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Physico-Chemical Assessment of Ground Water of Fazilka

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ABSTRACT

Ground water is a basic well of new water for common people and is used for neighborhood, greening and ebb and flow purposes. About 33% of the general population is dependent on groundwater for drinking water. Groundwater is a basic asset especially in arid and semi-arid districts where surface water and precipitation are tied up. Achieving protected and limitless reserves of groundwater for drinking is one of the essential drivers of potential improvement for a country. Nevertheless, urbanization, rural practices, present day works, and general change conditions are all fundamental threats to groundwater quality. Impurities in the form of harmful metals, hydrocarbons, ordinary corruption, pesticides, nanoparticles, microplastics and other emerging new substances threaten human success, common associations and potentially new turns of money related events.

Groundwater is a vast source of new water for common people and is used for surrounding, plant and motion purposes. Overall 33% of the people depend on groundwater for drinking water. Groundwater is a basic asset, especially in arid and semi-arid areas where surface water and precipitation are restricted. Achieving an unlimited supply of groundwater for drinking is one of the essential drivers of the country's proper recovery. Gradually, urbanization, natural practices, flow practices, and biological changes all pose monstrous threats to groundwater quality.

KEYWORDS: Ground, Water, Contaminants

INTRODUCTION

New substances such as toxic metals, hydrocarbons, follow conventional degradation, pesticides, nanoparticles, microplastics and other arising harms, are a threat to human flourishing, normal associations and just money related new turn of events.

The categories of toxins found in groundwater are rapidly evolving, yet they can be broadly grouped into three types: manufactured pollution, common new substances, and radioactive poisons. These toxins can originate from specific and anthropogenic sources. Traditional sources of groundwater erosion coordinate seawater, brackish water, poor quality surface water, and mineral deposits. These traditional sources can become serious sources of waste if human activity disturbs the normal normal balance, for example, depletion of springs provoking saltwater inundation, catastrophic mine loss due to outflow of mineral resources, and harmful design. Separation of substances carried irrational water system.

Groundwater contamination is a general issue with enormous implications for human well-being and general security. It needs to be understood holistically as consent is a fundamental open door for safe drinking water. The mediocre idea about the consumable water is destroying the human flourishing itself and affecting the rational progress of the society. Expanded urbanization and personal improvement in various regions of the planet have increased the pollution of groundwater, primarily through the misuse of groundwater resources in and around and the presence of ebb and sewage flowing into groundwater structures. Considering its confirmation in standard media and unprecedented danger, human success is vulnerable against metal/metalloid responsiveness, even at follow-up levels.

Nitrogen grafts, such as nitrates, nitrites and acid neutralizer nitrogenase, are ruling out inorganic toxins. Nitrate is disproportionately derived from agribusiness (i.e., manure, cow dung) and anthropogenic sources including neighborhood wastewater. Groundwater nitrate pollution is completely out of control. Other common inorganic impurities found in groundwater are anions and oxygens such as F−, SO42−, and Cl−, and strong cations such as Ca2+ and Mg2+. Full Scale Isolated Solids (TDS), which refers to the total sum of inorganic and specific ligands in water, may accordingly be raised in groundwater. These toxins are usually of normal origin, but human activities can also progress to groundwater.

Specific toxic substances have been widely observed in drinking water, and endlessly these mixtures are viewed as human dangerous developments that disturb subject matter experts or endocrine disruptors. In groundwater, more than 200 common contaminants have been observed, and this number is now increasing. Many conventional new materials are biodegradable, while some are useful.

