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REVIEW ARTICLE **OPEN ACCESS**

Ground Water Quality Assessment & its Feasibility for Drinking Purpose: A Review

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ABSTRACT

Surface water is less valuable than ground water. Ground water is contaminated as a result of fast population increase, industrialization, and urbanization. Because drinking tainted ground water causes the majority of human ailments, physico-chemical analysis of ground water samples was required to assess the quality of ground water. The current study focuses on a review of several research publications connected to physico-chemical analysis of ground water utilized for drinking purposes

Key Words: Ground water, Water Quality Index, Physico chemical parameter, Pollution, drinking water.

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INTRODUCTION

Water is required for all forms of life to live. Water accounts for more than 70% of a human body's bulk. The quality of the surrounding water influences the utilization of ground water for human consumption. Despite the fact that water covers 80 percent of the earth's surface, 97 percent of the water on the globe is unfit for human consumption. The massive glaciers and polar ice caps hold 2.14 percent of the world's water. As a result, just 1% of the available water for drinking, agriculture, residential, and industrial usage is available. According to a WHO study, water causes more than 80% of all illnesses in humans [1,2]. In both urban and rural India, groundwater is the most frequent source of household water. Once contaminated, it is impossible to restore its quality by preventing contamination at the source. As a result, it is necessary to regularly assess groundwater quality and establish strategies and ways to safeguard . The untreated use of waste water for agricultural purposes has reduced soil fertility and contaminated groundwater. As a result, ground water research for drinking and irrigation reasons is vital. The purpose of this review study is to explain the quality of groundwater used for drinking from various research regions [4, 5]. The purpose of this study work is to investigate the physicochemical parameters of ground water quality suitable for domestic use. K. Yogendra provided an experimental study on the WQI Rationality of an Urban Water Body in 2008. In this work, they computed the WQI of an urban water body based on the presence of specified physicochemical factors. According to the examination, the existing water bodies have a low amount of DO (Dissolved Oxygen) and a high level of chemical oxygen demand (COD) and nitrate content. and it turned out that the water was unfit for human consumption [6].

An intensive effort was made by the authors to collect, assess and compile the available data about the review of present study. A review on previous work and research has been carried out on the physic-chemical parameter analysis of ground water quality It is, therefore, much more important to consider the driving factors of the quality of groundwater in a systematic way. Various reports and research papers have been published in the light of improvement of ground water quality. Water quality index is one of the most effective tools to communicate information on the quality of water to the concerned citizens and policy makers. It thus becomes an important parameter for the assessment and management of groundwater

PREVIOUS STUDIES

The aim of this review paper is to study about the previous research conduct an assessment of the quality of groundwater . A review on previous work and research has been carried out on the physic- chemical parameter analysis of ground water quality. An exhaustive literature survey has been done on the evaluation of ground water quality with systematic way.

In 2008, C. R. RAMAKRISHNAIAH conducted study on groundwater quality. According to that performance report, they took groundwater samples and analyzed them for several phenominal factors, from which they computed the WQI and 12 other metrics. About 63.5 percent of the water samples were judged to be of low quality. They discovered that the WQI values for all 269 samples ranged from 89.21 to 660.567. Numerous water tests revealed low quality; the inquiry revealed that the groundwater in that location needs some more treatment and utility [7, 8].

Where District Nainital, Uttarakhand, India was investigated by C. K. Jain. According to their findings, total dissolved solids concentrations above the threshold limit of 500 mg/L in around 10% of the tests, but the results are far under the maximum allowed limit of 2,000 mg/L in all samples [9, 10, and 11].

A research paper was written by V.T. PATIL. They took groundwater samples from different-2 locations and from different sources in that experimental investigation. They analyzed the report and calculated the parameter values, which revealed the bad and good water quality. Whereas the Quality Index of the following water quality variables, such as EC (Electrical Conductivity), TDS (Total Dissolved Solids), DO (Dissolved Oxygen), TH (Total Hardness), pH, alkalinity, calcium, sodium, magnesium, sulphate, phosphate, potassium, chloride, fluoride, manganese, and nitrate, is used for the calculation. Have also been taken into account [12].

