

DEVELOPMENT OF WATER QUALITY INDEX FOR URBAN WATER BODY

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ABSTRACT: Among other factors, the quality of water supply in urban areas has experienced deterioration due to the disposal of domestic and industrial waste water and urbanization. Despite the legislative instruments aimed at protecting water sources, other procedures, such as tracking networks and publishing data, should be enforced. The understanding of the consequences that can help decision making on the measures to be taken is another problem. Conserve the consistency of the water. In the current analysis, lake water parameters will be evaluated and the water quality index for the selected lake will be created.

Keywords: Ground water, Surface, water quality, water quality index.

1. INTRODUCTION:

The key component of the environment is water, which is a vital natural resource and a significant national commodity. The primary sources of water can be rivers, reservoirs, glaciers, rainwater, groundwater, etc. Water services play a crucial role in numerous sectors of the economy, in addition to the need for drinking water, such as irrigation, livestock production, forestry, industrial operations, hydropower generation, fisheries, and other innovative activities. Due to certain essential reasons, such as growing population, industrialization, urbanization, etc., the supply and quality of water, either land or land, has declined. Physical, chemical and biological criteria may be used to determine the water content of any given region or particular source. The values of these metrics, whether they surpass specified thresholds, are detrimental to human health. The appropriateness of water supplies for human use has also been defined in terms of the Water Quality Index (WQI), which is one of the most powerful methods of defining water quality. WQI uses data on water quality and assists in the adjustment of policies produced by different environmental monitoring agencies. It has been found that it is not readily understood to use the individual water quality component to characterize the water quality for the general public. WQI has the potential to minimize the majority of the data from a variety of sources into a single value and aggregate them to create an overall water system status. They improve the capacity of decision makers and the general public to recognize the highlighted water quality problems as consumers of water supplies. The present thesis discusses some of the significant measures of water quality used in the measurement of water quality and offers their statistical framework, collection of criteria and measurements, along with the merits and demerits that are used worldwide. In many countries around the world, water quality is a huge

concern. Groundwater is more dependable than surface water because of its replenishing value and less vulnerability to contamination. Nevertheless, there are more risks of pollution due to the close interaction between surface water and ground water. In general, the key objective of the evaluation of water quality is to evaluate the fulfillment of established objectives; to describe water quality at provincial, national or international levels, and also to examine patterns in time such that it can be categorized for different intended purposes, such as potable water, agriculture, recreational, industrial water uses, under the respective regulatory requirements. Different researchers have established a variety of indexes of water quality, but all of them have some form of shortcomings. Water quality is defined in terms of its physical, chemical and biological parameters and it is important to assess its quality prior to its use for various intended purposes, such as drinking water, agricultural, recreational and industrial uses of water, etc. The key purpose of the assessment of water quality is to determine whether or not water quality meets previously established targets for specified purposes, to describe water quality at state, national or international levels, and to examine patterns in time, etc. Approaches to water quality assessment are based on a comparison with current guidelines with experimentally defined parameter values. In certain cases, the use of this technique encourages sources of contaminants to be better identified.

2. LITERATURE REVIEW:

Adriano A. Bordalo, et al: 2006. "A Water Quality Index Applied to an International Shared River Basin: The Case of the Douro River" In This analysis reinforces the requirement to include the prevailing bi-lateral agreements between European country and European

nation and to determine a broad international study covering the whole watershed to judge land uses, classify and amount purpose and diffuse sources of contamination, calculate current water uses and outline potential water resource use. And to uphold current international bilateral agreements and to adopt the Water Quality Guideline with a read to enhancing the number and quality of water that the downstream country collects from the common watershed, especially as a result of 2 million folks use water from the last watercourse as their sole supply of beverage.

Hulya Boyacioglu: January 01 2007. "Development of a water quality index based on a European classification scheme" It offers an easy illustration of elaborate and complicated variables dominant the overall surface water quality meant for drinking consumption. The findings showed that, by suggests that of AN index, the quality of the water quality activity is less complicated than comparison the parameter price calculated by experimentation with current steering. Supported ascertained knowledge on water quality, the implementation of the new index was incontestable at a sampler at the Tahtali Reservoir in Turkey.

