

ASSESSMENT OF GROUND WATER AND SURFACE WATER QUALITY IN THE UPSTREAM TANK OF COIMBATORE CITY

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ABSTRACT

Water is essential for life and access to clean drinking water is a necessity for good health. However, clean drinking water is not available everywhere, due to water scarcity and pollution of existing water resources. The pollution can be in the form of natural or anthropogenic activities. This study focuses on the Impact of anthropogenic activities on the water quality of 4 tanks in Coimbatore city and its contribution to the groundwater quality. Due to encroachment and other anthropogenic activities, the quality of water is being depleted rapidly. Disposal of municipal waste and waste from other various industries into the tank will deplete the quality of water in the tank. This water, along with the leach-ate may percolate through the pore spaces between the soil particles and interact with the groundwater. The contaminants will be transported and contribute to the nearby well head and affect the quality of water in the well too. Finally, the social consequences will be analyzed using PRA tools (Questionnaire survey)

NEED FOR THE STUDY

Decline of water quality in general, and groundwater in particular is of great concern. Unchecked disposal of untreated municipal and industrial wastewater and excessive use of fertilizers and deteriorate the ground water. The groundwater of Coimbatore has been degraded due to rapid industrialization along with urbanization and agricultural activities in its surroundings areas. All the industrial units consume large amount of water which, together with dissolved toxic substances (acids, base or toxic chemical compounds) after processing is discharged into nearby agricultural lands, ponds, open ditches, rivers, streams and open land. The data provides quick and useful baseline information on the parameters controlling the quality of the water. However all the controlling parameters have rarely been studied together because of non-availability of data, integrating tools and modeling techniques. The systematic study of these factors leads to better delineation of prospective zones in an area which is then followed up on the ground through detailed hydrogeological investigation. The present study to provide information regarding the numerical

data of important physical-chemical parameters that affect water chemistry. The major aim of the study was to assess the physico-chemical parameters of drinking water sources. . The pollution can be in the form of natural or anthropogenic activities. Fluoride contamination of groundwater is a growing problem in many parts of the world. The major sources of fluoride in groundwater are due to fluoride-bearing minerals such as fluor spar, cryolite, fluorapatite and hydroxylapatite in rocks. Some anthropogenic activities such as use of phosphate fertilizers, pesticides, sewage and sludge, depletion of groundwater table etc., contribute to water scarcity and pollution. The impact of this pollution on human health and other social consequences can be assessed using semi structured survey

OBJECTIVE OF THE STUDY

1. To determine the physio-chemical characters of the tank water and groundwater.
2. To assess the social consequences in and around the groundwater quality affected areas using Semi Structured Survey Tools.

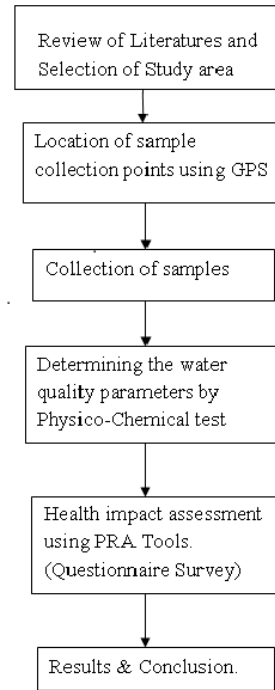
STUDY AREA CHARACTERISTICS

Coimbatore city has totally 8 surface water tanks along the noyal river stretch. There are 21 Anaikuts and 31 Tanks in noyal river system, Among them 8 tanks are located in Coimbatore namely, Narasampathi, Krisnampathi, Selvampathi, Kumarasamy tank, Selvasindhamani, Ukkadam periyakulam, Valankulam, Singanallur tank, that serves Coimbatore district in noyal river system. All these tanks are located to the north of Noyal River. Among these tanks, my study area is 4 upstream tanks. Since the upstream tanks are comparatively more polluted, so far the study will be carried over there. Flow through all these tanks are only through gravity.

