



Geo-chemical study of bore well water in Latur tehsil, Maharashtra

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Abstract

Ground water is one of the predominant source of drinking and other related requirements. It has the most exploited natural system due to over increasing demand of man for food, cloths, industrialization, enormous growth of population and agriculture. The drinking water quality was analyzed in all season. The water quality parameters such as PH, EC, T.D.S, Alkalinity, Chloride, Fluoride and Hardness were analyzed. The water sample collected from 12 stations. One result was compared with water quality standards of WHO, ICMR indicated that it is not suitable for drinking. So, the water needs treatment before human consumption.

Keywords: - Drinking water quality, physiochemical parameter, water pollution

Introduction:

Water is essential to sustain life for all the human being. This is the reason why ancient civilization found all over the world were mostly restricted to river valley only. But when the population has grown, the ancient man seems to have spread all over the plains adjacent to the river valley and subsequently to the upland even. But in recent year due to the phenomenal explosion of population, the available surface water resources could not hope up with the man's demands and hence he started to hunt for the ground water reservoirs. Water: is the essential element that makes life on earth possible. Without water there would be no life. We usually take water for granted. The people depend upon the groundwater as well as surface water for drinking domestic, livestock and agricultural purposes. More than 40 % of the drinking water supply to this area from ground water. An important aspect of urbanization is the increase in demand and creation of potential with the possibility of population of ground water. (Dong et al 1988)¹.

Material and Methods:

The study has been done in all seasons. Bore wells samples were collected from all area in brown glass bottles, with necessary precautions, during Dec.2020. The PH of samples is determined using the PH meter. EC is determined by using the conductivity meter calibrated with conductivity standard. Total Dissolved Solid is determined by gravimetric method. Calcium and Magnesium is analyzed by complexometric titration with EDTA. Alkalinity is determined with acid titrations. Chloride sample were determined by using argentometric method of precipitation. Nitrate and Sulphate is analyzed by Spectrophotometric method.

The physio-chemical parameters viz, , P^H, EC, TDS, hardness, alkalinity, chloride and Fluorides of

bore well water were analyzed following method of IS 500, P^H by digital P^H meter, total alkalinity, total hardness and chloride of water were analyzed following the methods of APHA (1998)² using Hanna fresh water analysis kit.

Study area:

Latur tehsil is one of the developing tehsil in Latur district. The tehsil lies on Balaghat pleatu and having altitude 540 to 638 Meter from mean sea level. Total area of this Tahsil is 1009 sq.km. Study area is located in Godavari river valley .Manyad, Lendi and Tiru these three rivers are flowing in northern plature of tehsil. According to 2011 the population of tehsil was 6, 83,667. According to 2011 census total population of Latur tehsil was 6, 83,666.

Result and discussion:

Water sample from different locations were also examined for the physio-chemical attributes. It was observed that was sample from bore wells entire the study area.

Characteristics of water sample:

The P^H, values in sampling area ranged from 6.6 to 8.2 i.e. alkaline natures. The electrical conductivity is a function of ions concentration. This can be used for quick checking of dissolved substance in water. Some researchers have described the importance of electrical conductance EC were observed. Permissible quality is 1500 mg/L (WHO, 1984)³ and recommended level of TDS (250-2100 Mg/L) for the protection of aquatic life (USEPA, 1975)⁴.

Irrigation (ISI, 1982)⁵ and domestics use (ICMR, 1975)⁶. The amount of TDS ranged between 91 to 923 mg/l. observed in Wanjarkheda and Gadhawad village. Calcium and Magnesium are the, principle cations responsible for hardness in present study. The value of alkalinity in ground water is varied between 80 to 330 ppm/l. salinity of

bore well water of Latur tahsil averaged 5.1 % high saline bore well water were recorded in Mamdapur and Gangapur village. The value of chlorides is observed between 55 to 300 ppm. The permissible limit of chloride in drinking water is 250 ppm (WHO, 1984). Highest concentration of chloride is found in Gangapur (300 ppm) village. Total hardness is an important parameter of water quality.

Values of Total hardness varied in between 150 to 525 Mg/L. These result exceed the limit set by WHO (150 Mg/L) and ISI (300 Mg/L) Thus the water is very hard water and not suitable for drinking and domestic purposes. Highest concentration of these cations recorded at Bhuisamudraga village. Calcium and Magnesium are the, principle cations responsible for hardness in present study.

