



A research paper on dams and its impact on fishery

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Abstract

India is the second biggest inland fish producer in the world. However, though blessed with one of the richest riverine fish gene pools and a network on hundreds of rivers, floodplains, ox bows and estuaries, the contribution of riverine and capture fisheries is declining sharply and many have collapsed, despite having a great potential to grow. India has 14 major and 44 medium rivers and countless tributaries, floodplains, riparian tracts, mangroves and estuaries. These inland water bodies combined together, stretch over 45,000 km across the country, making India one of the richest fish germplasm in the world. However, the reallocation of water through dams has severely affected the ecosystem of these rivers, as the downstream flows are restricted and mangroves vanish.

Keywords: dams, fishery, river

Introduction

Surface water is water in a river, lake or fresh water wetland, Surface water is naturally replenished by precipitation and naturally lost through discharge to the oceans, evaporation, evapotranspiration and groundwater recharge.

Although the only natural input to any surface water system is precipitation within its watershed, the total quantity of water in that system at any given time is also dependent on many other factors. These factors include storage capacity in lakes, wetlands and artificial reservoirs, the permeability of the soil beneath these storage bodies, the runoff characteristics of the land in the watershed, the timing of the precipitation and local evaporation rates. All of these factors also affect the proportions of water loss.

Human activities can have a large and sometimes devastating impact on these factors. Humans often increase storage capacity by constructing reservoirs and decrease it by draining wetlands. Water conservation is a practice in which the effective and efficient way of use water that reduce the demand of water for establishment. For example, recycling of wastewater comes from domestic and industrial activity used for some other purposes like cleaning, agricultural, etc.

Review of Literature

Uttam Kumar Sarkar (2015) the reservoirs play an important role in the developmental process of a Nation and also have an integral role in fisheries and livelihood security of the local community. With the increase in population growth reservoirs are becoming important provider of animal protein and for generation of employment in particular to poorer sectors of the people. Reservoirs have many uses from generation of electricity to irrigation purpose and also providing habitat to fishes and other aquatic life and in turn also help to provide feed and create revenue for fish communities. In India, reservoirs are playing a crucial role in the fisheries. Fish communities are often used as indicators of environmental

quality. In terms of fish diversity altogether 117 fish species were recorded from Indian reservoirs exhibiting rich fish diversity. These reservoirs have both positive and negative impacts on fishes and other aquatic environment. Therefore, present study is emphasized on synthesizing the available information on fish diversity and community structure of the potential Indian reservoirs and its effects on fisheries and other aquatic environment in reservoirs in India. Some strategies have been suggested for sustaining river and reservoir fish biodiversity.

Utpal Bhaumik (2016) Narmada, the oldest river system in India, originates from Amarkantak in Madhya Pradesh, flows east-west, and joins with the Gulf of Cambay on the Arabian Sea. The river drains 45.64 km³ of annual run-off and a series of dams was proposed to hold some of its water resources for multipurpose use. Currently, three dams have been built in Madhya Pradesh and one is under construction in Gujarat. A comparison of pre- and post-impoundment eco-environment and fisheries revealed changes in water quality, productivity, and aquatic flora and fauna of the river system. Among the fish, species like Tor tor, Labeofimbriatus, and Labeodyocheilus suffered most. The percentage contributions to total yield of Carp, Catfish, and miscellaneous groups have significantly changed, indicating falls of 17%, 36% and an increase of 410%, respectively. The percentage contribution to catches of Macro brachium rosenbergii and Tenulosailisha have also declined by 46% and about 75% in the estuarine stretch of the river system. Suitable conservation measures for sustenance and development of fishery have been suggested.

Wazir Singh Lakra (2010) in the present communication habitat ecology, species diversity; distribution and different indices of fish biodiversity management were studied in a Central India river (River Betwa, a tributary of River Ganga basin approved under India's first river linking plan). Correlation between fish species richness with the

hydrological attributes showed good relationship and water depth, dissolved oxygen and pH were found the most important variables in shaping fish assemblage. Altogether, sixty-three fish species belonging to 20 families and 45 genera were collected from five sampling stations spread along the upstream, mid-stream and lower streams. Cyprinids were the most dominated group represented by 26 species belonging to 15 genera, followed by Bagridae (6 species from 3 genera), and Schilbeidae (4 species from 4 genera). The distribution of fish showed interesting pattern and about 10% species were common to all the sites showing long migration range. Shannon-Weiner diversity index showed considerable variation and ranged from 1.89 to 3.51. Out of 63 species status of 10 species were not known due to data deficit, 29 categorized as lower risk, 14 as vulnerable, 8 as endangered, while the remaining two species were introduced. Our study shows that the River supports considerable diversity of the fishes and is important for conservation and about 34% fish fauna is threatened being either vulnerable or endangered. We assessed that the river supports considerable percentage of food fish (89.47%), ornamental fish (49.12%) and sport fish (5.26%). Among the eight major types of fish habitats identified along the entire stretch of river, Open River, shallow water and deep pools were habitats contributing maximum diversity. Fish species richness (FSR) were significantly different ($P < 0.05$) in all the habitats except channel confluence and scour pool. Trophic niche model may be useful for assessing altered as well as less altered fish habitat of the tropical rivers. Since this river will be interlinked in near future, this study would be useful for conservation planning and management and also for future assessment after interlinking. Issues related to various threats to aquatic environment and conservation management strategies have been discussed.

