

# **WATER RESOURCE ANALYSIS OF MINJUR BLOCK THIRUVALLUR DISTRICT IN TAMIL NADU USING GIS AND REMOTE SENSING**

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## **ABSTRACT**

*The study attempts to analyse the water resource availability and its condition in Minjur block. It studies about the water level and its quality of the study area, and examine the condition of water resource and its impact on local community. The region is facing problems related to water level and quality due to industrial pollution, Water scarcity in part of the district due to unfavorable hydro geological set up (Minjur Block). The area faces an alarming situation related to ground water and its level of availability. The study attempts to explore the need of water resources for agriculture and industrial of the region. The base map of Minjur block prepared from survey of India Toposheet on 1:250,000 scale. Temporal variation of water quality analysis will be using SPSS software. Rainfall data will be converted to spatially for annual rainfall using GIS Tool. Satellite imagery has been used for land use and land cover using remote sensing.*

## **INTRODUCTION**

Water is essential for all the living being such as plants, animals and human being. Ground water resource is the major source of drinking water is many part of the world. (Morris et al. 2003) Water is a natural resource of fundamental importance. It supports all forms of life and creates jobs and wealth in the water sector, tourism, recreation and fisheries (Ntengwe, 2005). Water is a natural resource of fundamental importance. It supports all forms of life and creates jobs and wealth in the water sector,

tourism, recreation and fisheries (Ntengwe, 2005). Without water life as it exists on our planet is impossible (Asthana and Asthana, 2001). 97.5% of water on the earth is salt water, leaving only 2.5% as fresh water of which over two thirds is frozen in glaciers and polar ice caps. The remaining unfrozen fresh water is mainly found as groundwater, with only a small fraction present above the ground or in the air. Fresh water is a renewable resource, yet the world's supply of clean, fresh water is steadily decreasing.

Water demand already exceeds supply in many parts of the world, and as world population continues to rise at an unprecedented rate, many more areas are expected to experience this imbalance in the near future (Wikipedia, 2008). Water forms the largest part of most living matter. Human beings can survive longer without food than without water (Ayoade, 1975, 1988; NEST, 1991). An average man is two-thirds water and would weigh only 13kg when completely without water (i.e., dry weight). Plants need water for photosynthesis and they take their nutrient from the soil in solution. Water is an important geomorphic agent playing a significant role in weathering the most important energy regulator in the heat budget of the earth (Ayoade, 1988).

