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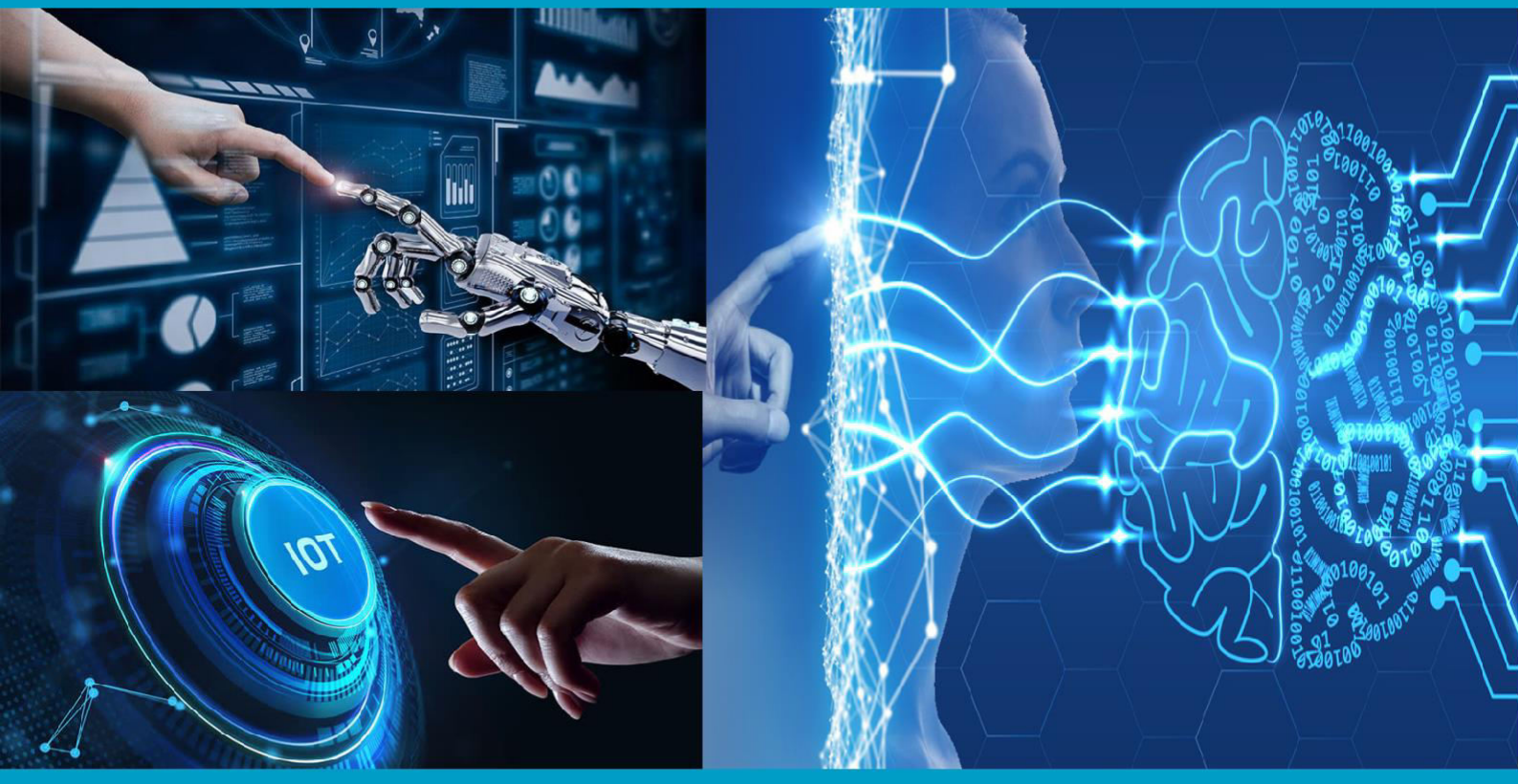