Chitrachavadi anaikut has been constructed across the Noyal River to divert water into Chitrachavadi canal which is 11.75 km long. The first five tanks are being fed by the Chitrachavadi canal. 1) Narasampathy tank is located to the west of Coimbatore city adjacent to thondamuhtur road and also to the west of kumaraswamy tank, this tank lies between latitude: $10^{\circ} 59' 58''$ N and longitude: $76^{\circ} 54' 31''$ E. Narasampathy is the first lake to receive water from the

noyal river through chitrachavadi anaicut channel. It also receives a runoff from the stream course coming from the maruthamalai forest area. 2) The krishnampathy tank is located to the west of Coimbatore city on thadagam to kondamuthur road and close to seeranaickenpalayam, the location of this tank lies between latitude :11⁰0.283'N and longitude : 76⁰55.237' E. Krishnampathy lake receives the water from the noyal river through chitrachavadi channel and also getting the surplus water from the narasampathy lake.3)

The selvampathy lake is situated to the left side of Coimbatore-thondamuthur road and west of kumaraswamy lake and it lies between latitude: 10⁰59.457' N and longitude:76⁰56.701' E. The surplus water from krishnampathy reaches to selvampathy and outlet of this tank is connected to the kumaraswamy lake. Selvampathy tank receives the sewage water from the two sewage inlets. 4) Kumaraswamy tank is the last tank of my study area which is situated to the left side of Coimbatore at Thondamuthur road and the east of selvampathy lake, this tank obtains the surplus water directly from the selvampathy lake .



TESTING PROCEDURE:

1.TESTING OF WATER SAMPLE FOR TOTAL HARDNESS:

BURETTE SOLUTION : EDTA
CONICAL FLASK : 20 ml sample
INDICATOR : Eriochrome black T
END POINT : Red to blue

2.TESTING OF WATER SAMPLE FOR CHLORIDE(CL)

BURETTE SOLUTION : silver nitrate
CONICAL FLASK : 25 ml sample
INDICATOR : Potassium chromate
END POINT : Yellow to brick red

3.TESTING OF SAMPLE FOR DISSOLVED OXYGEN (DO)

BURETTE SOLUTION: Sodium Thiosulphate
PIPETTE SOLUTION: Sample
INDICATOR: Starch
END POINT: Disappearance of blue color.



source: Google maps) **Figure 1.1 Map view of the Study area**

METHODOLOGY

COMPARISON OF VARIOUS PARAMETERS FOR MONSOON & POST MONSOON

Charts Showing Variation Of Values Of Ground Water And Surface Water Samples Taken At Narasampathy, Krishnampathy, Selvampathy And Kumaraswamy Tanks For The Monsoon Season And Post Monsoon Season.

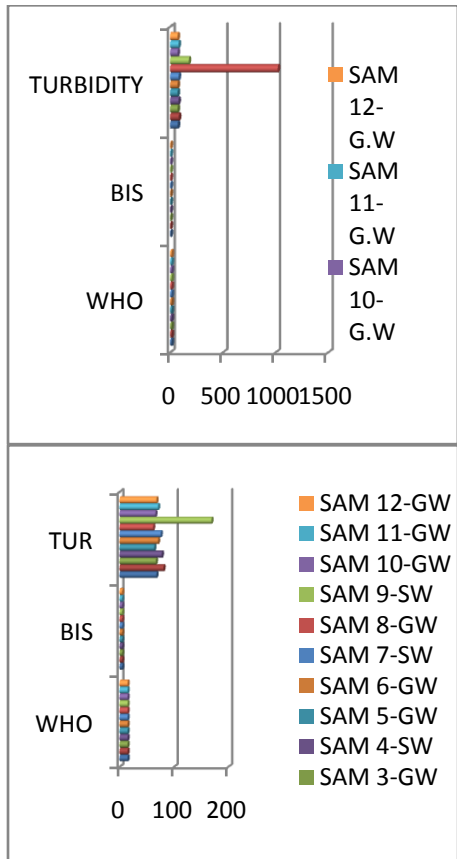


Figure 2.1 Turbidity Values Of Surface And Ground Water Samples Of Narasampathy Tank For Post Monsoon And Monsoon Season