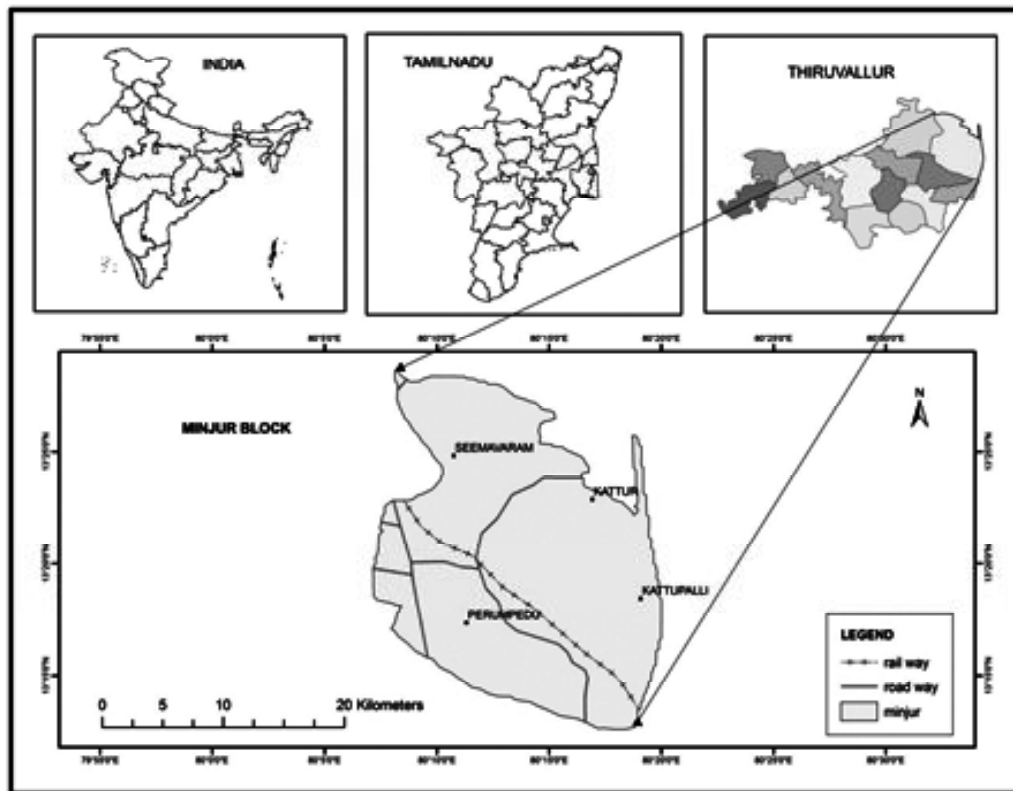
## LOCATION

Minjur is located at 13.27°N 80.27°E. It has an average elevation of 11 meters (36 feet). With Ponneri as its north, Cholavaram as its west, Manali New Town, Manali and Thiruvottiyur as its south, it is situated about 25 km from north of Chennai and a well connected to city with roadways and railways.

## GROWTH

Minjur is one of the suburban places of Chennai which is highly growing in terms of Education, Industrialization, Agriculture which is expanding leaps and bounds.

## LOCATION MAP



**POPULATION**

TOTAL POPULATION	154,148
OTHER POPULATION	86,914
SC POPULATION	56,120
ST POPULATION	3,030

**DRAINAGE**

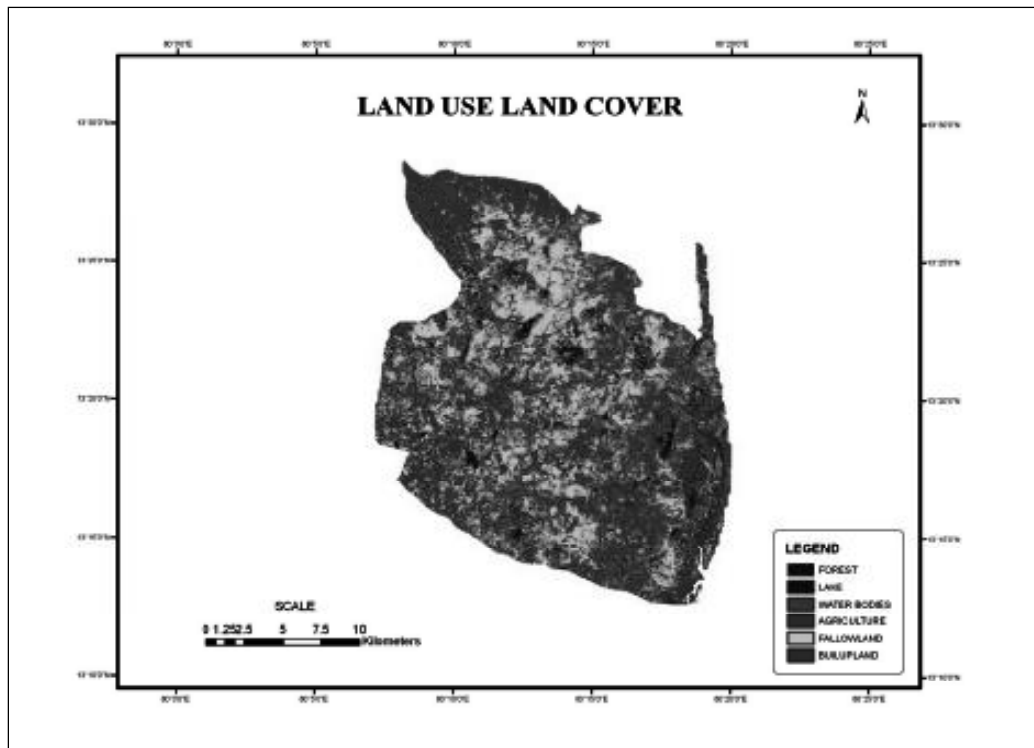
The study area consists of excellent network of drainage system, interlinked with one another. Some major tanks are present holds water during the full year. Araniyar, Korattaliyar are some major rivers that drain the study area and have the surface flow only during the monsoon periods. The study area en-joys tropical climate and falls in a semi arid region. The area of study includes highly elevated region, gentle slope and low-lying coastal plain.

