps would be taken for the culture of Catfish, Pugnacious Spp. because Pungasius species has achieved impressive success as a commercial aquaculture species. Its production levels and distribution in global markets are now similar to that of other aquaculture species as GIFT Tilapia, Common Carp and Salmon. Pungasius is commonly called silver striped catfish. It is cultured due to its strong market demand and faster growth. It is air breathing fish and can tolerate on low DO and can be cultured in fishponds, Concrete tanks, cages or pens also. By seeing the demand of Pungasius the department has taken so many steps so that culture of Pungasius can be introduced in Madhya Pradesh. Various federations are also working in the field of Pungasius culture. NABARD also provide financial support to the culture of

Pungasius sp. Cages installed in the Kaliasot, Indira Sagar, Halali, Bila, Kerwa, Gandhi Sagar and Dahod reservoirs for getting high yield through *Pungasius sutchi* culture. Cages installed in Indira Sagar, Halali and Gandhi Sagar by RKVY schemes and Bila, Kerwa and Dahod by MPWSRP project. Fish production 5 tonnes/Yr is got in each cage (96 Cu.m.) from Dahod and Bila Reservoirs. Pen installed in reservoirs of Raisen, Umariya, Khnadwa, Khargone and Mandla districts for production of large size fingerlings (100-150mm).

DEVELOPMENT OF BROOD STOCK BANK

NFDB is conceived to address issues related to brood stock (genetically superior breeding fish) development, production of quality brood, rearing of quality fish seed to fingerlings storage as well as distribution of these fingerlings to identified accredited hatcheries in different districts of Madhya Pradesh and in the different states of the country (Nayak, 2012). The Madhya Pradesh will maintain species diversity, continuous improvement of brood stock production with technical support from CIFA and NBFGR. Genetic improvement is a continuous and long term programme with short, medium and long term goals and objectives. It is proposed to expand the fish species base for growing in Brood bank from the existing three species of fish to at least ten species of commercial importance, which includes Indian major carps, Exotic carp, cat fishes, tilapia, fresh water prawn etc. The anticipated benefits would be enormous since the use of high quality fresh water fish species used for aquaculture will result in enhancement of fish production for the country by 20% within a period of three to five years. Genetically improved Jayanti Rohu brood bank is established in Dahod Fish Seed Farm, Raisen and success to bred them on farm and got 185 lakh spawn in first breeding. Seeds of Jayanti Rohu were distributed to Ujjain, Bhopal, Dhar, Satna, Harda, Indore, Raisen and Sehore districts framers (DoF, 2015).

ORNAMENTAL FISHERIES

Ornamental fish culture has been in practice in some districts of the State. This sector needs reorganization and support from adequate training and availability of funds. Ornamental fish breeding and culture has been inducted under FFDA from the year 2000 in certain

centers in the districts of Bhopal, Satna and Chhatarpur (DoF, 2015). 10 numbers of modern hatcheries for breeding those fishes have set up recently in Shahdol, Jabalpur, Hoshangabad, Bhopal, Sehore, Dewas, Ujjain, Dhar and Khargone districts of the State with financial and technical assisted by The Marine Products Export Development Authority (MPEDA), Kochi and schemes implemented through its project office located at Directorate of Fisheries, Bhopal (Rs. 58.79 lakh subsidy released) (MPEDA, 2015). National Fisheries Development Board (NFDB), Hyderabad assisted demonstration unit is established at Poudi Maihar Fish Farm of district Satna (DoF, 2015). Rearing of some local indigenous fishes, which is considered trash fishes, but have export potential are being encouraged by a private hatchery set up in Bhopal district under MPEDA, OFBU subsidize scheme.

SEWAGE FED FISHERIES

Sewage fed fisheries provide a unique system of recycling urban waste for productive use. Peri urban area of Bhopal is a modified zone, where the city and suburban village blends. It is unique in the sense that, the biodegradable human, animal and other domestic wastes of Bhopal are brought into those areas through canals, that inter its various pockets. In this zone where a series of tanks exist, the city sewage undergoes bio-recycling through production of profitable fish protein. The city waste based resources system has also been considered as the best possible ecologically balanced land use pattern in urban areas of the World. Indian Major Carps, Common Carps and Tilapia were dominant, but lately Catfishes, Pangasius and Fresh water prawn also been added. A project related to implementation of Sewage fed fisheries for utilization of the water area under fisheries is under consideration.

