

# Assessment of Ground water quality mapping along the banks of the Noyyal river in Tirupur district

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Received 05 Aug 2021, Accepted 10 Aug 2021, Available online 15 Aug 2021, **Special Issue-9 (Aug 2021)**

## Abstract

Emerging development of industries and economical firms around the Tirupur district has showed adverse effect in the quality of environment. Besides being an Industrial area, Tirupur also has a large involvement in agriculture that combinedly serve as a source of groundwater contamination. This study has been conducted in interest to deduce the various physio-chemical characteristics of ground water at various sites near the Noyyal river in Tirupur district. The sampling sites like Samalapuram, UnnaPalayam, Veliyampalayam has recorded high deviation in some parameters. This study perceivngly found the importance in monitoring the groundwater quality for future reliability.

**Keywords:** Environment, groundwater, industries, pollution, reliability..

## 1. Introduction

The records interpret that the river banks are the evolution place for all civilization. In spite of being a lifeline for human beings and all living organisms, Rivers have now become a place to dump and dispose urban and industrial wastes. This groundwater gets polluted by seepage of disposals into it. Tirupur district has become the highest hosiery manufacturing industrial cluster and also renowned for its garment production, cotton production etc., Hence study has made to deduce the physio-chemical parameters and to interpret the values with standard BIS recommendations

(Prakash Nellyat, 2017) conclude that the open wells and bore wells in and around Tirupur and the downstream stretch of Noyyal exhibit high level of TDS (most areas >3000mg/L and some places even upto 11,000 mg/L) and chloride (generally > 2000mg/L and certain areas upto 5000mg/L) due to industrial pollution.

(A.Geetha *et al.*, 2008) concluded that the ground water quality study in this region shows a constant variation in different parameters in different periods (before and after monsoon). So it is highly important to take periodical monitoring of the ground water quality in this region for our future sustainability.

(Udayakumar *et al.*, 2011) suggests that surface water of River Noyyal is not suitable for domestic and agricultural purposes as per drinking water standards of BIS recommendations and WHO guidelines. Rapid industrialization and urbanization in Tirupur city may further aggravate the pollution level in future. Implementation of zero discharge facilities and integrated waste water resources management

practices is paramount necessary in order to prevent the further deterioration.

(Saravanan *et al.*, 2011) concluded that the variation of predicted water level with respect to time is almost identical with that of variation of water level in the field. This could be possible only if the computed flow component are in close agreement with the actual flows, hence it can be concluded that the water level is high in central western part and declining towards the Noyyal river.

## 2. Study Area

The Noyyal River originates in the Vellingiri and Poondi hills and passes through Coimbatore, Tiruppur, Erode and Karur districts of western Tamilnadu before its confluence with the Cauvery River at Noyyal hamlet in Karur district. The Noyyal river basin falls within the latitude 10°54'00"N to 11°19'03"N and 76°39'30"E to 77°05'25"E. The average width of the basin is 25km. The basin is the widest in the central part with a width of 35km. The total area of the basin is 3510 sqkm. The Noyyal is a seasonal river which has a good flow only for short periods during the north east and southwest monsoons. Occasionally, flash floods occur when there is heavy rain in the catchment areas. Apart from these periods, there is only scanty flow of water of the year.

## 3. Tributaries of noyyal river system

The Noyyal river has seven major tributaries Koduvaipudiodai(odai-stream), Mullurambu odai, Mudhantharaja odai, Sundaram odai, Pachaanvaikal and kanchimanathi. All these tributaries and their lower order streams start from the foot of the Western

Ghats. Along the course of the Noyyal river, 55 check dams are presented. Six major tanks comes under our study area are Mangalam tank, Andipalayam tank, Mannarai tank, Orathupalayam reservoir, Kattagani tank and Athupalayam reservoir.

#### 4. Topography and Climate

The Noyyal river stands versatile with its three various topographic segments; the hills and valleys along the Western Ghats, flat plains, and minor undulations in the Eastern region. The main climatic condition of the river basin is semi-arid subtropical monsoon. West part climate is pleasant whereas Eastern part is hotter. As an average estimation of temperature at various stations found that the temperature reaches peak of 29.1 to 36.3 degree Celsius and rolls down to the range 17.3 to 24.4 degree Celsius.