R. MATHUR, *et al.* examined the 'GROUND WATER QUALITY ASSIGNMAENT' in 2010. They looked at samples from two separate places, Jodhpur and Barmer, and analysed the report by looking at the values of several parameters. They come to a conclusion at the end. The investigation of ground water found greater levels of fluoride and nitrate in drinking water samples from some locations in the Jodhpur region, whereas higher levels of alkalinity and chloride were found in some locations in the Barmer region, although all other parameters were within allowed limits [13].

Dr. Sangeeta Parihar conducted research on the Fluoride Distribution in 2011. She looked at numerous analytical reports on fluoride distribution in different ground water samples for her study. Finally, the results were calculated using a graph for two separate seasons at different stations. Also looked at the consequences of having a lot of flouride in the groundwater [14].

P. Balakrishnan, *et al.* investigated 'Water quality mapping GIS' in 2011. Maps were used to conduct their case study. They took into account the various-different maps for the various-2 elements with spatial distributions. They completed the needed values for the case study in the final canclusion, as well as an investigation of ground water and its availability for drinking, irrigation, and other purposes [15].

In 2011, Mouna Ketata-Rokbani, *et al.* looked at the Water Quality Report, and under that study, they looked at chemical analysis, GIS analysis, and water quality index estimation (WQI). They were able to undertake the Spatial Study of Groundwater Quality thanks to that analysis report. They estimated the different parameter values using those samples. WQI16's geographical distribution was also reported.

Patil, P.N., *et al.* published a review study in 2012. In this review paper, they demonstrated the declining quality of ground water by displaying various quality parameters from various locations, which are generally based on their various Chemical elements, which shows that in most of the parts inferred from GI of providing specific place, flowing of river from urban areas, industrial waste, and many other parameters by that review, they displayed the values based on WHO AND IS reports, and different expository WQP were used[16].

According to WHO reports and their calculation parameters formulas18, Susan Varughese and Devi Prasad.K.V published a research article in 2012 that includes the various physico-chemical water quality index with their minimum, maximum, mean, and standard deviations for the three sampling seasons.Vinod Jena studied a study report in the year 2012. They took groundwater samples from a city in Chhattisgarh state and experimented with various methods for different parameters of water analysis, such as potentiometric method for pH, potentiometric method for EC(s/cm) method for EC(s/cm) method for EC(s/cm) method for EC(s/cm) method for EC(s/cm) method for EC(s/cm) method for EC(s They displayed the WHO criteria and their experimental values at the conclusion for a better comparison[17,18,19].

For water quality testing, Patil *et al.* investigated a wide range of physical, chemical, and trace metal factors. The quality of consumable water should be tested on a regular basis, as the human population suffers from a variety of water-borne ailments as a result of the use of contaminated water [20].

P. Shroff, *et al.,* investigated the Water Quality Record. Water Quality Index was employed in this study, which was created by the Canadian Committee of Serve of the Environment. The WQI was calculated

using physical and chemical factors. The total result of the Valsad WQI was 59.6. Their investigation reveals that they only require further water treatment for improved water quality, which we can readily employ for our purposes [21].

Udit Mohan, *et al.,* analysed the report and conducted an experiment under their repots, resulting in 28 groundwater samples gathered from hand pumps Mark II located in various regions around the Hapur locality. Different physicochemical and organic characteristics were used in the study. Hapur discovers that the water quality isn't suitable/good for drinking, and as a result, it must be watched from a defilement standpoint. [22, 23].

Shweta Tyagi *et al.* completed a study paper and presented the results. Following a review of several water quality indices, it can be concluded that the goal of WQI is to assign a single value to a source's water quality while also reducing a large number of characteristics into a simple expression, allowing for easy interpretation of water quality monitoring data. And it was reviewed on. Selected Water Quality Indice's Advantages and Disadvantages [24].