PROCESSING AND FISH MARKETING

Keeping in view the increasing pressure for fish landing space, a programme for the creation of this infrastructural facility for landing and berthing has been taken up. Fishing Landing centers arranged and equipped fish markets are set up in the State. National Fisheries Development Board, Hyderabad is approved a sum of Rs. 657.90 Lakh to for the establishment of 6 proposed fish markets at Jabalpur, Seoni, Satna, Rewa, Anuppur and Sagar in FY 2010-11. Department of Fisheries also submitted the proposals for the establishment of more than 10 fish markets in various districts of Madhya Pradesh (NFDB, 2015).

CONSERVATION AND MANAGEMENT

In 11th November, 2011 Mahseer (*Tor tor*) is announced as state fish by an order of state government. Baseline of declaration of Mahaseer is that the fish is endemic of river Narmada, which is also known as the life line of the state. Mahaseer is locally known as Badhas. NBFGR has declared the fish is in Near Threatened category (CAMP, 1998), because of having sport fish value and continuous declined catch in state. Found in long length river

Narmada is also a base line for declaration it as state fish. Many fishes, which are having ornamental vales such as Honey Gourami (*Trichogaster chuna*), Banded Gourami (*Trichogaster fasciata*), Dwarf Gourami (*Trichogaster lalius*), Peacock eel (*Macrognathus aral*), Zipper loach (*Acanthocobitis botia*), Half banded loach (*Schistura savona*), Leaf fish (*Nandus nandus*) etc. also found in various water bodies of the state (Table-04 & Fig. 01). Conservation is an important aspect, so to increase the production and fulfill the desire of the production of fish.

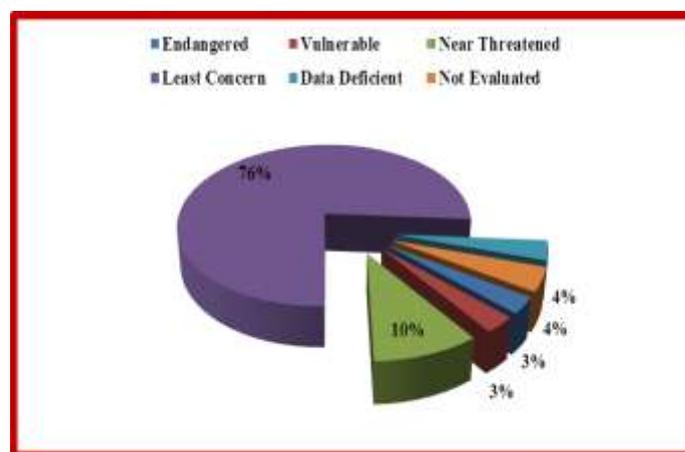


Fig-02: Number of Species under various threat categories as per IUCN red list.

RESEARCH OFFICE

Research is the backbone of fisheries development. To get sustainable development of fisheries, it is necessary to evolve scientific methods of understanding soil, water quality, hydro-biological, physico-chemical conditions of the water, basic requirement of fish production, diseases identification and its control etc. A well equipped research office is established at Bhopal for research and development in fisheries for the state. Chinese hatchery, Magur hatchery, Ornamental fish breeding unit, Laboratory and small nurseries farm infrastructure available for research and analysis.

PUBLIC AQUARIA

To motivate public's aesthetic values and promote fish culture hobby aquarium keeping plays very important role similarly research for update of present technique of fish culture is a must for running these activities and their promotion and extension, publication of information for circulation. Under these objectives a Fish shaped Public Aquaria named as Machhli Ghar was established on 31st May, 1977 near Lower lake and Governor House, Bhopal. That aquaria area is now handed over by the state government for their future projects and sifted the fishes in a small public gallery located at Directorate of Fisheries, Bhadbhada Fish Farm, Bhopal. State government is planning to establish a modern tunnel aquarium in Bhopal, but it is under administrative approval.