Karbassi, A. R, et al: May 25 2011. "Development of Water Quality Index (WQI) for Gorganrood River" Based on the comments and experiences of the many consultants acquainted & well advised of relevant water body conditions, the conclusions are updated and manipulated. Applying the approach of AHP restricts the utilization of NSF to a specific gain in water quality for a particular scenario. During this respect, in relevance the abstraction characteristics, the sensitivity of the analysis is also adjusted and updated. In different words, the utilization of the AHP approach compass the utilization of the NSF to a specific water quality project below specific circumstances.

Babaei Semiromi.F, et al: September 05 2011. "Water quality index development using fuzzy logic: A case study of the Karoon River of Iran" This analysis concerned the creation of the Fuzzy water quality index, a contemporary index. It provides a transparent illustration of the careful and complicated factors (physical, biological and chemical) regulation the quality of surface water for drinking use. Six water quality parameters, together with DO, turbidity, pH, TDS, nitrate, and unclean coli sort, were thought-about to be necessary FWQI predictor parameters for evaluating the standard of surface water provides, supported knowledgeable opinions and national expertise. The implementation of the new index was incontestable at the Karoon watercourse sampler in Persia on the premise of determined information on water quality.

P.J. Sajil Kumar, et al: May 12 2012. "Development of Water Quality Index (WQI) model for the groundwater in Tirupur district, South India" In the Tiruppur district, the water quality analysis found that the groundwater in several areas is declining. Each surface water Associate in Nursingd groundwater showed an enrichment of substance concentration within the flow direction throughout the post-monsoon season. Water altogether seasons seems base-forming in nature. So as to strengthen the present groundwater chemistry, the study recommends the installation of bound water storage services, like rain harvest & artificial recharge. To safeguard this important resource, contamination sources like artifact waste & inseminated emissions should be managed.

Shweta Tyagi, et al: August 07 2013. "Water Quality Assessment in Terms of Water Quality Index" It will be assumed that the aim of WQI is to produce one price to a source's water quality in conjunction with the next range of parameters in an exceedingly straightforward expression, leading to simple understanding of watching information on water quality. Moreover, this can be a trial to gauge the numerous indexes utilized in the measure of water quality. No index has been widely accepted till now, amid all the experimental works and diverse indexes getting used internationally, and there's still a search for a lot of helpful and universal water quality index, so water authorities, customers and water managers in numerous countries uses and follow it with very little adjustment.

H. Rubio Arias, et al: Nov 2013. "Development of a Water Quality Index (WQI) of a man-made Aquatic scheme in Mexico" throughout the time of year, a lot of the parameters multiplied. As per Mexican and foreign standards, the variables of turbidity and TH were below the allowable limits. Wonderful water quality for spring, tight quality for fall and winter and caliber for summer is decided by the measured WQI. Our findings indicate that the water of this scheme will safely be used for ecological functions furthermore as for fishing, cultivation and farm animal production with none issues. It's powerfully suggested to continue water sampling and to use further variables to use alternative methodologies just like the WQI.

Surjeet Singh, et al: Gregorian calendar month twenty nine, 2015. "Development of associate degree Overall Water Quality Index (OWQI) for Surface Water in Indian Context" The Water Quality Index (OWQI) is meant to produce a basic instrument for determinant the standard of the provision of drink from surface water provides. By considering sixteen criteria covering physical, chemical and biological aspects of water, the OWQI is outlined on

the idea of national and international standards. For 3 separate sampling sites, the applying of OWQI is illustrated and also the water state is written on the idea of the computed table. This OWQI may be a simplified approach of assessing water quality that is incredibly helpful for decision-makers, planners and field engineers to confirm the great health of surface water provides. It's conjointly doable to use the suggested index as a choice support mechanism for water internal control. It is conjointly doable to use the suggested index as a choice support mechanism for water internal control.

