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Fulfillment of the Purpose of Fish Ranching at Sirpur Reservoir Positioned on Bagh River District of Deori, Maharashtra

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Abstract

The Bagh River is positioned on Sirpur Reservoir. This rivulet divides the adjacent border areas of the two states Maharashtra and Chhattisgarh. Bagh River is not only a border river; it is also proving to be perfect from the point of view of drinking water and agriculture. Fish ranching on this river is basically based on conventional methods, in the past years it has supplied water for irrigation and drinking water to two states, the selected place for companion study has been selected around the dam which is similar to the one that occurs in nature. To determine the sudden change, chemical and physical factors are used for water testing, such as TDS (Total Dissolve Solid), pH, DO (Dissolve Oxygen), Turbidity, Conductivity, BOD (Biological Oxygen Demand), etc., impurities. Efforts to remove this will prove beneficial not only for the present time but also for the future of fish farming and drinking water and will also reveal the path to increase the production capacity of fish farming. In the entire selected area that has been identified around the dam, this limit can be reduced as per the study, eliminating the need for excessive testing of water quality and purity for drinking purposes. Considering the past as the basis of this river, the present and future are envisioned for fisheries, agriculture and drinking water. We can try to calculate the figures to be considered according to the security of this overall area.

Keywords: Water attributes; Sirpur; Cage culture; Conventional method; Agriculture; Drinking water

Introduction

The zenith of the present seems to be getting lost in the darkness of the future, in which the struggle of the fishes is also unforgettable. The rural people here know its usefulness in the traditional way, but are moving away from the livelihood. It will have to be made a means of livelihood of the people, so that people's lives can be easily spent. People will have to gradually depend on it (Castany, G., Marce, A., Margat, J., Moussu, H., Vuillaume, Y., and Evin, J., 1974) [1]. Various federal governments have launched their capacity in this area, but this dam is limited by that capacity. Now it is far away. It supplies the drink as per the need of the people, dividing the adjacent border of two states (Haque MH, 2014) [2]. The water in the dam is born from the forested hills and rivers of Chhattisgarh and is nourished by the anchal of Maharashtra and Madhya Pradesh (Islam M S, Murshed S M M, Moniruzzaman M and Baree M A., 2002) [3]. Fish of different species are found in this dam, which are carnivorous, omnivorous and vegetarian. Which by living in its habitat, is enhancing the beauty of this place (Arur, Anand and Krishanan, P., 2019) [4]. The weather here remains changeable, there is some cold in monsoon and hot environment is seen after monsoon, the potential of this area is so much that it can be used commercially (Rashed MAR, 2018) [5]. Fish farming can be done by using cage color and various new techniques to increase the yield (Islam S, 2010) [6]. Along with fish farming, pilgrimage should be promoted (Toppo N, 2016) [7]. People will get support in fishing in this area from the government, but the BOD and COD in the water here become relatively less during the monsoon, but the monsoon. There is an increase in these after fish farming also causes pollution in water (Fayyadh,A.S.; Hussien,B.M.; Al-Hamdani, M.M.; Salim,S.A.; Mukhlef,H.N and Maher, A.A., 2016) [8]. Fish ranching at Sirpur Reservoir offers a promising avenue for addressing the socio-economic challenges faced by the local community. By providing alternative livelihood opportunities, it can contribute to poverty alleviation and income generation (Jahan H, I Parvez, and ASM Kibria, 2018) [9]. The cultivation of fish can supplement the income of farmers, particularly during the lean agricultural season, enhancing their resilience to economic fluctuations. Moreover, fish ranching has the potential to improve food security by providing a sustainable source of protein for the local population (Dębowski, M.; Zieliński, M.; Kazimierowicz, J.; Kujawska, N.; Talbierz, S., 2020) [10]. Fish is a nutrient-rich food, essential for human health and development, and increasing its availability can contribute to the overall well-being of the community. While fish ranching holds immense promise, it is not without its challenges. Issues such as water quality fluctuations, overfishing, habitat degradation, and the introduction of invasive species can hinder the success of this endeavor (Tacon,A.G.J and Halwart,M., 2007) [11]. Effective management strategies are essential to mitigate these risks and ensure the long-term sustainability of the fish population. On the other hand, fish ranching also presents a host of opportunities (Castany, G., Marce, A., Margat, J., Moussu, H., Vuillaume, Y., & Evin, J., 1974) [12]. Advances in aquaculture technology, coupled with the growing demand for fish products, create a favorable environment for the development of this sector. By adopting sustainable practices and investing in research and development, it is possible to maximize the benefits of fish ranching while minimizing its impact on the environment (Hassan M N, Rahman M M, Hossain M M, Nowsad A A K M and Hossain M B., 2012) [13].

