International Journal of Theoretical & Applied Sciences, Special Issue-NCRTAST 8(1): 17-22(2016)

ISSN No. (Print): 0975-1718
ISSN No. (Online): 2249-3247

Control and Regulate Human Activities to reduce Water Pollution

Dr. Ratna Roy (Pathak)
Professor of Chemistry,
Govt. M.L.B. Girls PG Autonomous College, Bhopal, (Madhya Pradesh), INDIA

(Corresponding author: Dr. Ratna Roy (Pathak))
(Received 11 April, 2016 Accepted 20 May, 2016)
(Published by Research Trend, Website: www.researchtrend.net)

ABSTRACT: Approximately 95% of population in agricultural areas use ground water as its source of drinking water. Groundwater normally looks clear and clean because the ground naturally filters out particulate matter. But, natural and human-induced chemicals can be found in groundwater. As groundwater flows through the ground, metals such as iron and manganese are dissolved and may later be found in high concentrations in the water. Industrial discharges, urban activities, agriculture, groundwater pumpage, and disposal of waste all can affect groundwater quality [1]. Contaminants can be human-induced, as from leaking fuel tanks or toxic chemical spills. Pesticides and fertilizers applied to lawns and crops can accumulate and migrate to the water table. Leakage from septic tanks and/or waste-disposal sites also can introduce bacteria to the water, and pesticides and fertilizers that seep into farmed soil can eventually end up in water drawn from a well. In any case if anyone use groundwater or surface water for drinking purpose, it is advised to have tested it for contaminants. Now, what we can do to reduce water pollution. Each of us can modify behaviour to reduce or eliminate our impact on water bodies. Agriculture, mining, oil drilling, and many other industries dump chemical wastes into water sources. This makes the water unsafe to drink or to use for preparing food, for bathing, or for irrigation. In some places, water may be contaminated by toxics that naturally exist in the earth, such as arsenic and fluoride (a natural substance that causes brown spots on teeth and severe bone weakness).

As the groundwater is used up, the risk of natural toxics grows because they are concentrated in the water that is left. Whether they are from industry or from the earth itself, toxic chemicals are usually invisible and difficult to detect. Testing water in a laboratory, possibly at a university, can help detect both natural toxics and chemicals from industry. If possible, try to get the water to the laboratory within 6 hours of collecting it.

Waterways can easily be polluted through the way we all approach some common behaviors-applying fertilizers and pesticides, clearing grass clippings from yards, driveways and sidewalks; driving vehicles; flushing toilets; washing laundry and chemical disposal. It will take everyone's participation to improve the health of our rivers, lakes and streams. Each of us can modify behavior to reduce or eliminate our impacts on waterways.

Keyword: Particulate, Pumpage, Contaminants, Pesticides, driveway, modify.

I. INTRODUCTION

Water pollution is a major global problem which requires ongoing evaluation and revision of water resource policy at all levels. In general it takes much longer to clean up polluted water bodies than for pollution to occur in the first place and there is thus a need to focus on protecting water resources. In many cases clean up takes more than ten years. Although underground water is less easily polluted than water above ground, Cleaning it once it is polluted takes longer and is more difficult and expensive. Ways are being found assess where and how underground water is most vulnerable to pollution. The findings are important in cases where aquifers supply drinking water and where natural ecosystem depend on them. Sewage and runoff from farms, farmlands can contain nutrients such as nitrogen & phosphorus.

Complicating the problem of water pollution is the overall lack of adequate information about the quality of water. In the present investigation few sites are selected to analyse the ground water samples and assess the quality of water then only prevention steps can be taken to control and regulate any human activities.

II. MATERIAL AND METHOD

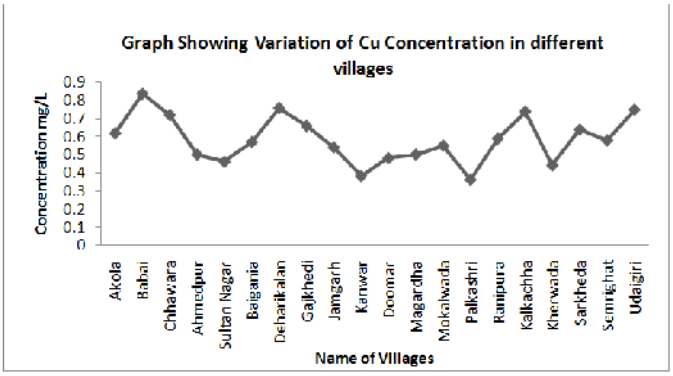
The sample were collected in polythene bottles which had been thoroughly washed and filled with distilled water, and then taken to the sampling site. The bottles were emptied and rinsed several time with the water to be collected. Also, the sample bottles were partially filled with the collected water and vigorously shaken to note the odour. The sample bottles were covered immediately after collection and the temperature taken. In the present investigation the ground water samples from twenty villages of Raisen District in M.P. were collected & analysed for some metal ions Iron, Copper & Lead using atomic absorption spectrometer as per the standard methods [2]. Fluoride, Nitrate, Sulphate and Chloride, Ion are also analysed.