WELFARE MEASURES

Training to fishermen's, fishermen credit card, saving cum relief, insurance, fishermen village, scholarship and others welfare schemes are implementing for the socio-economic upliftment of backward section of the fishermen community.

INSTITUTIONS

In the state only one university named as Barkatullah University conducting the UGC sponsored courses on Master of Fisheries Science in Applied Aquaculture and Limnology. Three colleges of the state Pandit Sanbhu Nath Shukla Govt. (Autonomous) P.G. College, Shahdol, Govt. Holkar Science Collage, Indore, Shaheed Bheema Nayak Govt. P.G. College, Badwani, Govt. Model Science College, Gwalior, Govt. P.G. College, Khandwa, Saifia College of Science, Bhopal are offered a separate subject Industrial Fish and Fisheries in graduation level. Atal Bihari Vajpayee Hindi Vishwavidyalaya (ABVHV), Bhopal is now started post gradation in fisheries science.

NOWGONG TRAINING CENTRE

Nawgong training centre was established at Chhatarpur district of Madhya Pradesh for conducting diploma and certificate courses for fisheries officials and fishermen of cooperative societies of the state. New administrative building and training centre was established through

World Bank funded Madhya Pradesh Water Sector Restructuring Project (MPWSRP) inaugurated by Honorable Minister of Fishermen Welfare and Fisheries Development Department, Govt. of Madhya Pradesh, Sushri Kusum Singh Mehdele on 20th December, 2014 at Chhatarpur.

COLLEGE OF FISHERIES

To fulfill the need of skilled and qualified professionals in fisheries for development of fisheries of the state as well as country, college of fisheries is established in 2012 with collaborated to the Nanaji Deshmukh Pasu Chikitsa Vigyan Vishwavidyalaya, Jabalpur and offer the B.F.Sc. four years course.

OTHER ORGANIZATIONS

Many other private and govt. sector organizations are working in the field of fisheries to conduct awareness, trainings and exposures for the adaptation of new scientific technologies and skill upgradation of traditional fishermen and fish farmers of the state. Few private sector organizations e.g. Aagaz Samaj Sevi Sansthan (ASSS), Shahdol, Ameen Lok Jan Kalyan Sangathan Samiti (ALJKSS), Shahdol, Society for Science & Environment (SSE), Bhopal, Aspiration Achiever Society (AAS), Bhopal etc.

Table-04: Fish Diversity of Madhya Pradesh, India.

S.No.	Order	Family	Species	Common Name	Local Name	IUCN Status
1	Anguilliformes	Anguillidae	<i>Anguilla bengalensis</i> (Gray, 1831)	Indian mottled eel	Endha, Bamil	NT
2	Beloniformes	Belonidae	<i>Xenentodon cancila</i> (Hamilton, 1822)	Freshwater garfish	Suja	LC
3	Beloniformes	Belonidae	<i>Xenentodon</i> sp.			LC
4	Clupeiformes	Clupeidae	<i>Gonialosa manmina</i> (Hamilton, 1822)	Ganges river gizzard shad	Korti	LC
5	Clupeiformes	Clupeidae	<i>Gudusia chapra</i> (Hamilton, 1822)	Indian river shad	Karti	LC
6	Cypriniformes	Nemacheilidae	<i>Acanthocobitis botia</i> (Hamilton, 1822)	Mottled loach	Gunguai, Gunguch	LC
7	Cypriniformes	Cyprinidae	<i>Amblypharyngodon mola</i> (Hamilton, 1822)	Mola carplet	Mola	LC
8	Cypriniformes	Cyprinidae	<i>Bangana dero</i> (Hamilton, 1822)	Kalabans	Khari	LC
9	Cypriniformes	Cyprinidae	<i>Barilius barila</i> (Hamilton, 1822)	Barred baril	Jhora, Persee	LC
10	Cypriniformes	Cyprinidae	<i>Barilius barna</i> (Hamilton, 1822)	Dudhnea	Jhora, Persee	LC
11	Cypriniformes	Cyprinidae	<i>Barilius bendelisis</i> (Hamilton, 1807)	Indian hill trout	Jhora, Persee	LC
12	Cypriniformes	Cyprinidae	<i>Barilius evezardi</i> (Day, 1872)	Day baril	Jhora, Persee	DD
13	Cypriniformes	Cyprinidae	<i>Barilius modestus</i> (Day, 1872)	Indus baril	Jhora, Persee	NE
14	Cypriniformes	Cyprinidae	<i>Barilius shacra</i> (Hamilton, 1822)	Bola	Jhora, Persee	LC
15	Cypriniformes	Cyprinidae	<i>Barilius vagra</i> (Hamilton, 1822)	Indian hill trout	Persee	LC