Mohammad Reza Mohebbi *et al.* presented a study report in the year 2013. Contaminating the methods such as Development of the modified DWQI, modified health-based water quality index (HWQI), and modified acceptability water quality index (AWQI), and presenting the final result which shows with the help of a pie chart and ascertained the highest provincial mean score of the modified DWQI was acquired in groundwater resources of the Ardebil Province to be 94; thus, water quality of the groundwater resources was described as good. The provinces of Ardebil and Kordestan also had the highest provincial overall score of the modified HWQI and AWQI, with 95 and 99, respectively[25].

Udit Mohan *et al.* conducted study in Hapur, Uttar Pradesh, in 2013. They conducted the experiment using several criteria such as pH, TDS, acidity, and others, and discovered that the quantity of nitrates in the ground water ranged from 16.10 to 74.89 mg/l. On five sample locations, nitrate concentrations higher than the acceptable vakue (45 mg/l) were found. The level of DO in all nine samples varied from 2.67 to 5.87 mg/l water, which was lower than the WHO's minimal DO recommendation [26].

P. N Rajankar presented the WQI report in 2013. They conducted an experiment in which they recorded the values of several parameters during the Pre Monsoon Season and Post Monsoon Season, and then compared them to the BIS Standards values. They were able to demonstrate the varying quality of water with various seasons as a result of that investigation [27].

Ahmad Ashfaq and Faizan Ahmad published a research study in 2014. They developed a graphical depiction of physicochemical properties with multiple specimens and examined for pH, TH, and a few other parameters in that review study [28].

Devendra Dohare *et al.* published a review study. They also indicated that the contamination factor of the chemical element was identified in a few ground waters, which can cause problems with the system's operation. and looked through another piece of research Finally, the study shows that the WQI parameter had a little larger value in the rainy season, whereas it decreased in the dry season [29].

In the year 2014, S. Selvakumar, *et al.,* conducted an experiment and produced a report based on the WQI. In their report, they collected 20 ground water samples and conducted an experiment on those samples, with the results indicating that some tests were reasonable and a few of them were unfit for human consumption. The report also revealed that the groundwater was fractionally soluble in some samples. Finally, disappearing dominance and shake water interaction dominance were used to conclude the study, with the finding indicating the water quality of the study location had changed [30].

Dr. C. Nagamani published a study article in which they gathered water samples from 5 different locations in the urban and rural sectors, conducted an experimental evaluation, and presented the results by comparing them to WHO criteria. And the results reveal that all of the sample values fall into the appropriate region. In the year 2015, the experiment was completed [31].

Where Sajitha V., *et al.,* displayed experimental reports, they were referring to the report of physicochemical parameters and lake water quality assessment. In this experiment, the quality of lake water was assessed using physicochemical parameters and WQI in accordance with WHO and BIS guidelines. The results revealed that the water is inacceptable condition and that it can be used for home purposes as well [32].

At 2016, Dhanji Kanase G and colleagues conducted a water test in Kadegaon Tahsil, Maharashtra (India). In all, two separate situations were evaluated and an experiment was conducted using bore well water and well water. For this experimental report, many parameters were used, resulting in the specific finding that the water quality is not excellent at all, and we cannot use it for household purposes or drinking [33].

adraku H *et al.* published an experimental study article in the year 2016. Temperature, electrical conductivity, pH value, dissolved oxygen, general mineralization, dry residue, ion $Mg^{2+,}$ $Ca^{2+,}$ and Na^{+} were explored in that work by calucating the parameter values and representing them using a bar graph [34].

Mohd Saleem *et al.* published their study report in 2016. They present the parameter values from

samples gathered from 10 distinct places throughout a period of 2015 under that publication. In this investigation, 90% of the water samples were determined to be of high quality, with only 10% falling into the fairly bad category. They completed the values with the assistance of graphical representation at the last step[35].

Sajitha V *et al.* did a study in the year 2016. The goal of the study was to determine the WQI of water samples by defining their quality in terms of physicochemical parameters. Water samples were taken from fifteen ponds in the Athiyannoor Panchayath for the evaluation of pond water quality in the Athiyannoor Panchayath. The water quality indicators (WQI) in the research region ranged from 6.47 to 16.17, suggesting good water quality [36].

S.S. Kolekar published a review study in 2017 that included surveys of many research publications linked to physic chemical analysis of groundwater (for drinking purpose). After considerable thought, he came to the conclusion that if the results are not within the permitted range, then the drinking water will require simple preparation prior to use [37].