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A Review on "Assessment of Physico-Chemical Parameters of Erai River of Chandrapur District in Maharashtra State"

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ABSTRACT- Due to increase population, advanced agricultural practices, industrialization, man- made activity, water is being highly polluted with different contaminants. In present situation, the waterway water has become wastewater because of removal of city squander through which it streams. Water is a vital resource for human survival. His accessibility of good quality water is an essential component for forestalling infections and improving personal satisfaction. It is necessary to know details about different physico-chemical parameters such as color, temperature, total dissolved solids, Total hardness, and pH, dissolve oxygen, chemical oxygen demand, used for testing of water quality. Chandrapur city is developing rapidly due to industrialization seeing that ultimate too many years. It's far considered as fourth most polluted city in India. the existing look at become completed which will have an expertise approximately the pollution status of Chandrapur district, particularly first-rate in location of business area and mining initiatives. Environmental studies have been achieved on floor and floor water to discover the physico-chemical parameter like TDS. it is necessary to accrued sample from distinct sites, for you to compare the consuming water first-rate in and around Chandrapur district. The analysis of various parameters the use of trendy methods (APHA/NEERI) and their assessment with WHO (international health corporation) standards values, suggest that most of the parameter within permissible limit given by critical pollution manipulate board of India (CPCB). awareness of parameters beyond the bounds in some regions might be reduced and could be a useful source for domestic functions within the vicinity. the existing challenge bills water satisfactory of diverse websites situated in Chandrapur and their efficiencies respectively. Commonly Water is a great solvent and chooses up impurities easily. Natural water is tasteless, colorless, and odorless. "Dissolved solids" consult with any minerals, salts, metals, cations or anions dissolved in water. Total dissolved accommodates inorganic salts (basically calcium, magnesium, potassium, sodium, bicarbonates, chlorides and sulphates) and a few small amount of organic be counted which might be dissolved in water. We typically speak TDS for freshwater machine only, as salinity consists of some of the ions contributing within the definition of TDS. The look at of water fine for streams, rivers and lakes is the maximum critical application of TDS, despite the fact that TDS is not primary pollutant, however TDS used as a hallmark of aesthetics characteristics of consuming water and as indicator of the presence of extensive array of chemical contaminant. In this project the study was carried out during monsoon for a period of two months (July-August) of the Erai River in the Chandrapur district of Maharashtra, to determine the quality of river water. Various Physico-chemical parameters such as rainfall, pH, turbidity, color, TDS, DO, etc.

KEYWORDS- TDS (Total Dissolve Solids), Turbidity, Dissolved solids, Suspended solids, Hydroponic, Gravimetry, conductivity,Surface water, Physico-Chemical Parameters

I. INTRODUCTION

Water plays a vital role in human life. The physicochemical parameters are very important in the study of any aquatic environment. For the developmental activities of the region water resource quality from any region is an important aspect, because the rivers, lakes and manmade dam or reservoir are used for water supply to domestic, industrial,

agricultural and fish culture. The water quality is describes by its physical, chemical and microbial characteristics. The data collected would create environmental awareness for the local people concerning the status of the dam.

The physico-chemical profile and biological analysis of flora and fauna is needed to obtain a clear picture of the underlying water conditions in a freshwater ecosystem. In recent years there is increase in water pollution as side effect of industrial and anthropogenic activities. The increase in load of pollutants bring about a rapid shift in the biota of the ecosystems and thus affect the water quality and subsequently biodiversity of the area. In view of this there is need for designing an appropriate framework to safeguard our natural resources for sustainable environmental management. Today water bodies throughout the world are medium to heavily polluted by man's negligent attitude and investigations are needed to overlook the changes.

