Short Communication

Journal of Indian Fisheries Association 50 (2) April-June 2023 page 52-57

Journal of Indian Fisheries Association

https://epubs.icar.org.in/index.php/JIFA/issue/view/3941

Socio-economic profile and challenges of fishing communities: A Case study of Chhirpani Reservoir in Kabirdham district, Chhattisgarh

B. Nightingale Devi[1]*, K. Kiran[2], Lavanya Kaiwart[2], Rakesh Bhaskar[2] and Vidya Dhruw[2]

[1] *Assistant Professor, Department of Fisheries Basic Science and Humanities, LSPN College of Fisheries, Kawardha (Chhattisgarh)*
[2] *Research Scholar, Department of Fisheries Basic Science and Humanities, LSPN College of Fisheries, Kawardha (Chhattisgarh)*

Abstract

Fisheries plays a vital role in offering sustenance, job opportunities, and entrepreneurial avenues to over 2.8 crore individuals engaged in fishing and aquaculture at the grassroots level with thousands of people across the entire value chain (Department of Fisheries, 2023). India holds the distinction of being the global leader in inland capture fish production (SOFIA, 2022). Notably, the inland fisheries and aquaculture have surged two-fold, rising from 61.36 lakh tons in 2013-14 to 121.12 lakh tons by 2021-22. The present study aims to provide an assessment of the socio-economic status and challenges of the fisher community in Chhirpani Reservoir, located in Kabirdham, Chhattisgarh. The primary data for socio-economic assessment and challenges were collected through qualitative research using semi-structured questionnaires and in-depth interviews with fishermen. The findings highlighted the dominant age group of fishers falling within 40-59 years, with male representation of 75%. Moreover, it was observed that 57% of fishers reside in Pucca houses constructed under the "Pradhan Mantri Awaas Yojna" scheme. The absence of a primary healthcare center in their villages necessitates an arduous 7-kilometer journey to access healthcare services, resulting in increased expenditure. Additionally, the study revealed that 52% of fishers have received only primary education and 35% were found to be illiterate. Subsequently, challenges they faced were discussed emphasizing the need for improved infrastructure, including health centers and schools in fishing villages, to uplift fishers' welfare and their standard of living. By addressing these challenges, the policymakers and stakeholders can contribute to the sustainable development and well-being of the fisher community in Chhirpani reservoir.

Keywords:
Livelihood, Fisher communities, Reservoir, Fisheries, Socio-economic profile

***Corresponding author:**
devi.cof12@gmail.com

Received : 11 January 2023
Accepted : 15 April 2023

Introduction

Chhattisgarh, situated in the central India, is blessed with abundant of inland water resources encompassing a total water area of 1.64 lakh hectares. This includes reservoirs, rivers, canals, tanks, and ponds, rendering it a prime locale for flourishing aquaculture and fisheries activities. The state recorded an estimated aggregate fish production of 5.91 lakh tons during the year 2021-22 (Directorate of Fisheries, Chhattisgarh, 2022). These water resources not only support the aquatic ecosystem but also play a crucial role in the socio-economic development of the local fishing communities. Moreover, the reservoirs in Chhattisgarh have been predominantly built to cater to irrigation needs, domestic water supply, and the generation of hydropower. However, these reservoirs also serve as vital habitats for a diverse range of fish species, effectively establishing a conducive environment for engaging in fishing activities.Reservoirs stand as the primary inland fisheries resources within India, yet a significant disparity exists between the potential and the realized fish yield. This discrepancy can readily be addressed through the implementation of scientific

management strategies (Jhingran, 1988; Sugunan and Sinha, 2000). The state currently hosts a total of 1770 reservoirs, collectively spanning an area of 0.89 lakh hectares. Interestingly, while the majority (99%) of these reservoirs fall into the small category, that contribute a substantial 54% to the overall reservoir area in the region. It is worth noting that the medium and large reservoirs constitute 25% and 21% of the total area respectively (Directorate of Fisheries, Chhattisgarh, 2017). The reservoirs also serve as a source of livelihood for numerous fishermen. Bhendarkar *et al*. (2017) emphasized the significance of cage culture practices as a promising cultivation system that has the potential to propel the state's advancement within the fisheries sector.Chhattisgarh has achieved notable acclaim on the national stage for its endeavors in advancing and nurturing the fisheries domain. The state has received distinguished recognition as the leading Inland State in Fisheries in the year 2022, a testament to its dedication in nurturing a flourishing fishing sector and prioritizing the well-being of the fishing populace (Directorate of Fisheries, 2022).