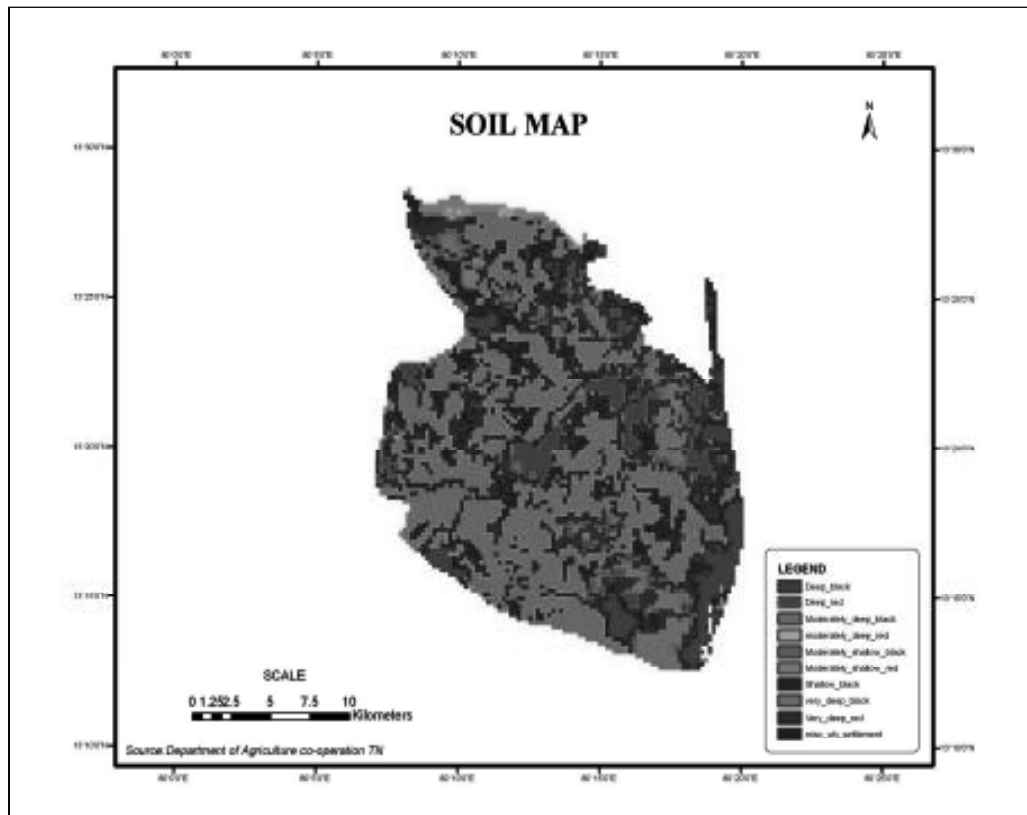
**LAND USE PATTERN**

The land use pattern clearly indicates the pre-dominance of rain fed agriculture. Lack of water for irrigation sets largely the limits for improving productivity. Moreover the average land holding size is small (0.5 ha). Agriculture is not a priority on Minjur where most of the surveyed villages are Coastal and depend on fishing in the Pulicatlake.

Details

Details	Area (ha)	Percent to total
Agriculture-irrigated	294	30.56
Agriculture-rain fed	359	37.32
Common lands (grazing, forests etc)	265	27.55
Water Bodies	44	4.57
<b>Total Area</b>	<b>962</b>	

