A CASE STUDY ON THE EVALUATION OF SURFACE WATER BODY SEDIMENTS

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Abstract

The quality of the sediments in the Krishna River, Vijayawada, Andhra Pradesh, was evaluated during the present study. The Geographical Information System 10.1 version software generated a considerable amount of data between various parameters. The toposheets are used to create maps of sediment prospective zones, which are effective instruments for thorough surface-based geological survey. The Krishna River's sediment quality is assessed with Arc-GIS software. This evaluation will aid in creating an area with good Sediments quality. With the use of GIS, environmental changes occurring in the sediments of the Krishna River should be documented, and satellite base image maps should be employed as the fundamental input parameters for environmental mapping and recording of the Krishna River Sediments environment.

Key Words: GIS, Base Map, Sediments and Surface Water.

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1. Introduction

After the Ganga, Godavari, and Brahmaputra, the Krishna River is India's 4th -largest river in terms of soil moisture content, flows, and river basin size. The river spans 800 metres. The river also goes by the name Krishna veni. The Krishna Basin includes the states of Andhra Pradesh, Maharashtra, and Karnataka, with a total size of 2,58,948 square kilometres, or little under 8% of the nation's total land area. The basin is located between 73°17' and 81°9' east longitudes and 13°10' to 19°22' north latitudes, with a maximum length and breadth of around 701 km and 672 km, etc. It borders on the north by the Balaghat Range, on the south and east by the Eastern Ghats, and on the west by the Western Ghatn. North of Mahabaleshwar, in the Satara district of Maharashtra, and at an elevation of 1,337 m, the Krishna River comes from the Western Ghats.

River Krishna as of the rapid urbanisation and the 80 million people who now live in the river basin, the levels of pollutants into the river have increased, creating soil wetness and soil sediments. Most years, there are insufficient average and minimum continuous environmental flows to the sea, which limits salt export and causes the creation of salty and alkaline soils in the lower sections of the river basin. Since the river basin drains vast areas of basalt rock formations, high alkalinity soil moisture sediments are naturally present in the river and are discharged from the ash dump areas of many coal-fired power stations. This increases the alkalinity of the river's soil moisture. Figure 1 has shown Krishna River's Soil Network Map and Fig. 2., as shown the Soil Satellite Map of Krishna River.

Because of what it offers for all of the different disciplines involved with spatial data and RS, remote sensing has been called a "enabling technology." The availability and accuracy of the data affect the findings. To develop accurate and reproducible maps for soil moisture water results, procedure analysis needs well-defined, consistent approaches. Remote sensing helps in Monitor agricultural drought in near real-time and also Improved weather forecasts.

GIS is a computer-based information system as is used to analyses and digitally show the geographical features that are present on the surface on the Earth. It is an organized collection of computer technology, software, information, and staff aimed at efficiently gather, store, update, alter, and present all kinds of spatially linked data. The key elements that must be linked in order for GIS tasks to be done are known as GIS Components.

A GIS's most crucial part is its users. Procedures must be created, and tasks for GIS data must be defined. The availability and veracity of the data affect the outcomes. Hardware A GIS's processing speed, usability, and output are hardware-dependent. Not only does this refer to the actual GIS programme, the app gives various tables, graphics, and statistics as well as to the true GIS software. using software for imaging.

Scope and Objectives:

The aim is to offer a set of best practices in assessing, testing, and analyzing the soil moisture content in the Krishna River. The major objective of this guide is to give users an understanding of the quality test parameters of pH, alkalinity, chloride, hardness, total dissolved solids, and total solids when assessing soil moisture samples from the Krishna river. to offer a reliable basis for Krishna River soil moisture samples are collected at various locations, their quality is tested at various locations using various physical and chemical properties, attribute data is collected from the surface soil moisture, and GIS analysis is done. Using Survey of India toposheet and satellite images, thematic maps are produced.