The Chandrapur district is blessed with many rivers, one of which is Erai River. It is located at latitude of 19°57'31.67"N and longitude of 79°16'37.18"E at its center. It is a tributary of Wardha River and is a main river in Chandrapur. The Erai 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. The river has a dam built on it called Erai Dam. The dam has a height of 30 m and a length of 1620 m. The volume content of the dam is 985 km3 and gross storage capacity is 226,500.00 km3 . The Municipal council in Chandrapur district supplies drinking water to the local public from Erai river dam. The Maharashtra State Electricity Board (MSEB) had built this dam across the river for industrial operations. The Erai River is the lifeline for the people residing in and around Chandrapur city. It primarily supplies water to the Chandrapur city and Chandrapur Super Thermal Power Station (CSTPS). After the establishment of major industries such as M/s CSTPS and Western Coalfields Limited (WCL), the river started to get polluted and is now gasping for breath. When the drinking water supply scheme from the Erai was initiated, the population of Chandrapur was approx. 50,000 and now, it is more than 3 Lakhs.

The environmental aspects of the earth are linked in a closed loop of which water is the essential component in the sustenance of the living organism. Water occurs on earth in various forms, one of which is liquid. The purest form being rain makes its way towards water bodies increasing their level when falls on the earth and provides moisture to the crops for cultivation. The study was carried out during monsoon for a period of two months (July-August) of the Erai River in the Chandrapur district of Maharashtra, to determine the quality of river water. Various Physico-chemical parameters such as rainfall, pH, turbidity, color, TDS, DO, etc., were determined and the final result was evaluated from the average determined from a period of two months. The samples were collected from five different locations of Erai River. Erai River is the tributary river of the Wardha River which meets to Erai River at Hadasti village. The turbidity was found greater and Dissolved oxygen was found almost negligible in the water. This indicates the river was polluted during monsoon which is a serious threat to aquatic life.

Erai River Profiling:

Erai River, which is the backbone of the Chandrapur Super Thermal Power Station (CSTPS), lifts 304 MLD of water daily from the river for its operation. Further, 54 MLD of whole water is supplied to the city and surrounding villages for domestic activities. A part of it is also used by commercial institutions and religious establishments. As the city does not possess any treatment plant to treat the incoming sewage, a large amount of effluent has been discharged into the river, making the river most polluted and contaminated for aquatic life as well as for local people. The whole of the domestic waste and a part of the treated waste from CSTPS is discharged into the river. Besides this, other M/s WCL opencast mines consume river water. During summer season, the industries mainly CSTPS have to limit their water usage to ensure enough drinking water for the city. The water is used for irrigation purposes and activities such as bathing of animals and washing of clothes also takes place. Due to agricultural run-off, the river water has been polluted and hence the quality of water has deteriorated.

II. LITERATURE REVIEW

Physico-synthetic boundary study is vital to get careful thought regarding the nature of water and we can contrast consequences of physicochemical boundary esteems and standard qualities. The broad writing survey was done by

alluding standard diaries and meeting procedures. The significant work completed by various scientists is summed up underneath:

[1] M. M. Akhtar and Zhonghua tang (june 2013): In various developing countries, groundwater pollution arises from various sources, such as sewers, rivers, industrial and agricultural sectors, which can contain highly complex toxic elements. , policies and proper enforcement of environmental laws have made groundwater systems unsuitable for the general public. Pakistan's second-largest city, Lahore, faces similar problems. About 36% of the groundwater samples had high concentrations from the Pakistan Quality Control Agency (PSQCA) and 1.5% exceeded the WHO standards for drinking water. According to 2010 groundwater chemical analysis data, most areas have adequate drinking zones. However, there is a higher risk of continuous contamination. Finally, this study identifies highly contaminated groundwater, facilitating identification of actual contaminants. Therefore, we need practical strategies to protect aquifers .