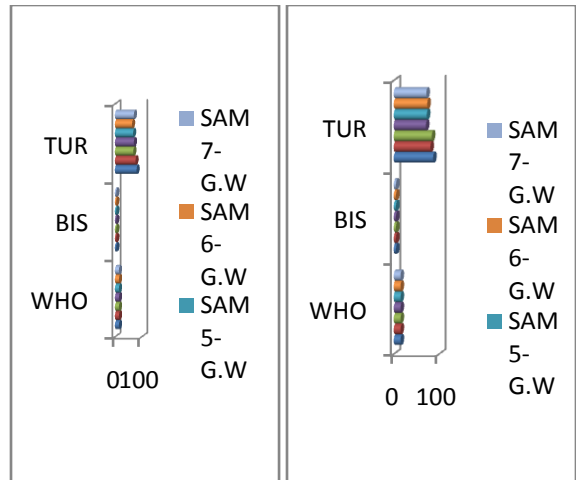


Figure 2.2 Turbidity Values Of Surface And Ground Water Samples Of Krishnampathy Tank For Post Monsoon And Monsoon Season

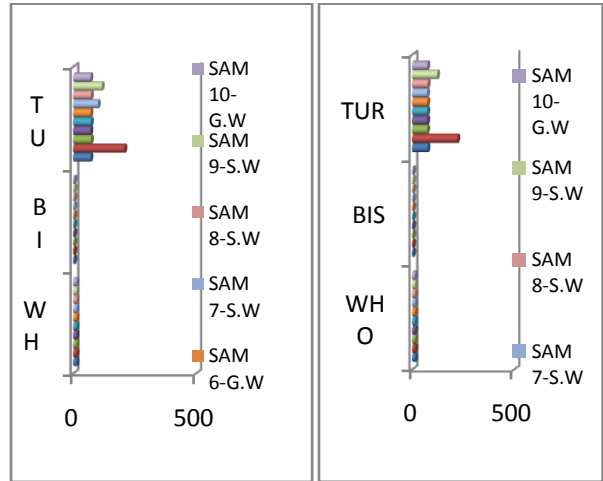


Figure 2.3 Turbidity Values Of Surface And Ground Water Samples Of Selvampathy Tank For Post Monsoon And Monsoon Season

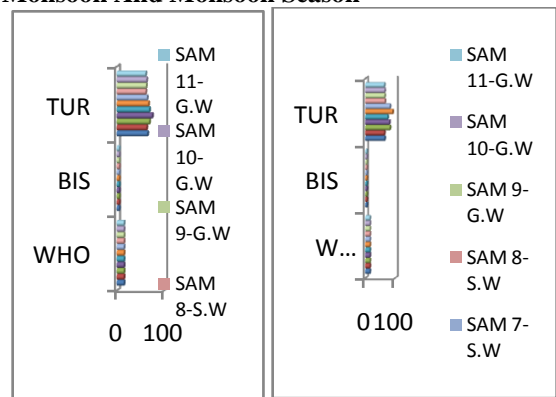


Figure 2.4 Turbidity Values Of Surface And Ground Water Samples Of Kumaraswamy Tank For Post Monsoon And Monsoon Season

Total dissolved solids values of all the ground water and surface water samples were not exceeded the desirable limit. Drinking water contains high TDS may cause gastro intentional irritation. TDS in water originates from various factors.

