

Limnological Study of Betwa River in Bundelkhand Region- A Research Article



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Abstract

In the present research investigation, periodic analysis of various physico-chemical parameters (colour, temperature, turbidity, transparency, pH, electric conductivity, dissolved oxygen, BOD, COD, free CO₂, alkalinity TDS, TSS, nitrate, phosphate, hardness etc.), biological parameters (phytoplanktons and zooplanktons) as well as ichthyodiversity are examining to access the quality of water status from different selected sampling stations of Betwa river in Bundelkhand region.

Keywords: Physico-Chemical Parameters, Phytoplanktons, Zooplanktons, Ichthyodiversity, Bundelkhand Region

Introduction

Bundelkhand is the historical region of central India. It is situated between the Indo-Gangetic plain to the north and the Vindhya range to the south. Bundelkhand is spread over southern Uttar Pradesh (U.P.) and northern Madhya Pradesh (M.P.) between 23°10' and 26°30' north latitude and 78°20' and 81°40' east longitude. The region covers a geographical area of around 70,000 sq km and includes seven districts of U.P. (Banda, Chitrakoot, Hamirpur, Lalitpur, Jalaun, Jhansi and Mahoba) and six districts of M.P. (Chhatrapur, Datia, Damoh, Panna, Sagar and Tikamgarh).

Review of Literature

Betwa River is an important major tributary of Yamuna, which provide life-line for Bundelkhand region in the form of irrigation, drinking water supply, fisheries sector and also for electricity generation from power plants. It originates from the Vindhya Range. The main tributaries of Betwa are Bina, Jamini, Dhasan, Virma and Narayani. Rajghat Dam, an Inter-state Dam project of the Government of Madhya Pradesh and Uttar Pradesh being constructed on Betwa River. On the downstream Matatila Dam, Dhukwan Dam and Parichha Dam are there (Singh and Sharma, 2017).

Life cannot be imagined without a substantial presence of water in any planet. Without water life become invisible from any living zone of biosphere. Water is the most important volatile life-component on the Earth. It is a universal solvent and renewable resource, which act as a very essential tool for continuous metabolic life activities. Water act as a connecting links for recycling of various nutrients within the body of living organisms. Of the total volume of water available on earth 97% is in the vast oceans, 2% is locked in the form of ice-sheets & only less than 1% is available as fresh water for which all people, animals & plants compete (Mishra and Pandey, 2008).

The addition of various kinds of pollutants and nutrients through the agency e.g. municipal sewage, industrial effluents and agricultural runoff into the water bodies brings about a series of changes in the physico-chemical and characteristics of water, which have been the subject of several investigations (Tripathi *et al.*, 2011).

Discharge of toxic chemicals, over pumping of aquifer and contamination of water bodies with substance that promote algae growth are some of the today's major causes for water quality degradation (Pandey *et al.*, 2014).

Pandemically, water scarcity and good quality of water, these are two huge burning issue not only in every part of Globalized world but also in India including the Bundelkhand region. Today every water bodies are nearly proceeding in the direction of considerable water pollution. The various lentic as well as lotic aquatic zones are now suffering with many natural and anthropogenic water contaminated effluents from domestic wastes, sewage supply-lines, agricultural runoffs, industrial wastes and thermal power plant effluents in the form of flyash. These all hazardous

contaminants are triggering a serious disturbance signals for aquatic balance and water quality of any aquatic ecosystem.