Gopal Krishan, et al: January 2016. "Water quality index of groundwater in Haridwar district, Uttarakhand" so as to work out the suitability of groundwater for drinking functions in Haridwar district, Uttarakhand, WQI was computed supported seven separate quality parameters. The findings indicate that ninety five % of groundwater samples qualified within the 'nice to outstanding' class and five % of groundwater samples needed treatment. This analysis concludes that thirty eight groundwater samples may be thought-about as a drinking norm which the remaining a pair of groundwater samples obtained from Libraheri and Laksar don't seem to be applicable for drinking as a result of the lower WQI worth, i.e. WQI = 75. In Haridwar district, Uttarakhand, continuous observation of groundwater is required as a result of any potential future pollution thanks to rising manufacture and agricultural activities within the district.

Sajal Singh, et al: Apr eighteen 2016. "Water quality index development for groundwater quality assessment of larger noida sub-basin, uttar Pradesh" the standard of groundwater is additionally necessary to the atmosphere, thus it's necessary to keep up its sensible quality the least bit times so as to not endanger the welfare of the user. In theory, 3 main operations square measure influenced by groundwater provides. The primary of these practices is that the improper use in agricultural areas of fertilizers and pesticides. In open un-engineered lowland, the operation of solid waste disposal is one in every of the explanations inflicting groundwater contamination thanks to lack of pollution management measures like water proof sheet, leachate treatment tank, testing wells, etc.

Rajiv Das Kangabam, et al: June twenty six 2017. "Development of a water quality index (WQI) for the Loktak Lake in India" Water quality may be a vital contribution to any or all aspects of ecology and human well-being, and a crucial instrument for assessing the speed of human impoverishment, income, and education. Water ecological advantages from rivers and lakes contribute directly or indirectly to human well-being and to the marine scheme. As most water bodies round the

world square measure the supply of water provides, for human use for domestic use, the increase in contamination of water provides like lakes and rivers may be a major concern for the world state of affairs. As most water bodies round the world square measure the supply of water provides, for human use for domestic use, the increase in contamination of water provides like lakes and rivers may be a major concern for the world state of affairs.

3. CONCLUSIONS:

After the analysis of various indices of water quality, it can be concluded that the goal of WQI is to provide a single value to a source's water quality, along with reducing a greater number of parameters into a simple expression, resulting in easy understanding of monitoring data on water quality. As we address the benefits and demerits of both the WQI National Sanitation Base and the WQI of Oregon, which are useful for tracking, assessing and influencing studies for various regions of water bodies. These indices use different physico-chemical and biological parameters and have been developed as a result of research and development efforts. In spite of all the attempts and distinct indices discussed are being used, So far, no metric has been widely adopted and there is already a hunt for a more useful and universal index of water quality, so that water authorities, consumers and water managers are situated at various locations. With little change, it can be used and accepted.

REFERENCES:

- Adriano A. Bordalo, et al: 2006. (910-919) "A Water Quality Index Applied to an International Shared River Basin: The Case of the Douro River"
- Hulya Boyacioglu: January 01 2007. (101-105) "Development of a water quality index based on a European classification scheme"
- Karbassi, A. R, et al: May 25 2011. (1041-1046) "Development of Water Quality Index (WQI) for Gorganrood River"
- Babaei Semiromi.F, et al: September 05 2011. (10125-10133) "Water quality index development using fuzzy logic: A case study of the Karoon River of Iran"
- P.J. Sajil Kumar, et al: May 12 2012. (261-267) "Development of Water Quality Index (WQI) model for the groundwater in Tirupur district, South India"

- Shweta Tyagi, et al: August 07 2013. (34-37) "Water Quality Assessment in Terms of Water Quality Index"
- H. Rubio Arias, et al: November 2013. (1296-1302) "Development of a Water Quality Index (WQI) of an Artificial Aquatic Ecosystem in Mexico"
- Surjeet Singh, et al: October 29, 2015. (813-814) "Development of an Overall Water Quality Index (OWQI) for Surface Water in Indian Context"
- Gopal Krishan, et al: January 2016. (55-58) "Water quality index of groundwater in Haridwar district, Uttarakhand"
- Sajal Singh, et al: April 18 2016. (1-16) "Water quality index development for groundwater quality assessment of greater noida sub-basin, uttar Pradesh"
- Rajiv Das Kangabam, et al: June 26 2017 (2907-2915) "Development of a water quality index (WQI) for the Loktak Lake in India"



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