#### 5. Ground water potential of the noyyal basin

The ground water potential for the past two decades drastically reduced all over India at an average of 13 feet depth and out of 32, 22 districts are severally affected in Tamil Nadu (central ground water board, 2004) . Ground water recharge is mainly due to rains, infiltration during monsoon and non-monsoon rains, rainfall, seepage from wet cultivation, seepage from water bodies such as tanks, check dams, canals, and reservoirs. As water storage is monsoon dependent, the water available in the wells in both sides of the banks is good only during the rainy seasons.

#### 6. Industrial Data collection

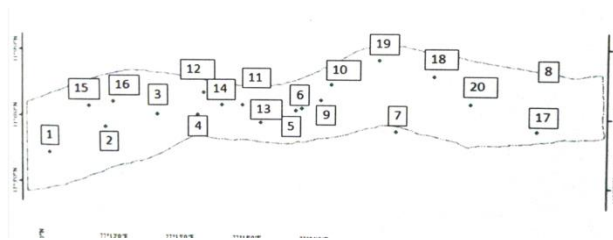
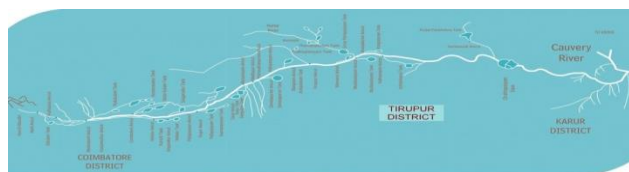
Tirupur is the fifth largest urban agglomeration of Tamil Nadu with its vast propagation of textile, knit wear hubs and other industries

S No.	TYPES OF INDSTRY	NO. OF UNITS
1	Knitting wear	8000
2	Dyeing and bleaching	1000
3	Fabric Printing	2820
4	Garment Making	11268
5	Embroidery	2000
6	Other Ancillary Units	2600
7	Compacting and Calendaring	1250

From MMSE -2016

#### 7. Selection of Sampling Site

The site for the collection of the ground water sample is based on the distance between the two locations and distance between the site and Noyyal river. The distance between the two sampling sites are selected such that it should not exceed 2 km and the distance between the sampling site and the Noyyal river is selected such that it should not exceed 1 km.



S NO	LOCATION	LATTITUDE	LONGITUDE
1	Samalapuram	11° 4' 23.27" N	77° 11' 40.31" E
2	Velayuthapalayam	11° 5' 33.68" N	77° 14' 2.87" E
3	Mangalam	11° 6' 7.06" N	77° 16' 7.46" E
4	Koluthupudhur	11° 6' 5.47" N	77° 17' 45.56" E
5	Karuvampalayam	11° 5' 45.42" N	77° 20' 18.78" E
6	Renukanagar	11° 6' 24.12" N	77° 21' 57.64" E
7	Mundalipalayam	11° 5' 23.68" N	77° 25' 45.55" E
8	Chinnaputhur	11° 4' 22.08" N	78° 8' 58.56" E
9	Bavani nagar	11° 6' 17.64" N	77° 21' 43.56" E
10	VSA nagar	11° 6' 45.36" N	77° 22' 44.04" E
11	Kathankanni	11° 6' 36.83" N	77° 28' 40.62" E
12	Savadipalayam	11° 5' 27.71" N	77° 31' 13.22" E
13	Thiru VK nagar	11° 6' 31.68" N	77° 19' 34.68" E
14	Kavilpalayam	11° 7' 4.94" N	77° 18' 0.32" E
15	Semandampalayam	11° 6' 29.74" N	77° 13' 22.3" E
16	Pudur	11° 6' 41.08" N	77° 14' 22.09" E
17	Annapalayam	11° 6' 31.75" N	77° 18' 44.32" E
18	Kolathupalayam	11° 7' 26.94" N	77° 23' 9.78" E
19	Veliyampalayam	11° 8' 31.34" N	77° 24' 4.73" E
20	Anaipalayam	11° 7' 49.33" N	77° 27' 14.83" E