Impacts of Dams on Fisheries in Narmada

Narmada River system on the west coast experienced significant decline (68.24%) in Hilsa catch in 2004-05 (4866 t) as compared to 1993-94 (15319 t) and this decline was prominently recorded from 1998-99 onwards. The construction of the Tawa Dam resulted in a reduction of water depths and loss of carp breeding grounds, spawning and feeding in the central 240 km stretch of the Narmada Basin. Flow reduction is the reason for reduced carp fisheries. Hoshangabad, on the banks of Narmada in Madhya Pradesh enjoyed some of the best Mahseer landings in the country. After construction of Tawa and other projects, the Mahseer catches have already dropped drastically. In the sixties, monthly catches of Mahseer at Hoshangabad alone ranged upto 2-3 tonnes. The fish is nearly wiped out from the river after construction of Tawa Dam and Madhya Pradesh is now embarking on protecting the fish only through reservoir breeding and hatcheries program.

Incidentally, like many other states, Madhya Pradesh has also declared Mahseer as its state fish. If targeted through ecosystems approach, there could be hope for reinstating Mahseer in Rivers of Madhya Pradesh, but there is no evidence that Madhya Pradesh is serious about this. At the Narmada estuary near Bharuch, the fish landings are reducing at an alarming rate. Even as fishermen blame low Hilsa runs

and fish decline on the low water levels and non-release of water from the Sardar Sarovar Dam in the upstream, the Sardar Sarovar Narmada Nigmal Limited (SSNNL) maintains that enough water has been released in the downstream. No data is available in the open domain to establish this claim of SSNNL.

The oligotrophic tendencies shown by some of the reservoirs are mainly due to the poor nutrient status and other chemical deficiencies. In most of the cases, poor water quality is a direct reflection of the catchment soil. All reservoirs in Kerala portray a low status in terms of specific conductivity ($< 50 \mu\text{mhos}$) and total alkalinity ($< 50 \text{mg l}^{-1}$) with the attendant low primary productivity and plankton. The rivers of Kerala drain the hills of Western Ghats with lateritic and humus soils deficient in N, P and Ca. The eastern slopes of these hills drain the rivers feeding Hope Lake, Manimuthar, Pechiparal and Peruchani, all deficient in ions. Sathanur, Krishnagiri and Vidur reservoirs receiving drainage passing predominantly through cultivated area have higher levels of alkalinity and hardness. Similarly, in Madhya Pradesh the water is soft to medium soft with less mineral salts, due to geo-chemical reasons. Even small lakes with shallow bottoms, more often than not, do not show signs of productivity due to the poor chemical makeup of the catchment. Soils in Madhya Pradesh are normally deep black, medium black, shallow black and mixed red and skeletal, low in nitrogen and phosphorus.

Conclusion

In conclusion, dams have its ups and downs in different people's views or opinions for building a dam. The Sardar Sarovar Dam is one of the major big dams that has an issue in India that has good outcomes for be being built and also bad ones too. This dam will have the one of the biggest impacts in India considering it will be the biggest dam constructed in the world. But the plans for it will leave many people in India without homes and will harm there food production.

Fish populations are highly dependent upon the characteristics of their aquatic habitat which supports all their biological functions. Migratory fish require different environments for the main phases of their life cycle which are reproduction, production of juveniles, growth and sexual maturation. The life cycle of diadromous species takes place partly in fresh water and partly in sea water: the reproduction of anadromous species takes place in freshwater, whereas catadromous species migrate to the sea for breeding purposes and back to freshwater for trophic purposes. The migration of potamodromous species, whose entire life cycle is completed within the inland waters of a river system, must also be considered.

The construction of a dam on a river can block or delay upstream fish migration and thus contribute to the decline and even the extinction of species that depend on longitudinal movements along the stream continuum during certain phases of their life cycle. Mortality resulting from fish passage through hydraulic turbines or over spillways during their downstream migration can be significant. Experience gained shows that problems associated with downstream migration can also be a major factor affecting anadromous or catadromous fish stocks. Habitat loss or alteration, discharge

modifications, changes in water quality and temperature, increased predation pressure as well as delays in migration caused by dams are significant issues.

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