

Assessment of the Appropriateness of Drinking and Irrigation Water Quality Improvement with the Health Risks of Shirala Village, Amravati District, Maharashtra

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Abstract

The assessment of drinking and irrigation water analysis of ground water is most important for human health risk and irrigation purpose. The water quality analysis of Shirala village near by Chandur bazaar taluka, Amravati City, Maharashtra. The sustainability of drinking water and irrigation purpose was studied by chemical and physical, biological parameters and their properties of water sample like P^H, Hardness, Acidity, and Total dissolved solid chloride. The collected of dug well and bore well water sample. Some parameters not observed permissible limit by determine various agencies. Water parameters determine goodness of water for particular purpose and provided right information of human health and irrigation. Analyzing of water quality by using different parameters like that Acidity, Alkalinity, calcium, chloride, calcite, CO₂, P^H, Hardness, Temperature, with assessment of appropriateness aquatic micro invertebrate can be provided approximate record and indicates water quality of particular areas by analyzing water sample.

Keyword: Assessment of improvement water quality, physical chemical biological using parameter, health risk.

Introduction

Water is most important source of us and all living things are totally dependent on water. Irrigation also need of sufficient quantity of water and good water quality for crop production and human being need to water for good health as per the direction of health risk. [23] In Areas some spring are place but groundwater is discharge at specific location. Some spring are crack, joint and many problems are found that area. [22] Hot springs are defined as springs where the temperature of water lies significantly above the mean of annual air temperature of that region. [24] Rainfall, an important and largest source of water, other sources are surface water and sub-surface water or ground water. [20] Water is mostly important for drinking and irrigation purposes. [18] In addition to the direct consumption of water at homes and farms, there are many

indirect ways in which water affects our daily life. The physical, chemical and biological composition of water is influenced to a great extent by different factors including climate, geomorphology and geology. Shirala village near by Chandur bazaar taluka of Amravati District is suffering from shortage of groundwater with high scale of sodium chloride due to lowering of water table, excess extraction of the same for domestic and agriculture purposes and localized occurrences of groundwater salinity. Shirala village is small part of area is pedhi river basin is tributaries of purna river. The aim of work is to determine groundwater condition, interpreted hydro-geological report for improvement water quality of groundwater resource of this area. The water characterize by different physical-chemical and biological parameters comprising the observation with standard prescription by the Central Pollution Control Board (CPCB) and World Health Organization (WHO), [2] Investigation of quality of water for drinking and irrigation concerning parameter were Hardness, Temperature, P^H , Alkalinity, Acidity, CO_2 , Calcium, sodium chloride, All the parameters are independent. [19] The water quality show the majority of the parameters are found within non-permissible limit. Therefore, necessary to carry physical-chemical-biological analysis to improvement of water quality. The water sample was made by composite sampling method. The consecutive sampling site are at a distance of 2 km from each other. The population of Shirala village about 9035. It is located near 11km away from Chandur bazaar taluka 23km away from District Amravati, Maharashtra, The level of ground water decreasing in this duration of October 2018 to June 2019. The drinking and irrigation problems are created to the population in this village.

Geology and Geomorphology

Northern part of district is most hilly area and covered by forest. North west part is covered by thick forest Sagwan tree. The central part is covered by purna and pedhi alluvium. Total area is 3053 sq km with slope NS 9m depth to 15 km while EW slope 15 m deep to 15 km. (GSDA Amravati)The purana alluvium consist of silt, clay, sand, while Bazada, zone foot hill portion of satpuda range covers part of Anjangaon surji, Achalpur and Chandur Bazar taluka village Shirala also consisting silt, clay, boulder, pebble, The total coverage of this area is 25% while other 75% area is Deccan trap mostly jointed, vesicular basalt. Following table showing



Fig 1: Map of the Amravati District Showing Location of Shirala, Village near Chandur Bazar, Amravati District, Maharashtra.

