



Analysis of Water Quality using Physico-Chemical Parameters, Satak Reservoir in Khargone District, MP, India

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Abstract

Satak reservoir, a small inland reservoir located in Village Bamandi, Teh Kasrawad District Khargone, Madhya Pradesh, India is constructed over Satak river, in the basin of Narmada River. The physico-chemical characteristics, pollution studies of Satak reservoir have been studied from February 2012 to March 2012. The nutrients including are in sufficient quantities for the growth of aquatic animals in the reservoir. The above study indicated that the satak reservoir is under the category of mesotrophic water body slightly inclined towards eutrophication. Therefore, the conservation and management of this water body is very much required. Here we are study about chloride, total hardness Mg hardness, Ca hardness, alkalinity, temperature, Ph parameter.

Keywords: Water quality, tropic status, physicochemical, chloride content, hardness.

Introduction

India is facing a serious problem of natural resource scarcity, especially that of water in view of population growth and economic development. Water is a prime natural resource, a basic human need and a precious national asset and hence its use needs appropriate planning, development and management. However, studies related to ecology and environment are often perceived as 'anti-development and detrimental to the overall growth and welfare of human beings and are viewed with suspicion and generally considered as nuisance. The tropic status of a water body depends on the locality and its topography of all. It is essential for sustaining all forms of life, food production, economic development and for general well being. Due to tremendous development of industry and agriculture, the water ecosystem has become perceptibly altered in several respects in recent years and as such they are exposed to all local disturbances regardless of where they occur. The increasing industrialization, urbanization and developmental activities, to cope up the population explosion have brought inevitable water crisis'. The health of lakes and their biological diversity are directly related to health. In freshwater bodies, nutrients play a major role as their excesses lead to eutrophication. Excessive macrophytic vegetation is indicative of the eutrophication status of any water body². Monitoring of water quality is the first step that can lead to management and conservation of aquatic ecosystems. It is also true that the management of any aquatic ecosystem is aimed to the conservation of its habitat by suitably maintaining the physico-chemical quality of water within acceptable levels. Hence, in the present study, an attempt has been made to study the physico-chemical parameters of Satak reservoir situated in Khargone district, Madhya Pradesh India to arrive at certain

conclusions on the structural and functional aspects of the reservoir and to suggest ways and means for its conservation³.

Material and Methods

Satak, a small man-made reservoir with 140.097 ha water spread area, was built over a Satak river in the basin of Narmada River. The reservoir is located approximately 10 km northwest of Kasrawade Tehsil in Madhya Pradesh, India and approximately 40 km south of Khargone. This reservoir is a multipurpose point tank used for different activities like drinking water supply, irrigation, fisheries etc. Three sampling stations Map of Satak reservoir showing sampling stations. Stations namely, point 01, point 02, point 03 were selected for analysis of physico-chemical characteristics of water covering whole area of the reservoir (figure 1 and 2).

Sampling procedure and laboratory analysis: Water samples were collected from all three sampling stations from February to March, 2012. Monthly samples of sub-surface water in triplicate were collected during first week of each month in the early hours of the day (7 a.m. to 9 a.m.). Iodine treated double stop par polyethylene bottles were used for collection of water samples. Bottles were kept in ice bucket and brought to the laboratory for analysis. Some of the physico-chemical characteristics of water including water temperature, depth, color, transparency, pH were determined using mercury thermometer, graduated string, visual, Secchi disc, digital pH meter, respectively, total alkalinity, total hardness, chlorides, calcium and magnesium Hardness, were analyzed using titrimetric method at the sampling stations.