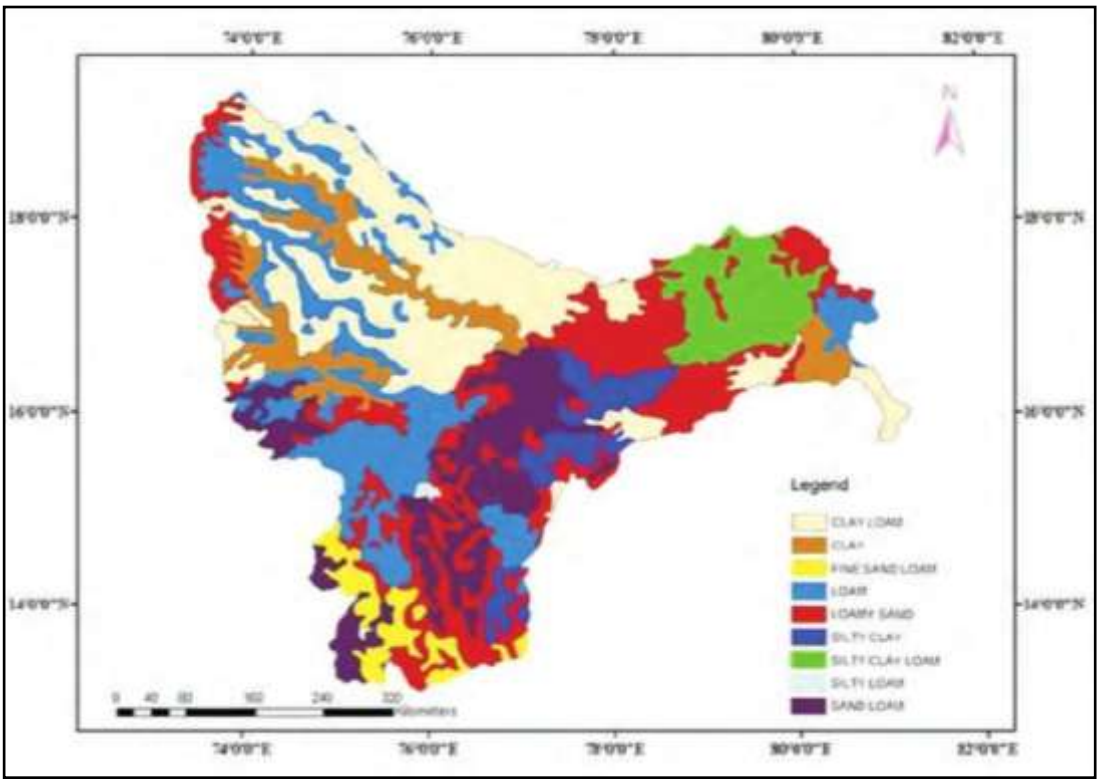


Fig. 1. Krishna River's soil/sediment Network Map

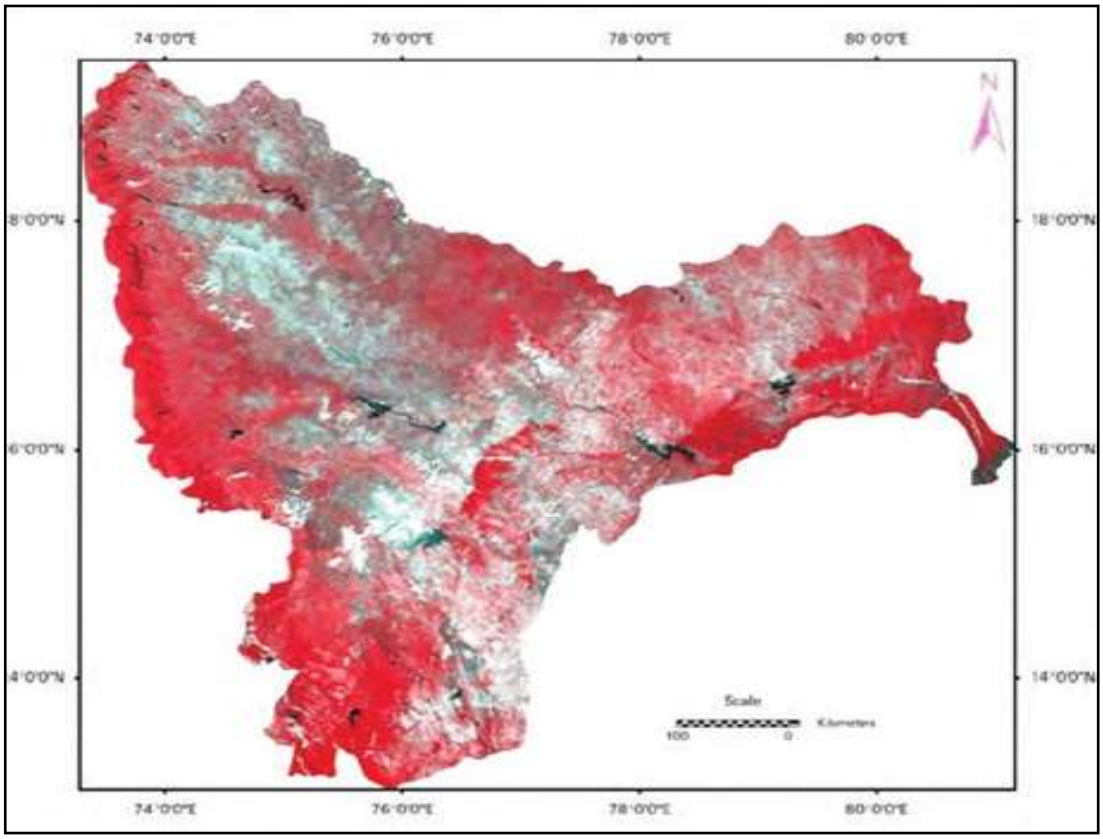
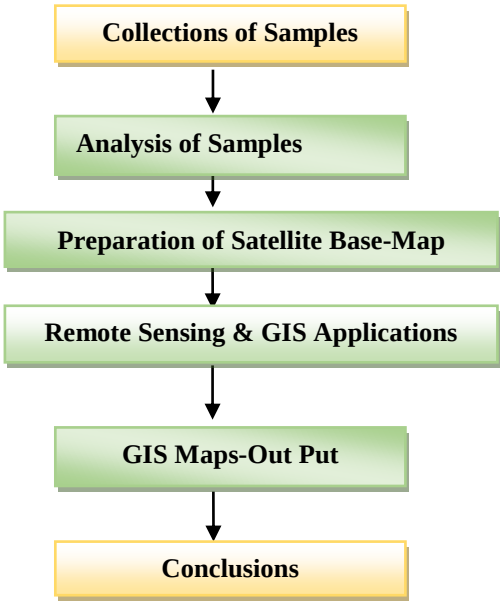