16	Cypriniformes	Cobitidae	<i>Botia dario</i> (Hamilton, 1822)	Bengal loach	Bedri	LC
17	Cypriniformes	Cobitidae	<i>Botia rostrata</i> (Günther, 1868)	Gangetic loach	Gunguch	VU
18	Cypriniformes	Cyprinidae	<i>Cabdio morar</i> (Hamilton, 1822)	Morari	Kargi	LC
19	Cypriniformes	Cyprinidae	<i>Catla catla</i> (Hamilton, 1822)	Catla	Katla	LC
20	Cypriniformes	Cyprinidae	<i>Chela cachius</i> (Hamilton, 1822)	Silver hatchet chela	Chal	LC
21	Cypriniformes	Cyprinidae	<i>Cirrhinus mrigala</i> (Hamilton, 1822)	Mrigal Carp	Naren	LC
22	Cypriniformes	Cyprinidae	<i>Cirrhinus reba</i> (Hamilton, 1822)	Reba carp	Bhinjri, Rewah	LC
23	Cypriniformes	Cyprinidae	<i>Crossocheilus diplochilus</i> (Heckel, 1838)	Kashmir latia	Latia	NE
24	Cypriniformes	Cyprinidae	<i>Crossocheilus latius</i> (Hamilton, 1822)	Stone roller	Gauma	LC
25	Cypriniformes	Cyprinidae	<i>Ctenopharyngodon idella</i> (Valenciennes, 1844)	Grass carp	Grass carp	NE
26	Cypriniformes	Cyprinidae	<i>Cyclocheilichthys apogon</i> (Valenciennes, 1842)	Beardless barb	Pane	LC
27	Cypriniformes	Cyprinidae	<i>Cyprinus carpio</i> (Linnaeus, 1758)	Common carp	Common carp	VU
28	Cypriniformes	Cyprinidae	<i>Danio rerio</i> (Hamilton, 1822)	Zebra danio	Patter	LC
29	Cypriniformes	Cyprinidae	<i>Devario aequipinnatus</i> (McClelland, 1839)	Giant danio	Patai, Debari	LC
30	Cypriniformes	Cyprinidae	<i>Devario devario</i> (Hamilton, 1822)	Sind danio	Patai, Debari	LC
31	Cypriniformes	Cyprinidae	<i>Esomus ahli</i> (Hora & Mukerji, 1928)			LC
32	Cypriniformes	Cyprinidae	<i>Esomus danricus</i> (Hamilton, 1822)	Flying barb	Dedu	LC
33	Cypriniformes	Cyprinidae	<i>Esomus thermoicos</i> (Valenciennes, 1842)		Miseri	LC
34	Cypriniformes	Cyprinidae	<i>Garra annandalei</i> (Hora, 1921)			LC
35	Cypriniformes	Cyprinidae	<i>Garra gotyla gotyla</i> (Gray, 1830)	Sucker head	Pathar Chata	LC
36	Cypriniformes	Cyprinidae	<i>Garra lamta</i> (Hamilton, 1822)			LC
37	Cypriniformes	Cyprinidae	<i>Garra mullya</i> (Sykes, 1839)	Sucker fish	Pathar Chata	LC
38	Cypriniformes	Cyprinidae	<i>Hypophthalmichthys molitrix</i> (Valenciennes, 1844)	Silver carp	Silver carp	NT
39	Cypriniformes	Cyprinidae	<i>Hypophthalmichthys nobilis</i> (Richardson, 1845)	Bighead Carp	Bighead	DD
40	Cypriniformes	Cyprinidae	<i>Hypselobarbus kolus</i> (Sykes, 1839)	Kolus	Kolasa	VU
41	Cypriniformes	Cyprinidae	<i>Hypselobarbus mussullah</i> (Sykes, 1839)	Humpback mahseer	Badas, Mahseer	EN
42	Cypriniformes	Cyprinidae	<i>Labeo bata</i> (Hamilton, 1822)	Bata	Bhana	LC
43	Cypriniformes	Cyprinidae	<i>Labeo boggut</i> (Sykes, 1839)	Boggut labeo	Nunia	LC
44	Cypriniformes	Cyprinidae	<i>Labeo calbasu</i> (Hamilton, 1822)	Orangefin labeo	Kalot	LC
45	Cypriniformes	Cyprinidae	<i>Labeo dyocheilus</i> (McClelland, 1839)	Bhorat	Dyocheilus trout	LC