V. Jena *et al.* investigated a water quality check in Raipur in 2017 and produced physicochemical parameter reports. In this study, 20 groundwater samples from Raipur were analyzed for physicochemical characteristics between 2015 and 2016. The standard approaches and methods were used to get the desired results. They come to the conclusion that standard chemical analysis is required [38].

Water Quality in and around Tekanpur, M.P., was investigated by Namita et al (India). They conducted experiments on physicochemical characteristics of groundwater samples collected in and around Tekanpur and Gwalior (M.P.). Water samples were taken at Tekanpur from five distinct locations. The generated values were then compared to the WHO and ISI criteria. Where the majority of the parameters are in compliance with the rules [39].

Jebastina, *et al.,* published an experimental study report in 2017. In this case, the quality of groundwater was tested by a sample experiment using hydro chemical parameters, and the quality of groundwater was assessed for its appropriateness for certain uses. During the post-storm season, they gathered a total of 78 tests for their experiment report. To determine the quality of groundwater for drinking and water system needs, an evaluation based on the Geographic Data Framework was carried out (GIS). Seventy-three percent of tests appear to be within the legal drinking limit. And all ponder zone groundwater tests are suited for water systems [40].

In the year 2018, Jyoti Bansal and A.K. Dwivedi published a study article in which they presented bore well reports by taking into account the pre- and post-seasons and determining the accurate value of the WQI variables as the seasons change.[41].

Poornima Verma, Prasoon Kumar Singh, Ritu Ranjan Sinha, and Ashwani Kumar Tiwari investigated the 'groundwater quality status by applying water quality index (WQI) and geospatial data structure (GIS) techniques' in the year 2019, using the Bokaro region of India as a case study. The results of the study revealed that rock weathering, particles exchange processes, and anthropogenic activities all influenced the chemistry of water in the study zone [42].

ANALYSIS METHOD

Standard procedures were used to determine the physico-chemical properties of the ground water samples. Portable meters were used to test pH and electrical conductivity. Volumetric techniques were used to determine the concentrations of magnesium, calcium, hardness, nitrate, and salinity, and the findings were compared to BIS standards as shown in Table 1.

Table 1. Methods for Physico -Chemical Parameters

S.No.	Parameters	Unit	Method Employed
1.	pH		Digital pH-meter
2.	Electrical Conductivity	mhos/cm	Digital Conductivity-meter
3.	Total Alkalinity	Mg/L	Titrimetric method (With HCl)
4.	Total Hardness (as CaCO3)	Mg/L	Titrimetric method (with EDTA)
5.	Calcium Hardness (as CaCO3)	Mg/L	Titrimetric method
6.	Magnesium Hardness (as CaCO3)	Mg/L	Titrimetric method
7.	Chloride (as Cl-)	Mg/L	Titrimetric method (With AgNO3)
8.	Nitrate (as NO3 -)	Mg/L	Spectrophotometric method
9.	Fluoride (as F-)	Mg/L	Ion Selective Electrode
10.	Total Dissolved Solids	Mg/L	Digital Conductivity-meter

Temperature

The Temperature was within the extend of 17.1°C to 18.2°C in Post- mansoon and 25°C to 26°C in Pre-mansoon. The variety in the water temperature may be due to distinctive timings of collection and impact of season

pH

The pH esteem is the –ve log of hydrogen particle concentration. The hydrogen particle concentration as a rule the conducting ranges from 0 to 14. When values of pH get lower than 7 at that point the following water is named as acidic. Namita *et al* (2017) found that where the pH value exceeds 7 at that point water is known as base. When pH esteem is precisely break even with to 7 at that point water is said to be neutral. pH esteem is measured by pH meter. 6.5 to 8.5 is the restrain of pH esteem for drinking water [43].

