
INTERNATIONAL JOURNAL OF CURRENT RESEARCH IN CHEMISTRY AND PHARMACEUTICAL SCIENCES

(p-ISSN: 2348-5213; e-ISSN: 2348-5221)

www.ijcreps.com

(A Peer Reviewed, Referred, Indexed and Open Access Journal)

DOI: 10.22192/ijcreps

Coden: IJCROO(USA)

Volume 10, Issue 1 - 2023

Review Article



DOI: <http://dx.doi.org/10.22192/ijcreps.2023.10.01.001>

Impact assessment of pollutant for the water-quality of the rivers flowing in the Gangetic plain of Western Uttar Pradesh in India

***Prashant-Dwivedi, **Lokesh Kumar**

*Assistant Professor, IIMT College of Engineering Department of Applied-Sciences,
Greater-Noida (U.P), India

**Professor, J.VJain College, Saharanpur, (U.P), India

Abstract

The coming study focuses on the water resource management and shows the needs to enforce to implement the water-framework directives in the country like India in order to improve the water-quality and water-quantity received by a downstream country of a watershed in the river flowing in the Doab area of Western Uttar-Pradesh in India having Great Ganga-river System.

The spatial trend of water-quality Index (WQI) and its subindexes are important for determining the locations of major pollutant sources that contributes to water-quality depletion in this region of Western Uttar-Pradesh, India. In order to assess the water-quality-index (WQI) for a long period of time taking into account the maximum, minimum and the mean annual values of physical, chemical and biological parameters (=DO, pH, BOD-3 or BOD-5, temperature, total-solids, phosphorous, nitrogen, nitrate, sulphate etc).

These data are also used for statistical and mathematical analysis by involving the software as SPSS and MATLAB but main focus is only on the Water-Quality-Index (WQI) of these rivers that flowing in the area of Western (U.P).

Keywords: water-quality, Great Ganga-river System, water-quality Index, biological parameters.

Introduction

Poet **Atonine** in his poem , “**WATER**” said You are not necessary to Life : You are Life and we all agree that water is life, as we cannot think of life without water . Water is among the most vital and most essential requisites that nature has provided to sustain life on the earth.

Water is the elixir of life and abundant on earth , but this vast natural resources has been depleted and turned into scarce commodity with increased usage catering to the needs of ever expanding population. There is almost a global shortage of water and the world’s most urgent and front rank problem today is supply and maintenance of clean

drinking water. Water plays a significant role in maintaining the human health and welfare clean drinking water is now recognized as a fundamental right of human beings. Around 780 million people do not have access to clean and safe water and around 2.5 billion people do not have proper sanitation. As a result around 6 to 8 million people die each year due to water related disease and disaster. Therefore, water-quality control is a top-priority policy agenda in many parts of the world.

In the today world, the water use in household supplies is commonly defined as drinking water and other purposes. Water quality and water suitability for use are determined by its taste, odour, color and concentration of organic and Inorganic matters. "Water-Quality" is a term used here to express the suitability of water to sustain various used or processes. Any particular use will have certain requirements for the physical, chemicals or biological characteristics of water.

Consequently, water-quality can be defined by a range of variable which limits water use. The water-quality from the rivers has considerable importance for the reason that these water resources are generally used for multiple purposes such as : for drinking, domestic and residential water supplies, agriculture (irrigation), hydroelectric power plants, transportation and infrastructure, tourism recreation and other human or economic ways to use water (as for Hydroponic Agriculture). For the selected rivers of Western U.P. area of India, the water-quality is the result of several inter-related parameters with a local and temporal variation which are influenced by the water-flow rate during the year.

In the context of sustainable water-management many hydrological studies are conducted which highlights the Ecological Role of Water from the river. Moreover, there have been more researches based upon water-quality evaluation. This category of studies is related to the quality of water courses which generally use many statistical and mathematical model.

Most of the studies related to the assessment of the water resources quality use several water quality indices among the most important are water-quality index (WQI), water-pollution-index (WPI) and River Habitat Survey (RHS).

Studies must be focused on the water-quality of river in Gangetic-river-system flowing in the region of Western Uttar-Pradesh India.

Methodology

Water can be defined as the chemical, physical and biological characteristics usually, in respect to its suitability for a designated uses, water can be used for recreation, drinking, fisheries, agriculture and industry. Each of these designated uses has different defined chemical, physical and biological standards necessary to support that use. The importance of water begins with the beginning of water itself.