The *Chhirpani* reservoir, located in the Kabirdham district of Chhattisgarh, is of particular interest in this study. Operational since 1992, this reservoir has wielded a substantial influence on the socio-economic landscape of the local fishing community. Through initiatives such as the National Mission for Protein Supplement, *Rashtriya Krishi Vikas Yojana*, Blue Revolution, and support from the National Fisheries Development Board (NFDB), the state of Chhattisgarh has successfully established cage culture units across 12 reservoirs including the *Chhirpani* reservoir and has also significantly bolstered their income generation capacities and livelihood of the fishermen (Kumar *et al*., 2021). By examining the challenges faced by the fishermen in *Chhirpani* reservoir, we can gain insights into the broader issues affecting the fishing communities in Chhattisgarh and develop strategies to address these challenges effectively. Understanding the challenges faced by fishermen in *Chhirpani* reservoir is crucial for identifying the key obstacles hindering their livelihoods and devising appropriate solutions. By addressing these challenges, policymakers, government agencies, and stakeholders can work together to promote sustainable fishing practices, enhance infrastructure, provide adequate support systems, and improve the overall well-being of the fishing community in Chhattisgarh.

Materials and methods

The study was conducted in the *Chhirpani* reservoir, located in the Kabirdham district of Chhattisgarh. The geographical coordinates of the study area are defined by latitude 22.20° N and longitude 81.18° E. Primary data was gathered to evaluate the livelihood conditions and the challenges encountered by fishermen depending on the reservoir.The study encompassed members of two cooperative societies,