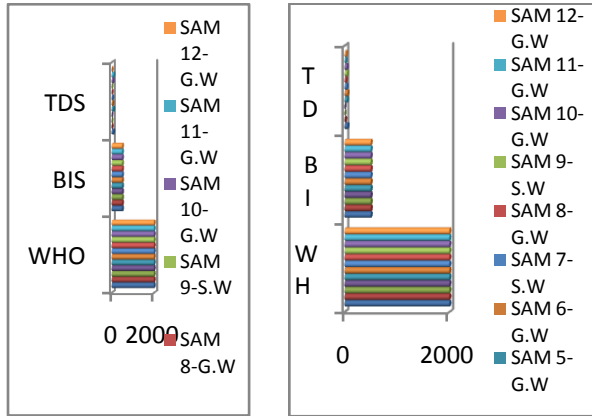


Figure 2.5: Tds Values Of Surface And Ground Water Samples Of Narasampathy Tank For Post monsoon And Monsoon Season

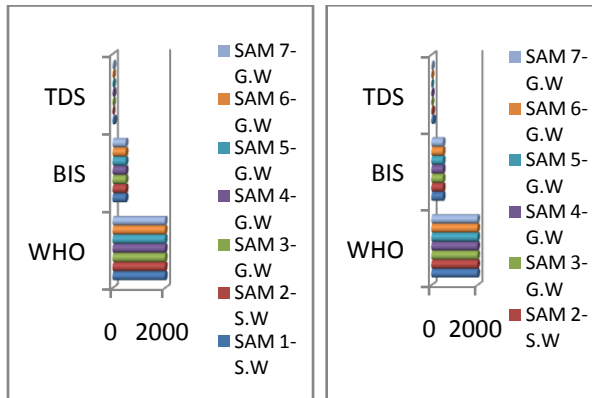


Figure 2.6 Tds Values Of Surface And Ground Water Samples Of Krishnampathy Tank For Post Monsoon And Monsoon Season

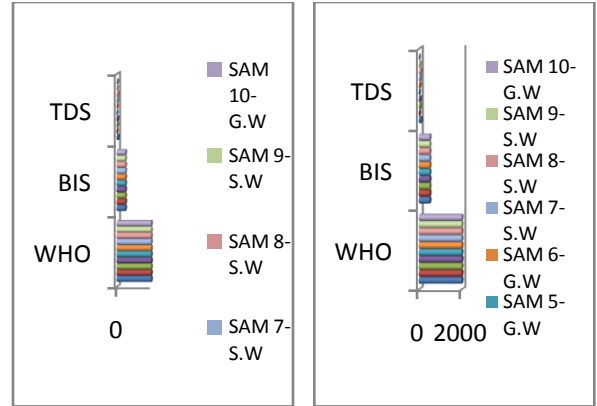


Figure 2.7 Tds Values Of Surface And Ground Water Samples Of Selvampathy Tank For Post monsoon And Monsoon Season

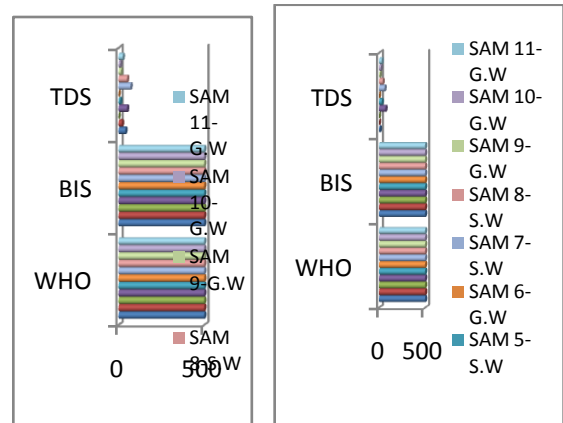


Figure 2.8 Tds Values Of Surface And Ground Water Samples Of Kumaraswamy Tank For Post Monsoon And Monsoon Season

Electrical conductivity of most of the ground water and surface water samples were found with similar permissible limits. Higher values of EC shows a large amount of salts dissolved in water.

