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A Study on Fish Productivity of Loni Dam, Rewa, Madhya Pradesh, India

Jai Shankar Singh[1], Dr. Mohd. Shamsul Haque[2]

[1]Assistant Professor Department of Zoology, P. M. College of excellence, Govt. Nehru P. G. college Budhar Dist. Shahdol, (M. P.)

[2]Assistant Professor Department of Zoology, Govt. Indira Gandhi Home Science Girls P. G. College Shahdol (M. P.)

Abstract: ***Loni dam is a unique reservoir of Rewa District. Which is rich in both flora and faunal diversity. Dam water is used in fish culture irrigation along with other nistar activities. In fish culture some important factors control the productivity, they are suitability of cultivated fish species, biological and physico - chemical condition of water body where cultivation is done. Proper maintenance and improvement of that above mention condition of dam productivity will increase significantly. Polyculture is more productive than traditional monoculture. In present study in Loni Dam polyculture/ mixcultuer is used for fish farming. The combination of compatible fish species with supplementary nutrients supply will make proper use of dam food resources. The composition by number Indian major carp (Catla, Rohu, Mrigal) shows maximum productivity as compare to exotic fish carps (Silver carp, Common carp, Grass carp), in the study period.***

Keywords: Loni Dam, Fish culture, Polyculture, Dam productivity, Indian major carp, Exotic carps

1. Introduction

India has a very large coastline of about 7516 km and form an exclusive economic zone (EEZ) off almost 2 million square km. In India nearly 20% of these people live in that area. India is also rich in inland fisheries because it has tremendous resource like reservoirs, dams, lakes, ponds, Canal system which gives opportunity to become a global leader in fisheries sector, that's why fisheries and aquaculture play an important role in Indian economy, food supply and also provide livelihood to the Millions of people. In fish production India ranked second in the world and fourth largest exporter of fish, and fish product. In the financial year 2023, India's fish production was almost 17 million metric tons (mmt). It more than 22 times more than the fish production of 1950 to 1951. The contribution of fisheries sector in Indian total GDP is 1.09% and agricultural GDP is 6.21%. The per capita fish consumption in India is 6.31 kg. Fish culture is also called as fish farming /pisciculture. In fish culture fishes are cultivated in a confined water body. It includes both agriculture and animal husbandry practices. In pisciculture most important thing is water and soil management of the water body, which prepare for the culture. fish culture is one of the Unique cultures because culturable animal is a cold blooded /poikilothermic and live in aquatic ecosystem.

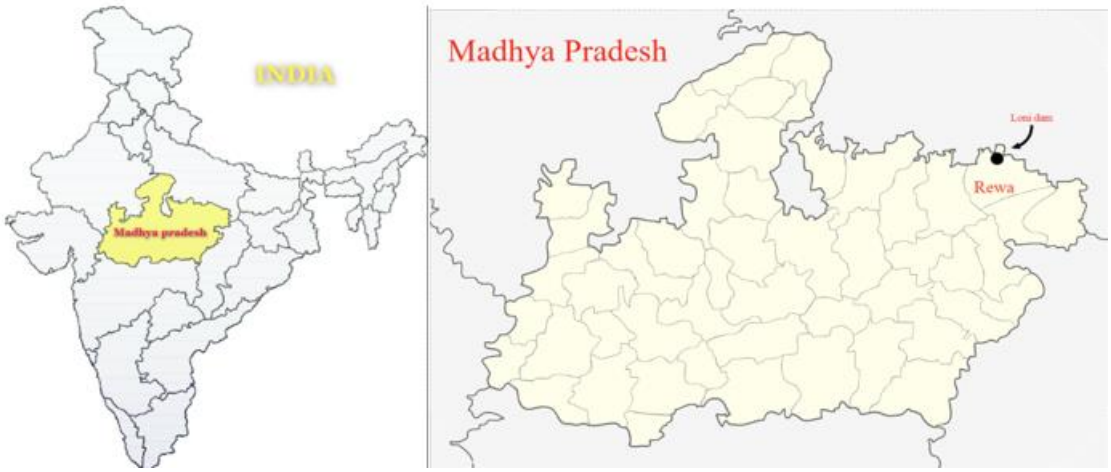

Figure: Showing Loni Dam, Rewa, Madhya Pradesh, India

Now days the inland fisheries are spread to most of the state of India. The most important point is that in rural areas of country these practices increase remarkably. Time has come to change our traditional fishing method to modern methods of aquaculture, extensive fish culture to intensive fish culture, and monoculture being replaced by polyculture (composite or mixed fish farming). For this ecologically suitable plan have been introduced, it means suitable exotic species that compatible with indigenous major carp are cultivated for maximum production and resources utilisation.