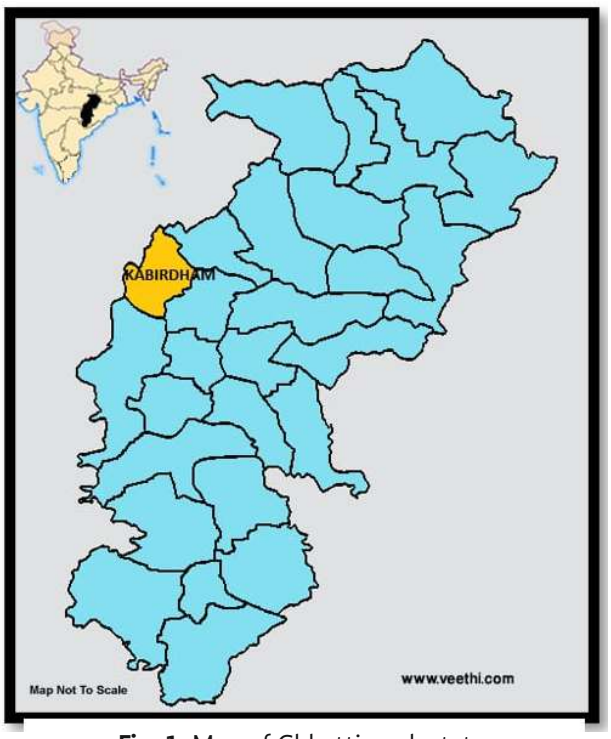

Fig. 1. Map of Chhattisgarh state

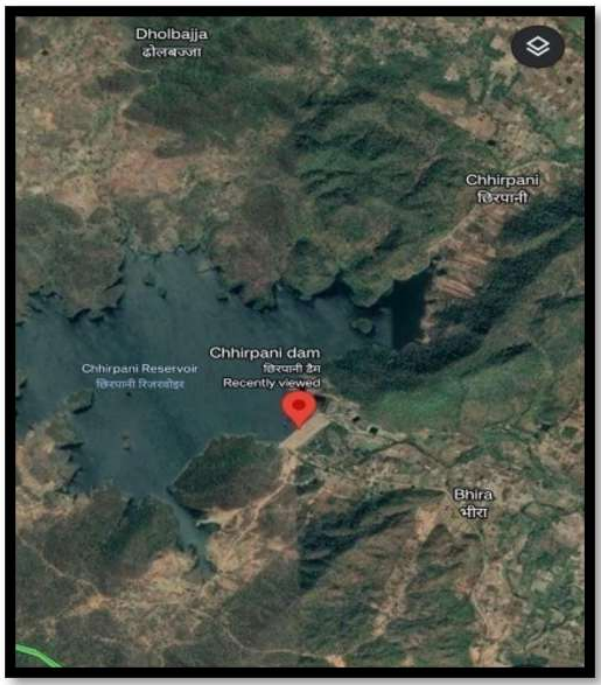

Fig. 2. Satellite image of Chhirpani reservoir

specifically the *Mahila Samiti Cooperative Society Limited* and the *Baiga Janjati Cooperative Society Limited*. A total of sixty respondents, with 30 individuals from each society, including both male and female members, were interviewed using pre-structured questionnaires. A 3-point Likert scale (comprising "Agree," "Neutral," and "Disagree") was employed to assess health status parameters (Likert, 1932). The collected data was tabulated and analyzed using descriptive statistical techniques, including measures such as mean, average, and percentage.

To analyze the challenges and contraints faced by fishers, a Rank based Quotient (RBQ) approach was employed. RBQ quantifies the data collected through preferential ranking techniques by assigning ranks to the parameters and then calculating the RBQ values, the formula of RBQ given by Savarathanam (1988) is

$$RBQ = \sum_{i=1}^{n} \frac{(fi)(n+1-i)}{N*n} * 100$$

Where,

f_i = number of respondents reporting a particular constraint under i^{th} rank.

N = Total number of respondents

n = number of constraints identified

Results and discussion

The findings obtained from the data analysis, focusing on the socio-economic profile of fishermen in the *Chhirpani* reservoir are given below.

Sex ratio: The study found that the fishing activity in the *Chhirpani* reservoir was predominantly male-dominated, with 75% of the fishers being male. The sex ratio was found to be 3:1 (male: female).

Age distribution: Knowledge of age structure of fishermen is important in estimating potential productive human resources (Hussain, *et al*. 2009). The study revealed significant insights into the socio-economic profile of fishers in the reservoir. It indicated that the majority of fishers fall within the age group of 40-59 years, with a predominance of male representation. The age of fishers was categorized into three groups: younger age group (<39 years), middle age group (40-59 years), and old age group (>60 years). The analysis revealed that the middle age group accounted for the highest percentage (58%) of the total fisher population, followed by the young age group (24%) and the old age group (18%). Habib and Jan (2021), Khemraj *et al*. (2022), obtained similar results, with the majority of respondents falling into the middle-age group. In the study by Mir *et al*. (2023), it was reported that less than 18% of the old age group were involved in fishing activities.

Family type and size: Family size is a significant socio-economic indicator since it has a direct impact on household income, food consumption, and overall socio-economic well-being. Most of the fishermen in the *Chhirpani* reservoir lived in nuclear families (63.4%) with medium size family of 4-6 members, while the remaining 36.5% lived in joint families, which could be attributed to poor economic conditions. The results are in line with the study done by Bhendarkar *et al*., (2017).

Educational status: The educational status of the fishermen was categorized into five levels: illiterate, primary, secondary, higher secondary, and graduation. The study indicated that the majority of fishermen had a primary level of education (52%), while 35% were illiterate, and none had completed higher secondary or graduation. Education is another key area that requires attention. The study revealed that a significant portion of fishers have received only primary education. Efforts should be made to improve educational opportunities and promote higher levels of education among fishers, enabling them to acquire new skills and knowledge that could contribute to their socio-economic development. Khemraj *et al*. (2023) reported that fishers had lower education-related aspirations, not recognizing the value of education in improving their economic situation. Additionally, they identified infrastructure-related challenges that hinder the effective delivery of quality primary education in remote or disadvantaged communities.