Table 1.

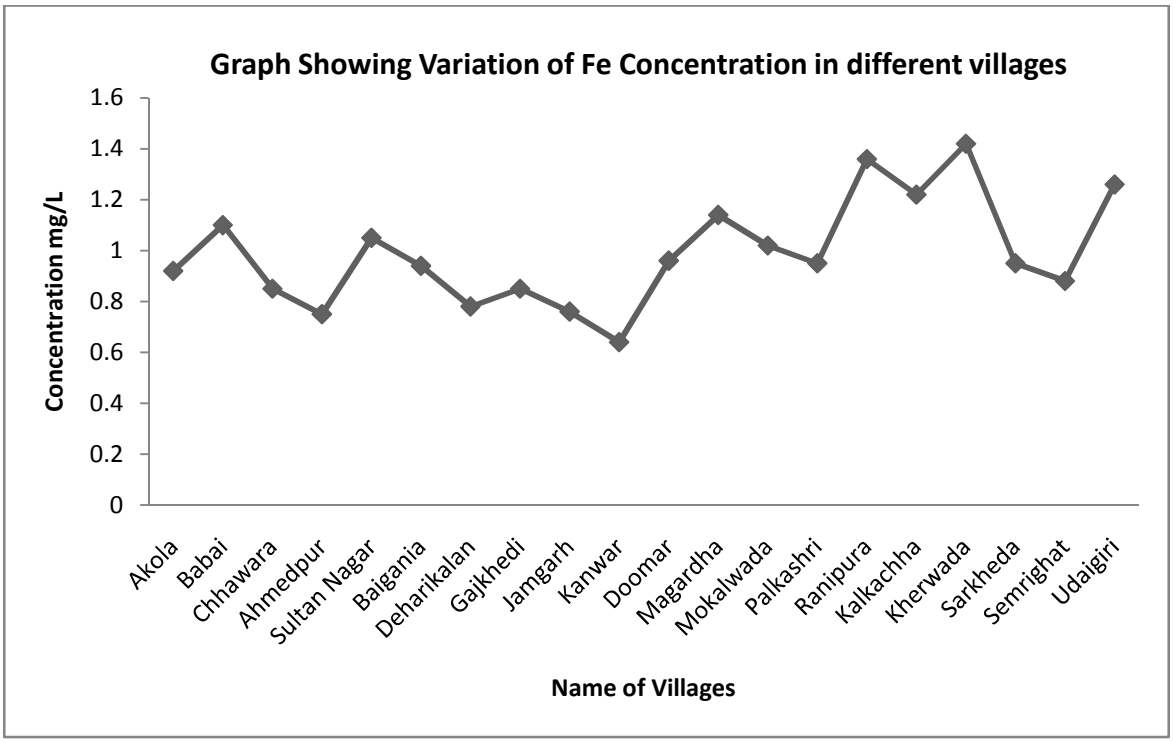
Sl.No.	Parameter	Bureau of Indian Standard (IS-10500:1991	Range
1.	Cl (mg/l)	250-1000	344 – 862
2.	SO_4^{-2}(mg/l)	150-400	264 – 510
3.	NO_3(mg/l)	45 (no relaxation)	28 – 78
4.	F (mg/l)	1.0-1.5	1.5 – 4.8
5.	Fe (mg/l)	0.30-1.0	0.64 – 1.42
6.	Cu (mg/l)	0.05-1.50	0.36 – 0.84
7.	Pb (mg/l)	Toxic ion .05(no relaxation)	0.046 – 0.095

Table 2: Analytical Parameters Showing the Concentration of Various Ions in Ground Water of some Villages in Badi of District Raisen (M.P.)