[2] Soni Chaubey and Mohan KumarPpatil (november 2015): Shows relationships between variables and shows that one variable actually causes a change in another. In this paper, 52 data on drinking water from different sources in his four areas (i.e, Khaparkheda Water Supply, Koradi Gram Panchayat, Koradi Devi Mandir and Bokara) in the hot and dry climate city of Nagpur Use the point statistical regression method. Made in Maharashtra, Central India. Samples were collected from October 2013 to May 2014. This technique was based on the study and calculation of correlation coefficients between various physicochemical parameters of drinking water. The results were further compared with drinking water quality standards published by the World Health Organization (WHO) and concluded that most water samples were not potable.

[3] Tan C. W, Thishalini A., Goh, E. G.and Edlic S.: synthetic water was used to study the relation of turbidity with suspended solid, velocity, temperature and time. Results indicated that turbidity increases with increasing temperature, suspended solids concentration, and velocity, but reduces with time. In phase there were four set of parameter-modified and four set of respective control water samples. Parameter-modified water samples were subjected changes of temperature (25-70 oC), pH (5-10), color (red, yellow, blue, orange, green, brown, and black at 500 mg/L), and conductivity (100-1000 µS/cm). Results showed the relation of these parameters fell between most likely positive and negative. In addition, the current proposed model gives a high R-squared (> 0.969), low mean square error, and has a p value lesser than 0.05.

[4] Anurita Sharma (2015), We have established that clean drinking water is the foundation of good health. The aim of this study was to analyze the physico-chemical properties of Chandigarh tap water. Tap water was sampled from different locations in Chandigarh and physico-chemical parameters such as color, odor, temperature, pH value, turbidity, electrical conductivity; total dissolved solids (TDS), dissolved oxygen and salinity were analyzed. The tested water samples showed that the values of various parameters were within his BIS (Indian Bureau of Standards) / WHO (World Health Organization) guidelines. Although it was concluded that the quality of the tested water samples was acceptable based on various physico-chemical parameters, regular monitoring of drinking water is recommended as human health is affected. It is important.

[5] Bhalme S.P and Dr Nagarnaik P.B (2012), It was explained that this study was based on the analysis of drinking water parameters in an educational institution in Nagpur, Hingna MIDC Region. From this, it was concluded that the quality of drinking water is deteriorating due to the progress of industrialization, and appropriate water analysis and pretreatment are required.

[6] Boob T.N (2014), It declared that providing clean and affordable water that meets human needs is a major challenge of the 21st century. Water supplies around the world are struggling to keep up with rapidly increasing demand exacerbated by population growth, global climate change and deteriorating water quality. The need for technological innovation to enable integrated water management cannot be overemphasized. The world will face a significant freshwater crisis in the coming decades due to high levels of surface and groundwater pollution. Groundwater is the ultimate and optimal freshwater resource for human consumption in both urban and rural areas. Groundwater quality

reflects information about natural and anthropogenic sources of pollution. A study was conducted in his Pusad city, Yavatmal district, India to determine the groundwater quality of parameter d. H. TDS, Hardness, Ph, Chloride, Fluoride, Nitrate levels in water. Experimental analysis shows that fluoride, chloride and hardness are within limits. TDS and nitrates are unacceptable, degrading groundwater quality and contributing to cardiovascular damage, immunodeficiency, coordination problems, premature aging, cancer, coronary artery disease, atherosclerotic heart disease and cardiovascular disease. It causes various diseases such as mathemoglobinemia and Blue-Baby. cause syndromes, etc.

[7] G. Devendra Dohare and Vyoma Gupta (2014), Suppose the human body contains approximately 60% water, and water is used in many ways in most human activities. It is thus observed that early human civilizations were spread along the riverbanks. If the water quality of the water area deteriorates, it will be in a disadvantageous situation and cannot be used for various purposes such as swimming, recreation, and raw water supply. According to the Central Environmental Management Board (2008), 90% of all water supplied to Indian cities is polluted and only 1.6% of it is treated. Therefore, water quality management is fundamental to human well-being. A safe supply of water in sufficient quantity is needed at a suitable location and at a reasonable cost to consumers. Therefore, the performance of water treatment plants had to be evaluated and monitored by analyzing various physicochemical and bacteriological parameters.