The "water-quality" is a term used here to express the suitability of water to sustain various uses or processes. Any particular use will have certain requirements for the physical, chemical or biological characteristics of water; for example limits on the concentration of toxic substances of for drinking water use or restriction on temperature and pH ranges for water-supporting invertebrate communities. Consequently, water-quality can be defined by a range of variable which limit water use. Although many uses have some common requirements for certain variables, each use will have its own demands and influences on water-quality. Water-Quality is affected by a wide range of natural and human influences. The most important of the natural influences are geological, hydrological and climatic, since these affect the quantity and quality of water available. Poor condition of water-bodies are not only indicator to environmental degradation, it is also threat to the ecosystem.

The parameters of water-quality are selected entirely according to the need for a specific use of that water. Some examples are:

Drinking: As per WHO/CPCB Standards
 Industries: As per Specific requirement
 Domestic-Consumption: As per BIS standard
 Water Bodies: As per CPCB guidelines

WHO Drinking Water Specification

Parameters	WHO Limits
1. pH	6.5-8.5
2. Conductivity	-----
3. Turbidity (NTU)	5
4. TSS(mg/l)	-----
5. TDS(mg/l)	1000
6. Cu(mg/l)	2
7. Zn(mg/l)	None
8. Mg (mg/l)	None
9. Fe (mg/l)	0.3
10. Cd (mg/l)	0.003
11. Cr (mg/l)	0.05
12. Pb (mg/l)	0.01
13. As (mg/l)	0.01
14. Hg (mg/l)	0.006
15. Sn (mg/l)	-----

Water Quality analysis is required mainly for monitoring purpose. Some importance of such assessment includes:

1. To check whether the water-quality is in compliance with the standard and hence suitable or not for the designated use.
2. To monitor the efficiency of a system , working for water quality maintenance
3. To check whether upgradation/change of an existing system is required and to decide what changes should take place.
4. To monitor whether water-quality is in compliance with rules and regulation

Water-Quality Analysis is of extremely necessary in the sectors of :

1. Public Health (especially for drinking water)
2. Industrial Use
3. Now a days in the area of agriculture that include hydroponic farming

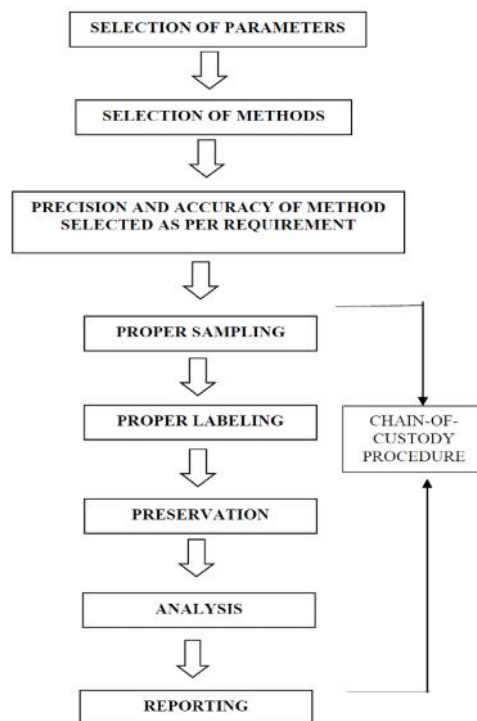
Geographical Information System (GIS) are gaining now a days widespread acceptance in the study of water resource management and on the other side fast and reliable water quality models and parameters estimation technique must be used. Research and development attempts on water-quality models created valuable resources in the sense of model calibration and verification technique. Recognizing the current degree of pollution in rivers. GIS technique also not only helpful in studying the area in which river flowing also helpful in the mapping of the flowing area of this river and selecting the sample stations on the flowing rivers. This made easy in collecting the sample water from the river also in modeling the Water-quality-index model of that particular sample station of the flowing river.

Research and development attempts on water quality models created valuable resources in the sense of model calibration and verification techniques. Recognizing the current degree of pollution in rivers and the importance of the sustainable water resources management,

the interactive river monitoring is our main center of study.

GIS Technique not only helpful in mapping of geographical area but also made easy of preparing reliable water quality model.