S.No.	Name of Villages	Cu mg/l	Fe mg/l	Pb mg/l	SO_4 mg/l	NO_3 mg/l	F mg/l	Cl mg/l
1.	Akola	0.62	0.92	0.054	425	56	2.4	862
2.	Babai	0.84	1.10	0.082	385	48	1.8	754
3.	Chhawara	0.72	0.85	0.063	292	35	3.2	685
4.	Ahmedpur	0.50	0.75	0.095	356	28	4.6	852
5.	Sultan Nagar	0.46	1.05	0.076	415	55	2.8	764
6.	Baigania	0.57	0.94	0.048	424	62	3.4	526
7.	Deharikalan	0.76	0.78	0.084	510	68	1.9	438
8.	Gajkhedi	0.66	0.85	0.067	336	72	1.7	535
9.	Jamgarh	0.54	0.76	0.070	406	58	2.7	384
10.	Kanwar	0.38	0.64	0.051	376	44	1.8	668
11.	Doomar	0.48	0.96	0.065	292	64	3.0	802
12.	Magardha	0.50	1.14	0.071	352	75	2.6	796
13.	Mokalwada	0.55	1.02	0.078	432	54	4.8	692
14.	Palkashri	0.36	0.95	0.047	392	38	3.7	752
15.	Ranipura	0.59	1.36	0.085	272	46	3.1	654
16.	Kalkachha	0.74	1.22	0.073	380	62	2.9	538
17.	Kherwada	0.44	1.42	0.068	425	78	1.8	476
18.	Sarkheda	0.64	0.95	0.052	366	52	3.3	344
19.	Semrighat	0.58	0.88	0.046	264	60	2.5	682
20.	Udaigiri	0.75	1.26	0.064	358	76	1.5	472



Graph 1.



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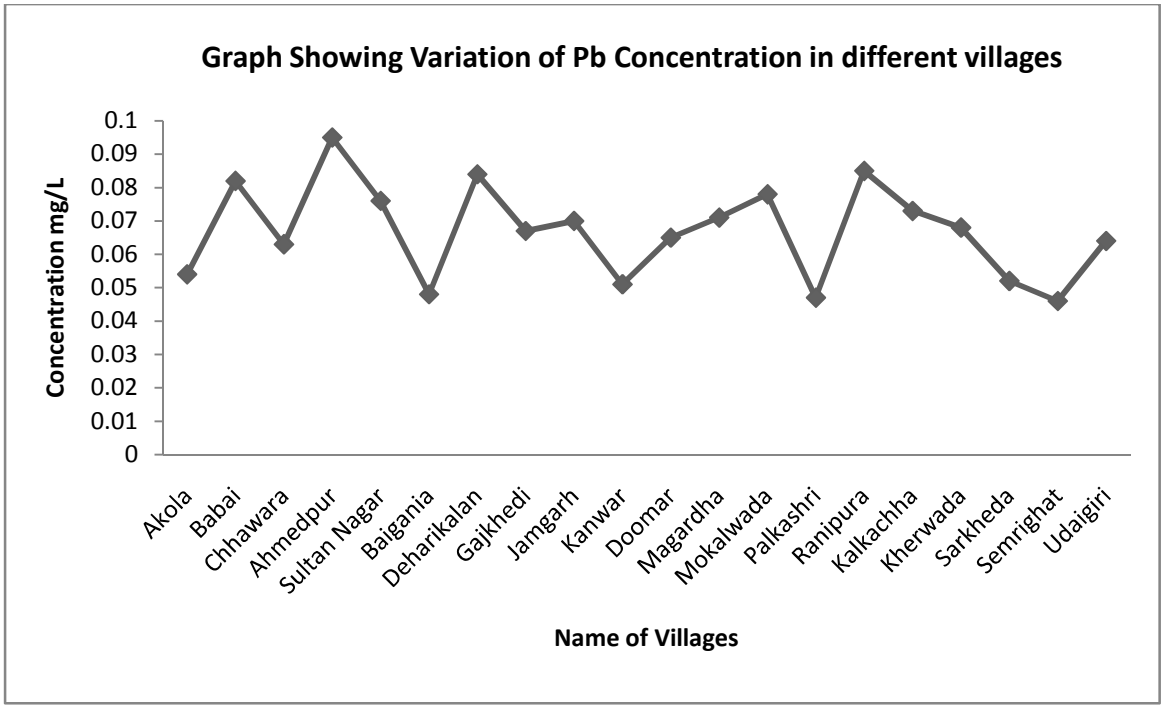