Geo-chemical analysis of Bore well water in Latur Tahsil (Dec.2020)

Villages	PH	EC	TDS	Calcium	Mg	Alkalinity	Chloride	Nitrate	Sulphate	Hardness
Gadhawad	7.3	1420	923	245	93	190	230	42.91	123.48	480
Gangapur	7.4	1338	870	289	163	230	300	36.6	97.53	280
Mamdapur	8.2	1369	890	521	215	330	190	10.45	6.27	280
Wanjarkheda	7.2	140	91	668	190	80	155	17.96	30.39	180
Takli	6.9	1246	810	602	128	200	230	18.89	31.65	250
Bhuisamudraga	8.1	698	454	428	117	160	110	33.65	39.56	525
Nandgaon	7.4	812	528	308	111	90	85	3.81	24.128	150

Source: GSDA, Latur pH, EC, TDS, Alkalinity, Chloride, Total Hardness (mg/ L)

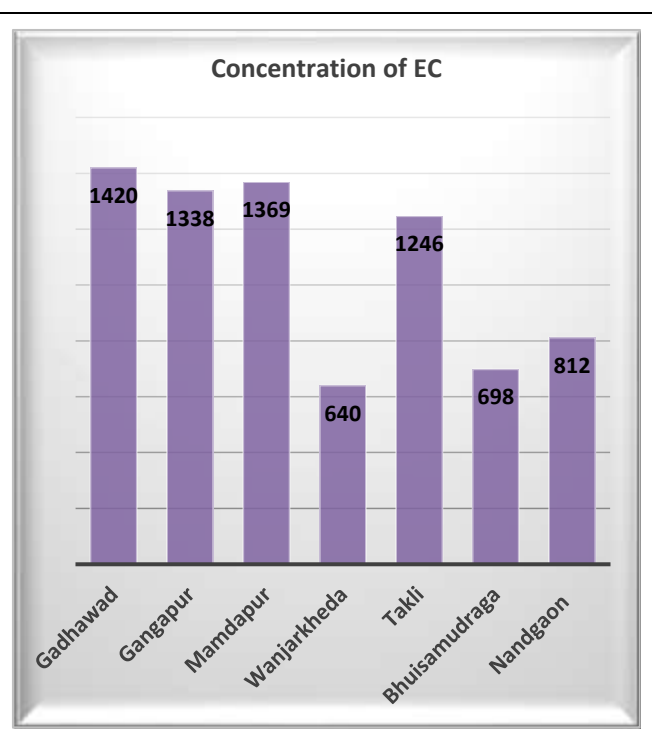
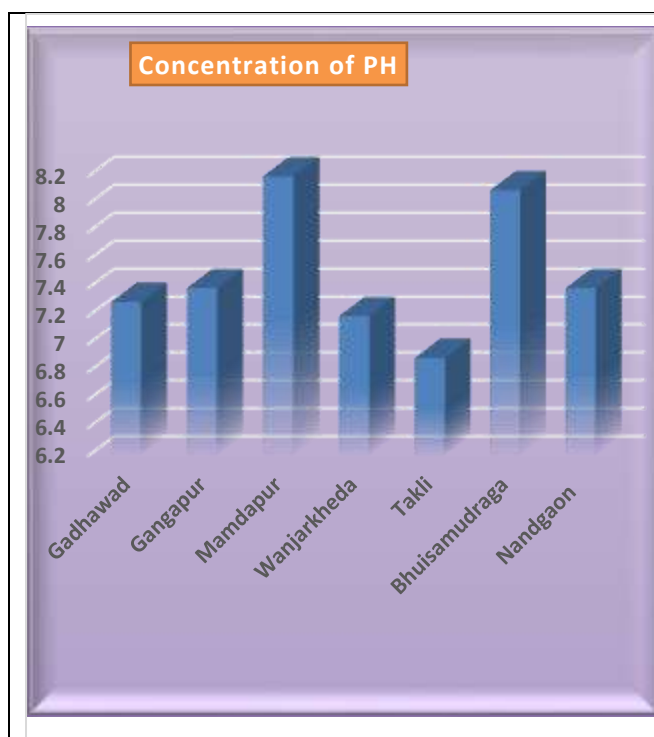
Conclusion:-