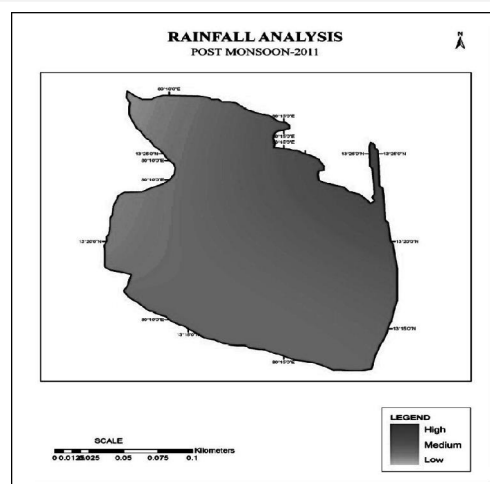
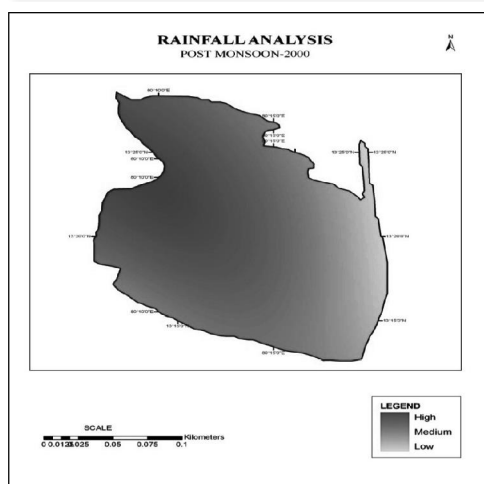
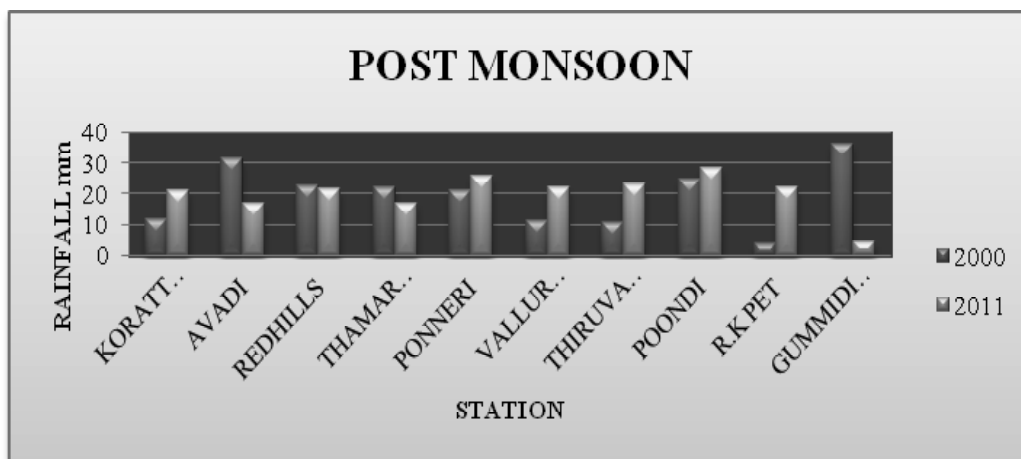




### RAINFALL ANALYSIS POST MONSOON

LOCATION	2000	2011
KORATTUR ANAICUT	11.6	20.8
AVADI	31.2	16.8
REDHILLS	22.6	21.6
THAMARAPAUK	21.8	16.8
PONNERI	21.2	25.4
VALLUR ANAICUT	11.16	22
THIRUVALLUR	10.4	22.8
POONDI	24.4	28.15
R.K PET	4	22.2
GUMMIDIPOONDI	36.2	4.6

The distribution of post monsoon rainfall data of Minjur Block Thiruvallur Districts is been statistically analyzed. We can understand that among the ten taluks gummidipoondi has received a good monsoon rainfall when compared with other districts. When comparing the post monsoon rainfall during the year 2000 and 2011, there has been large variation in rainfall distribution.