[8] Devangee Shukla, Kinjal Bhadresha, Dr Jain N.K and Dr Modi H.A (2013), Water has established itself as one of the most important of all known natural resources on earth. It is important to all living things, most ecosystems, human health, food production and economic development. Drinking water safety is important to your health. Drinking water safety is affected by a variety of contaminants, including chemicals and microbes. Such pollutants pose serious health problems. Because of this drinking water, drinking water becomes bad and sometimes such bad water causes many diseases in humans, so it is necessary to test the water quality.During the investigation, WHO (1971) and BIS (1991) found that the maximum number of physical and chemical parameters proposed by was within desirable limits.

[9] Dhawale P.G and Ghyare B.P (2015), It declared that water resources are essential for both natural ecosystems and human development. It is essential for agriculture, industry, and human existence. A healthy aquatic ecosystem depends on physicochemical and biological properties. The quality of water resources depends on numerous physico-chemical parameters and biological properties. We assess that monitoring of these parameters is essential to determine the extent and source of exposure to contamination. These traits can identify specific conditions in an organism's ecosystem and suggest appropriate conservation and management strategies.

[10] Dhirendra Mohan Joshi, Alok Kumar, and Namita Agrawal (2009), It was mentioned that a systematic study was conducted to evaluate the water quality index of Ganga River in Haridwar District. Ninety water samples were collected from five sampling stations and analysed for physicochemical parameters (temperature, flow rate, pH, dissolved oxygen, free CO2, C.O.D., B.O.D., carbonate, bicarbonate, total alkalinity, hardness, turbidity, calcium, magnesium, sodium, potassium, nitrate, phosphate, chloride, sulphate and conductivity, total dissolved solids and total suspended solids). The study area has a seasonal climate, which can be roughly divided into three seasons: winter (November to February), summer (March to June), and rainy season (July to October).

III. PROPOSED METHODOLOGY

Sampling sites covering the entire 25km radius of Chandrapur district will be selected after a preliminary survey to obtain an accurate assessment of water quality in Chandrapur district and its surroundings. This project is based on water testing. Different samples are collected from different parts of the Chandrapur region. Water samples are collected to test various sources. H. Well water, tap water, river water, self-flowing well water, hand pump. At that time, the TDS of the water is analyzed to determine the water quality. According to IS 10500, water quality and potability are related. The Central Groundwater Board (CGWB) has been monitoring the district's groundwater quality for the past 40 years through established monitoring wells. The purpose of monitoring is to get an overall picture of groundwater quality in the district. The TDS test measures quantity, but does not identify individual

compounds or their sources. Gravimetry and conductivity are the two most important methods for measuring total dissolved solids. The gravimetric method, a more accurate method, evaporates the liquid solvent at 180° C and reports the mass of the remaining residue. Shell weight gain represents TDS and is expressed in mgVl. This is generally the best method, but it is time consuming. If inorganic salts make up the bulk of the TDS, the gravimetric method is more appropriate. The concentration of dissolved ionized solids in water is directly related to the electrical conductivity of the water. Ions in dissolved solids in water create stability for water to conduct electric current. This is measured with a TDS meter or a conventional conductivity meter. Conductivity usually provides an approximation of TDS concentration and is usually within 10% accuracy.

IV. CONCLUSION

The study emphasizes the need to regularly monitor groundwater quality in order to assess pollution activity from time to time and take appropriate control measures in a timely manner to reduce the severity of pollution activity. Analytical reports show that water levels around the industrial zone have already reached alarming levels with health implications. Large industrial sampling points nearby should provide safe drinking water for people surrounded by industry or rehabilitate people from this point on as they are a major source of pollution. Urban areas, a lot of industrial activity takes place, especially in congested and densely populated areas. They may represent threshold limits and therefore require treatment for safe human consumption. may spread over the study area. Results from early epidemiological studies indicate that even low concentrations of TDS in drinking water have beneficial effects. However, the presence of high concentrations of TDS in water can be objectionable to consumers due to its taste and excessive skin deposits on water pipes, heaters, boilers and household appliances. Water with extremely low TDS levels may also be unacceptable to consumers because it is bland and tasteless. It also often corrodes the water supply system.