For modeling the water quality parameters and also for mathematical and statistical study of the parameters collection of sample must be done and following steps should be followed as given below in the flow chart



1- Selection of Parameter: The parameter of water-quality are selected according to the need for a specific use of that water.

2- Precision and accuracy of method selected as per requirement

3- Proper sampling is a vital condition for current measurement of water quality parameters. The data must represent the waste water or environmental being sampled So, the following factors must be well planned for proper sampling:

- i- Process of Sampling
- ii- Sampling size/volume
- iii- Number of sampling location
- iv- Number of samples
- v- Types of samples
- vi- Time intervals

During sampling these factors must also be taken care of:

- a-Choosing of proper sampling container
- b-Avoiding contamination
- c- Ensure the personal safety of the collectors

4- Proper Labelling

Information on the sample container or the tag should include atleast

- i- Sample code number (identifying location)
- ii- Date and time of sampling
- iii- Source and type of sample
- iv- Pre-treatment or preservation carried out on the sample
- v- Any special notes for analyst
- vi- Sample- Name

5- Preservation

There is usually a delay between the collection and analysis of a sample. The nature of the sample can be changed during the period. Therefore proper preservation is required in the way to laboratory after collection, and in the laboratory upto when analysis starts.

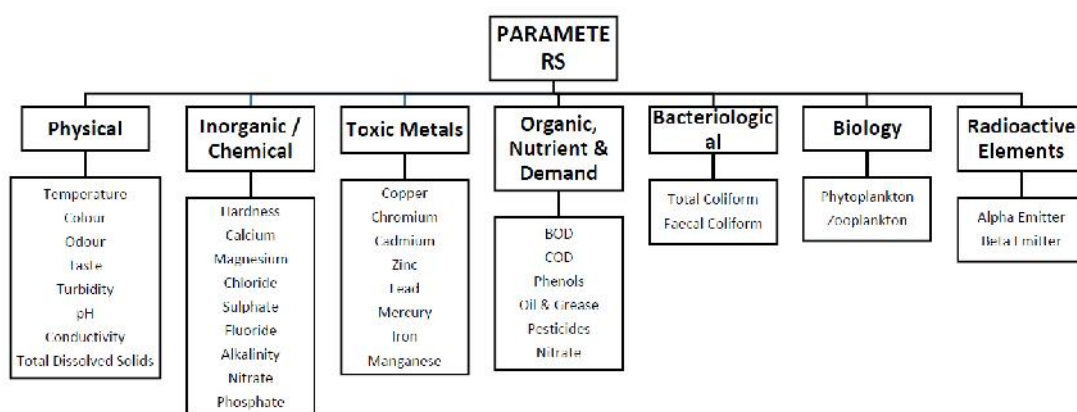
Although no single methods of preservation is entirely satisfactory so various techniques are used to preserves these samples.

6- Analysis

The sample that reach laboratory are analyzed according to the requisite parameters, following standards methods and protocol.

7- Reporting

Overall quality of water is to express it in the form of water quality index (WQI). WQI is a concise numerical representation of overall water quality of a water analysis.



The water-quality of the rivers that are taken into study are flowing in the area of Western UP region of India are the fastest growing area in urbanization and Industrial .regular intervals.

Conclusion

Water is perhaps the most precious natural resource after air. Though the surface of the earth is mostly consists of water ,only a small part of it is usable, which makes this resource limited. This precious and limited resource therefore, must be used with care As water is required for different purposes , the suitability of it must be checked before use .Assessment of water-quality is essential to check the suitability of a water source for the designated use. Several water-quality parameters are assessed and compared with their standard values to determine the acceptability of the source of water. After the prolonged duration of assessment of water quality of different rivers

flowing in doab area of Western Uttar-Pradesh these flowing water are standardize for different purposes.

The overview of guidelines for the procedure and standardize the water-quality of the water flowing in the rivers of doab area of Western Uttar-Pradesh India.

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Quick Response Code

DOI: [10.22192/ijcrcps.2023.10.01.001](https://doi.org/10.22192/ijcrcps.2023.10.01.001)

How to cite this article:

Prashant-Dwivedi, Lokesh Kumar. (2023). Impact assessment of pollutant for the water-quality of the rivers flowing in the Gangetic plain of Western Uttar Pradesh in India. Int. J. Curr. Res. Chem. Pharm. Sci. 10(1): 1-6.

DOI: <http://dx.doi.org/10.22192/ijcrcps.2023.10.01.001>