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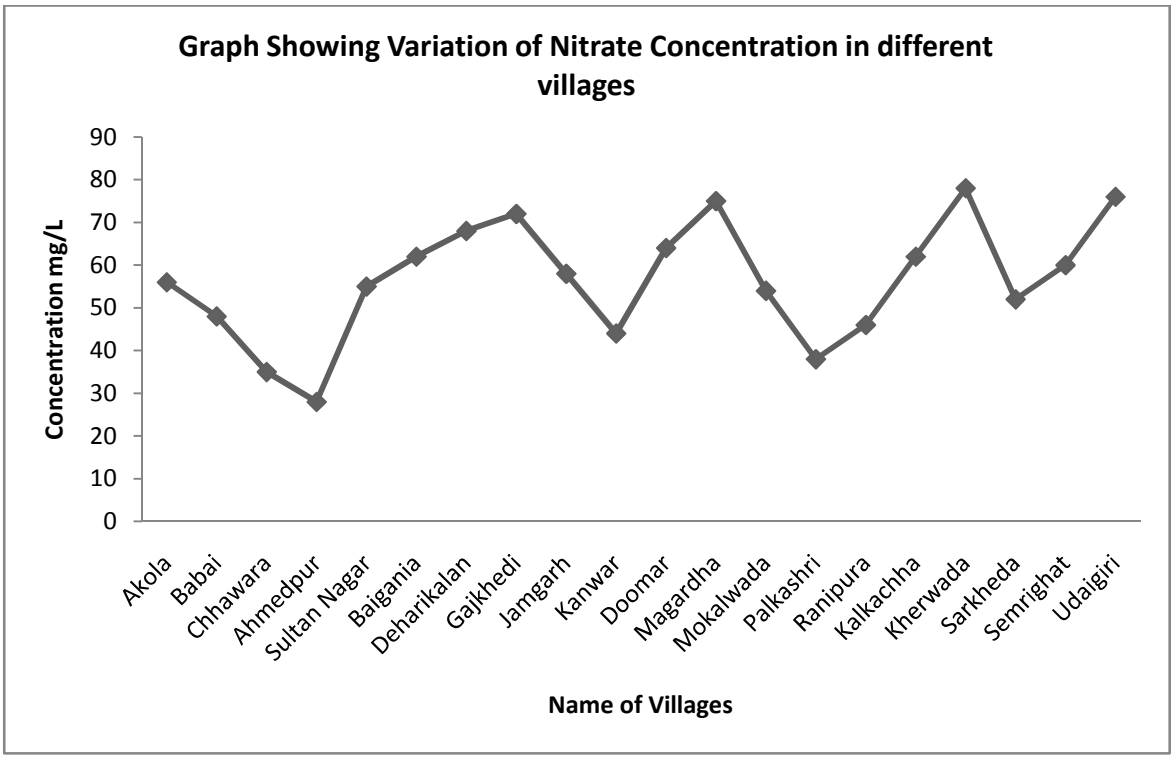

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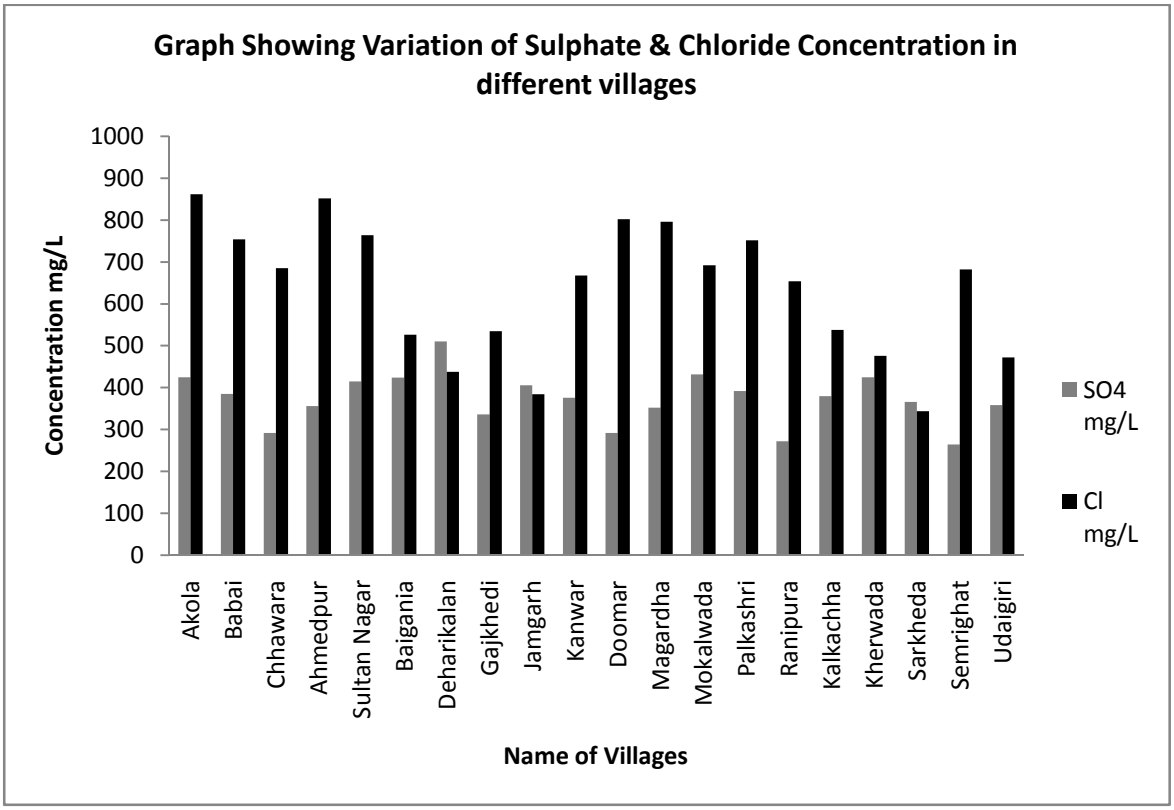