2. Material and Methods

The present study was done in Loni Dam. The Loni dam is located northern border of Rewa District of Madhya Pradesh at distance of 90 km from district headquarter. The credentials of dam with a longitude 25°08'19"N and latitude 81°34'11"E. Loni dam is used for irrigation, fisheries, drinking and bathing purposes. By commercial fishing we find the mean weight of the total fish caught in each fishing months, with the help of these data we will find the total fish production during the year by all the activities (Including closed period and off season). With the help of regional fishermen, fish will be caught from small mesh sized Cast net, Gill net and Drag net. Various species of fish caught will be preserved in 5% formalin solution and brought to the laboratory for further investigation. The fishes will be identified up to the species level with the help of "The fishes of India" by (F. Day, 1889, Reproduced in 1958). In Loni Dam mixed/ polyculture form of fish farming is adapted, for this very common combination of Indian major carp Catla, Rohu and Mrigal and exotic carps, Silver carp, Common carp, Grass carp fingerlings is used in standard stocking ratio. Productivity of fish farming depends on proper stocking or maintain standard/scientific proportion of different species. The ration of stocking of above 6 species was, 1 Catla: 2.5 Rohu: 1 Mrigal: 2.5 Silver carp: 2 Common carp: 1 Grass carp. In Loni dam 30000 fingerlings were used for stocking in above mention proportion showing stock ration of fishes during July 2021 to June 2022. For the Compatibility of different species fallowing standard rules like different species have supplementary feeding habits, one species tolerates others, different species occupy different ecological niches and they are not predatory, are strictly follow for the achieving commercial size at standard time period. Catla and Silver carp are surface dwellers and predominantly feed on zooplankton and later its phytoplankton feeder. Rohu is column dweller and saprophagic, Mrigal is bottom dweller and eat filamentous algae and debris, while Common carp is omnivorous. The Grass carp use macro vegetation for their feeding habits.

3. Results and Discussion

Stocking fingerlings of size 10 to 15 cm is done as proportion mention in above. Stocking by volume is more correct as compare to area basis. Standard combination of fish species and their number reduces intraspecific competition to allow the species to grow in suitable size for sale. Main governing factor for growth of fishes is food nutrient but natural fish food act as limiting factor that's why fishes cannot obtain desired weight, in desired time. So, the need of supplementary food which enhances the fish production. For the optimal growth of fingerlings and fry artificial food contain 45% protein and 25% carbohydrate are desirable. The common supplementary food are aquatic weeds, rice and wheat bran, wheat flour, oil cakes, powdered algae (Spirulina) fish and meat meal etc. In the present study, mix/composite fish culture with average survival of almost 71% fish seed are observed. In five to six months fingerlings are grow to the desired market size that is near 01 kg or more. The stocking of fingerlings of above mention six carp species was done in first week of October 2021 and harvesting was mainly done in March, April, May and June 2022. The culture period of 9-month (October 2021 June 2022) in Loni Dam a total 2360.55 kg / hectare /month (stocking done in almost 08 hectare of area) production of carp fishes and 29.75 kg/ hectare /month production of other local fishes were obtained.

There is the total 21345 number and 21245 kg fishes were recorded during present study period from July 2021 to June 2022, in which 2388 number and 3398 kg of Catla, 4799 number and 5225 kg Rohu, 2248 number and 2353 kg Mrigal, 4754 number and 4181 kg Silver carp.3931 number of fishes and 3274 kg Common carp, 2250 number and 2276 kg Grass carp.975 other local fishes in number and 538 kg in weight were recorded during this period. Maximum number and weight of Rohu, minimum number and weight of other local fishes were recorded. The percent composition of number and weight are Catla 11.19 % and 15.99 %, Rohu 22.48% and 24.59%, Mrigal 10.53% and 11.08%, Silver carp 22.27% by and 19.68%. Common carp 18.42% and 15.41 %, Grass carp

10.54% and 10.71%, other local fishes 4.57% and 2.54 % were recorded during the present study period.

