



Sediments study of Erai river in Chandrapur District of Maharashtra, India with reference to its fish fauna.

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Manuscript details:

Received: 03.05.2020
Accepted: 23.06.2021
Published: 30.06.2021

Cite this article as:

Gaidhane DM (2021) Sediments study of Erai river in Chandrapur District of Maharashtra, India with reference to its fish fauna, *Int. J. of Life Sciences*, 9 (2): 247-251.

Available online on <http://www.ijlsci.in>
ISSN: 2320-964X (Online)
ISSN: 2320-7817 (Print)



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ABSTRACT

Erai river is an important river in Chandrapur District of Maharashtra, India. It is a tributary of Wardha river. The river originates near Kasarbodi Village of Chimur Taluka and meets Wardha river near Hadasti village. It has a total length of 78 Km. and lies entirely within Chandrapur District. Its basin is Godavari River. Erai river is located at 20.52°N and 79.23°E on the East side of Vidarbha region of Maharashtra. The water quality and sediments were deteriorated due to the domestic activities, Chandrapur Super Thermal Power Station (CSTPS) waste, Cremation waste and Eichhornia plants. The sediments study was carried out for a period of three months from December, 2016 to February, 2017 at monthly intervals. Standard methods were used to analyze the Sediment texture and Sediment pH. The average percentage of Sand was found 55.14 to 70.15%; Silts percentage was 18.27 to 35.47% and Clay was 6.39 to 15.22%. The sediment pH was ranged between 5.0 to 7.79. During the period of study, fish fauna like Catla, Rohu, Cyprinus and Mangur, etc. were found. Eichhornia plants were also found in the Erai river.

Keywords: Sediments, Sand, Silt, Clay, Fish fauna, Eichhornia.

INTRODUCTION

Rivers are the prime source of water for drinking, irrigation and other domestic purposes. The changes in the global environmental parameters have been resulted in great alternation in the pattern of summer, rainfall, winter and wind direction. Erai river is an important river in Chandrapur District of Maharashtra, India. It is a tributary of Wardha river. The water of Erai river is used for Chandrapur city and Super Thermal Power Station. Its water quality and sediments are deteriorated due to the domestic activities. This ultimately affects on its fish fauna, sediments and other parameters. As the soil is a 'Store house of nutrients' for living organisms. It helps in mineralization of organic matter and release of nutrients into water. Therefore, the present study has been taken up in order to understand the sediments characteristics of Erai river with reference to its fish fauna.

MATERIAL AND METHODS

Chandrapur District is located on the Eastern side of Vidarbha region of Maharashtra, formerly known as 'Chanda'. It is renamed as 'Chandrapur' in 1964. It has Coal mines, Cement factories and Super Thermal Power Station. Tadoba National Park is also located in Chandrapur District. Erai river is an important river in Chandrapur District of Maharashtra. The river originates near Kasarbodi village of Chimur Taluka and meets Wardha river near Hadasti village. It has total length of 78 Km. and lies entirely within Chandrapur District. The river has a dam built on it

that is called 'Erai dam'. The dam supplies water to Chandrapur city and to Chandrapur Super Thermal Power Station. Zarpat river is a tributary of Erai river and meets it near Mana village. The basin of Erai river is Godavari river and mouth is Wardha river. Erai river is located at 20.52°N and 79.23°E.

For the Sediments study of Erai river, three sampling stations were selected. viz., Chandrapur Super Thermal Power Station (Erai river sampling station-1), Datala (Erai river sampling station-2) and Pathanpura (Erai river sampling station-3). These three stations are shown in Figures 1, 2 and 3.



Figure 1: Erai river Sampling Station-1: Chandrapur Super Thermal Power Station.

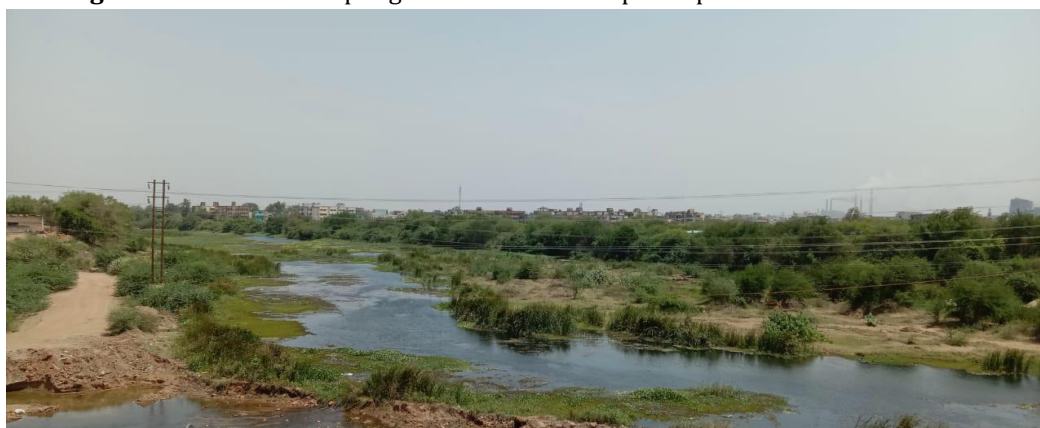


Figure 2: Erai river Sampling Station-2: Datala station.



Figure 3: Erai river Sampling Station-3: Pathanpura station.