Health status: Access to healthcare facilities is a major challenge faced by fishers in the study area. The absence of a primary healthcare center in their villages necessitates a considerable distance to travel for medical services, leading to increased costs and inconvenience. Addressing this issue and ensuring better access to healthcare resources is crucial for the well-being and health of the community. It has been found that 56% of the respondents agreed that regular medical check-ups are important, while 16% disagreed, and 28% remained neutral. Additionally, the majority of respondents (89%) reported having administered regular infant vaccinations, while 11% displayed a lack of knowledge about it. Regarding maternal health, 76% of respondents agreed on its importance, 18% remained neutral, and 6% disagreed. Moreover, a significant percentage (96%) of the respondents agreed on the occurrence of seasonal common diseases like fever, cold, cough, diarrhea as well as blood pressure. However, limited access to healthcare facilities, mainly due to the absence of a primary health center in the village, posed challenges to the availability of medical services. Ekka *et al*. (2012) underscored the crucial role of literacy in increasing awareness and comprehension of healthcare facilities. They also emphasized the significant impact of distance on the accessibility of healthcare services.

House ownership and type: Housing conditions are also a concern, as a substantial proportion of fishers reside in pucca houses, but there is still room for improvement in ensuring better living standards for the community. Among the fishermen in the *Chhirpani* reservoir, the majority (57%) lived in pucca houses constructed under the "*Pradhan Mantri AwaasYojna*," followed by semi-pucca houses (25%), and a smaller percentage (18%) lived in kaccha houses. 70 % of the fishermen owned agricultural land, while the remaining 30% were landless.

The study analyzed the monthly income and expenditure patterns of the fishermen. The majority (63%) earned a monthly income ranging from Rs 9,000 to 13,000. Additionally, the analysis of expenditure revealed that food consumed the largest

portion (45%) of their earnings, followed by entertainment (32.2%), religious rituals (12.6%), medical expenses (5%), and education expenses (5.2%). The results align with a study conducted by Ekka *et al*. in 2012, which also identified that the primary expenditure for fishers in most Indian states is on food items.

Savings and debt: The study found that 10% of fishermen had no savings, while 53 % saved less than Rs 50,000 per annum and 22% between Rs 50,000 and 1 lakh per annum. About 15% of fishermen reported being in debt, primarily for family and business purposes.

Occupation: Fishing was identified as the primary occupation of fishermen in the *Chhirpani* reservoir. Additionally, 65% of the respondents were engaged in agriculture during the non-harvesting season and bad weather, while 25% were involved in labor work and 10% in small business.

Marketing: Most fishermen sold their catch directly to fish markets or local buyers, which reduced the need for fish preservation methods. Consequently, the majority of fishermen refrained from participating in fish preservation or processing activities due to the absence of adequate infrastructure.

Commercial fish species from the Reservoir

In *Chhirpani* reservoir, fishers caught a variety of fish species that contribute to their livelihoods. While the specific fish species caught may vary, five main fish species were commonly found in the reservoir (Table 1).

Table 1. Main fish species caught from the reservoir

Name of species	Scientific name	Local name	Price (kg/Rs)
Rohu	*Labeo rohita*	Rohu	140
Catla	*Catla catla*	Catla/bhakur	140
Tilapia	*Oreochromis sps.*	Tilapia	130
Mrigal	*Cirrhinus mrigala*	Mrigal	130
Pangas	*Pangasius sps.*	Sawali	120

The *Chhirpani* reservoir is stocked with seeds or fingerlings of various Indian Major Carp species, including *Catla catla, Labeo rohita, Cirrhinus mrigala, and Pangasianodon hypophthalmus*. These species are chosen based on their ability to adapt to the reservoir's conditions and their market demand. Among the species caught; fishers generally earn higher profits from the catch of Rohu (*Labeo rohita*). Rohu commands a higher price in the market due to its taste, texture, and market demand. On the other hand, Pangas *(Pangasianodon hypophthalmus)* tends to have a lower market price compared to other species. The dominance of Indian Major Carps has also been reported by Telvekar *et al*. (2021) and Keshava *et al*. (2014) in the Upper Wardha reservoir and Itiadoh reservoir of Maharashtra, respectively.