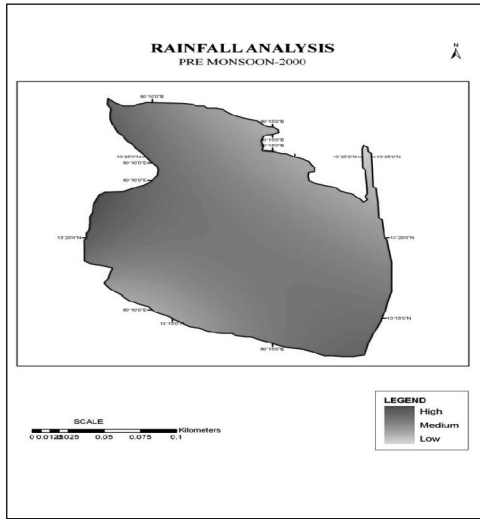


Source: Tamil Nadu Statistical Department

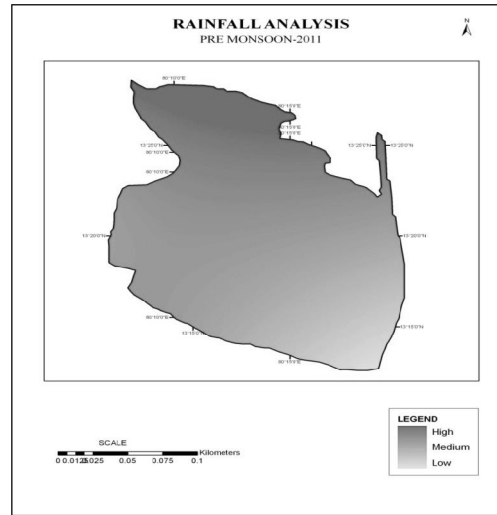
### PRE MONSOON

LOCATION	2000	2011
KORATTUR ANAICUT	124.57	216.66
AVADI	144.24	188.5
REDHILLS	137.71	138.55
THAMARAPAUK	157.57	141.42
PONNERI	137.85	228.88
VALLUR ANAICUT	142.63	138.31
THIRUVALLUR	148.03	223.78
POONDI	135	172.44
R.K PET	62.86	134.45
GUMMIDIPOONDI	156.43	273.14

The distribution of the Pre monsoon has been analyzed statistically and spatially which shows that the monsoon has been very effective in the district. The distribution of rainfall has been high in thamarapaku taluk during 2000 and high in gummidipoondi in 2011. Whereas in Ponneri taluk the distribution of rainfall as been moderate level only during 2000 and increased during the year 2011.



Source: Tamilnadu Statistical Department



Source: Tamilnadu Statistical Department

## WATER LEVEL & WATER QUALITY ANALYSIS

### WATER LEVEL IN MINJUR BLOCK 2000 AND 2011

S.N	WELL CODE	PANCHAYAT	WATER LEVEL 2000		WATER LEVEL 2011	
			PRE MON SOON	POST MON SOON	PRE MON SOON	POST MON SOON
1	0008	PERUMPEDU	14.3	13.4	16.3	17.8
2	0009	KATTOR	5.5	6.7	8.6	7.8
3	0018	SEEMAVARAM	1.8	11.3	23.9	15
4	0019	KATTUPALLI	2.2	2.4	2.8	5.5