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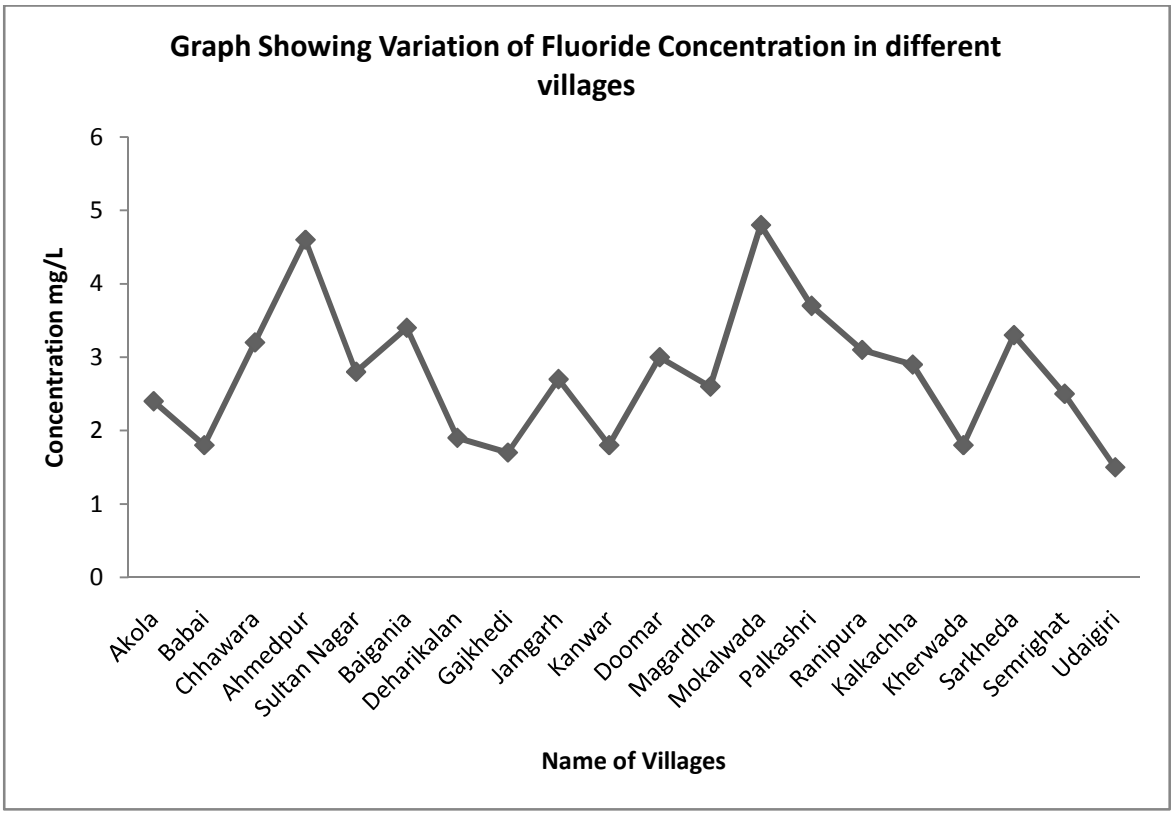

Graph 6.