Stratigraphy

Table 1: Showing Geological Succession of Shirala village, Chandur Bazar taluka, Amravati District

Age	Formation	Lithology
Recent	Alluvium	soil ,clay,silt recent
.....Unconformity.....		
Upper cretaceous – lower Eocene	Deccan trap	Basalt
.....Unconformity.....		
Turonian	Lameta bed	Limistone, clay,Sandstone
.....Unconformity.....		
Upper carboniferous Permian	Gondwana	Sandstone
.....Unconformity.....		
Archean	Metamorphic	gneisses/ Granite

Location of the Area

The study of area comprising of Shirala village near by Chandur bazar taluka in Amravati District lying between Latitude ‘20.930686’ N and longitude ‘77.758706’ E and is covered in survey of India. This village lies at 11km away from Chandur bazaar taluka and about 23 km away West to the District headquarter Amravati (Fig 1.)

Soil in the area is basically derived from basaltic lava flows and alluvial deposits. The soils in the vicinity of part of Pedhi tributaries of Purna River are generally deep black to dark brownish grey in colour with

calcareous concretions. [21] Land use / Land cover: vegetations and manmade features and on its bare rocks and water. In the study area agriculture is the main land use. Other than the agriculture the area comprises of wasteland, forest land, water bodies and built up.

Methodology

Methodology followed includes collection of data Shirala village area, well inventory and recharge condition, types of aquifer and depth of weathering. [16] All this information were collected from ground water survey and development agency (GSDA) Amravati the laboratory data include determination of physical and chemical parameters of 14 samples covering the entire area in a uniform manner. The physical evaluation includes P^H , and temperature whereas, later incorporates acidity, alkalinity, CO_2 chloride, Calcium and hardness of water, temperature. [19] The analytical data and its graphical representation are provided in the table 2 and fig. 2 respectively. Sample collected by different places of Shirala village and using different parameters to analyzing water quality are shown in the Table 2.

Table 2: Well Inventory and Analysis Data of Water Sample

Sr .No	Name of villages	Water table height (m)	pH	Temp. t^0	Acidity mg/l	Alkalinity mg/l	CO_2	Chloride mg/l	Calcium mg/l	Hardness mg/l
1	Bus stand	5.6	7.09	22.8	162	234	136	190.4	43.02	180
2	Gajanan temple	5.6	7.08	27.2	78	267	56.8	195.8	15.06	188
3	police station	7.2	7.07	28.6	121	234	77.7	154.2	21.04	180
4	Marwadi ward	11.01	7.01	25.7	60	243	99.8	130.2	70.03	190
5	Bajar area	9.9	7.06	26.5	48	166	67.6	170.1	29.02	183
6	Jagdamba temple	6.67	7.07	27.9	70	186	40.5	163.2	28.03	160
7		7.2	7.29	25.3	72	198	45.6	149	15.08	182
8	Borala fata	8.7	7.3	26.4	85	237	61.2	102.7	84.12	185
9	Chincholi Fata	6.76	7.52	26.3	130	139	143.5	167.3	190	180
10	Walgaon fata	3.6	7.25	24.4	120	253	132.3	164.3	167	166
11	slums area	5.89	7.8	27.6	163	256	132.3	199.8	190	175
12	Muslim	5.83	7.9	26.3	102	243	70.5	112.9	180	188

	ward									
13	Dewari road	6.3	7.1	24.9	56	288	67.2	135.3	136	160
14	S.Jibhkate house	5.67	7.16	25.6	89	167	78.2	189.5	14.02	165