Fig. 2. Krishna River's soil/sediments satellite map

2. Methodology

Flow Chart1 has shown the methodology.



Flow Chart 1. Methodology

3. Results

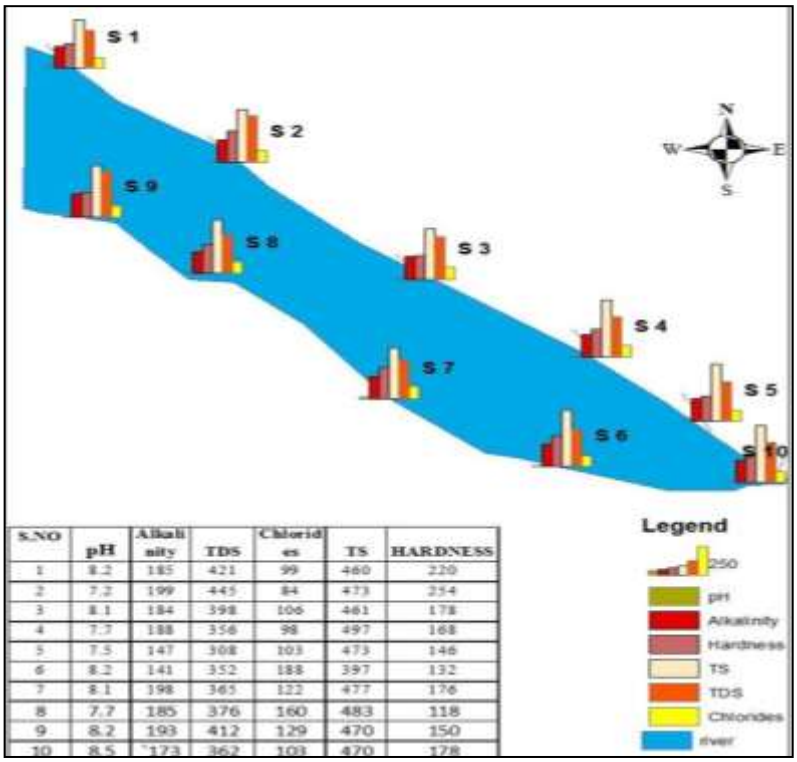
Sediments samples were tested as per with number of 10 samples for the period of pre-monsoon and post-monsoon of 2022. Samples were taken in line to UNESCO standard. The well-marked samples that had been collected had labels given the precise location of sample collection inside the study region. Standard procedures are employed for analysis of bottled samples and get sent to the lab (APHA 1998)., and results has shown in Table 1 and Table 2. And analyzed Sediments samples concentrations maps during pre-monsoon and post-monsoon are has shown in Figures 3 and Figure 4.