PHYSICO-CHEMICAL ASSESSMENT OF GROUND WATER

Ground water samples were collected from hand siphon, chamber well and bore-well during pre-rainy season. The groundwater samples in pre-cleaned and washed one liter limit containers were collected during the pre-rainy season with basic pre-warnings. Ground water tests were screened by various physical and formed limits like Odor, Total Dissolved Solids (TDS), Total Hardness (CaCO3), pH,

BLOCK- FAZILKA

Sr. No.	Name of Village	Colour	Odour	Total Dissolved Solids (TDS)	Total Hardness (CaCO)	pH	Fluoride (F)	Calcium (Ca)	Magnesium (Mg)	Iron (Fe)	Chloride (Cl)	Sulphate (SO_4)	Nitrate (NO_3)	Alkalinity
1	AKERA	Clear	None	610	130	7.4	0.54	28.12	11.95	0.1	85	16	12.9	390
2	BIKANER	Clear	None	930	160	7.8	2.38	32.08	22.07	0.04	94	88	16.4	520
3	BITHWANA	Clear	None	1430	210	7.6	1.07	34.04	38.08	0.02	350	90	1.6	600
4	BHARAWAS	Clear	None	600	280	7.7	0.21	14.08	56.14	0.1	130	52	1.1	360
5	CHILLAR	Clear	None	290	120	8.4	0.88	38.08	8.24	0.07	70	54	1.4	130
6	DHARUHERA	Clear	None	790	260	7.6	0.38	28.08	42.44	0.08	130	36	20.5	310
7	GOKALGARH	Clear	None	900	180	7.6	2.12	30.12	24.12	0.04	98	90	14.6	490
8	HANSAKA	Clear	None	1510	220	8.5	0.8	13.07	40.62	0.01	450	105	2.6	400
9	JANTI	Clear	None	1290	435	7.4	0.8	62.08	71.48	0.03	380	120	0.4	260
10	KHARKHARA	Clear	None	720	240	7.4	0.36	26.08	40.44	0.08	110	34	22.4	300
11	KAMALPUR	Clear	None	1420	230	7.8	1.07	36.05	36.08	0.02	360	92	1.8	610
12	KAPRIWAS	Clear	None	620	140	8.2	1.25	19.06	16.98	0.02	110	68	4.4	330
13	MEERPUR	Clear	None	1490	240	8.6	0.6	13.08	41.12	0.01	480	120	2.8	350
14	MASANI	Clear	None	1530	230	8.4	0.7	14.08	42.62	0.01	460	110	2.4	380
15	RAMPURA	Clear	None	180	120	7.2	0.12	30.12	16.12	0.02	60	19	0.6	120

Calcium (Ca), Magnesium (Mg), Iron (Fe), Chloride (Cl) Was. , sulphate (SO4), fluoride (F), nitrate (NO3) and alkalinity.

Ground water quality cutoff marks:- The impact of various physical and substance limits was dissected by Indian principles as per BIS-10500:2012 and WHO. These principles are given below:-

RESULTS AND DISCUSSIONS:-

The results of various physical and designed barriers to ground water of Fazilka block of Fazilka, (India) region during pre-storm season are displayed in the table below:-

DISCUSSION

BIS-10500: 2012 and results as reported by World Achievement Affiliation (WHO) and different Indian regulations , under discussion of various physical and built-up limits of ground water of Fazilka block of area Fazilka, (India) during pre-storm has given:-

Odour:- Odor in water may be the result of presence of mineral salts, decaying prevalent matter, mineral salts, planned compounds etc. In the energy profile, all groundwater tests were unbalanced.

Complete split up solids (TDS) - TDS was found to increase from 180 mg/l to 1530 mg/l in the continuous assessment. The best TDS (1530 mg/l) was found in Bharwas city and the lowest TDS (180 mg/l) was found in Janti city. The TDS value for drinking water should be less than 500 mg/l as per WHO and Indian regulations.

Absolute Hardness (CaCO3) - The external hardness (CaCO3) increased from 110 mg/l to 430 mg/l in continuous assessment. The highest hardness (CaCO3) for example 430 mg/l was found in Rampura town and the lowest hardness (CaCO3) was found for example 110 mg/l in Masani town. The farthest satisfactory limit for all around hardness is 200 mg/l as demonstrated by Indian Standards and WHO.

pH - The satisfactory range of pH as shown by Indian Standards and WHO is 6.5 to 8.5. In nonstop audit the pH was found to be 7.2 to 8.6. The most unbelievable pH (8.6) was found in Bikaner city and the lowest pH (7.2) was found in Janti city.