For the Sediments study of Erai river, Sediment's texture and Sediment pH were selected to analyze. The sediment texture was estimated by particle size distribution method and pH meter was used for sediments pH. The samples were collected for a period of three months. i.e., December, 2016 to February, 2017 in the morning hours from above three sampling stations. Sediments samples were brought in the laboratory. Dried them and analyzed. Fish fauna was collected by the local fishermen. A key was used for its identification.

RESULT AND DISCUSSION

Sediment's texture implies the percentage of Sand, Silt and Clay present in the sediment at a given time. It influences the diversity of the benthic organisms as well as on nutrients in the sediment. Gandhi *et al.*, (2000) concluded that the morphogenic and sediment characteristics differ from one environment to the other and reflect the effect of the local hydrodynamic conditions. They found that the sand is dominant constituent of the bottom sediment. The bottom silt

and clay are characterized by the low organic matter contents. In the present study, the average percentage of Sand was 55.14 to 70.15 %; Silt percentage was 18.27 to 35.47 %; and Clay was 6.39 to 15.22%. (Data Collection period: December, 2016 to February, 2017 @ monthly intervals.) (Table 1).

The variations may reflect a well defined seasonal pattern. Reddy *et al.*, (1983) was studied the sediment texture of Netravati-Gurupur estuary and reported that the variations in sediment texture are due to circulation pattern of the estuary during different seasons. Arun *et al.*, (2019) was made studies on textural characteristics of sediments in the Periyar river basin, Kerala, Southern India. Their studies clearly revealed that the sediments of Periyar river basin were dominant in gravel and sand. Maibam (2018) had done the assessment of water and sediments in the rivers of Manipur, India. He had observed that the monitoring of sediment exhibit the definite spatial and temporal variation in the rural areas where most catchments has been altered by agricultural development (mainly kitchen gardening), it leads to increased nutrient levels.



Figure 4: Erai river was occupied with *Eichhornia*, Water Hyacinths, at Pathanpura.

Table 1: Sediment's parameters of Erai river.

Sr. No.	Sediments parameters	Sampling Stations		
		Station -1: Chandrapur Super Thermal Power Station (CSTPS)	Station -2: Datala	Station -3: Pathanpura
A	Sediments texture:			
1	Sand (%)	56.7 to 67.7	58.14 to 70.15	55.14 to 70.15
2	Silt (%)	20.55 to 31.46	18.27 to 30.29	18.4 to 35.47
3	Clay (%)	7.53 to 14.98	7.97 to 15.22	6.39 to 15.22
B	pH	5.2 to 7.79	5.0 to 7.45	5.16 to 7.41

There are also down-stream effects due to impoundments and alterations to water flow regimes. Ying Pan *et al.*, (2016) was studied the effects of sediments on soil physical and chemical properties and vegetation characteristics in sand dunes at the Southern Dongting lake region, China. They highlight the importance of sedimentation in determining the ecological processes, which play the essential roles in the maintenance of ecosystem function such as biodiversity conservation, environmental protection and water storage. Gaidhane and Saksena (2007) had made studies on sediments of Kharland (Saline) ponds of Ratnagiri with reference to prawn culture. From his study, it was concluded that, the sediment characteristics of these kharland ponds are suitable for the culture of prawns, *Macrobrachium rosenbergii* and *Penaeus monodon* separately or along with cultivable species of fishes. Chattopadhyay and Lahiri (2000) was studied the sediments quality of Ganga River in the deltaic region and its utilization for fishery, pollution in rivers and biomonitoring of Indian rivers. As the aquaculture ponds receives inputs of organic matter such as uneaten feed, fertilizer and faeces. These affect on the quality of water and sediments (Hussenot and Martin, 1995). Chattopadhyay and Roy (1990) had observed the sediments chemistry parameters in river around Jamshedpur. Our results are similar with these studies.

The sediment pH is being influenced by several factors such as ionic composition of interstitial water, biochemical reactions and dissolved as well as available nutrients. In the present study, the sediment pH was ranged from 5.0 to 7.79. During the period of study, fish fauna like Catla, Rohu, Cyprinus, Mangur and other local fishes were found. Erai river was occupied with *Eichhornia* plants, Water hyacinths. *Eichhornia* is commonly called as 'Water Hyacinths'. It is a polyphyletic genus of aquatic flowering plants belongs to family *Pontederiaceae*. Its species are perennial aquatic plants (or hydrophytes) with prostrate and densely branched stems. It was named in honour of *Friedrich Eichhorn*, an early 19th Century Prussian Minister of Education. The inflorescences can have 1 to 30 conspicuously attractive flowers, mostly Lavender to Pink in colour, rarely White. Its removal is important for the improvement of water and sediment quality and conservation of aquatic biodiversity. A view of Erai river occupied with *Eichhornia* plants is shown in Figure 4 at Pathanpura station.

CONCLUSION

From this study, it may be concluded that:

1. Erai river's sediments quality is good for fish culture practices.
2. Local people deteriorates its water and sediments quality by anthropogenic activities, Super Thermal Power Station wastes and Cremation. Therefore, special precautions should be taken to avoid deterioration.
3. Waste management is important for the improvement of quality of river.
4. Erai river was occupied with *Eichhornia* plants. Its removal is important for the improvement of water and sediment quality and conservation of aquatic biodiversity.

Acknowledgement

I would like to thanks Dr. M. Subhas, Principal, Janata Mahavidyalaya, Chandrapur for provided facilities to conduct this research work.

Conflicts of Interest: The authors declare no conflict of interest.

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