Table 1. Assessment of Sediments sample concentrations during pre-monsoon in the study area

Sample No.	pH	Alkalinity mg/l	TDS mg/l	Chlorides mg/l	TS mg/l	Hardness mg/l
S 1	8.2	185	421	99	460	220
S 2	7.2	199	445	84	473	254
S 3	8.1	184	398	106	461	178
S 4	7.7	188	356	98	497	168
S 5	7.5	147	308	103	473	146
S 6	8.2	141	352	188	397	132
S 7	8.1	198	365	122	477	176
S 8	7.7	185	376	160	483	118
S 9	8.2	193	412	129	470	150
S 10	8.5	`173	362	103	470	178

Table 2. Assessment of Sediments sample concentrations during post-monsoon in the study area

Sample No.	pH	Alkalinity mg/l	TDS mg/l	Chlorides mg/l	TS mg/l	Hardness mg/l
S 1	8.4	152	380	132	420	204
S 2	7.6	166	496	152	368	244
S 3	7.2	162	360	146	412	234
S 4	7.8	168	482	172	397	238
S 5	7.4	188	310	142	344	132
S 6	8.2	116	252	198	302	192
S 7	8.1	120	312	112	386	196
S 8	8.5	194	356	160	490	258
S 9	8	140	402	119	310	210
S 10	7.4	198	350	105	490	268



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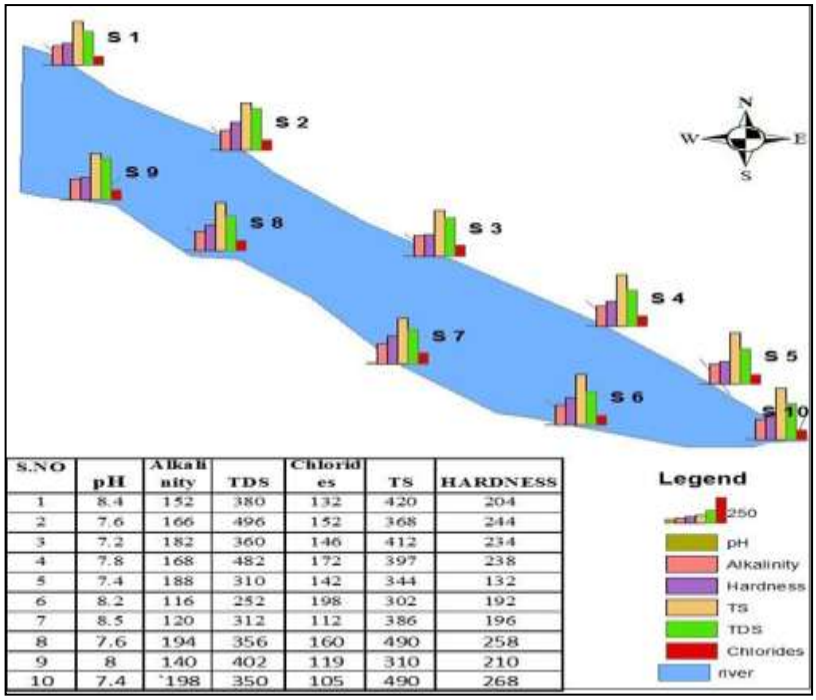
10	8.5	173	362	103	470	178

Fig. 3. Pre-Monsoon Sediments Sample Analysis Map



S.NO	pH	Alkalinity	TDS	Chlorides	TS	HARDNESS
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2	7.6	166	496	152	368	244
3	7.2	182	360	146	412	234
4	7.8	168	482	172	397	238
5	7.4	188	310	142	344	132
6	8.2	116	252	198	302	192
7	8.5	120	312	112	386	196
8	7.6	194	356	160	490	258
9	8	140	402	119	310	210
10	7.4	'198	350	105	490	268

FIG. 4. Post-Monsoon Sediments Sample Analysis Map

4. Conclusions

Environmental changes taking place on Krishna River GIS and satellite-based image maps can be utilized to track sediments which are caused by growing urban activities in the area. GIS can be very useful for simple results interpretation.

This analysis of the sediments from the Krishna River water body has shown the value of using GIS for assessing the quality of sediments.

For the purpose of to build maps that can be used as references in the future in and around the area of study, geospatial technology integrates sediment quality data from the Krishna River gathered during a number of months with geographic information systems.

It needs to be done to continuously monitor the surface water body sediments of the Krishna River in order to spot any changes.

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