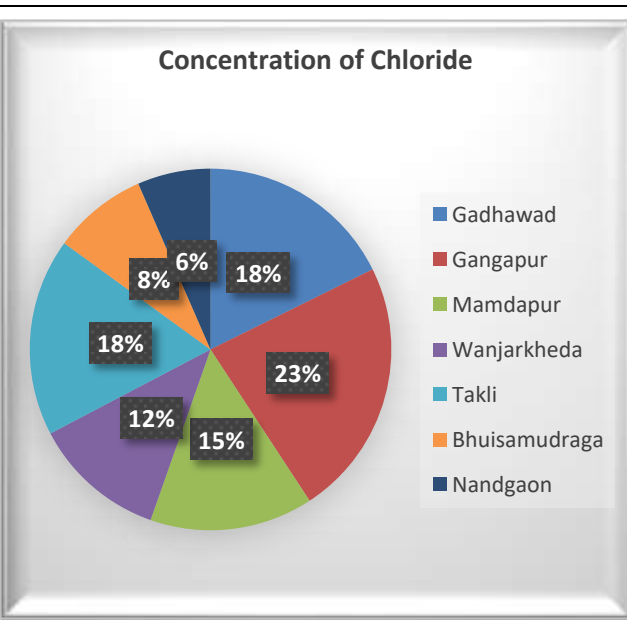
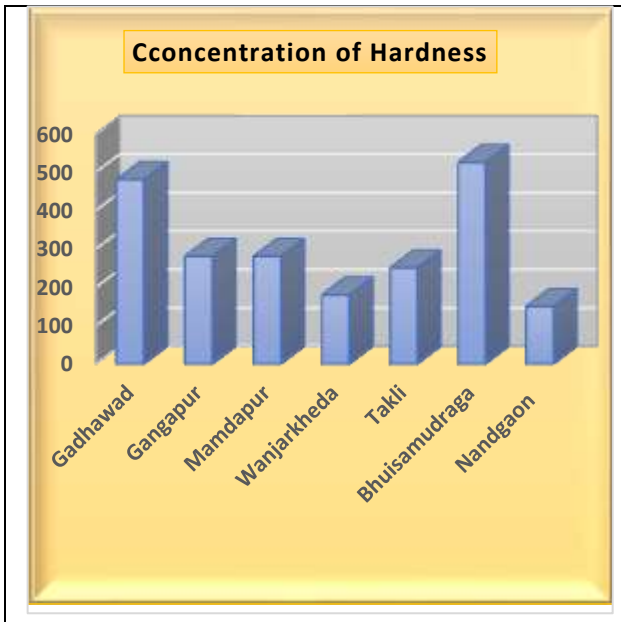
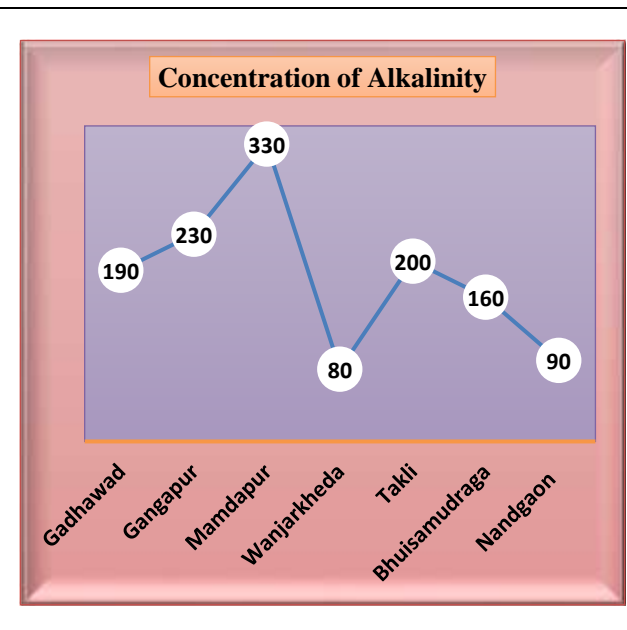
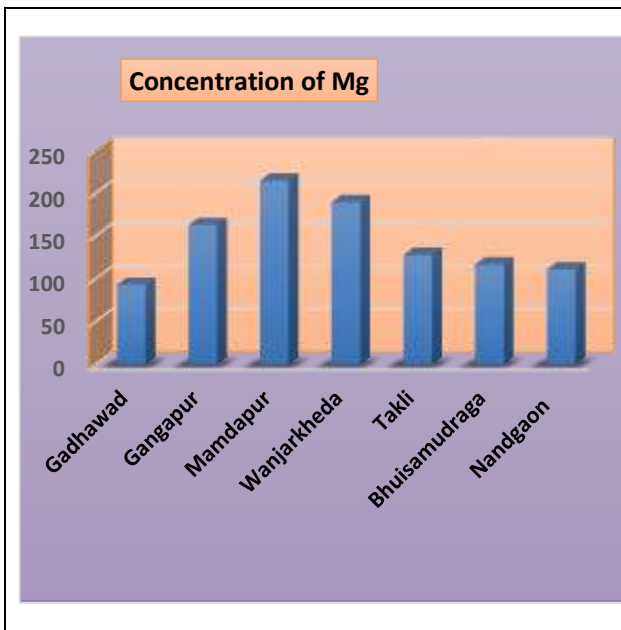
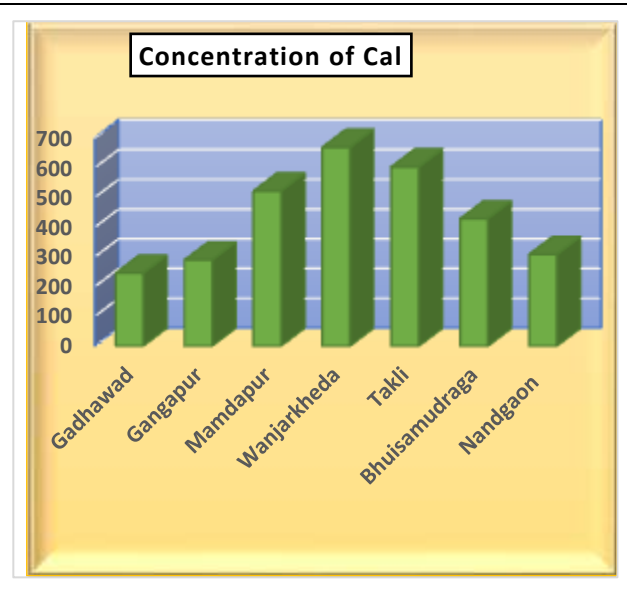
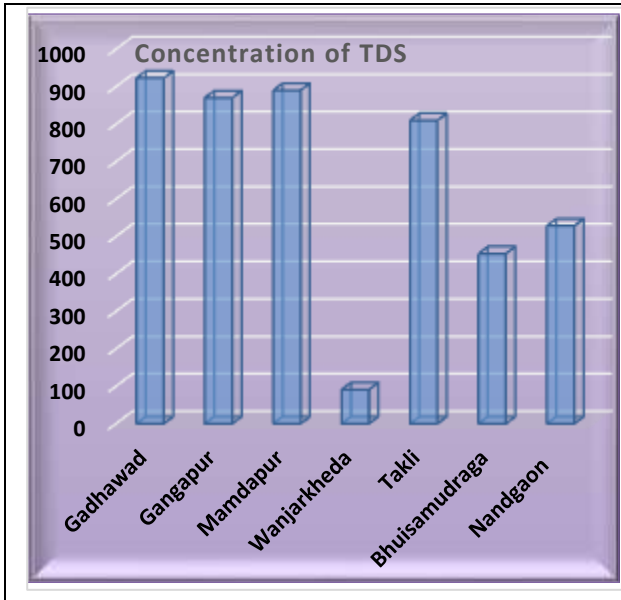
The quality of drinking bore well water in the study area has been deteriorating indicted by the presence of high concentration of TDS observed in Gadhawad village. Gangapur and Mamdapur villages has 2 samples having 117 exceeded TDS Concentration. 05 samples were found to be proper for drinking purpose whereas 04 samples badly require proper chemical treatment. Hence there is an

urgent need to take steps for protection of this valuable source.

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References:-

1. Dong .C Holseld D.R. and Ragons S.F (1988) Preliminary evaluation of regional ground water quality in relation to land use, Ground water, pp26.
2. APHA (1998), Standard methods for the examination of water and waste water (20 th Edi) Washington DC.
3. WHO. (1984), Guideline for water quality. Vol., Recommendation World Health Organization, Geneva.
4. USEPA (United States Environmental Protection Agency), 1975, Quality criteria for water (Ed.Train R.E) Caste House publication Ltd. Great Britain.
5. ISI (Indian Standard Institution) 1982, Draft Indian standard specification for drinking water, Doc, CDC, New Delhi.
6. ICMR (1975), Manual of Standard of quality for drinking water supplies, Indian council of Medical Research spl ; Rep. ser. No.44. APHA (1989)