Objectives of the Study

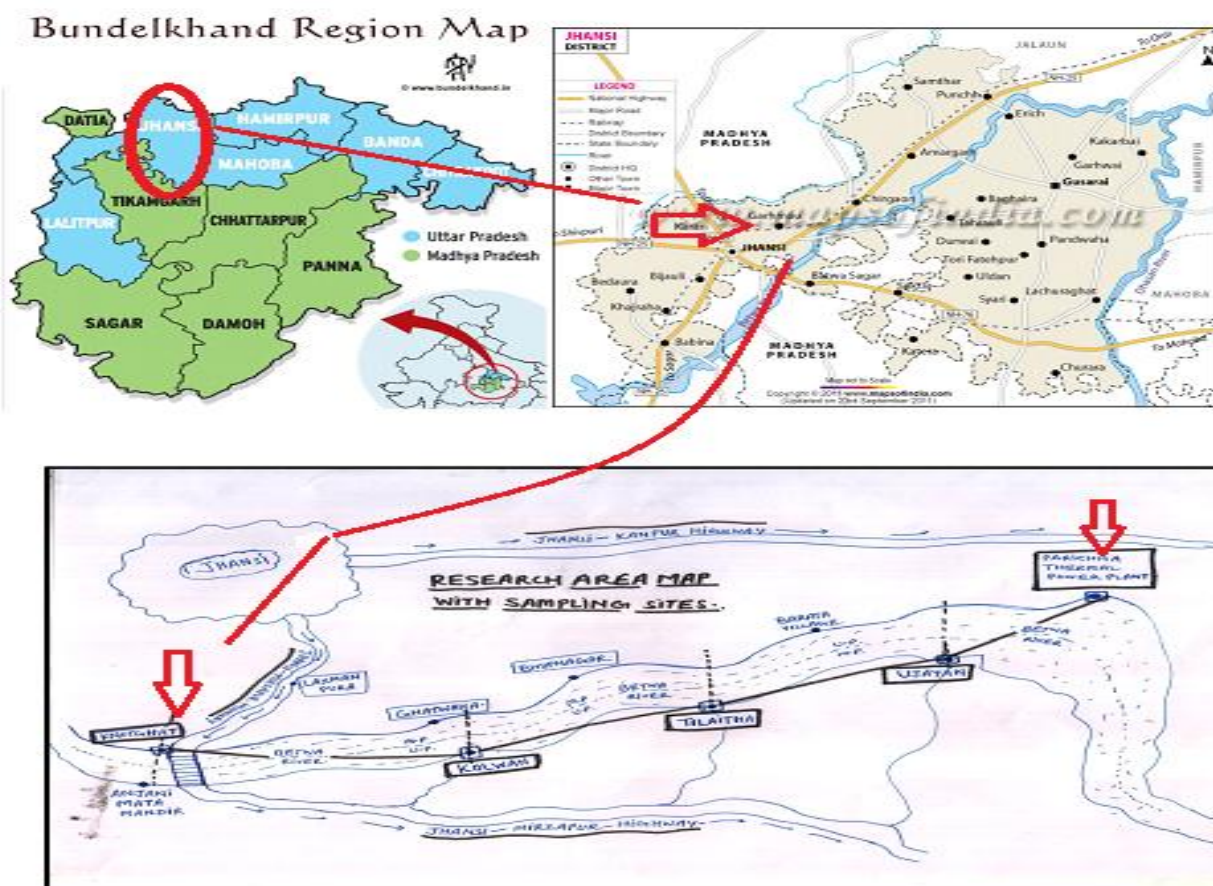
The main aim and objectives of this research investigation is to explore the limnological profile of Betwa River in Bundelkhand region by periodic analysis of physico-chemical and biological parameters from the selected sampling stations and also to access the ichthyodiversity and fish productivity status of the research area.

Material and Methods

Research Area

The research area is situated about 13km away from Jhansi city, which spreads from Knotghat to Parichha dam head (thermal power station) on the Betwa River. Knotghat is situated on the Jhansi-Mirzapur highway (U.P.) and Parichha dam head situated on Jhansi-Kanpur highway. The whole research area includes four selected sampling stations on the basis of both lentic as well as lotic ecosystem of water bodies. Four sampling stations named as S-1-Knotghat, S-2- Kolwan, S-3- Baratha village and S-4- Parichha dam head (thermal power plant).

RESEARCH AREA MAP ON BETWA RIVER IN BUNDELKHAND



Sampling Collection and Analysis

Water samples were collected during morning hours in the plastic canes of two liter capacity. After collection samples are immediately brought to the laboratory to avoid any type of changes. Some sensitive parameters were measured at sampling sites. For DO (dissolved oxygen) and BOD (biological oxygen demand) analysis separate BOD bottles were used. Other parameters like turbidity, total alkalinity, hardness, nitrate, phosphate, free CO₂, chloride and C.O.D. were analyzed in the laboratory according to the standard methods (APHA, 1998, Trivedi and Goel 1986, Adoni, 1985).

Observation and Discussion

Life totally depends on water but when any undesirable contaminants are added to the water it

affects the water quality parameters which directly or indirectly affects the diversity of flora and fauna of that water body. Today various natural and anthropogenic activities from different sources like sewage runoff, agriculture runoff, and industrial wastes are posing serious threat to our aquatic ecosystem. Hence, limnological study is very important, because it provide valuable information about water quality status. In view of this serious problem we are conducting the present study to evaluate the limnological profile of Betwa River in selected sampling stations of Bundelkhand region.

During the present ongoing research investigation various physical, chemical and biological parameters will be evaluated to access the water quality status of the selected sampling stations, which

will be of great advantage in accessing the ecological status, ichthyodiversity and fish productivity of Betwa river. Pollution status of a lotic ecosystem can be assessed by analysis of physico-chemical parameters (Kumar *et.al* 2016). The research area will also cover the Parichha reservoir which has multipurpose usage such as electricity generation, irrigation, drinking water supply and fish production.

Conclusion

Since the research work is in still going on and after completion of the full research period, the study will display a clear cut actual situation of the ecological status of Betwa river in near future. This study will help in taking effective measures to improve the water quality status and ichthyodiversity status of Betwa river.

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