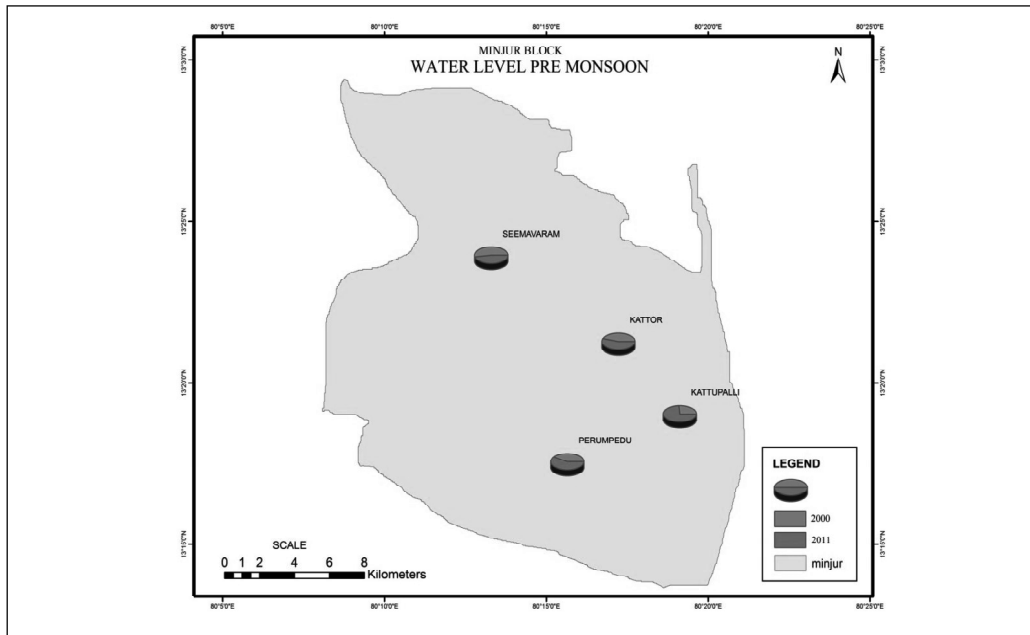
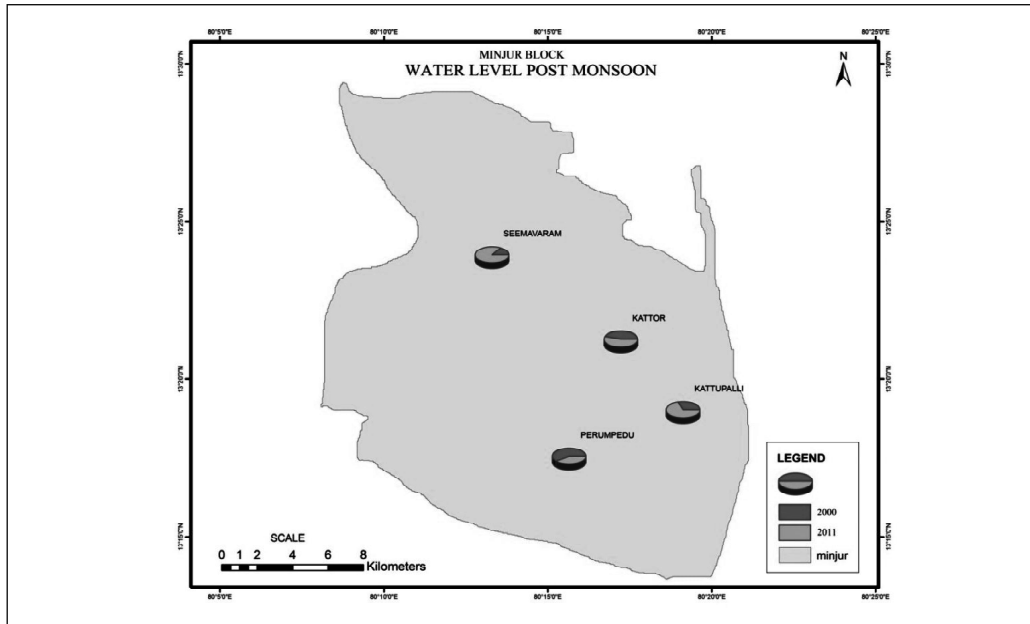
### POST MONSOON PRE MONSOON 2000 AND 2011

The water level in Minjur block has been analyzed in different panchayats of minjur block during the pre-monsoon and post-monsoon during the year 2000 and 2011.

The Pre Monsoon water level during 2000 is

high in Perumedu village and low in Seemavaram village and The Pre Monsoon water level is high in Seemavaram village and low in Kattupalli village during 2011.

The Post Monsoon water level during The Perumedu village has high water level during 2000 and 2011 and low in Seemavaram village in 2000 and Kattupalli village during 2011.



