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Assessment of Quality of Water: A Review

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Abstract: ***Water is one of the precious natural resources present on the earth and it is very important for survival of flora and fauna. Quality of water is equally important to the quantity available. While considering of total percentage of water present on earth as 97% in ocean and 3% as a fresh water with considering glacier. Out of which 2 % as fresh water in the form of surface and subsurface water bodies and it usable for the human consumption. So when we consume water its quality measurements are necessary and management should be done in systematic path. Water quality is directly related to the physical, chemical, biological and radiological property of water . These properties of water are affected due to the pollution of water due to various human activities. Depend on the activities; disposal of pollutant in the water bodies are done that changes the standard quantity of parameters in water. There are various parameters which can be assess for measurement of quality of be generates Quality Index (WQI) is the quite popular method in water quality assessment. This can be told whole story of water in single scoring number and it is calculated using different methods. It is very helpful to decide appropriate treatment technique to meet the concern issue. In this paper, WQI and its development methods are discussed***

Keywords: Water, Water pollution, Water quality parameters, WQI water quality process

I. INTRODUCTION

Water is the prime natural resource. Acknowledging the vital importance of this scarce resource for human and animal life, as well as for maintaining ecological balance for economic and developmental activities of all kinds is a matter of utmost concern. In recent times, there has been a tremendous increase in demand for freshwater and water shortage in arid and semiarid regions due to population increase, urbanization, industrialization, and intense agricultural activities in many parts of world. Due to inadequate supply of surface waters, most of the people are depending mainly on groundwater resources for drinking and domestic, industrial, and irrigation uses. Multitudinous enormous towns and numerous urban areas get water supply from groundwater and surface water for various uses through region arrange and furthermore from huge number of private boreholes Ordinary water quality observing of the water assets are totally important to survey the nature of water for environment wellbeing and cleanliness, mechanical use, farming use and local use and so on. Appraisal of water quality can be a mind boggling procedure undertaking numerous parameters fit for causing different weights on generally water quality. To evaluate water quality from a large number of samples, each containing concentrations for many parameters is very difficult. Conventional ways to deal with evaluating water quality depend on the examination of tentatively decided parameter esteems with the current rules. In this way, water quality records are such methodologies which limit the information volume, as it were, and streamline the declaration of water quality status. Water quality list can be assessed based on different physical, substance and bacteriological parameters.

Water, a prime common asset and valuable national resource, shapes the central constituent of biological system. Water sources may be mainly in the form of rivers, lakes, glaciers, rain water, ground water etc. Besides the need of water for drinking, water resources play a vital role in various sectors of economy such as agriculture, forestry, industrial activities, hydropower generation, fisheries and other creative activities. The availability and quality of water either surface or ground, have been deteriorated due to some important factors like increasing population, industrialization, urbanization etc. Water quality of any specific area or specific source can be assessed using physical, chemical and biological parameters are very important. The values of these parameters are harmful for human health if they occurred more than permissible limits Therefore; the suitability of water sources for human consumption has been described as far as Water quality file (WQI), which is a standout amongst the best approaches to depict the nature of water. WQI uses the water quality information and aides in the adjustment of the arrangements, which are planned by different ecological observing organizations. It has been understood that the utilization of individual water quality variable so as to depict the water quality for normal open isn't effectively justifiable. That's why; WQI has the capability to reduce the bulk of the information into a single value to express the data in a simplified and logical form. The present investigation surveys a portion of the significant water quality lists utilized in water quality evaluation and gives their numerical structure, set of parameters and estimations alongside their benefits and bad marks, which are being utilized around the world

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II. LITERATURE SURVEY

A. A.Andreadakis, C.Noutsopoulos, E.Gavalaki [1]. Examined on water quality administration and insurance plan for Lake Plastira, one of the principle undertakings was the foundation of a sound connection between the base water level and the trophic condition of the lake. The investigation includes the use of an eutrophication-disintegrated oxygen scientific model (EUTRO-SEL) which depicts different physical, concoction and natural procedures occurring in a water body. Three water the board situations were analyzed with regards to the investigation, in view of option insignificant working water levels (782m, 784m and 786m).According to the modelling results and the classification of the water bodies according to the recent standards and trends within the European Commission, the task of Lake Plastira at any rate water dimension of 786 m guarantees generally excellent water quality attributes (Category I). The operation of the Lake Plastira at lower water levels between 782-784 m, results in acceptable water quality that classify the lake into Category II. The qualitative assessment and trophic state classification on the basis of the results, they find out10ìgl^{-1}average Concentration and 20 ìg l^{-1} maximum concentration of chlorophyll can be considered as threshold values signifying eutrophication phenomena in lakes.