Electrical Conductivity (EC)

Electrical Conductivity (EC) could be a numerical esteem. Typically the capacity of an aqueous solution to require away the electric current. The virtue of water is assessing by EC (electrical conductivity) and therefore it may be a valuable device to check the virtue of water Sajitha V. *et al.* (2016)reported thatEC is measured by an instrument called electrical conductivity meter. The instrument is standardized with the assistance of std. KCl solution.[44]

Chloride

In all types of normal waters the sum of chloride display in broadly varying concentration. Devendra Dohare *et al.* 2014 found that when the mineral substance will increment in water at that point chloride substance will consequently increments. Due to human activities the concentration of chloride is tall. As per IS: 10500-2012 satisfactory restrain of chloride is 250 mg/l and permissible restrain is 1000 mg/l [45]

Sulfate

In common water particles of sulphte are display and most of those particles are solvent in water. It is measured by Bright Spectrophotometer. As per IS: 10500-2012, satisfactory restrain of sulfate is 200 and permissible limit is 400 mg/l.

Nitrate

Nitrate is display in crude water and basically it could be a form of N2 compound (of its oxidizing state). Nitrate is produced from chemical and fertilizer production lines, matters of animals, decline vegetables, residential and industrial waste. The method to calculating amount of nitrate is by UV Spectrophotometer. As per IS: 10500-2012 Alluring restrain for nitrate is max.45 and no unwinding in allowable constrain

Total Alkalinity

Alkalinity may well be a chemical action of water's capacity to neutralize acid. Hydroxide, carbonate and bicarbonate are caused the huge portion of the alkalinity in natural water. In potable water 120 mg/l is the worthy constrain of alkalinity

Total Hardness

The whole of calcium and magnesium hardness in mg/l is equal to the total hardness .The affect of hardness is scale in utensils and situation framework in boilers etc. The degree of hardness of consumable water has been classified in terms of identical CaCO3 concentration as takes after: Delicate- 0-60 mg/l, Medium- 60-120 mg/l, Difficult- 120-180 mg/l, appallingly difficult- > a hundred and eighty mg/l

Calcium and Magnesium (Ca^{2+}, Mg^{2+})

Calcium and Magnesium are specifically related to hardness. V.T. Patil et, al (2010) found that Calcium concentration extended between 27.25 mg/L to 114.6 mg/L and found underneath reasonable limit, but tube well sample from inspecting point S2. Magnesium substance within the explored water tests was extending from 20.95 mg/L to 142.3 mg/L which were found within WHO constrain [46]

Fluoride

Fluoride happens as fluorspar (fluorite), rock phosphate, triphite, phosphorite gems etc, in nature. Among factors which control the concentration of fluoride are the climate of the zone and the nearness of accessory minerals in the rock minerals gathering through which the ground water is circulating. As per IS: 10500-2012 Alluring restrain for fluoride is 1 and 1.5 mg/l in Passable

Sodium

Sodium is measured with the help of flame photometer. The instrument is standardized with the known concentration of sodium particle (1 to 100 mg/litre). Patil. P.N et,al 2012 researched that tests having higher concentration are reasonably diluted with refined water and the dilution factor is applied to the observed values [47]

Potassium

Potassium is measured with the help of flamephotometer. The measuring instrument is standardized with known concentration of potassium solution, in the range of 1 mg to 5 mg/litre. The sample having higher concentration is suitably diluted with distilled water and the dilution factor is applied to the observed values

Kelly Ratio

Kelley (1940) introduced a parameter that evaluated irrigation water quality on the basis of measured sodium compared to calcium and magnesium. Waters with less than 1 KR are suitable for irrigation. [48] The KR has been calculated according to

$$KR = \frac{Na}{Ca + Mg} \qquad \text{……(1)}$$

Sodium Absorption Ratio (SAR)

Gholami and Srikantaswamy (2009). reported that amount of sodium or alkalinity hazard is expressed in terms of Sodium Absorption Ratio SAR values less than 10 are excellent for irrigation. Values from 10 to 28 are average and more than 28 are dangerous. [49]

Sodium Absorption Ratio has been calculated according to equation 2.

$$SAR = \frac{Na}{\sqrt{\frac{Ca + Mg}{2}}} \qquad \text{……(2)}$$

Magnesium Adsorption Ratio

Values exceeding 50 are considered dangerous and inappropriate for irrigation. The MAR has been calculated according to equation 3

$$MAR = \frac{Mg \times 100}{Ca + Mg} \qquad \text{……(3)}$$

Dissolved oxygen (DO):

Dissolved oxygen is imperative parameter in water quality evaluation and reflects the physical and organic forms prevailing within the water. The DO values show the degree of contamination in water bodies. DO values change from 2.2 to 8.3. The inspecting points S2 and S3 appeared low DO values showing overwhelming defilement by organic matter.