46	Cypriniformes	Cyprinidae	<i>Labeo fimbriatus</i> (Bloch, 1795)	Fringed-lipped peninsula carp	Tambir	LC
47	Cypriniformes	Cyprinidae	<i>Labeo gonius</i> (Hamilton, 1822)	Kuria labeo	Kusra	LC
48	Cypriniformes	Cyprinidae	<i>Labeo pangusia</i> (Hamilton, 1822)	Kuria labeo	Kanas	NT
49	Cypriniformes	Cyprinidae	<i>Labeo rohita</i> (Hamilton, 1822)	Roho labeo	Rohu	LC
50	Cypriniformes	Cyprinidae	<i>Laubuka laubuca</i> (Hamilton, 1822)	Indian glass barb	Chal	LC
51	Cypriniformes	Cobitidae	<i>Lepidocephalichthys guntea</i> (Hamilton, 1822)	Guntea loach	Gunguch	LC
52	Cypriniformes	Cyprinidae	<i>Oreochthys kosuati</i> (Hamilton, 1822)	Kosuati	Khauli	LC
53	Cypriniformes	Cyprinidae	<i>Osteobrama cotio</i> (Hamilton, 1822)	Bhoiya, Gooradah	Cotio	LC
54	Cypriniformes	Cyprinidae	<i>Osteobrama vigorsii</i> (Sykes, 1839)	Koera	Koera	LC
55	Cypriniformes	Cyprinidae	<i>Osteochilus vittatus</i> (Valenciennes, 1842)	Bonylip barb	Nimla	LC
56	Cypriniformes	Cyprinidae	<i>Pethia conchonius</i> (Hamilton, 1822)	Rosy barb	Karita, Pothi, Beda	LC
57	Cypriniformes	Cyprinidae	<i>Pethia gelius</i> (Hamilton, 1822)	Golden barb	Karita, Pothi, Beda	LC
58	Cypriniformes	Cyprinidae	<i>Pethia</i> sp.			LC
59	Cypriniformes	Cyprinidae	<i>Pethia ticto</i> (Hamilton, 1822)	Ticto barb	Karita, Kaoli, Beda	LC
60	Cypriniformes	Psilorhynchidae	<i>Psilorhynchus balitora</i> (Hamilton, 1822)	Balitora minnow	Subido	LC
61	Cypriniformes	Psilorhynchidae	<i>Psilorhynchus sucatio</i> (Hamilton, 1822)	River stone carp	Sucio	LC
62	Cypriniformes	Cyprinidae	<i>Puntius amphibius</i> (Valenciennes, 1842)	Scarlet-banded barb	Karita, Guldi, Beda	DD
63	Cypriniformes	Cyprinidae	<i>Puntius chola</i> (Hamilton, 1822)	Swamp barb	Karita, Kerrundi, Beda	LC
64	Cypriniformes	Cyprinidae	<i>Puntius sophore</i> (Hamilton, 1822)	Pool barb	Karita, Katcha-karawa	LC
65	Cypriniformes	Cyprinidae	<i>Puntius vittatus</i> (Day, 1865)	Greenstripe barb	Karita, Beda	LC
66	Cypriniformes	Cyprinidae	<i>Raiamas bola</i> (Hamilton, 1822)	Trout barb	Rasobi	LC
67	Cypriniformes	Cyprinidae	<i>Rasbora daniconius</i> (Hamilton, 1822)	Slender rasbora	Dhera	LC
68	Cypriniformes	Cyprinidae	<i>Rasbora rasbora</i> (Hamilton, 1822)	Gangetic scissortail rasbora	Rasobi	LC
69	Cypriniformes	Cyprinidae	<i>Salmophasia bacaila</i> (Hamilton, 1822)	Large razorbelly minnow	Chelliah	LC
70	Cypriniformes	Cyprinidae	<i>Salmophasia balookee</i> (Sykes, 1839)	Bloch razorbelly minnow	Chelliah	LC
71	Cypriniformes	Cyprinidae	<i>Salmophasia boopis</i> (Day, 1874)	Boopis razorbelly minnow	Chelliah	LC
72	Cypriniformes	Cyprinidae	<i>Salmophasia orissaensis</i> (B?n?rescu, 1968)	Orissa razorbelly minnow	Chelliah	NE
73	Cypriniformes	Cyprinidae	<i>Salmophasia phulo</i> (Hamilton, 1822)	Finescale razorbelly minnow	Chelliah	LC
74	Cypriniformes	Cyprinidae	<i>Salmophasia sardinella</i> (Valenciennes, 1844)	Sardinella razorbelly minnow	Chelliah	LC
75	Cypriniformes	Nemacheilidae	<i>Schistura multifasciata</i> (Day, 1878)		Chimsi	LC
76	Cypriniformes	Nemacheilidae	<i>Schistura savona</i>	Savona khorka	Savona	LC