Study Area - It is situated between the (Northing = 21°04'37.8"N; Easting = 80°28'24.2"E) latter two states. 40% of it falls in Chhattisgarh and 60% in Maharashtra. This dam is spread over 32.970 square kilometers, which keeps water throughout the year (Gagan Singh Guru: 14. Islam MR, MM Haque, and MM Rahman, 2017) [14]. Generally, different types of seasons are seen here, which can be divided into

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four months. Comparatively, the average temperature, rainfall and wind speed here is twenty four degrees Celsius, Two hundred fifty millimeter, twenty kilometers per hour, according to (Haque MH, 2014) [15]. There are no fish farms far and wide in this area, people fish here only according to the weather (Thakur, Ankit., 2018) [16]. They cast nets through which the people here earn their living (Kothari CR, 2004) [17]. The present study has been adjusted for physical and chemical analysis on dam water to determine pre-monsoon and post-monsoon (October 2023 to March 2024) from fish culture point of view (Fayyadh, A.S.; Hussien, B.M.; Al-Hamdani, M.M.; Salim,S.A.; Mukhlef, H.N and Maher, A.A., 2016) [18]. (Figure 1 and Table 1)

Materials and Methods

This dam is built on the border with Chhattisgarh towards the west, which passes through the south and moves towards the north-west (Mazid MA, 2002) [19] is no fish ranching in this area. On the basis of the survey, we have taken into account the water Physico - chemical factors (Mabunay, L., 2008) [20]. Work has been done on this such as

Figure 1: Sirpur Reserviour.

Temperature, Turbidity, Chlorine, Dissolve Oxygen, Biological Oxygen Demand (BOD), Total Dissolve Solid (TDS), Salinity, Conductance etc (Mia MS, F Yeasmin, SM Moniruzzaman, MFH Kafi, MI Miah, and MS Haq, 2015) [21]. We have selected the water from the entry and exit route of the dam as samples, which seems to be collected from the upper surface for sampling (Hossain M Z, 1999) [22]. There are 100 to 150 villages around the dam where construction of ponds is seen extensively (Köppen, W., 1936) [23]. People are inclined towards fish farming in a timely and traditional manner (Mischke CC, 2012) [24]. These monitoring points are protected according to the use of (Global Positioning System) GPS (Yi Y, Phuong DR, Phu TQ, Lin CK, Diana S., 2004) [25]. It is tested by the Maharashtra government for drinking purpose for big cities, We are done according to (APHA1998) [26] and (Mischke CC, 2012) [27] (Table 2).

Result and Discussion

According to Table 2, its temperature keeps changing according to the weather. During the study, its temperature was low during monsoon which was 22°C, 25°C, 23°C from October to December, After monsoon the temperature increases, from January to March it is - 24°C, 28°C, 34°C which is beneficial for the fish from the point of view of adaptation. In the months of October and January, turbidity increases to 0.19 NTU and 0.18 NTU, but in November, December, February and March, turbidity becomes normal to 0.12 NTU, 0.16 NTU, 0.10 NTU, 0.11 NTU, as a result of which turbidity is seen in the water. Total dissolved solids are very less during monsoon 200 ppm, 250ppm, 300ppm but after monsoon it increases relatively to 260ppm, 310ppm, 410ppm. Its quantity increases in the months of October and December to 30 mg/litre., 33.5mg/litr but after the end of monsoon, a change is seen in it, from January to March, 32.2mg/litr to 26.6 mg/litr Dissolved Oxygen is seen in the month of October to December, 7mg/litr, 9mg/litr but From January to March, its quantity increases to 10 mg/litre, 18mg/litre due to which the transpiration of water decreases. The amount of chemical oxygen demand in the water here is not normal, which is 6.9mg/litre at the beginning of monsoon. litr

Table 1: Fish Found In Sirpur Reserviour.