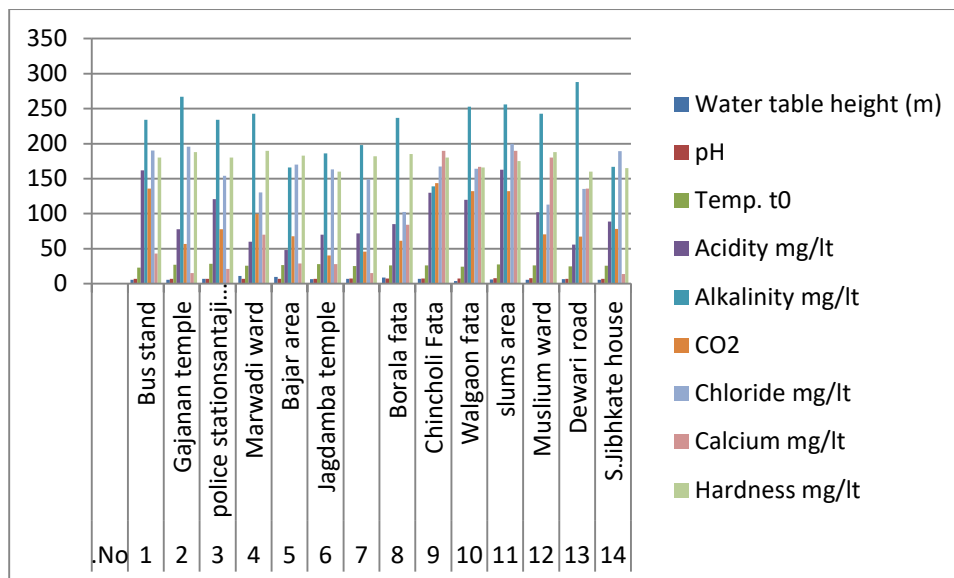


Figure 2: Histogram of Various Parameters Determined for water Samples Collected from the Study Area.

Result and Discussion

Result and Discussion of Groundwater survey has been carried out to suggest that artificial and natural groundwater recharge structures suitable for host rock of sedimentary terrain. According to desalting different element in water samples. Physical and chemical changes are showing in parameters. Physical and chemical parameters of groundwater collected in the water samples for 14 dug wells.

Hydrogen Ion Concentration (pH)

The average of pH noted from ground water samples in an around Shirala village, chandur bazaar taluka, Amravati District, Maharashtra. Ground water sample is 7.52 as maximum and minimum 7.01 was observed. Similarly, the higher values of pH may be due to the increased in nutrients and productivity in aquatic ecosystem was noted by [26] and similar observations are detected at Lonar lake, Buldhana district of Maharashtra, India, [17].

Temperature

The temperature of 14 sampling locations are observed water sample is below detectable limit in pre-monsoon and 28.6 degree maximum and minimum 22.8 degree. Similarly, the values of temperature due to the geology as recorded at[26] and [17].

Acidity

The acidity of 14 sampling locations are observed water sample is below detectable limit in pre-monsoon and 163 mg/l maximum and minimum 48 mg/l. Similarly, the acidity due to the geology as recorded at [26] and [17].

Alkalinity

The Total alkalinity of 14 sampling locations are observed water sample is below detectable limit in pre-monsoon and 288 mg/l maximum and minimum 139 mg/l. Similarly, the higher values of Total Alkalinity due to the geology as recorded at [26] and [17].

Carbon dioxide (CO₂)

The calcium of 14 sampling locations are observed water sample is below detectable limit in pre-monsoon and 143.5 maximum and minimum 40.5 Similarly, calcium due to the geology as recorded at [26] and [17].

Chloride (Cl)

Chloride of 14 water samples noticed 199.8 mg/l maximum and minimum 102.7 mg/l. The estimated chloride of water samples in an average 150 mg/l-1L. Similarly, the values are below the permissible limits of chlorides are also noted at [26] and [17].

Calcium

The calcium of 14 sampling locations are observed water sample is below detectable limit in pre-monsoon and 190 mg/l maximum and minimum 14.2 mg/l. Similarly, calcium due to the geology as recorded at [26] and [17].

Hardness

The mean value of observed total hardness from water sample is maximum 190 mg/l and minimum 165 mg/l. Similarly, the higher values of hardness (Total hardness and Calcium hardness) due to the geochemistry and geology as recorded at [26] and [17]. Indicating irregular trend, because of variable nature of the host sediments. These values are exceptionally high as compared to the standard recommended by [3]. These deficiencies in the water resources of those areas, need to improvement water quality to health risk of human being the people are exposed to different type of diseases like typhoid, kidney stone blue baby syndrome, dysentery, jaundice, etc.

Conclusion

The study of groundwater in this particular area are fluctuates in weathered jointed and fractured portion of dug well are shown by physical and chemical variation in water samples. It is indicated that irregular trend because of host sediment. The source of drinking water are not good for people its harmful and exposed to different type of diseases like dysentery, typhoid, blue baby, syndrome, jaundice, kidney stone, etc.

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