			(Hamilton, 1822)		aschmeri	
77	Cypriniformes	Cyprinidae	<i>Securicula gora</i> (Hamilton, 1822)	Gora-chella	Chelliah	LC
78	Cypriniformes	Schilbeidae	<i>Silonia silondia</i> (Hamilton, 1822)	Silond catfish	Silond	LC
79	Cypriniformes	Cyprinidae	<i>Systomus sarana</i> (Hamilton, 1822)	Olive barb	Karpata	LC
80	Cypriniformes	Cyprinidae	<i>Tor khudree</i> (Sykes, 1839)	Deccan mahseer	Badas, Mahseer	EN
81	Cypriniformes	Cyprinidae	<i>Tor putitora</i> (Hamilton, 1822)	Putitor mahseer	Badas, Mahseer	EN
82	Cypriniformes	Cyprinidae	<i>Tor tor</i> (Hamilton, 1822)	Tor barb	Badas, Mahseer	NT
83	Cyprinodontiformes	Poeciliidae	<i>Gambusia affinis</i> (Baird & Girard, 1853)	Mosquitofish	Masamachali	LC
84	Cyprinodontiformes	Poeciliidae	<i>Poecilia reticulata</i> (Peters, 1859)	Guppy	Repsii	NE
85	Mugiliformes	Mugilidae	<i>Rhinomugil corsula</i> (Hamilton, 1822)	Corsula	Karsul	LC
86	Osteoglossiformes	Notopteridae	<i>Chitala chitala</i> (Hamilton, 1822)	Clown knifefish	Patola, Chital	NT
87	Osteoglossiformes	Notopteridae	<i>Notopterus notopterus</i> (Pallas, 1769)	Bronze featherback	Patola	LC
88	Perciformes	Anabantidae	<i>Anabas testudineus</i> (Bloch, 1792)	Climbing perch	Kewai	DD
89	Perciformes	Badidae	<i>Badis badis</i> (Hamilton, 1822)	Badis	Kali Potiah, Telin machli	LC
90	Perciformes	Ambassidae	<i>Chanda nama</i> (Hamilton, 1822)	Elongate glass-perchlet	Kakhai, Chahal	LC
91	Perciformes	Channidae	<i>Channa gachua</i> (Hamilton, 1822)	Brown snakehead	Mathia, Bhutna, Gilwa	LC
92	Perciformes	Channidae	<i>Channa marulius</i> (Hamilton, 1822)	Great snakehead	Sambhal, Kharra, Dhok	LC
93	Perciformes	Channidae	<i>Channa punctata</i> (Bloch, 1793)	Spotted snakehead	Sambhal, Kabra, Mathia	LC
94	Perciformes	Channidae	<i>Channa striata</i> (Bloch, 1793)	Striped snakehead	Morrel, Sambhal	LC
95	Perciformes	Gobiidae	<i>Glossogobius giuris</i> (Hamilton, 1822)	Tank goby	Khasua	LC
96	Perciformes	Nandidae	<i>Nandus nandus</i> (Hamilton, 1822)	Gangetic leafish	Bhongal, Singer, Chamri	LC
97	Perciformes	Cichlidae	<i>Oreochromis mossambicus</i> (Peters, 1852)	Mozambique tilapia	Tilapia	NT
98	Perciformes	Cichlidae	<i>Oreochromis niloticus</i> (Linnaeus, 1758)	Nile tilapia	Tilapia	NE
99	Perciformes	Ambassidae	<i>Parambassis lala</i> (Hamilton, 1822)	Highfin glassy perchlet	Sudi	NT
100	Perciformes	Ambassidae	<i>Parambassis ranga</i> (Hamilton, 1822)	Indian glassy fish	Kakhai, Chahal	LC
101	Perciformes	Ambassidae	<i>Parambassis baculis</i> (Hamilton, 1822)	Himalayan glassy perchlet	Subaci	LC
102	Perciformes	Osphronemidae	<i>Trichogaster chuna</i> (Hamilton, 1822)	Honey gourami	Gaschi	LC
103	Perciformes	Osphronemidae	<i>Trichogaster fasciata</i> (Bloch & Schneider, 1801)	Banded gourami	Khardia, Ellai	LC
104	Perciformes	Osphronemidae	<i>Trichogaster lalius</i> (Hamilton, 1822)	Dwarf gourami	Ellai	LC
105	Siluriformes	Schilbeidae	<i>Ailia coila</i> (Hamilton, 1822)	Gangetic ailia	Patasi	NT