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REFERENCES

1. APHA, AWWA and WPCF (1981) Standard methods for the examination of water and wastewaters. American Public Health Association, 14th ed., pp.1-1193.
2. BUREAU OF INDIAN STANDARDS (1991) Drinking water specification (First Revision), IS 10500.
3. CHAKRABORTI, P.K., WELEKAR, K.G. and DESHMUKH, A.N. (1995) direct aquifer recharge as a method for lowering fluoride content of groundwater of selected fluorosis endemic areas of Chandrapur district. Gondwana Geol. Mag.,v.9, pp.185-195.
4. DURAISWAMI, R.A. (2007) Groundwater conditions in the groundwater provinces of eastern Maharashtra: emerging challenges. Gondwana Mag. Spec. vol.11, pp.69-76.
5. DURAISWAMI, R.A. (2008) Changing geohydrological scenario in the hard rock terrain of Maharashtra: issues, concerns and way forward. Mem. Geol. Soc. India, no.69, pp.86-121.
6. HANDA, B.K. (1975b) Natural waters, their geochemistry, pollution and treatment with a chapter on the use of saline water. Govt. of India, Min. Agri. Tech., v.2, pp.246.

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7. HEM, J.D. (1991) Study and interpretation of the chemical characteristics of natural groundwater, United States Geological Survey Water Supply Paper 2254, Scientific Publishers, Jodhpur, 3rd ed., pp.120-130.
8. Department, Government of Maharashtra, pp.1-16.
9. PARANJPE, S.C. (2000) Climatic classification of Maharashtra State based on methods proposed by Thronwaite. In: Groundwater Surveys and Development Agency Seminar volume "Integrated approach for strengthening and protecting drinking water sources", IUCCA, Pune, 1999, pp.489- 498.
10. PIPER, A.M. (1994) A graphic procedure in the geochemical interpretation of water analyses. Am. Geophys. Union Trans., v.25, pp.914-923.
11. SUMA LATHA, S., AMBIKA, S.R. and PRASAD, S.J. (1999) Fluoride contamination status of groundwater in Karnataka. Curr. Sci., v.76, pp.730- 734.
12. VISHWANATHAN, S. (2004) Roof top rainwater harvesting for tackling fluoride contaminated groundwater. www.rainwater club.org
13. C.M. Hogan, Marc Papineau et al. Development of a dynamic water quality simulation model for the Truckee River, Earth Metrics Inc., Environmental Protection Agency Technology Series, Washington D.C. (1987)
14. EPA. "Guidance for Water Quality-Based Decisions: The TMDL Process." Doc. No. EPA 440/4-91-001. April 1991
15. W. Adam Sigler, Jim Bauder. "TDS Fact Sheet". Montana State University. Archived from the original on 2015-04-29. Retrieved 23 January 2015.
16. Boyd, Claude E. (1999). Water Quality: An Introduction. The Netherlands: Kluwer Academic Publishers Group.
17. Position Paper on Total Dissolved Solids, State of Iowa, IAC 567 61.3 (2)g et sequitur updated March 27, 2003
18. Anurita Sharma, (2014), Physico-chemical analysis of tap water of Chandigarh (UT) India, International journal curr science, 14: 51-54.
19. Bhalme S.P1 , Dr Nagarnaik P.B2 , (2012), Analysis of drinking water of different places: A review, International journal of engineering research and application (IJERA), 2(3): 3155-3158.
20. Boob T.N, (2014), Evaluation of groundwater quality for its drinking suitability-A case study for Pusad town (India), Int jour of curr eng and tech, 4(3): 1399-1405.

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