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Comparative study of sport fishing and water quality parameters between Siswan dam and Sukhna Lake

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Abstract

Siswan Dam and Sukhna Lake both are manmade water bodies situated in the range of Shivalik Hills at different geographical area like Village Siswan, S.A.S Nagar Punjab and north east region of Chandigarh respectively. We analysed distinct water quality sample from Siswan Dam and Sukhna Lake during October and November 2018 (Morning, Afternoon and evening). Besides this, Sukhna Lake is very popular place for tourism as compare to Siswan Dam. Sukhna Lake is famous for recreational activities like boating, sightseeing, food plaza, traditional boat race, canoe polo, canoe marathon and sport fishing also. On the other side, Siswan Dam has less tourism and mostly voyagers visit over there during their journey to Shimla. Dam comes under irrigation department of Punjab and lake comes under Department of Animal husbandry and Fisheries Sector Chandigarh UT and Forest Department respectively. On the other hand, Lake also declared as a national wetland of India and Department of Animal husbandry and Fisheries Sector Chandigarh UT also providing daily fishing licenses on different terms and conditions like for angling activity @ 40 rupee daily, 300 rupee for 10 days and 800 rupee for one month but there is no sport fishing and boating club at Dam except a Café Black Hole Siswan is situated in front of the entrance of Dam from Road side. During water sampling we assessed different water quality parameters like D.O, pH, Air Temperature, water temperature, alkalinity and water color from both sites. There was huge difference between water quality of Siswan dam and Sukhna Lake. We observed that Sukhna Lake water pH 8.4 was alkaline as compare to Siswan Dam pH 7.7 and not only pH there was huge difference in other water quality parameters also like water color and D.O respectively. With respect to these Situations Lake has a great scope of fisheries and sport fishing as compare to Dam.

Keywords: Siswan dam, Sukhna Lake, spot fishing and water quality parameters.

1. Introduction

The aquatic ecosystem has distinct kind of components like water quality and biological diversity of aquatic animals and aquatic flora respectively. Physicochemical parameters of water play a significant role in the biology and physiology of fish. India has near about 3.15 million ha reservoir area [4]. Most number of reservoirs present in Maharashtra state of India. Nowadays Quality of these water bodies has immense role in fisheries and aqua tourism throughout the India. Besides this, lakes has not only very productive role in fisheries sector but lakes also has good aqua tourism industry and sport fishing in the upper range of north India at Himalaya region like Bhimtal lake Uttarakhand, Sukhna lake Chandigarh, Dal lake Srinagar and Wular lake respectively. On the other hand, In India from last 70 years number of stagnant water bodies has constructed under irrigation department of India like Siswan Dam and Sukhna Lake at Punjab and Chandigarh respectively. Siswan Dam in Punjab region comes under irrigation water quality system constructed during 1998 at S.A.S Nagar on Siswan Khad River respectively [2]. Siswan dam has a 435 meter length with 950 ha culturable command area (CCA) respectively [2]. Dam has maximum height above foundation is 24 meter and water depth in winter season is 15- 25 feet and total water capacity is near about total volume count of dam is 417 respectively. Dam comes under lease for five years via irrigation department of Punjab for fish culture use only. On the other hand, Sukhna Lake constructed during 1958 on Sukhna Choe at the foot hills of Shivalik hills in Chandigarh [6]. Main water source is seasonal streaming from hilly region during monsoon season. Lake has total 3 km square area and average depth is near about 2.4 meter throughout the year and maximum depth during monsoon season is 4.9-5.1 meter respectively. In Chandigarh Sukhna lake is main source of fisheries and Fisheries Department Fish-seed Farm just off Sukhna Lake produces 6.5 lakh fish seed annually. These fish are stocked in Sukhna Lake, and in village ponds and

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ponds formed by check dams built by the Forest Department [5, 6]. Besides this, Lake is also famous for recreational activities like boating, sightseeing, food plaza, traditional boat race, canoe polo, canoe marathon and sport fishing respectively. Lake also declared as a national wetland of India via Govt. of India and Department of Animal husbandry and Fisheries Sector Chandigarh UT also providing daily fishing licenses on different terms and conditions.

2. Material and Methods

2.1 Site of study

We collected water sample from distinct sites of Siswan Dam S.A.S Nagar, Punjab and Sukhna Lake, Chandigarh for water quality assessment during last week of October and first week of November 2018 (Morning, Afternoon and evening).

2.2 Water quality parameter sampling

Water quality parameter has significant role in fisheries. Fish are equilibrium with potential organisms to their environment. Changes in this equilibrium, such as deterioration in water quality can result in fish becoming stressed and vulnerable to diseases. Therefore, it is important to know water quality parameters and their management is necessary for better growth and survival. There is various kinds of physical and chemical water quality parameters like DO (Dissolved Oxygen), Temperature, pH, Salinity, Turbidity, Ammonia, Nitrate, Nitrite, Total Alkalinity, Total Hardness, Orthophosphate, Carbon Dioxide etc.