106	Siluriformes	Amblycipitidae	<i>Amblyceps mangois</i> (Hamilton, 1822)	Indian torrent catfish	Mandsi	LC
107	Siluriformes	Sisoridae	<i>Bagarius bagarius</i> (Hamilton, 1822)	Goonch		NT
108	Siluriformes	Sisoridae	<i>Bagarius yarrelli</i> (Sykes, 1839)	Goonch	Goonch	NT
109	Siluriformes	Clariidae	<i>Clarias batrachus</i> (Linnaeus, 1758)	Philippine catfish	Magur	LC
110	Siluriformes	Clariidae	<i>Clarias gariepinus</i> (Burchell, 1822)	North African catfish	Thai magur	LC
111	Siluriformes	Schilbeidae	<i>Clupisoma bastari</i> (Datta & Karmakar, 1980)		Bastar	DD
112	Siluriformes	Schilbeidae	<i>Clupisoma garua</i> (Hamilton, 1822)	Garua bachcha	Batchua, Bhekri	LC
113	Siluriformes	Schilbeidae	<i>Eutropiichthys murius</i> (Hamilton, 1822)		Bhekri	LC
114	Siluriformes	Schilbeidae	<i>Eutropiichthys vacha</i> (Hamilton, 1822)	Batchwa vacha	Vacha	LC
115	Siluriformes	Sisoridae	<i>Gagata cenia</i> (Hamilton, 1822)	Indian gagata	Gagachi	LC
116	Siluriformes	Sisoridae	<i>Gagata itchkeea</i> (Sykes, 1839)		Gagachi	VU
117	Siluriformes	Heteropneustidae	<i>Heteropneustes fossilis</i> (Bloch, 1794)	Stinging catfish	Singhi	LC
118	Siluriformes	Bagridae	<i>Mystus bleekeri</i> (Day, 1877)	Day's mystus	Katua, Tengra	LC
119	Siluriformes	Bagridae	<i>Mystus cavasius</i> (Hamilton, 1822)	Gangetic mystus	Tengra	LC
120	Siluriformes	Bagridae	<i>Mystus tengara</i> (Hamilton, 1822)	Tengara catfish	Tengra	LC
121	Siluriformes	Bagridae	<i>Mystus vittatus</i> (Bloch, 1794)	Striped dwarf catfish	Singharh	LC
122	Siluriformes	Siluridae	<i>Ompok bimaculatus</i> (Bloch, 1794)	Butter catfish	Gangwari, Pabda	NT
123	Siluriformes	Siluridae	<i>Ompok malabaricus</i> (Valenciennes, 1840)	Goan catfish	Gangwari, Pabda	LC
124	Siluriformes	Siluridae	<i>Ompok pabda</i> (Hamilton, 1822)	Pabdah catfish	Gangwari, Pabda	NT
125	Siluriformes	Pangasiidae	<i>Pangasianodon hypophthalmus</i> (Sauvage, 1878) Striped catfish		Pangas	EN
126	Siluriformes	Pangasiidae	<i>Pangasius pangasius</i> (Hamilton, 1822)	Pangas catfish	Pangas	LC
127	Siluriformes	Bagridae	<i>Rita chrysea</i> (Day, 1877)	Mahanadi rita	Katua	LC
128	Siluriformes	Bagridae	<i>Rita gogra</i> (Sykes, 1839)	Gogra rita	Gegra	LC
129	Siluriformes	Bagridae	<i>Rita rita</i> (Hamilton, 1822)	Rita	Rita	LC
130	Siluriformes	Bagridae	<i>Sperata aor</i> (Hamilton, 1822)	Long-whiskered catfish	Singharh, Kohra	LC