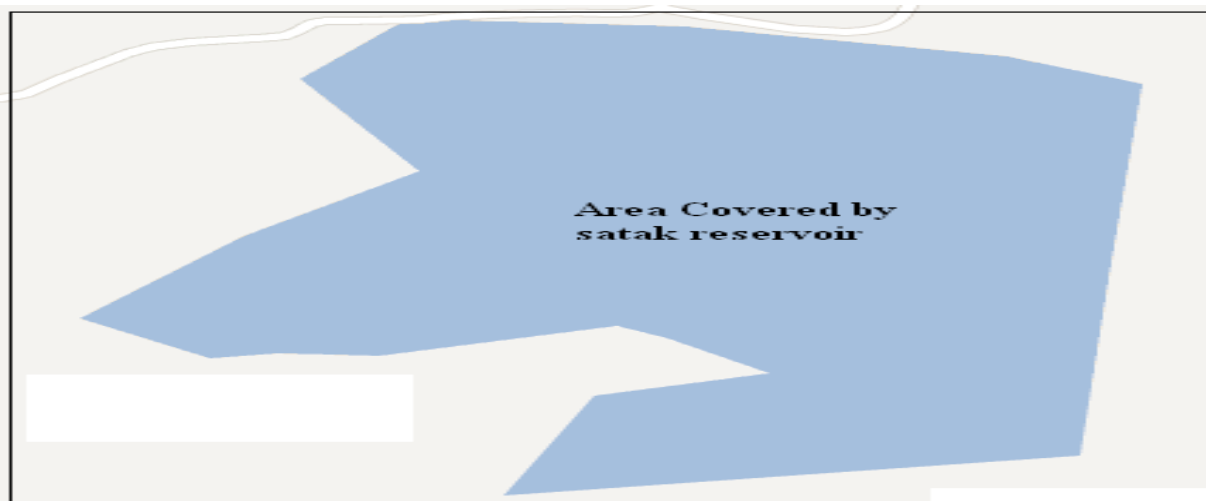


Figure- 1
 Area covered by satak reservoir

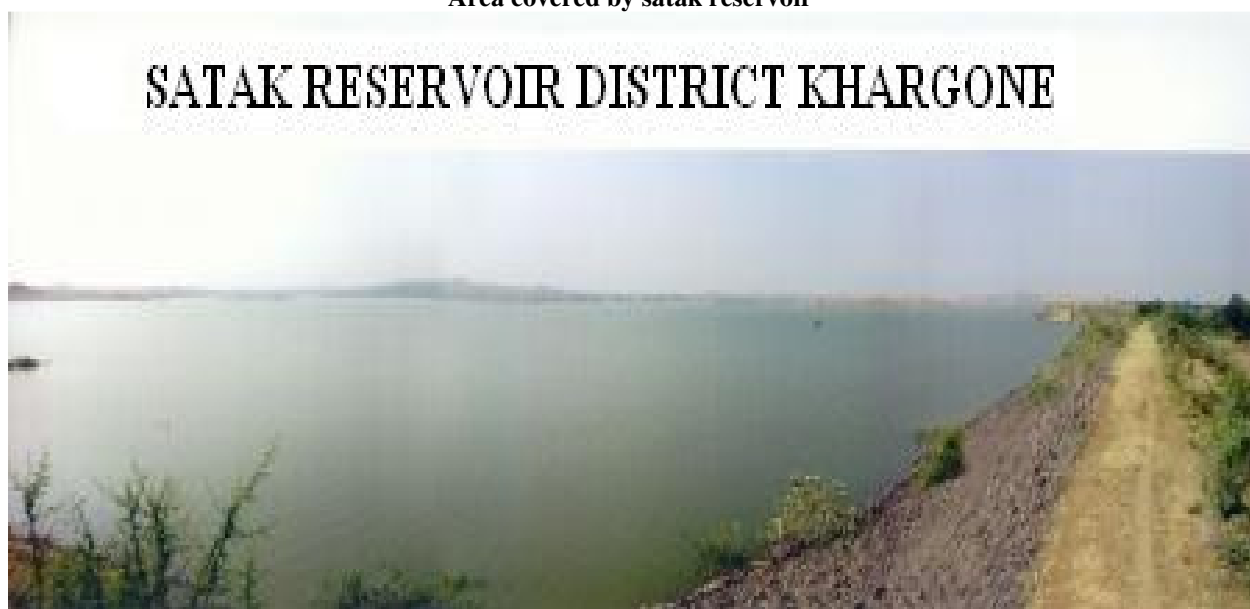


Figure- 2
 Photo of satak reservoir

Table-1
 Parameters of Satak Reservoir water

PARAMETER	POINT 01	POINT 02	POINT 03
Colour	yellow	Light yellow	Light yellow
Odour	Light sweet	Light sweet	Light alcoholic
Ph	5.32	5.45	5.89
Temprature	32	34	35
Total hardness	760	785	800
Ca hardness	160.32	165.2	200.4
Mg hardness	599.68	602.32	625.5
Alkalinity	83	85	90
Chloride content	78.1	63.9	71.0
Electrical conductivity	109.00 μ S/cm	236.40 μ S/cm	248.30 μ S/cm
Transparency	68.59cm	90.40cm	118.00cm

Results and Discussion

Range of variation and their annual mean along with standard deviation of various physico-chemical characteristics of water of Satak reservoir is given in table 1.

Reservoir: In Satak reservoir, maximum water level was recorded in post-monsoon period while minimum water level was recorded in summer season during both the years of study. Water was turbid in monsoon season with yellow brown color, while green color in winter and transparent green color was observed in summer season. The transparency of water is mainly affected by factors such as biological productivity, suspended particles and water color⁴. The transparency in satak reservoir ranged from 68.59 - 118.00 cm with low value during monsoon season. Settlement of sand, silt and clay result in a higher transparency from the post-monsoon period reaching a maximum of 118.00 cm marks the highest transparency in this reservoir. Conductivity measures the capacity of a substance or solution to conduct electrical current. The electrical conductivity was found to fluctuate between 109.00 μ S/cm and 248.30 μ S/cm in this reservoir and that falls within the range observed for Indian waters. According to this criteria, Satak reservoir water falls under the category of mesotrophic water body. Clay, silt, organic matter, plankton and other microscopic organisms cause turbidity in natural waters

Water quality of the reservoir: In Satak reservoir, the water temperature increased during warmer months and decreased during colder months. Similar seasonal variations were also observed by Survey. Water level plays an important role in governing the water quality⁵.

Conclusion

Conservationists are meticulously attempting to conserve the biodiversity from anthropogenic erosion and 'prenatural' extinction⁵. The major barriers in conservation of biodiversity for sustainable life in future include Inadequate data base, inadequate funding for research, confusions and controversies over area selection for conservation. This has made the task more and more difficult. On the basis of physicochemical characteristics it may be said that the Satak reservoir is a mesotrophic water body, which is slightly inclined towards eutrophication⁶. The trophic status of reservoir warrants a proper conservation and management and best possible use of the reservoir, the macrophytes will have to be controlled⁷. This can be achieved by mechanical removal or by biological means using grass carp. since the removal of nutrients in the form of biomass can only check eutrophication. The nullahs, streams

and river let's joining the reservoir should be obstructed by constructing stop and check dams. This will not allow the siltation in reservoir.

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