III. RESULT AND DISCUSSION

Table 1 result shows nitrate concentration in study area is high. It is due to excessive use of chemical fertilizer which often leads to accumulation of nitrate in water. Nitrate generally occur in trace quantity in surface water but attain high level in ground water [3-4]. It is well known that nitrogenous fertilizers are one of the important sources for ground water nitrate for the past two decades [5]. When animal or human drink such water, these nitrate taken into body are converted to toxic nitrite by intestinal bacteria [6]. This inturn form methaemoglobin which interferes with oxygen carrying capacity of the blood. Application of chemical fertilizer, pesticides for increasing the crop production is not quantitative and the excess amount gradually infiltrate to subsurface water. Nowadays their use is controlled and regulated.

Fluoride concentration is also found to be high in this region. Except few all villages show high concentration of fluoride [7]. Bedrock containing fluoride mineral is generally responsible for high concentration of this ion in ground water. Fluoride usually accumulates in the bones teeth and other calcified tissues of human body [8]. Excess of fluoride in water cause serious damage to the teeth and bones of human body which shows, the symptoms of disintegration and decay called dental and skeletal fluorosis [9].

Chloride is a widely distributed element in all types of rocks in one or the other form. Therefore its concentration is high in Groundwater. Soil porosity and permeability also has a key role in building up the chloride concentration. The sulfate ion is one of the important anion present in natural water. It produce dehydration and gastrointestinal irritation effect in human being if present in high concentration. The higher sulphate content may be attributed to anthropogenic sources.

Iron concentration in study area except few villages is within permissible limit. Few locations show marginally high concentration i.e. not in alarming situation. Iron is biologically important element which is essential to almost all organism and present in haemoglobin system [10-11]. High concentration causes slight toxicity, bitter and astringent taste. The shortage of it causes Anaemia. Weathering of rocks and discharge of waste effluent on land are generally considered the main source of Iron in Ground Water.

Copper concentration is found to be very low. It is an essential element for biological process. Copper is essential for the formation of hemoglobin and normal bones.

In human being 100-150 mg copper is present and an adult human requires about 2mg every day. Sources of copper in ground water is from natural deposit, Industrial and mining waste and leaching from copper water pipes. Copper salts are used in water supply system to control the growth of algae & fungi. Copper sulphate with calcium carbonate is one of the commonest fungicide called Bordeaux mixture and through runoff from crop field copper reaches water bodies.

Lead is an undesirable poisonous metal ions abundantly found in earth crust. The concentration in the studied villages is slightly higher than permissible limit. It is attributed to the anthropogenic activities and poor waste management. Lead is used in lead-acid batteries, solders and alloys. Lead is a serious cumulative body poison [12-13]. It inhibit several key enzymes involved in the overall process of haemosynthesis.

CONCLUSION

Analytical parameter of Ground water in Badi region of Raisen district reveals that fluoride nitrate concentration is more than permissible limit for drinking purpose. Sulphate and chloride concentration is also high but except few within permissible limit. Iron and copper which are essential element are within safe limiting value. Lead is a poisonous element and has the property of getting accumulated in increasing concentration over a period of time in the body of organism. It affects bone marrow, formation of blood hemoglobin and replaces calcium in bone, but luckily the concentration is not very high in studied area. The high fluoride and nitrate content in drinking water should be given attention and defluoridated, denitrated water should be provided to villagers.

Ground water quality is strongly influenced by bedrock geology but may also be attributed to the impact of human activities. The prime source of nitrate enrichment are leaching from sewage effluent being utilized for irrigation. The other source is application of fertilizer, insecticide/pesticide in excess and indiscriminately. These should be used in quantitative amount. If we control and regulate our activities today then only in near future the quality of ground water may improve. Treatment through ion exchange, using activated alumina, Reverse osmosis, electrodialysis and other processes [14] can rehabilitate already contaminated water.

Proper sewage treatment, regular cleaning and detoxifying the garbage, effluent analysis should be carried on priority basis. Then only the contamination can be controlled and prevented at the source. Groundwater is used fester than it is replenished. There is sharp drops in aquifer level. Over exploitation of groundwater should be immediately restricted, instead it should be recharged on priority basis. Regular monitoring of water quality is recommended & advised to control and minimize water contaminant.

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