Fluoride (F) - Fluoride (F) was found to be 0.12 mg/l to 2.38 mg/l in nonstop evaluation. The best fluoride (F) for example 2.38 mg/l was found in Kamalpur city and the least fluoride (F) was found for example 0.12 mg/l in Janti city. The OK furthest limit for Fluoride (F) is 1.0 mg/l as shown by Indian Standards and WHO.

Calcium (Ca) - Calcium (Ca) was found in the range of 13.07 mg/l to 62.08 mg/l in frequent tests. The highest calcium (Ca) for example 62.08 mg/l was found in Rampura town and the lowest calcium (Ca) was found for example 13.07 mg/l in Akera town. The maximum permissible limit for calcium (Ca) is 75 mg/l as shown by Indian regulations and WHO.

Magnesium (Mg) - Magnesium (Mg) increased from 8.24 mg/l to 71.48 mg/l, which was found in continuous evaluation work. The best Magnesium (Mg) for example 71.48 mg/l was found in Rampura town and the lowest Magnesium (Mg) was found for example 8.24 mg/l in Masani town. As per Indian Standards and World Health Organisation, the permissible maximum limit of Mg is 1.0 mg/l.

Iron (Fe) - Energy assessment paper observed that Iron (Fe) is far and wide in all groundwater tests as per Indian principles and WHO.

Chloride (Cl) - Chloride (Cl) ranged from 60 mg/l to 480 mg/l, which was observed continuously in the survey. Most surprising Chloride (Cl) was found for example in Bikaner city 480 mg/l and lowest Chloride (Cl) was found in Janti city for example 60mg/l. The farthest satisfactory compass for Chloride (Cl) is 250 mg/l as shown by Indian Standards and WHO.

Sulphate (SO4) - Sulphate (SO4) was found to be 16 mg/l to 120 mg/l in continuous assessment paper. The highest Sulphate (SO4) for example 120 mg/l was found in Bikaner city and the least sulfate (SO4) was found for example 16 mg/l in Hanska city. The incredible far reaching compass of Sulphate (SO4) is 200 mg/l as shown by Indian regulations and WHO.

Nitrate (NO3) - Nitrate (NO3) was found to be 0.4 mg/l to 22.4 mg/l in the groundwater stream assessment. The lowest Nitrate (NO3) was found in Dharuhera town for example 22.4 mg/l and the lowest Nitrate (NO3) was found in Rampura town for example 0.4 mg/l. The farthest OK for Nitrate (NO3) is 11.4 mg/l as per Indian regulations and WHO.

Alkalinity - The alkalinity was found to be 120 mg/l to 610 mg/l in the continuous evaluation paper. The highest alkalinity (610 mg/l) was found in Mirpur town and the lowest alkalinity (120 mg/l) was found in Janti town. The farthest compass of alkalinity as shown by Indian standards is 200 mg/l.

Post monsoon:

BLOCK- FAZILKA

Sr. No.	Name of Village	Colour	Odour	Total Dissolved Solids (TDS)	Total Hardness (CaCO)	pH	Fluoride (F)	Calcium (Ca)	Magnesium (Mg)	Iron (Fe)	Chloride (Cl)	Sulphate (SO_4)	Nitrate (NO_3)	Alkalinity
1	AKERA	Clear	None	1505	230	9.7	2	14.12	41.67	0.04	460	110	3.8	410
2	BIKANER	Clear	None	1495	250	9.8	1.8	14.13	42.17	0.04	490	125	4	360
3	BITHWANA	Clear	None	605	290	8.9	1.41	15.13	57.19	0.13	140	57	2.3	370
4	BHARAWAS	Clear	None	1535	240	9.6	1.9	15.13	43.67	0.04	470	115	3.6	390
5	CHILLAR	Clear	None	625	150	9.4	2.45	20.11	18.03	0.05	120	73	5.6	340
6	DHARUHERA	Clear	None	725	250	8.6	1.56	27.13	41.49	0.11	120	39	23.6	310
7	GOKALGARH	Clear	None	795	270	8.8	1.58	29.13	43.49	0.11	140	41	21.7	320
8	HANSAKA	Clear	None	615	140	8.6	1.74	29.17	13	0.13	95	21	14.1	400
9	JANTI	Clear	None	185	130	8.4	1.32	31.17	17.17	0.05	70	24	1.8	130
10	KHARKHARA	Clear	None	905	190	8.8	3.32	31.17	25.17	0.07	108	95	15.8	500
11	KAMALPUR	Clear	None	935	170	9	3.58	33.13	23.12	0.07	104	93	17.6	530
12	KAPRIWAS	Clear	None	1435	220	8.8	2.27	35.09	39.13	0.05	360	95	2.8	610
13	MEERPUR	Clear	None	1425	240	9	2.27	37.1	37.13	0.05	370	97	3	620
14	MASANI	Clear	None	295	120	9.6	2.08	39.13	9.29	0.1	80	59	2.6	140
15	RAMPURA	Clear	None	1295	440	8.6	2	63.13	72.53	0.06	390	125	1.6	270

Discussion: -

Different physical and planned limits of ground water of Fazilka block of district Fazilka, (India) during pre-storm are discussed, separating Indian standards and results displayed by BIS-10500: 2012 and World Prospering Association (WHO) given under:-

Odor:- Odor in water can be a quick result of the presence of mineral salts, common substances, mineral salts, substance compounds etc. In energy audit, all the ground water tests were found to be unsaturated.

Complete Discrete Solids (TDS) - TDS increased from 185 mg/l to 1535 mg/l in successive assessments. Highest TDS (1535 mg/l) was observed in Bharwas town and lowest TDS (185 mg/l) in Janti town. As per WHO and Indian regulations TDS value for drinking water should be less than 500 mg/l.

Absolute Hardness (CaCO3) - The absolute scale hardness (CaCO3) increased from 120 mg/l to 440 mg/l in continuous assessment. The highest reducible hardness (CaCO3) for example 440 mg/l was found in Rampura town and the lowest hardness (CaCO3) was found for example 120 mg/l in Masani town. The pleasing ultimate compass of full scale hardness as shown by Indian regulations and WHO is 200 mg/l.

pH - The pH classy end is 6.5 to 8.5 as per Indian regulations and WHO. In continuous survey the pH was found to be 8.4 to 9.8. The highest pH (9.8) was found in Bikaner town and the lowest pH (8.4) was found in Janti town.

Fluoride (F) - Fluoride (F) increased from 1.32 mg/l to 3.58 mg/l in nonstop assessment. The best fluoride (F) for example 3.58 mg/l was found in Kamalpur city and the least fluoride (F) was found for example 1.32 mg/l in Janti city. The OK Perm Compass of Fluoride (f) is 1.0 mg/l as prescribed by Indian Standards and World Health Organisation.

Calcium (Ca) - Calcium (Ca) was found to increase from 14.12 mg/l to 63.13 mg/l in the consecutive assessment. The highest calcium (Ca) concentration for example 63.13 mg/l was found in Rampura city and the lowest calcium (Ca) concentration for example 14.12 mg/l was found in Akera city. The farthest satisfactory threshold for calcium (Ca) as demonstrated by Indian guidelines and WHO is 75 mg/l.

Magnesium (Mg) - Magnesium (Mg) increased from 9.29 mg/l to 72.53 mg/l in continuous evaluation work. The best Magnesium (Mg) for example 72.53 mg/l was found in Rampura town and the lowest Magnesium (Mg) was found for example 9.29 mg/l in Masani town. The farthest limit for Mg is 1.0 mg/l as shown by Indian regulations and WHO.

Iron (Fe) – In the stream assessment paper, it was observed that Iron (Fe) is past what many consider possible in all groundwater tests as per Indian standards and WHO.