B. ShwetaTyagi, Bhavtosh Sharma Prashant Singh, and Rajendra Dobhal, [2] study on "Water Quality Assessment in Terms of Water Quality Index." Water quality index (WQI) is valuable and unique rating to delineate the general water quality status in a solitary term that is useful for the determination of fitting treatment system to meet the concerned issues. WQI portrays the composite impact of various water quality parameters and imparts water quality data to general society and authoritative leaders. Regardless of nonappearance of an all inclusive acknowledged composite file of water quality, a few nations have utilized and are utilizing collected water quality information in the advancement of water quality lists. . Endeavors have been made to audit the WQI criteria for the fittingness of drinking water sources. Besides, the present article also highlights and draws attention towards the development of a new and globally accepted "Water Quality Index" in a simplified format, which may be used everywhere and could speak to the dependable picture of water quality. . After the investigation of various water quality lists, it might be gathered that the point of WQI is to give a solitary incentive to water nature of a source alongside lessening higher number of parameters into a straightforward articulation coming about into simple understanding of water quality checking information. Moreover, this is an effort to review the important indices used in water quality vulnerability assessment and also provides information about indices composition and mathematical forms also. These indices utilize various physico-chemical and biological parameters and have been resulted as an outcome of efforts and research and development carried out by different government agencies and experts in this area globally. In spite of all the efforts and different discussed indices being used globally, no index has so far been universally accepted and search for more useful and universal water quality index is still going on, so that water agencies, users and water managers in different countries use and adopted it with little modifications.

C. TirkeyPoonam, Bhattacharya Tanushree, Chakraborty Sukalyan [3] study on water quality indices They research that, the water quality varies according to the type of use. Furthermore, the criterion of an 'acceptable water quality' varies from region to region and from time to time depending upon the prevailing conditions. Water quality files are important for settling long, multi-parameter, water examination reports into single digit scores. This, thus, is fundamental for looking at the water nature of various sources and in checking the adjustments in the water nature of a given source as a component of time and other affecting elements. Time of the inspecting likewise essentially impacts water quality parameters and hence the index value. Researchers may develop region and source specific water qualityindex.Mostofthedevelopedwaterqualityindicesaresurfacewater specific and there is ample scope to develop groundwater quality index. NSF WQI, CCME WQI and WQI are water quality indices which are frequently used for water quality assessment. CCME and BCWQI are most efficient for low parameter values. General WQI is an efficient one but parameters should be carefully selected depending on the source and time. Smith's index gives a better aggregation of datasets. The main drawback of NSFQI is the eclipsing effect. Due to this affect one or more parameters which have values above permissible limit are masked if rest of the parameters is within the limits. In all the water quality lists referred to in written works natural poisons are not considered, in light of the fact that investigation of organics is excessively costly. Otherwise most of the important water quality parameters are taken into account.

D. A.N.Prasad, K. A. Mamun, F. R. Islam, H. Haqva [4] research on Smart Water Quality Monitoring system for Fiji, using IoT and remote sensing technology. This research demonstrates a smart water quality monitoring system. Four different water sources were tested within a period of 12 hours at hourly intervals to validate the system measurement accuracy. The results obtained matched with the expected results obtained through research. The temperature relation with pH and conductivity were also observed for all the water samples. GSM technology has been successfully implemented to send alarm based on reference

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parameter to the ultimate user for immediate action to ensure water quality. Additionally, the parameter references obtained from all the different water sources will be used to build classifiers which will be used to perform automated water analysis in the form of Neural Network Analysis In a nutshell, the system has proved its worth by delivering accurate and consistent data throughout the testing period and with the added feature of incorporating IoT platforms for real time water monitoring, this should be an excellent contender in real time water monitoring solutions.