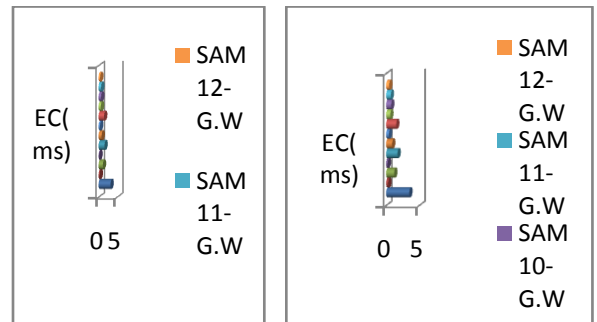


Figure 2.9 Ec Values Of Surface And Ground Water Samples Of Narasampathy Tank For Post Monsoon And Monsoon Season

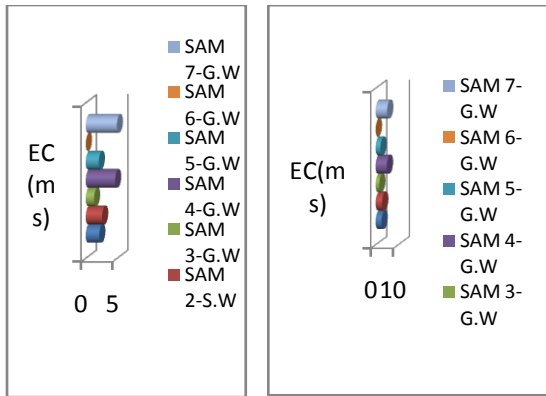


Figure 2.10 Ec Values Of Surface And Ground Water Samples Of Krishnampathy Tank For Post Monsoon And Monsoon Season

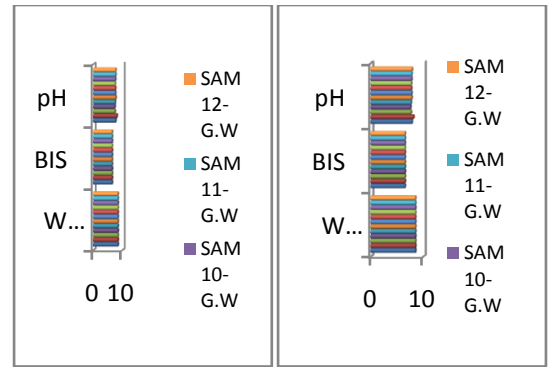


Figure 2.13 Ph Values Of Surface And Ground Water Samples Of Narasampathy Tank For Post Monsoon And Monsoon Season

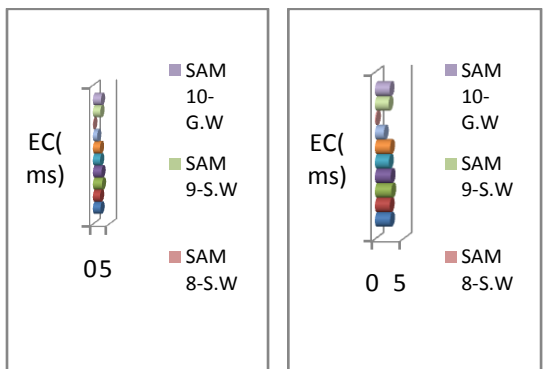


Figure 2.11 Ec Values Of Surface And Ground Water Samples Of Selvampathy Tank For Post Monsoon And Monsoon Season

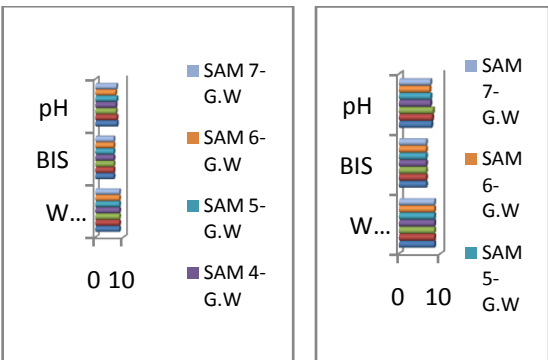


Figure 2.14 Ph Values Of Surface And Ground Water Samples Of Krishnampathy Tank For Post Monsoon And Monsoon Season