Total Dissolved Solid

Solids might affect on water quality adversely in numerous ways. A different kind of minerals which is display in water is indicated by add up to dissolved solids (TDS). TDS is straightforwardly related with the purity of water additionally the quality of water. And we are able say the whole of the cations and anions concentration is rise to to TDS. TDS can be calculated by TDS Meter. As per IS: 10500-2012 worthy constrain is 500 mg/l and permissible limit is 2000 mg/l

Turbidity

Particles which are suspended in water interfering with route of light is known as turbidity. Turbidity is due to the nearness of distinctive types of suspended particles. It is measured by Turbiditymetry. As per IS: 10500-2012 worthy restrain is 1 NTU and allowable constrain is 5 NTU

Chemical Oxygen Demand

For measuring the natural quality of residential and mechanical squander COD test is widely utilized. COD is assessing in brief time implies it takes around 3-4 hours whereas BOD takes five days. It is used to evaluate the carbonaceous division of natural matter

Water Quality Index (WQI): The Water Quality index is employed to combination of numerous parameters and their dimensions into one score. Water Quality Index,

WQI=$\sum Wiqin$

i=1 Where,

qi(quality rating for the parameter) = (Ci/Si)×100 Ci =
Concentration of the ith parameters

Si = Standard guidelines value for each parameters,

mg/l Wi = wi /$\sum$ $wini$=1

wi= weight to the ith parameter, n = Number of parameters

Canadian council has discovered Canadian Water Quality Index (CWQI) that is founded on W.Q.I. of British Columbia. Canadian Water Quality Index is predicted on 3 attributes of water quality that relate to water quality objectives:

i.Scope-F1, ii.Frequency-F2, iii. Amplitude- F3 +++++

CWQI = {100- (F12+F22+F33)} / 1.732

Quality Index defines ranges for each CWQI: Unhealthy (0-44), Marginal (45-64), Good (65- 79), Superb (80-94), and Glorious (95-100) .

TABLE 2. CWQI rating for Water Quality

WQI	Rating	Significance
95-100	Excellent	Water Quality is protected with a virtual absence of threat or impairment; condition very close to pristine levels.
80-94	Good	Water Quality is protected with only a minor degree of threat or impairment; condition rarely depat from desirable levels.
65-79	Fair	Water Quality is usually protected but occasionally threatened or impaired; condition sometime depart fromnatural levels.
45-64	Marginal	Water Quality is frequently threatened or impaired; condition often depart from natural levels.
0-44	Poor	WQ is almost always threatened or impaired; condition usually depart from natural levels.

TABLE 3: Different analytical water quality parameters with their analytical technique and guideline values as per WHO and IS (Indian Standard)

S. N.	Parameter	Technique used	WHO Standard	Indian Standard	EPA guidelines
01	Temperature	Thermometer	-	-	-
02	Electrical conductivity	Conductivity meter/ Water analysis kit	-	-	2500us/cm
03	Dissolved oxygen	Redox titration	-	-	-
04	pH	pH meter	6.5-9.5	6.5-9.5	6.5-9.5
05	Total Hardness	Complexometric titration	200 ppm	300 ppm	<200 ppm
06	Alkalinity	Acid-Base titration	-	200 ppm	-
07	Acidity	Acid-Base titration	-	-	-
08	Biochemical Oxygen Demand (B.O.D.)	Incubation followed by titration	6	30	5
09	Chemical Oxygen Demand (C.O.D.)	C.O.D. digester	10	-	40
10	Chloride	Argentometric titration	250 ppm	250 ppm	250 ppm
11	Magnesium	Complexometric titration	150 ppm	30ppm	-
12	Nitrate	UV Visible Spectrophotometer	45 ppm	45 ppm	50 mg/litt.
13	Potassium	Flame Photometer	-	-	-
14	Sodium	Flame Photometer	200 ppm	180pmm	200 ppm
15	Sulphate	Nephelometer/ Turbidimeter	250 ppm	200pmm	250 ppm

TABLE 4: Different analytical water quality parameters used for testing of quality of water and their source of occurrence and potential health effects with USEPA guidelines.