SL No.	Scientific name	Order	Local Name	Fin Formula	Feding Habit	100% of productivity for abundance
1.	*Labeo rohita*	Cypriniforms	Rohu	D. 16 (3/13); P. 17; V.9; A. 7; (2/5); C. 19; L. 1. 40--41 ; L.tr. 6½ – 7½ /9; Barbels 1 pair.	Herbivorous	*22.3%*
2.	*Catla catla*	Cypriniforms	Catla	D.18-19 (3/15-16); P. 19; V.9; A. 8(3/5); C. 19; L.1. 43; L.tr. 7(1/2) - 6(1/2).	Herbivorous	*20%*
3.	*Cirrihinus mrigala*	Cypriniforms	Mrigal	D. 16(3/13); P. 18; V. 9; A.8(2/6); C. 15; L. 1. 42-44; L.tr. 6(1/2). Barbels 1paire	Herbivorous	*10%*
4.	*Wallago attu*	Cypriniforms	Padhina	D. 5; P.1/14; V. 10; A.86 (4/82); C.17; Barbels 2 pairs	Herbivorous	*9%*
5.	*Amphipnous cuhia*	Symbranchifroms	Bam	D. very reudimentry, just fold of skin, P., V. , A. , and C. absent	Carnivorous predatory	*7.5%*
6.	*Ilisha motius*	Clupeiforms	Sarangi	D.15-17 (3/12-14); P.14-16; V.6-7;A. 40-41; (2/38-39); C.17; Lr. 44 -45; L.tr. 12-13	Carnivorous predatory	*8.3%*
7.	*Oreochromis mosambica*	Perciforms	Tilapia	D. 11 (3/8); P.13 – 15; V.9; A.8 (3/5); C. 19; L.1. 26 – 27; L.tr. 5½ - 6/6½	Omnivorous	*22.8%*
8.	*Mystus tengara*	Bagridae	Tegna	D.8(1/7);P.8(1/7);V.6;A.9(3/6);C.17; Barbles four pairs	Omnivorous	*14%*
9.	*Channa punctatus*	Channidae	Ghunda	D.51;P.18;V.5;A.32;C.15;L.I.65;L.tr.51/2/12	Carnivorous predatory	*6%*
10.	*Colisa fasciatus*	Belontidae	Gourami	D.16;P.11;V.6;A.17;C.15	Carnivorous predatory	7%
11.	*Clarias batrachas*	Claridae	Magur	D.65;P.9(1/8);V.6;A.47;C.17; Barbles four pairs	Omnivorous	*8.3%*
12.	*Labeo boga*	Cyprinidae	Lohia	D.8(1/7);V.8(1/7);A.14(2/12);L.I.110; L.tr.28-33/16-28	Herbivores	*3%*
13.	*Labeo calbasu*	Cyprinidae	Kalbaz	D.11(3/8);P.15;V.9;A.8(2/6);C.19;L.I.23; L.tr.41/2/4/1/2	Herbivores	4.33%
14.	*Puntius sophore*	Cyprinidae	Kotri	D.9(2/7);P.12;V.9;A.15;C.19;L.I.43;L.tr.12/10	Herbivores	*4%*
15.	*Pangasius pangasius*	Pangasiidae	Pangas	D.1/7;P1;1/12;P2,6;29	Omnivores	5.1%
16.	*Channa orientalis*	Channidae	Khoksi	D.51;P.18;V.5;A.32;C.15;L.I.65;L.tr.51/2/12	Carnivorous predatory	*10.3%*
17.	*Notopterus Chitala*	Notopteridae	Patola	D.8(1/7);P.17;V.6;A.100;C.19;L.I.200; L.rt.25/50	Carnivorous predatory	*7%*

Table 2: Physico – Chemical parameter analysis of fish ranching in Sirpur Reserviour.