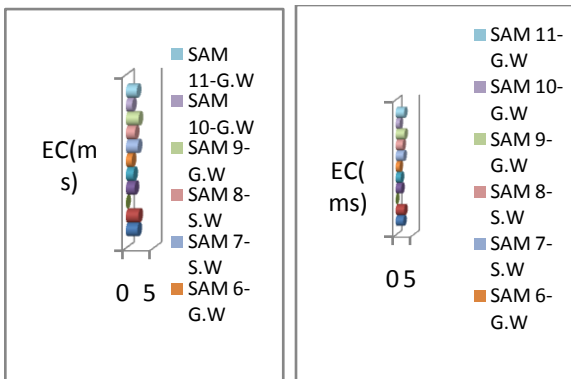


Figure 2.12 Ec Values Of Surface And Ground Water Samples Of Kumaraswamy Tank Monsoon And Monsoon Season

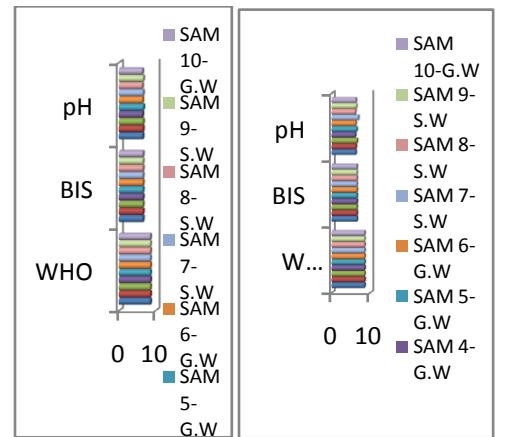


Figure 2.15 Ph Values Of Surface And Ground Water Samples Of Selvampathy Tank For Monsoon And Monsoon Season

pH values of all ground water and surface water samples were found within the desirable limit(6.5-8.5). pH is a measure of hydrogen ion concentration. It indicates Ground Water and Surface Water are suitable for drinking purpose.

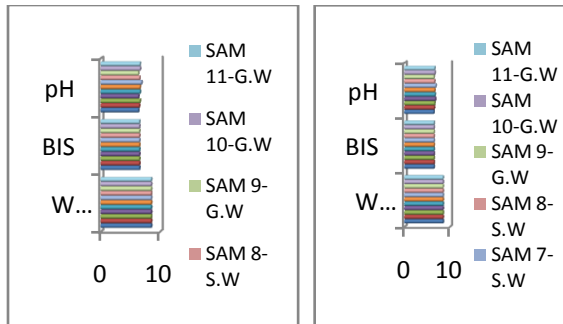


figure 2.16 pH values of surface and ground water samples of kumaraswamy tank for post Monsoon And Monsoon Season

CONCLUSION

Physico-chemical characteristics of ground water and surface water samples are taken from Coimbatore city. 16 ground water samples and 8 surface water samples of post-monsoon and monsoon period were collected from four upstream tanks in Coimbatore namely, Narasampathy and Krishnampathy. These collected samples are analyzed for pH, EC, TDS, Cl, SO₄, F, DO, TURBIDITY, COLOUR, ODOUR, TA, TH using standard procedures. The values of all the ground water and surface water samples are compared with the standard permissible value. Turbidity, pH and sulphate values of all the samples were found within the desirable permissible limit. It indicates ground water suitability to drinking water. Total Dissolved Solids, Total alkalinity, Total Hardness, and concentrations of chloride and fluoride ion values of the ground and surface water samples exceeded the desirable permissible limit. It indicates ground water slightly not suitable for drinking purpose. From the obtained results, it is suggested to monitor the surface and ground water quality and assess periodically in this study area to prevent the further contamination.