E. B. MENAKA DEVI, N. AMMU ABIRAMI [5] they study on determination quality of water automatically using low cost and in-pipe sensors. Here an array of sensor node is developed to assess the quality of water. Algorithms are developed for fusing the data collected by the sensors. ZigBee transceiver and GSM transmitters are used to transmit the collected data to the server. This paper additionally gives the methods to determine water pollution. They study on, the implementation of several on-line in pipe sensors that are used to determine the contamination of water has been discussed and the results were produced. Here the low cost sensors are used and hence the implementation cost for this system is getting reduced. Moreover, efficient algorithms are also being used here to co-ordinate the information collected by the sensors and hence there is no data loss and also the efficiency of transmission is increased. The information collected by the sensors are sent to the main server so that the in case of any contamination, the information will be passed to the authority as well as the ordinary citizens can perceive how far the water being utilized by us is spotless. The message will also be sent to the mobile phones through GSM incase of any emergency.

F. K. A. Unnikrishna Menon[1], Divya P[2], Maneesha V. Ramesh[3] [6] in this paper, they present the system architecture for a Wireless sensor Network which aids in River Water Quality Monitoring. This paper likewise proposes a novel strategy for the plan of a water quality sensor hub which can be utilized for observing the pH of water. The proposed plan of the sensor hub comprises of the pH speaker circuit, the dimension moving circuit, channel configuration utilizing Sallen key topology, the handling unit which is actualized utilizing PIC microcontroller and the remote correspondence module comprising of Zigbee radio. The circuit for the sensor node is designed, simulated and the hardware prototype is developed which was tested for different pH conditions with the wireless transmission of that data achieved. This framework gives a vitality proficient and ease sensor hub stage for observing water quality using modest, low power gadgets for the equipment plan. When this pH sensor unit is integrated with other basic water quality sensors such as temperature, conductivity, dissolved oxygen and turbidity, etc, it can be used for monitoring the water pollution in an area as well.

G. S.P. Bhalme [7] study on the analysis of drinking water parameters in an Educational institute situated in Hingna MIDC area, Nagpur. In this paper, different authors' papers are summarized on water analysis and their treatment processes in different region, which is helpful to know the different treatment processes and parameters used in the study. From the above papers he concluded that due to increase in industrialization water quality of drinking water get decreases, and hence there is a need of proper analysis of water and prior treatment.

H. Andreea-MihaelaDunca [8] This study focuses on water assets the board and demonstrates the need to uphold the current global reciprocal understandings and to implement the Water Framework Directive of the European Union in order to improve the water amount and quality gotten by a downstream nation of a typical watershed, like Timiș-Bega hydrographical basin, shared by two countries (Romania and Serbia). The results of this paper present the water polluting and quality assessment of two trans boundary rivers (Timiș and Bega) from two different hydrographical basins and show that WQI values of the Timiș River ranging from 86 to 8 and WQI values of the Bega River ranging from 8 to 61 denote degradation of water quality downstream of the rivers. Water quality in the upstream sections of the Timiș and Bega has been in a better condition than the downstream river sections. Tere have been sign cant deterioration in values of the most important water quality parameters (DO, pH, BOD5, temperature, total P, N- 2−, and slurry) downstream of the rivers, which demonstrates that the neighbourhood poisons might contribute gradually to the debasement of waterway quality.

I. V.T. PATILand P. R. PATIL [9] study on Physicochemical characteristics of groundwater and municipal water in Amalner town by taking water samples from five different stations. The study was carried out by collecting four groundwater samples (Two open well, two bore well) and one municipal water sample during November 2007-February 2008. The results were compared with standards given by WHO and ISI 10500-91. Total 15 parameters were analysed. It was found that the underground water was more contaminated at few sampling sites namely Shirud Naka, Cotton Market and Shivaji Nagar. The sampling sites Dekhu road showed physicochemical parameters within the water quality standards and the quality of water is good and it is fit for drinking purpose. They research that Deviations were observed by groundwater samples from municipal water and water quality standards indicating groundwater pollution. Municipal water was found to be fit for drinking purpose

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than groundwater. The water samples from sites S2 (Tube well) and S3 (Open well) showed poor water quality as compared to other water samples, probably due to sewage pond close to site S2 and large sewage flowing near the site S3. The water samples from sites S2 and S3 are highly polluted and unfit for drinking purpose. The sampling point S1 (Tube well water) showed high TDS, Alkalinity and sodium content indicating the need of some treatment for minimization of the parameters. The sampling site S4 (Open well) showed physicochemical parameters within the water quality standards and the quality of water is good and it is fit for drinking purpose. The estimations of relationship coefficients will help in choosing legitimate treatment to limit groundwater contamination.

