

# UNIVERSITY GRANTS COMMISSION

## MINOR RESEARCH PROJECT

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### CHEMICAL ANALYSIS OF UNDERGROUND WATER FROM DROUGHT PRONE ZONE OF SATARA DISTRICT OF MAHARASHTRA

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## SUMMARY AND CONCLUSIONS

The study to ascertain the quality variations in ground water of Man Tahshil (Satara district, Maharashtra) by natural and anthropogenic activities in the urban as well as the rural environment is multidisciplinary in approach. 36 sampling locations were selected covering urban and rural areas of Man, Khatav and Phaltan tahshil (Satara district, Maharashtra). The sample were collected in the consecutive years 2010-11 (winter season) 2011-12 (summer season). The analysis of physico- chemical nature of such water samples various parameters (pH, TDS, EC,  $\text{Cl}^-$ ,  $\text{SO}_4^{2-}$ ,  $\text{HCO}_3^-$ ,  $\text{Ca}^{2+}$ ,  $\text{Mg}^{2+}$ ,  $\text{Na}^+$ ,  $\text{K}^+$ , TH) are studied.

The results obtained on the chemistry of ground water in the area indicated that-

❖ The average pH ranges from 6.3 to 7.7 indicating weakly to moderately alkaline nature of ground water.

❖ The average EC value ranges from 0.47 mhos/cm to 1.5 mhos/cm, reflecting fresh to weakly saline in character of ground water.

❖ The average TDS ranges from 440 mg/l to 1708 mg/l , indicates that nin saline to moderately saline of ground water.

❖ The values of  $\text{Cl}^-$  ranges from 82 mg/l (minimum) to 410 mg/l (maximum) indicates that chloride ions are in between the permissible limit of drinking water.

❖ The values of  $\text{SO}_4^{2-}$  ranges from 110 mg/l (minimum) to 677 mg/l (maximum) indicates that overcome the excessive limit in maximum location of the study area.

❖ The average  $\text{NO}_3^-$  values ranges from 20 mg/l to 59.7 indicating within the permissible limit of drinking water.

❖ The average  $\text{Cl}_2^-$  values ranges from 109.3 mg/l to 193.8 mg/l in winter season indicating within the limit of drinking water. But in summer season value ranges from 131.9 mg/l to 333.4 mg/l indicated that overcome the excessive limit of drinking water in maximum location of sample collected study area.

❖ The value of  $\text{Mg}^{2+}$  ranges from 35.8 mg/l (minimum) to 141 mg/l (maximum) indicating the maximum samples overcome the excessive limit of the drinking water.

❖ The average TH value ranges from 354 mg/l to 1170 mg/l indicating that hard water of ground water.

❖ The values of  $\text{HCO}_3^-$  ranges from 225 mg/l (minimum) to 1120 mg/l (maximum) indicates that slightly increasing the excessive limit of drinking water, in some cases.

❖ The average  $\text{Na}^+$  values ranges from 113 mg/l to 460 mg/l indicates that the higher concentration of ground water.

In the study area the pH, EC, TDS,  $\text{Cl}^-$ ,  $\text{NO}_3^-$ , which are lie in the permissible limits of drinking water and other parameters like  $\text{SO}_4^{2-}$ ,  $\text{HCO}_3^-$ ,  $\text{Ca}^{2+}$ ,  $\text{Mg}^{2+}$ ,  $\text{Na}^+$ , TH are increases slightly to excessive limits. The reasons could be-

1) Urbanization and increasing population results in over exploitation of ground water, which lowers the water levels and dries the soil. In turn, it increases the maximum adsorption of domestic sewage and pollute the ground water.

2) Unscientific storage and uses of pesticides and fertilizers by the farmers.

3) The leachate from improper disposal of municipal solid waste.

4) Regular addition of large quantities of sewage and detergents from the residential localities.

5) Low rainfall in the year 2008 compare to average rainfall in this area.

## **RECOMMENDATIONS**

The wells are recharging by roof top rain water should be propagated and if possible, the same should be made mandatory for achieving long term benefits such as increased fresh water availability and reduction in salinity/ hardness.

Periodic monitoring of water quality should be carried out.

Encouragement should have given to build septic tanks instead of leach pits. The farmer should have advice to use bio fertilizers instead chemical fertilizers in agricultural

activities. If it becomes inevitable to use chemical fertilizers they should be used in judicious way.

Though fertilizers and pesticides are needed for agricultural production, farmers should be educated in the optimum use of fertilizers and pesticides.

To solve non agricultural area problems of pollution, policies for protection of agriculture crops must be integrated with policies of conservation and environmental protection.

Disposal of solid waste (domestic) on a land fill is highly undesirable and it is a source for ground water contamination. A proper management of these activities by the concern authorities must be made for safe disposal of solid wastes.

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Construction of percolation tanks, check dams, irrigation tanks and bunds across the major and minor perennial or non- perennial streams at geologically ideal locations would help the aquifer recharge and also surface storage. Therefore said water management maintenance should be adopted at the earliest. Further it is traced that the concern authorities should maintain the existing ponds, lakes reservoirs in man tahshil (satara district, Maharashtra) to increase the ground water table.

The study concludes that the quality of water in this area needs special attention. The present situation has been the outcome of human activity and it is in our hands to set thing right. The people in this area may be advice to let their drainage away from the water sources.

Once the ground water source gets polluted the effects of pollutants may persist for longer duration. The reclamation of surface water is easier than the reclamation of sub surface water; hence prevention of ground water pollution due to any causes is necessary.