During water quality assessment from these two water bodies

we used Aqua sol water quality testing kits for distinct water quality parameters respectively.

Besides this, all information regarding sport fishing and aqua tourism we collected from distinct respective departments of these two different water bodies like Department of Animal husbandry and Fisheries Sector 22 Chandigarh, Forest Department Chandigarh And Irrigation Department of Punjab office at Siswan Dam respectively.

3. Results

3.1 Water Quality Parameters Assessment

We collected water sample from distinct sites of Siswan Dam and Sukhna Lake for water quality assessment during start of winter season.

During water sampling we analysed different water quality parameters like D.O, pH, Air Temperature, water temperature, alkalinity and water color from both sites. There is huge difference in water quality parameters of Sukhna Lake and Siswan dam except temperature only. Water is alkaline of Sukhna Lake with average 8.5 ph as compare to Siswan dam which has 7.7 ph respectively [Table no. 1]. On the other hand, Dissolved oxygen content in water of Sukhna Lake is optimum for fish growth with average 5.5 mg/l as compare to Siswan dam with is quite low with average value 4.1 mg/l respectively [Table no. 1]. Sukhna Lake has dark brown and green color was present in Siswan Lake during our study [Table no. 1]. On the other side, water temperature of both water bodies has similar value with minute difference respectively [Table no. 1].

Table 1: Representing water quality parameters of Lake and Dam

Lake/Dam	pH	Alkalinity (ppt)	Temperature(°C)	D.O (mg/l)	Water color	Air Temperature (°C)
Lake (Morning)	8.5	180	18	3.5	Dark Brown	20
Lake (Afternoon)	8.4	210	26	5.5	Dark Brown	29
Lake (Evening)	8.5	310	24	6.5	Dark Brown	26
Dam (Morning)	7.8	140	17	3.5	Light green	19
Dam (Afternoon)	7.7	160	24	4.0	Light green	29
Dam (Evening)	7.7	190	21	5.0	Light green	25

3.2 Sport fishing and Aqua tourism

Sukhna Lake is very attractive place for tourists as compare to Siswan Dam. Sukhna Lake is famous for recreational activities like boating, sightseeing, food plaza, traditional boat race, canoe polo, canoe marathon and sport fishing also. On the other side, Siswan Dam has less tourism and mostly voyagers visit over there during their journey to Shimla. Dam comes under irrigation department of Punjab and lake comes under Department of Animal husbandry and Fisheries Chandigarh UT and Forest Department respectively. On the other hand, Lake also declared as a national wetland of India via Govt. of India. Department of Animal husbandry and Fisheries Sector 22 Chandigarh UT also providing daily fishing licenses for angling activity @ 40 rupee daily, 300 rupee for 10 days and 800 rupee for one month with rod, line and one hook only on different terms and conditions like Bag limit is restricted 2 numbers of fishes of size not more than 20 cm and weight not exceeding 3 5 kg but there is no sport fishing and boating club except a Café Black Hole Siswan is situated in front of the entrance of Dam from Road side. Besides this, Number of licenses issued per day should not exceed 20 to maintain ecological balance of Sukhna Lake. Dam is on lease of five year nowadays with average production is near about 1 tonnes per year but lake has 2-3 tonnes per year.

4. Discussion

Water quality assessment provides valuable information in prospective of fisheries and it's an important tool in sustainable development of water ecosystem. According to (Simarjit *et al.*, 2011) [3]. The temperature of the Sukhna Lake was found to be in between the range 20 and 21 °C during the first sampling in November, 2009. The accepted pH range of the water by Union Health Ministry is 7.0 to 8.5 but may be tolerated up to the range of 6.5 -9.2 if any other source is not available. As the pH of the samples taken are in the range of 6.9 to 8.3. Thus the range of the water samples is almost within the range of the acceptability and is harmless for the aquatic life in terms of the pH level of the water body. In our diurnal water quality assessment we reveal that pH of Sukhna Lake was Alkaline with 8.5 and diurnal temperature average 23 °C respectively [Table no. 1]. On the other hand, (P. Chaudhry *et al.*, 2013) [1] observed D.O 6.8 mg/l annual average. In our study during winter season we founded that D.O was 5.5 mg/l throughout the whole day [Table no. 1]. On the other side, Siswan Dam also has good water quality as compare to Sukhna Lake but there was lack of management in prospective of development and sustainability of water ecosystem. Lastly, Chandigarh administration playing an important role in the development of aqua tourism and sport

fishing with their impressive polices as compare to Punjab Government on Siswan Dam.

5. Conclusion

It is Cristal clear that from our diurnal water quality assessment of Sukhna Lake has alkaline pH value as compare to Siswan Dam respectively. On the other hand, Lake has better D.O content in water throughout the day rather than Dam. Besides this, lake is also famous for sport fishing, boating, sightseeing, food plaza, traditional boat race, canoe polo and canoe marathon. According to our research we find out that Nowadays, Dam has good water quality but there is no scope of fisheries and aqua tourism industry as compare to lake.

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