Seasons	Monsoon			Post monsoon			APHA	USEPA	FAO
Parameters	Oct 2023	Nov 2023	Dec 2023	Jan 2024	Feb 2024	Mar 2024			
Color	Dark Green	Dark Green	Light Green	Light Green	Light White	Light Green	-	-	-
Temperature ° C	22	25	23	24	28	34	25°C-30°C	25°C-30°C	25°C-30°C
Turbidity (NTU)	0.19	0.12	0.16	0.18	**0.10**	**0.11**	**b	< 30	30
Total Dissolve Solid(ppm)	200	250	300	260	**310**	**410**		< 450	**b
Chlorine (mg/litr)	30	31	33.5	32.2	**29.2**	**26.6**	-	-	-
DO (mg/litr.)	7	10	9	10	**16**	18	>20	< 40	>30
BOD (mg/litr.)	6.2	6.5	6.7	5.6	**5.3**	**5.2**	3-20	10	-
COD (mg/litr.)	6.9	5.3	6.6	4.5	**2.6**	**3.2**	-	-	-
Salinity (ppt)	6.2	8.3	8.3	10	**11.1**	**12.2**	-	-	-
EC (pS)	175	120	100	120	**90**	**80**	-	>200	>220
Conductance (mS)	5	3	2	6	**8**	10	**b	< 0.75	-
pH	7.2	7.5	7.9	8	**8.3**	**8.6**	5.9-8.2	-	6.0-8.5
Total Alkanity (mg/litr.)	50	62	71	80	**83**	**90**	-	-	-

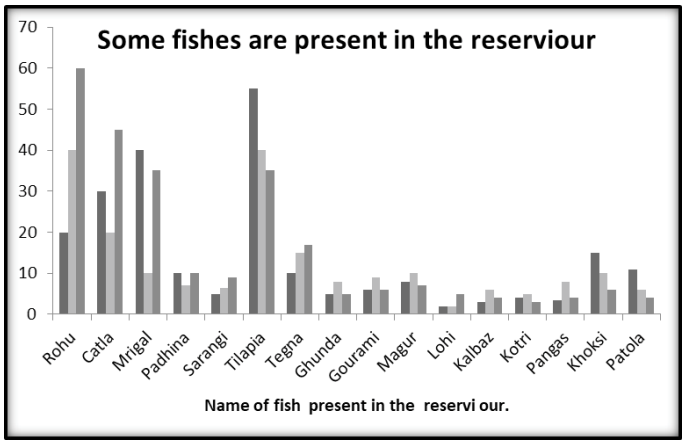

Figure 2: Fishes present in the reservoir.

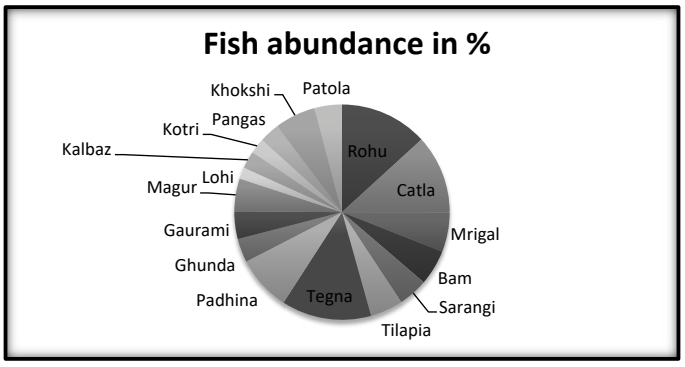

Figure 3: Data for fish abundance in Sirpur Reservoir.