S. N.	**Parameter**	**Source of occurrence**	**Potential health effect**
01	Turbidity	Soil runoff	Higher level of turbidity are related with infection causing bacteria's
02	Electrical conductivity	Due to distinctive dissolved solids.	Conductivity due to ionizable ions High conductivity increases corrosive nature of water.
03	PH Dissolved oxygen	pH is changed due to diverse dissolved gases and solids.	Affects mucous membrane; bitter taste; corrosion
04	Dissolved oxygen	Presence due to dissolved oxygen	D. O. corrode water lines, boilers and heat exchangers, at low level marine animals cannot survive.
05	Total Hardness	Presence of calcium (Ca2+) and magnesium (Mg2+) particles in a water supply. It is	Poor lathering with soap; deterioration of the quality of clothes; scale forming

		expressed. Hardness minerals exist to a few degreein each water supply	
06	Total Alkalinity	Due to dissolved gases (CO2)	Embrittlement of boiler steel. Boiled rice turns yellowish
07	TDS	Presence all dissolved salts	Undesirable taste, gastro-intestinal irritation; corrosion or incrustation
08	Calcium	Precipitate soaps, anionic	Interference in dyeing, textile
09	Magnesium	surfactants, anionic emulsifiers	Paper industry etc
10	Biochemical Oxygen Demand (B.O.D.) Chloride	Organic material contamination in water	High BOD decreases level of dissolved oxygen.
11	Chloride	Water additive used to control microbes, disinfect	Eye nose imitation, stomach discomfort. Increase corrosive character of water.
12	Nitrate	Runoff from fertilizer use; leaking from septic tanks, sewage; erosion of natural deposits	Effect on Infants below the age of six months Symptoms include shortness of breath and blue-baby syndrome.
13	Phosphate		stimulate microbial growth, Rancidity Mold growth
14	Sodium	Natural component of water	
15	Sulphate	Due to dissolved Ca Mg/Fe sulphates	Taste affected; gastro-intestinal imitation. Calcium sulphate scale

DISCUSSION

Groundwater quality is important to human health and also to the agriculture system. The groundwater resources is too much affected by agricultural uses, industrial wastes, and human activity that is not suitable for drinking and other purposes. A variety of plans are needed for the purpose of healthy water service, which will be possible through the water quality map. In this study various parameters have been discussed (Table 1 & Table 2) for assessing water quality for drinking and irrigation purposes. Different analytical water quality parameters used for testing of quality of water and their source of occurrence and potential health effects has been elaborated in Table 3 & Table 4. Various researches have used different techniques, like correlation analysis, factor analysis ,PCA analysis, SAR,MAR, PI, PS, RSC, WQI, EWQI, etc.The outcome of this work will helps to delineate the zones that are suitable or unsuitable for irrigation and drinking water. Farmers must take precautions to use this type of water in their agricultural field in the unsuitable zone. And the administration also has to take appropriate measures ,through water purification, the use of specific plants, etc. Furthermore, excessive pesticide use in agriculture is to be reduced, allowing groundwater to be suitable for irrigation.

CONCLUSION

The type of pollutant has an impact on ground water quality. Furthermore, it is dependent on the type of mineral present in a certain bore hole location. Ground water quality testing is done by collecting water tests and analyzing physico-chemical characteristics of water tests in totally various areas of totally different cities. Garbage pickup vehicles carried their garbage from every residence. The purpose of this review paper is to raise awareness among individuals who reside near a squander collecting substation. Bore well water contamination will be reduced by straightforward housekeeping and administration practices, which will be encouraged by the individual, the community, and Civil Enterprise.

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CONFLICT OF INTEREST

The authors declare that they have no any conflict of interest.

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