Table 1: Yearly fish catch (July 2021 to June 2022) of Loni Dam with species composition by number of commercial fishes.

Month – Name	*Major carps*						*Exotic carps*						*Other* Local fish		*Total No. of fish caught*
	Catla		*Rohu*		*Mrigal*		Silver carp		Common carp		Grass carp				
	No.	No. %	No.	No. %	No.	No. %	No.	No. %	No.	No. %	No.	No. %	No.	No. %	
Jul-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aug-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sep-21		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oct-21	198	9.3	476	23.64	187	9.29	471	23.39	377	18.72	175	8.69	130	6.44	**2014**
Nov-21	213	11.43	421	22.6	205	11	399	21.48	329	17.51	199	10.68	97	5.3	**1863**
Dec-21	249	11.8	473	22.43	224	10.62	461	21.86	347	16.45	238	11.37	117	5.47	**2109**
Jan-22	280	12.24	411	17.96	265	11.58	513	22.42	449	19.63	265	11.58	105	4.59	**2288**
Feb-22	307	10.96	635	22.6	295	10.54	625	22.32	551	19.68	291	10.39	96	3.43	**2800**
Mar-22	305	11.04	639	23.08	284	10.28	611	22.14	521	18.88	301	10.89	102	3.69	**2763**
Apr-22	251	10.86	536	23.2	238	10.3	507	21.96	426	18.44	229	9.92	123	5.32	**2310**
May-22	254	11.2	531	23.43	241	10.65	514	22.6	394	17.38	241	10.65	91	4.01	**2266**
Jun-22	331	11.29	677	23.09	309	10.54	653	22.2	537	18.31	311	10.6	114	3.89	**2932**
Total	**2388**	**11.19**	**4799**	**22.48**	**2248**	**10.53**	**4754**	**22.27**	**3931**	**18.42**	**2250**	**10.54**	**975**	**4.57**	**21345**

Table 2: Yearly fish catch (July 2021 to June 2022) of Loni Dam with species composition by weight of commercial fishes

Month - Name	*Major carps*						*Exotic carps*						*Other* Local fish		*Total fish production/ caught (kg)*
	Catla		*Rohu*		*Mrigal*		Silver carp		Common carp		Grass carp				
	Weight	Weight %	Weight	Weight %	Weight	Weight %	Weight	Weight %	Weight	Weight %	Weight	Weight %	Weight	Weight %	
Jul-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aug-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sep-21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oct-21	301	16.53	518	28.28	157	8.59	381	20.65	273	14.91	149	8.15	53	2.89	**1832**
Nov-21	263	15.86	438	26.42	179	10.8	337	20.33	236	14.23	168	10.13	37	2.23	**1658**
Dec-21	277	14.4	507	26.37	214	11.13	379	19.71	258	13.42	217	11.28	71	3.69	**1923**
Jan-22	359	16.1	564	25.29	292	13.09	369	16.55	315	14.12	268	12.02	63	2.83	**2230**
Feb-22	496	16.94	687	23.46	321	10.96	572	19.54	487	16.63	308	10.52	57	1.95	**2928**
Mar-22	478	16.53	672	23.24	331	11.46	575	19.89	462	15.98	312	10.79	61	2.11	**2891**
Apr-22	386	15.96	557	23.02	252	10.42	482	19.93	406	16.78	263	10.87	73	3.02	**2419**
May-22	355	15.39	564	24.45	265	11.48	477	20.68	347	15.04	244	10.58	55	2.38	**2307**
Jun-22	483	15.8	718	23.49	342	11.19	609	19.92	490	16.03	347	11.35	68	2.22	**3057**
Total	**3398**	**15.99**	**5225**	**24.59**	**2353**	**11.08**	**4181**	**19.68**	**3274**	**15.41**	**2276**	**10.71**	**538**	**2.54**	**21245**

4. Conclusion

Loni dam is reservoir about 143-hectare area but stocking is done in only 08 hectare of the area, due to lack of water resource in dam and other reasons. Water quality of dam is good and suitable for fish farming productivity of dam is 2360.55 kg/ hectare. Total 21245 kg Biomass produced during study period. The productivity of dam was increased by the application of proper maintenance of dam, timely nutrient supply and by the trained fisherman. Catla, Rohu, Silver carp, and Common carp showing better production during present study period.

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