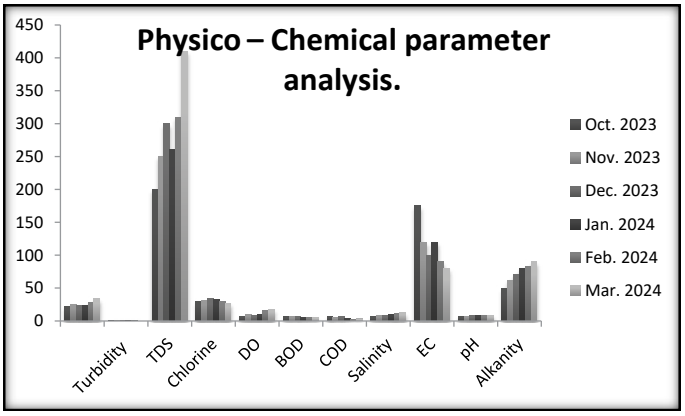

Figure 4: Data for Physico – Chemical analysis for sample water.

to 6.6mg/litr. After monsoon, 4.5 mg/litr to 3.2 mg/litr is used. On this, the increase in salinity factor is more. After monsoon, 10 mg/litr to 12.2 mg/litr which is suitable for some fishes. It can be harmful but it is seen so widely in this place that it does not have much impact (FAO, 2016) but it will have to be reduced for commercial fish ranching.

Observation

When after complete assessment in Sirpur Dam it is found that there is a decline in the productivity of fish during monsoon due to increase in TDS, chlorine content and weather also does not remain stable due to which is Catla, Mrigal, Pangas, Khokshi, Kotri,Patola etc.many fish die. Due to this, some fish species like - But on the other hand, as soon as the monsoon goes, there is an increase in the productivity of fishes because at this time their condition becomes more clean due to which the fishes get adequate adaptation and also get adequate nutrition (Banjare, Gokul Ram and Sahu, Bharat Lal, 2019). Fish ranching at Sirpur Reservoir has the potential to fulfill multiple purposes, contributing to food security, income generation, and environmental sustainability (Mabunay, L., 2008) [28]. However, careful planning and management are necessary to address potential challenges and ensure the long-term viability of this practice (Mabunay, L., 2008) [29]. By promoting responsible aquaculture practices and balancing various needs, fish ranching at Sirpur can be a valuable asset for the local community and environment (Quddus M A, Rahman M S and Moniruzzaman M., 2000) [30] (Figure 2, Figure 3, Figure 4 and Figure 5).

Conclusion

The above data shows that there is no contaminant in the water of this dam which can pollute the water. The salinity in this area has to be reduced and the fish species in the stocked area have to be conserved and produced on a large scale. This can be done in a convenient way due to which the polluting elements will also be removed. At present this water is not very bad but considering the near future, it is necessary to conserve these fishes which are listed in IUCN so that the productivity can increase. Can increase and can support people's livelihood. Fish ranching can significantly increase fish production in the reservoir.

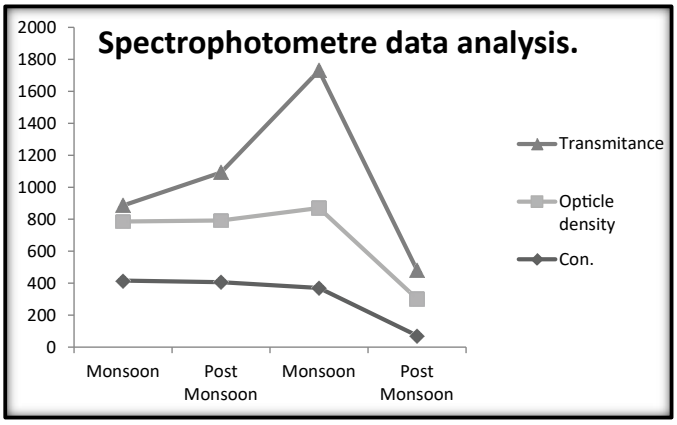

Figure 5: Values for Concentration, Optical Density etc.

Stocking the reservoir with commercially valuable fish species can provide a reliable source of income for local fishermen and contribute to food security in the region. Careful selection of fish species that thrive in the reservoir's specific conditions and responsible stocking practices are crucial for long-term sustainability. This can empower local communities, particularly those dependent on traditional fishing practices, and provide a stable source of income. Training programs in sustainable fish ranching techniques can further enhance the skills and knowledge of local fishers. Fish play a vital role in maintaining a healthy aquatic ecosystem. Stocking the reservoir with native fish species that have a balanced predator-prey relationship can help control invasive species and maintain biodiversity. Additionally, fish can contribute to improved water quality by consuming algae and other organic matter.

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