Craft and Gear used by Fishers

In *Chhirpani* reservoir, fishers use different fishing gears and crafts to carry out their fishing activities.

Wooden boats: The majority of fishing crafts in *Chhirpani* reservoir were wooden boats. The study observed that the fishing craft in the reservoir mainly comprised of wooden boats, which fishermen acquired through their contributions along with a grant of Rs. 10,000 from the Department of Fisheries (Table 2). These boats are typically made from durable sal wood, chosen for its strength and resistance to water. Wooden boats are preferred for their stability and suitability for navigating the reservoir's waters. The presence of both wooden boats and a motor boat provides the fishermen with options for different fishing needs and situations. Wooden boats are more commonly used for general fishing activities, while the motor boat offers advantages in terms of mobility, speed, and navigation during specific circumstances. The availability of both traditional wooden boats and a motor boat reflects the adaptation of fishing practices to suit the specific needs and challenges of the reservoir environment. In line with the present study, Keshave *et al*. (2014) and Tevelkar *et al*. (2021) reported that wooden boats were observed to be in use in the *Upper Wardha* and *Itiadoh* reservoirs of Maharashtra. These boats were acquired with a 50% subsidy from the Department of Fisheries (DoF), while the remaining 50% was contributed by the fishermen.

Motor boat: Alongside the wooden boats, there is one motor boat in use at *Chhirpani* reservoir. The motor boat is operated by a trained individual and serves multiple purposes for the fishermen. It is used for navigation, especially during night time when visibility is reduced. Additionally, the motor boat is employed in fish catching activities. Typically, the motor boat requires two people to operate it efficiently and effectively.

Table2. Crafts used by the fishermen in the reservoir

Name of Craft	No. of Craft	Size	Material Used	Area of Operation
Boat	08	5M(L), 2M(W), 1M(D)	Wood (Sal tree)	Reservoir
Motor Boat	01	5M(L), 2M(W), 1M(D)	Wood and Metal	Reservoir

Fishing gear: In *Chhirpani* reservoir, fishers primarily rely on gill nets as their primary fishing gear for capturing fish. Gill nets are widely used due to their effectiveness in catching various fish species and their relative ease of use. Gill nets are popular among fishermen in *Chhirpani* reservoir due to their efficiency in capturing fish. However, it is crucial to implement responsible fishing practices to prevent overfishing and minimize the impact on the fish population and the overall ecosystem. This includes adhering to regulations regarding mesh size, avoiding sensitive

areas or breeding grounds, and practicing proper net handling and disposal techniques. By utilizing gill nets effectively and responsibly, fishermen in *Chhirpani* reservoir can enhance their catch and contribute to their livelihoods while ensuring the long-term sustainability of the fish population in the reservoir. The use of gill nets in reservoir and lake fishing has also been reported in studies by Keshava *et al*. (2014), Telvekar *et al*. (2021), and Mir *et al*. (2023).

Challenges faced by fishers

Fishers in *Chhripani* reservoir faced various challenges in their daily lives and livelihoods. These challenges can significantly impact their ability to sustain their fishing activities and secure a livelihood. Table 3 depicts the challenges and constraints faced by the fishers in *Chhripani* reservoir.