III. CONCLUSION

After surveying all the above research articles, it can be concluded that, it is important to know various parameter related to water resources for improving and maintaining both quality and quantity. From this assessment we can set up the normal and confided in data which is helpful for making viable decision

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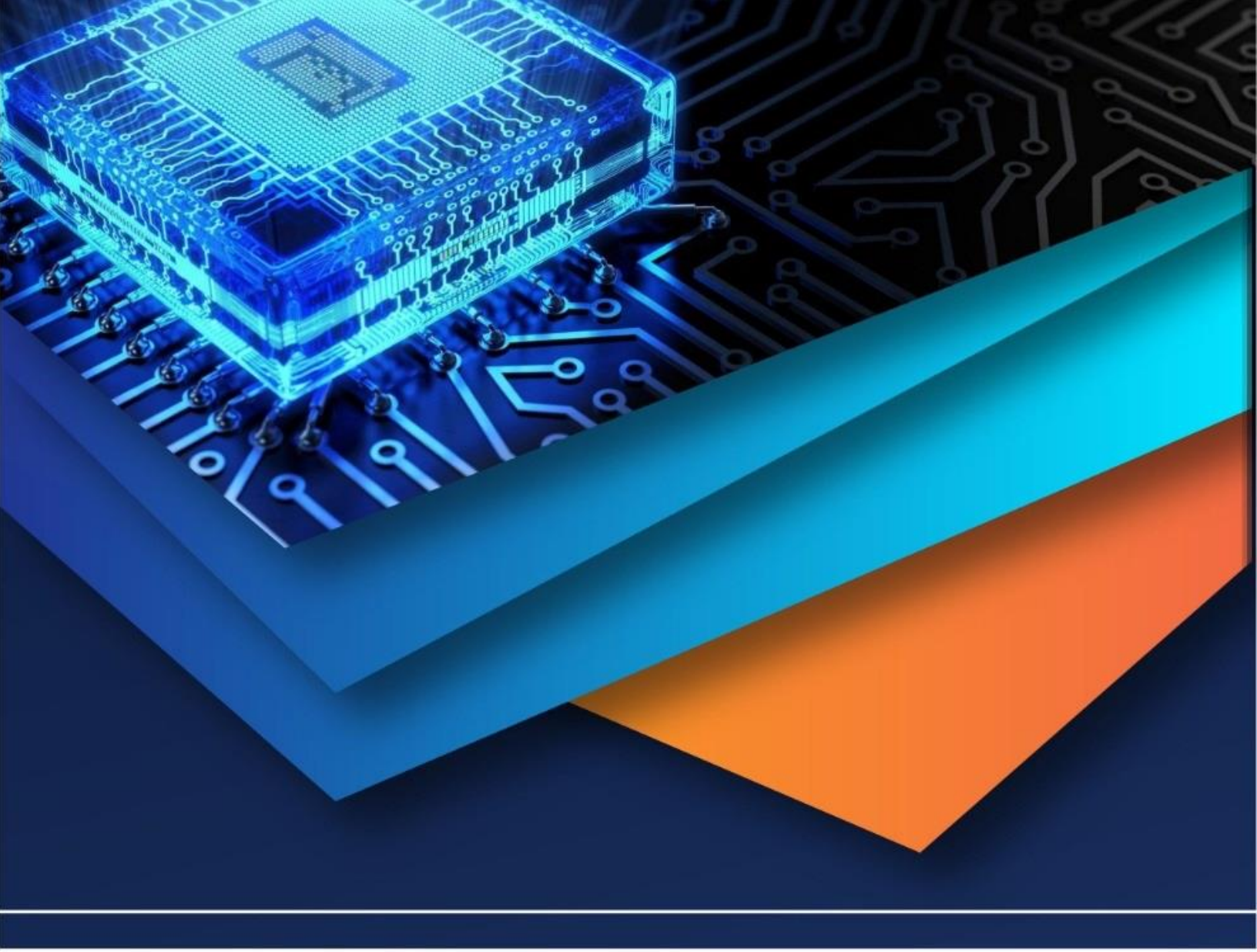
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