131	Siluriformes	Bagridae	<i>Sperata seenghala</i> (Sykes, 1839)	Giant river-catfish	Singharh, Ari	LC
132	Siluriformes	Siluridae	<i>Wallago attu</i> (Bloch & Schneider, 1801)	Wallago	Padhin	NT
133	Synbranchiformes	Mastacembelidae	<i>Macrognathus aral</i> (Bloch & Schneider, 1801)	One-stripe spinyeel	Baam	LC
134	Synbranchiformes	Mastacembelidae	<i>Macrognathus pancalus</i> (Hamilton, 1822)	Barred spiny eel	Baam	LC
135	Synbranchiformes	Mastacembelidae	<i>Mastacembelus armatus</i> (Lacepède, 1800)	Zig-zag eel	Baam, Karbaam	LC
136	Synbranchiformes	Synbranchidae	<i>Monopterus cuchia</i> (Hamilton, 1822)	Cuchia	Endha	LC



Plate-01: Cage culture unit installed in Dahod Reservoir, Dist.-Raisen, Madhya Pradesh, India.

CONCLUSION

Nature is having a large number of fishes so a judicious exploitation of fishes from nature is required for sustainable development of fishes. In conclusion, Madhya Pradesh hosts a number of freshwater fish species including commercial and ornamental fishes. However, the fish fauna of the state are being threatened due to several anthropogenic activities including introduction of exotic fish species, habitat degradation, pollution, irrational fishing etc. The need of the hour is to protect the existing indigenous fish stock and steps for enhancing the quality of the culturable species rather than go in for indiscriminate introduction of exotic species. Due to some anthropogenic activities fish diversity is in declining mode. To conserve this inherent treasure, a long term management plan should be adopted. Strictly implementation of the regulations on mesh size and fishing gears are much needed to prevent over exploitation. Strict management measures with large public awareness would be essential to save the germplasm of commercial fishes of the state and it's time to make proper policies and take necessary actions to improve conservation measures so that the future generations can get the fish live on the earth rather than the photographs in the literature. Department of fisheries is having well infrastructure and resources but proper

management and effectively implementation of scientifically approach are needed. This study would serve as a frame of reference for future initiatives in studying fish biodiversity and conservation management.

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