Table 3. Challenges faced by the respondent fishers of Chhirpani reservoir

Challenges/constraints	RBQ	Rank
Declining fish stocks	83.32 %	I
Lack of access to credit	67.47 %	II
Inadequate infrastructure (storage and transportation)	57.24%	III
Inadequate awareness and training	52.56 %	IV
Lack of coordination among members	27.56%	V

Declining fish stocks: One of the significant challenges faced by fishermen is the declining fish stocks in the reservoir. Around 83.32% reported that declining fish stocks as foremost challenge. Overfishing, pollution, habitat degradation, and inadequate fishery management practices can lead to a decrease in the availability of fish. This scarcity makes it difficult for fishermen to catch an adequate quantity of fish, impacting their income and livelihoods. Abache (2015) also reported overfishing in the Tono reservoir fisheries of Ghana's upper east region due to unrestricted access, heightened fishing activities, inadequate adherence to closed fishing seasons, sub optimal management practices, and the absence of effective policy interventions.

Lack of access to credit and other resources: 67.47% of respondents ranked lack of access to financial credit and resources necessary for their fishing activities as second most challenges. Limited access to affordable financial aids, loans, fishing gear, boats, and nets hampers their ability to upgrade their equipment or invest in better fishing practices. This can hinder their productivity and income potential. Similarly, Katre *et al*. (2020) identified financial constraints as the second most common challenge faced by fishermen in Bargi reservoir, Madhya Pradesh.

Inadequate Infrastructure, storage and transportation facilities: Poor infrastructure and lack of basic facilities, such as landing sites, storage facilities, and transportation scored as third most constraint factors (57.24%) and it make challenging for fishermen to effectively handle and transport their catch. Insufficient infrastructure also limits their ability to access markets and obtain fair prices for their fish. The study conducted by Kumari and Sharma (2015) reported different findings, where the topmost infrastructural constraint identified was the lack of ice storage and transportation issues.

Inadequate awareness and training: It is considered the fourth constraint factor (52.56%). Fishermen have expressed that a lack of access to necessary information and insufficient timely training regarding sustainable fishing practices, fishery management, and market trends hampers their ability to adapt to changing conditions and adopt more sustainable and profitable fishing techniques.

Lack of coordination among members: The challenge of coordination among members, identified as the fifth most significant challenging factor (27.56%). Kumari and Sharma (2015) categorized the lack of coordination among members as a social constraint. This constraint can have a notable impact on the overall functioning of society by hindering collaborative efforts and interactions among its members.

Addressing these challenges requires a multi-faceted approach involving sustainable fishery management, infrastructure development, access to credit and resources, awareness campaigns, and effective government support to ensure the long-term viability and well-being of the fishing community in *Chhripani* reservoir, Chhattisgarh.

Conclusion

The study provides insights into the socio-economic conditions of fishermen in the Chhirpani reservoir. The findings highlight various aspects, including the sex ratio, age distribution, family type and size, education status, health conditions, housing, income and expenditure patterns, savings and debt, and secondary occupations. Understanding these factors is crucial for developing effective policies and interventions to enhance their livelihood. The findings emphasize the socio-economic status and livelihood conditions of the fisher community, shedding light on the challenges faced by fishermen in the Chhirpani reservoir area. The findings of this study underscore the urgent need for enhancing basic infrastructure and civic amenities in fishing villages. Establishing primary health centers and schools within reasonable proximity to these communities would significantly improve their quality of life and contribute to their overall welfare. Overall, by addressing these socio-economic challenges and investing in infrastructure and education, policymakers and stakeholders can promote the sustainable development and well-being of the fisher community in the Chhirpani reservoir. This would not only enhance their livelihoods but also contribute to the overall economic growth and social progress of the region and the community.

Acknowledgements

Authors are grateful to the Dean, Late Shri Punaram Nishad College of Fisheries (DSVCKV) for providing opportunities to successfully conduct the study.

Conflict of interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

Abache,G., 2015. The contribution of Tono Reservoir Fisheries to household livelihoods in selected communities in the Kassena Nankana East District of the Upper East Region of Ghana (Doctoral dissertation).

Anonymous, Directorate of Fisheries, Government of Chhattisgarh.2017. Machali Palan Varshik Prativedan. 2016-17, 34.

Bhendarkar, M.P., Sarang, N. Bhosale, M.,Rathod, R.H., Laxmi and Vardia, H.K., 2017. A study on profile of socio-economic condition of fishermen in selected village in Kabirdham district, Chhattisgarh state, India. *International Journal of Educational Science and Research,* 7(6), pp 49-56.