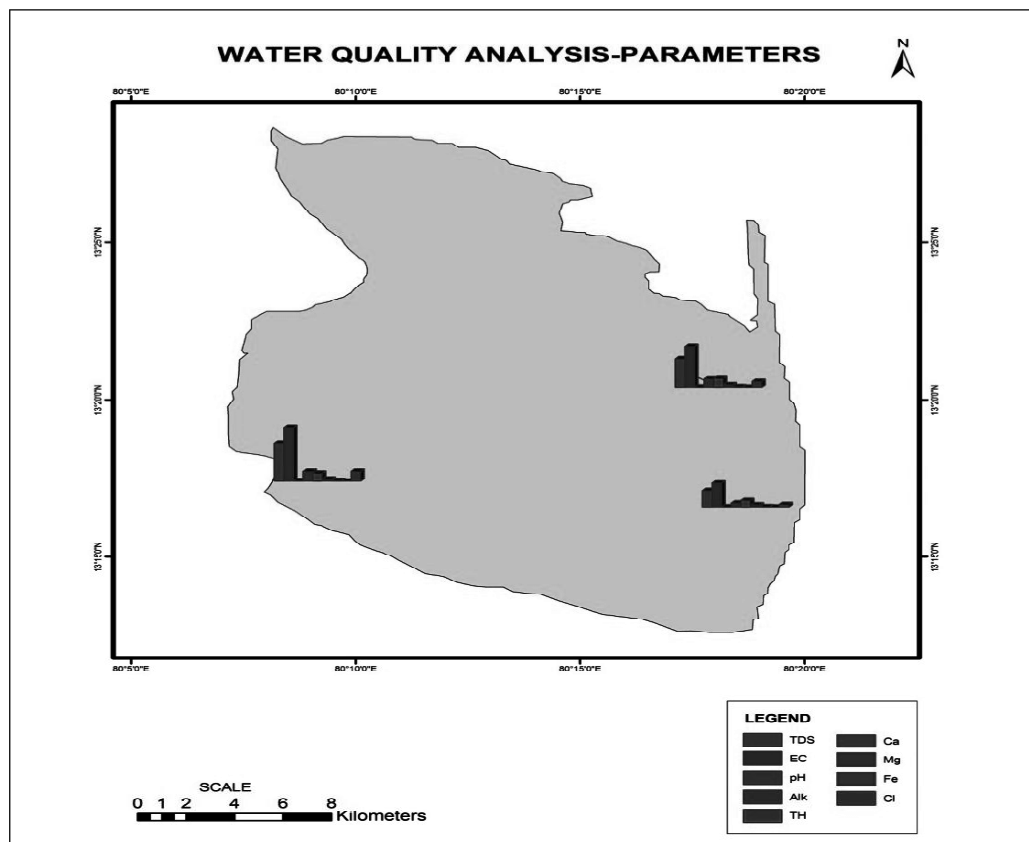
## WATER QUALITY ANALYSIS

The suitability of ground water for irrigation purpose is mainly based upon the estimation of the parameter like TDS, PH, TH, Ca, mg, fe, cl, Turb, Alkalinity. Total pH concentration

and pH are important qualifying for Drinking purposes in study area (or) local community all the water parameter permissible limit are normal in the Minjur block.

### INDIAN STANDARD SPECIFICATIONS FOR DRINKING WATER

Sl.NO	Parameter	Requirement	Remarks
		Desirable limit	
1	Total Dissolved solids	500	May be relaxed up to 2000 in the absence of alternate
2	pH	6.5-8.5	May be relaxed up to 9.2 in the absence of alternate
3	Total Hardness	300	May be extended up to 600
4	Calcium	75	May be extended up to 200
5	Magnesium	30	May be extended up to 100
6	Fluoride	0.6-1.2	If the limit is below 0.6 water should be rejected. Max limit is 1.5
7	Chlorides	250	May be extended up to 1000
8	Turbidity	10	May be relaxed up to 25 in the absence of alternate





## CONCLUSION

Over the years increasing population urbanization and expansion in agriculture has head in the scientific exploitation of ground water creating a water stress condition. Minjur area is under threat due to the critical issues of environmental pollution and water scarcity problems. The groundwater quality in Minjur Block has been reduced due to pollution. Hence monitoring the groundwater quality is indispensable. The study was carried out in entire Minjur Block. GIS technologies can provide appropriate platform for convergent analysis of large volume of multi-disciplinary data and decision making for ground water studies can be effectively done. The present study provides a guideline for solving water quality problem in Minjur Block. The results of water investigation show that the waters of the study area are highly contaminated with total dissolved solids. As a result of high concentration of TDS, water loses its portability and reduces the solubility of oxygen in water. Water of almost all study points is hard and contaminated because of this, people of Minjur Block are prone for the immediate health problems such as stomach diseases, gastric troubles etc. This study would help to create and develop awareness among the people to maintain the quality of the ground water.

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