



STUDY OF GROUND WATER QUALITY FOR IRRIGATION IN SOME VILLAGES OF YAVATMAL DISTRICT, MAHARASHTRA (INDIA)

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Abstract:

30 ground water samples of 10 villages in Pandharkawada Tahsil of Yavatmal district, Maharashtra (India) were analyzed for their suitability for irrigation purpose. The mean values of 3 samples taken from each village have been reported in the present study. Ground water was classified according to Sodium absorption ratio (SAR), Percentage Sodium, Residual sodium carbonate and electrical conductivity. Only one village Shibala fall in very high salinity and medium sodium hazard water which has alkaline in nature and require proper management practices.

Keywords: Pandharkawada, SAR, Yavatmal

Introduction

India is a predominantly agricultural country where rural economy is completely depending on agriculture. In Pandharkawada tahsil of Yavatmal district (Maharashtra), the water resources for irrigation are mainly rain water, surface water & ground water. Due to lack of perennial river system & other surface water resources, the ground water is an important source for irrigation purpose. To improve the maximum crop yield, the water used for irrigation purpose should of such quality that does not harm the soil. It can be evaluated by its effect on soil & crops. Various factors have been proposed to classify the water quality for irrigation purpose. Several investigations (Das

et. al; 1999, Srimvasulu et. al; 1994, Singh, 1998, Rao et. al; 1993) have analyzed & classified the water suitability for irrigation purpose. In Yavatmal district, there is some problems of good quality water for drinking & irrigation purpose.

Material & Methods:

Study Area:

Pandharkawada tahsil of Yavatmal district (Maharashtra) is located between [19.9594527°N 78.7261256°E](#). & is known as white diamond as there is maximum yield of cotton. The study was carried out for one year from May-2016 to April-2017. Ground water were collected from ten villages, namely Pahapal, Saykheda Mohda, Wai, Mangurda, Shibala, Chalbardi, Both(B), Kelapur, Khairgao. We study the ground water quality of ten villages to evaluate & classify the ground water quality for irrigation.

The sample were collected in pre-cleaned polyethylene bottles with necessary precaution (Brown et. al;). Electrical conductivity and pH of all water samples were studied by Elico CM 180 and Elico LI 610 respectively. Titrimetric method were used to estimate carbonate, bicarbonate, calcium & Magnesium using standard method (APHA; 1995). The analysis of water was carried out for three seasons including twice in summer; once in Monsoon & once in winter.

Result and Discussions:

On the basis of EC, SAR, RSC, & PS, the ground water quality of study area were obtained.

Sr.No.	Parameter	S-1	S-2	S-3	S-4	S-5	S-6	S-7	S-7	S-8	S-9	S-10
1.	pH	7.40	8.04	8.13	7.57	7.45	7.34	8.75	7.45	7.345	7.54	8.05
2.	EC	1352.4	356.8	526.4	845.6	553.6	235.4	3456.6	12422.7	1535.23	1375.5	1684.5
3.	Sodium	1.432	0.52	4.2156	4.236	4.236	5.646	5.356	3.246	3.574	0.109	0.083
4.	Potassium	0.083	0.184	0.082	0.109	1.428	1.098	2.132	0.084	0.083	0.143	0.402
5.	Calcium	3.804	1.0897	0.835	1.18	1.211	2.245	1.424	2.434	2.653	2.785	1.434
6.	Magnesium	4.47	0.4455	0.864	1.074	1.756	5.764	3.075	2.9056	2.953	3.905	1.6344
7.	Carbonate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8.	Bicarbonate	8.24	2.28	6.29	8.78	9.45	9.64	8.43	7.06	7.84	7.42	7.90
9.	SAR	0.632	0.724	4.324	4.675	4.643	1.856	10.43	3.85	2.78	3.908	2.645
10.	PS	15.42	27.89	64.98	61.98	69.07	34.28	81.97	42.427	32.087	54.988	48.908
11.	RSC	-1.278	0.208	4856	4.789	6.298	0.757	6.895	6.34	3.24	-0.68	3.986

The results as shown in Table 1 are the arithmetic mean of three results obtained three samples taken from each village in May 2016 to April 2017. All the value is expressed in meg/l except pH and EC.

Electrical Conductance (EC):

The procedure to evaluate salinity of water is to measure its electrical conductance. The high electrical conductance value is harmful for plant growth physically by reducing the uptake of water, its also changes soil structure, permeability & aeration which ultimately affect plant growth & crop yield. The mean value of EC of each village is reported in Table 1 as per classification made by United state Salinity laboratory (Richards). There required special management for salinity control while in some villages it is good with medium salinity.

Sodium adsorption Ratio (SAR):

Sodium influence the soil quality and plant growth by affecting the permeability of soil by logging or replacing other cations. Results of sodium in water from ten villages has low sodium (< 10) which has excellent for irrigation.

Residual Sodium Carbonate (RSC)

The water with RSC will have pH and make soil infertile by depositing black alkaline on the surface. In four samples RSC value below 1.25 meg/l are safe for irrigation purpose while in five samples, it was unsuitable.

Percentage Sodium (PS):

It is used for adjudging the quality of ground water for the agricultural purpose. From the Table 1, only one sample fall in good category while five samples are permeability to doubtful while only one sample is unsuitable and six samples of six villages are suitable.

Conclusion:

The study revealed that only three villages has low salinity and low sodium hazards water. Ground water is suitable for irrigation purpose. Some village i.e. Chalbardi, Pahapal, Khaigao, Wai has medium salinity and low sodium hazards water and require proper management practices. Six samples from Saikheda, Both(B) villages represent high salinity and low sodium hazards water. This could be used for irrigating semi-tolerant crops without any harmful sodium effect. Only one village Shibala fall in very high salinity and

medium sodium hazard water which has alkaline in nature.

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