Bhendarkar, M.P., Sundaray J.K., Ananth P.N. and Pradhan, S., 2017. Aquaculture Development in Chhattisgarh, India: What, why and How. *International Journal of Fisheries and Aquatic studies*. 5(4): 272-278.

Bunkar, K., Ananthan, P.S., Qureshi, N.W., Sharma, L.L. and Sundaramoorthy, C., 2022. Human development of small-scale fishers: Evidence from Rana Pratap Sagar reservoir region, India. *Journal of Indian Fisheries Association*, 48: pp.61-69.

Department of Fisheries, 2023. 9 years of Indian Fisheries Sector. Ministry of Fisheries, Animal Husbandry and Dairying, Government of India., Government of India, 2023.

Directorate of Fisheries, 2020. Administrative Annual Report 2019-20, Department of Fisheries, Govt. of Chhattisgarh.

Directorate of Fisheries. 2022. Administrative Annual Report 2021-22, Govt. of Chhattisgarh. Pp. 38.

Ekka, A., Katiha, P.K., Pandit, A., Barik, N. Salim, S. and Kumar, G.B., 2012. Socio-Economic status of fishers of reservoirs in India. *J. Inland Fish. Soc. India*. 44 (2): 79-87.

Habib, N. and Jan, S., 2021. Socio-economic status of fishermen community of Wular Lake in district Bandipora of Jammu and Kashmir. *Journal of Fisheries*, 9(3), pp.93205-93205.

Hussain, M. I., Siwar, C., Mokhtar, M. B., Dey, M. M. and Jaafar, A. H., 2009. Socio-economic condition of fishermen in seasonal floodplain beels in Rajshahi District, Bangladesh. *Research Journal of Social Sciences*, 4 : 74-81.

Jhingran AG., 1988 Reservoir fisheries in India, *Journal of the Indian Fisheries Association*. 18:261-273.

Katre, N., Ojha, S.N., Sharma, A., Sharma, R., Dubey, S. and Yadav, V., 2020. Alternative livelihood opportunities for fishers of Bargi reservoir, Madhya Pradesh. *Journal of Indian Fisheries Association*, 47 (2): 78-84.

Keshave, J.V., Ananthan, P.S. and Landge, A., 2014. Fish and fisheries management status of Itiadoh reservoir, Maharashtra State. *Ecology, Environment and Conservation*,20(4): 1653-1659.

Kumar, M., Kujur, R. and Honnananda, B.R., 2021. Cage culture practices in Kabirdham district of Chhattisgarh: A case study. *Journal of Entomology and Zoology studies*, 9(3):170-174.

Kumari, S. and Sharma, A., 2015. Constraint analysis of Self help groups in fisheries sector, Raipur, Chhattisgarh. *Journal of Indian Fisheries Association*, 42. PP. 81-88.

Likert R.A., 1932. Technique for the measurement of attitudes. *Arch Psychology,* 22(140):55.

Mir, S.A., Ojha, S.N., Ananthan, P.S., Qureshi, N.W. and Argade, S.D., 2023. Socio-economic status of fishers inDal Lake, Kashmir, India. *Journal of Indian Fisheries Association*, 50(1), pp.38-45.

Sabarathnam, V.E., 1988. Manual on field experience training for ARS Scientists, National Academy and Agricultural Research Management (NAARM), Hyderabad, (1988).

SOFIA, 2022. Towards Blue Transformation. Food and Agriculture Organisation of the United Nation. Rome.

Sugunan, V.V. and Sinha, M., 2000. Guidelines for small reserviour fisheries management. Bulletin 93, Central Inland Capture Fisheries Research Institute, Barackpore, 2000, 35.

Telvekar, P.A., Gore, S.B., Relekar, S.S., Meshre, S., Kate, G. and Baig, L., 2021. Status of Fisheries of Upper Wardha reservoir,Maharashtra, India. *Journal of Indian Fisheries Association*. 48(2): 49-55.