Chloride (Cl) - Chloride (Cl) was found to be 70 mg/l to 490 mg/l in continuous review. The best Chloride (Cl) was found for example in Bikaner city 490 mg/l and the lowest Chloride (Cl) was found in Janti city for example 60 mg/l. The farthest limit of OK for Chloride (Cl) is 250 mg/l as shown by Indian regulations and WHO.

Sulphate (SO4) - Sulphate (SO4) was found to be increased from 21 mg/l to 125 mg/l in persistent assessment paper. The highest sulfate (SO4) concentration was found in Bikaner city for example 125 mg/l and the lowest sulfate (SO4) concentration was found in Hansaka city for example 21 mg/l. Sulphate (SO4) has a significant reach of 200 mg/l as shown by Indian standards and WHO.

Nitrate (NO3) - Nitrate (NO3) was found to be 1.6 mg/l to 23.6 mg/l in the flow assessment of ground water. The best Nitrate (NO3) for example 23.6 mg/l was found in Dharuhera city and the lowest Nitrate (NO3) was found for example 1.6 mg/l in Rampura city. The farthest limit of OK for Nitrate (NO3) is 11.4 mg/l as prescribed by Indian regulations and the World Health Organisation.

Alkalinity - Persistent assessment paper found alkalinity in the range of 130 mg/l to 620 mg/l. The highest alkalinity (620 mg/l) was found in Mirpur town and the lowest alkalinity (130 mg/l) was found in Janti town. The farthest degree of alkalinity as shown by Indian standards is 200 mg/l.

CONCLUSION

Biodegradable standard pollution basically starts from the sewage of the neighborhood and the waste water of the stream. These infinitely simple substances are usually distributed using carbs, proteins, fats and oils and can be converted into solid inorganic substances by microorganisms. They affect living animals yet can reduce the level of dissolved oxygen in groundwater. Common customary harmful substances mix hydrocarbons, halogenated compounds, plasticizers, pesticides, treatments, and individual concoctions and standard estrogens, among others.

REFERENCES

[1] Kamanula, J.F., Zambasa, O.J., Masamba (2014), W.R.L. Quality of drinking water and cholera prevalence in Ndirande Township, City of Blantyre, Malawi., Phys. Chem. Earth,vol 72–75, pp- 61–67.

[2] Niba RN. and Chrysanthus N. (2013), Bacteriological Analysis of Well Water Sources in the Bambui Student Residential Area. J Water Res Prot. Vol.5, pp- 1013-1017.

[3] Shrivastava N., Mishra DD., Mishra PK. Bajpai A.(2013),Water QualityDeterioration of Machna River due to Sewage Disposal, J Env Earth vol. 3, pp- 1-5.

[4] Y Nergis, SM Yahya, A Rahman, SA Shimim. (2013), Environmental Research Center, Karachi-75260, vol. 3(4), pp- 19- 30.

[5] DR Janardhana, BB Hari, AVVA Swami, S Sumithra. (2013), Universal Journal of Environmental Research and Technology, vol. 3(2), pp225-232.

[6] S. Khan, M. Shahnaz, NoorJehan, S. Rehman, M. T. Shah and I. Din.(2013), Drinking water quality and human health risk, Journal of Cleaner Production. Vol. 60, pp- 93–101.

[7] Ulia M. B. Robert S. and Ryan P. (2013), Cisterns and safe drinking water in Canada, Canadian Water Resources Journal., vol. 38(2), pp121-134.

[8] Srinivas Rao G. and Nageswararao G. (2013), Assessment of Groundwater quality using Water Quality Index, Arch. Environ. SCI., 7, 1-5

[9] Mohamed Hanipha M. and Zahir Hussain A. (2013), Study of ground water quality at Dindigul town, Tamilnadu, India, Int. Res. J. Environment Sci., vol. 2(1), pp- 68-73.

[10] Yadav Janeshwar, Pathak R.K., Rathour Jaypal andYadav Ankit(2013), Physico-Chemical Analysis of Water and Locked Soil of Sadli Reservoir, Int. Res. J. Environment Sci, vol. 2 (4), pp- 26-29.