TWENTY SAMPLING LOCATIONS

#### 8. Standard limit based on BIS recommendations

##### PHYSICAL PARAMETERS

##### CHEMICAL PARAMETERS

S.NO	CHARACTERISTIS	ACCEPTABLE LIMITS	PERMISSIBLE LIMITS
1	COLOUR (HAZEN UNITS)	5	15
2	ODOUR	AGREEABLE	AGREEABLE
3	TURBIDITY (NTU)	1	5

S NO.	CHARACTERISTICS	ACCEPTABLE LIMITS	PERMISSIBLE LIMITS
1	PH	6.5 - 8.5	NO RELAXATION
2	TOTAL DISSOLVED SOLIDS(mg/l)	500	2000
3	HARDNESS(mg/l) as CaCO <sub>3</sub>	200	600
4	CHLORIDES (mg/l)	250	1000
5	SULPHATES (mg/l)	500	NO RELAXATON
6	ALKANITY(mg/l) as CaCO <sub>3</sub>	200	600

16	7.65	2304	2	850	1696
17	8.02	784	2.4	725	543
18	7.74	417	1.8	875	346
19	7.46	3103	1.6	1625	2113
20	7.74	1036	2.6	725	893

**EXPERIMENTAL OBSERVATON**

Experiments were conducted and the following results were obtained

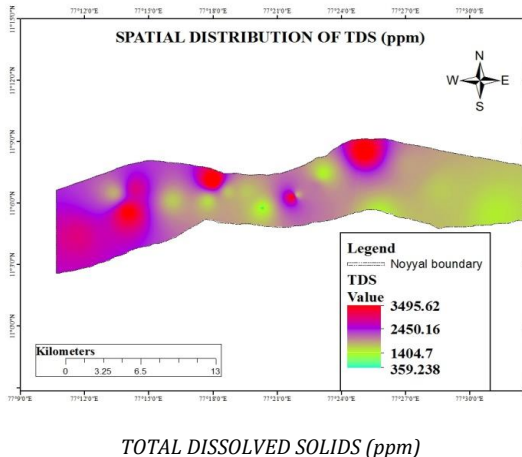
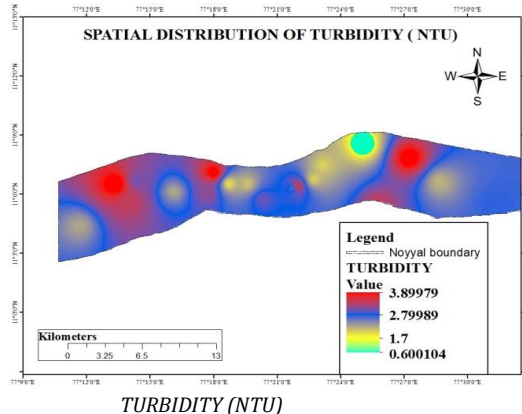
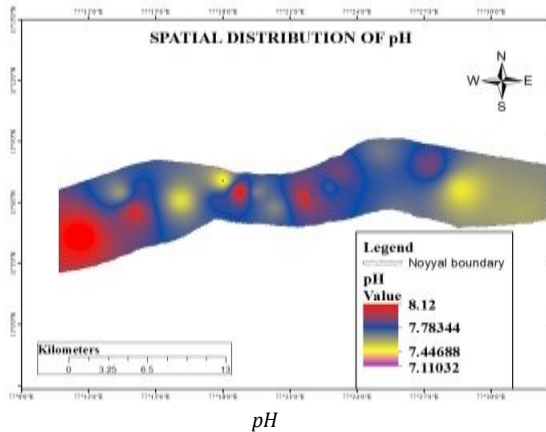
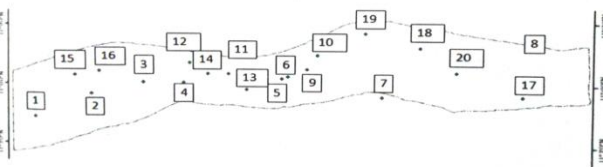
**PHYSICAL PARAETERS**

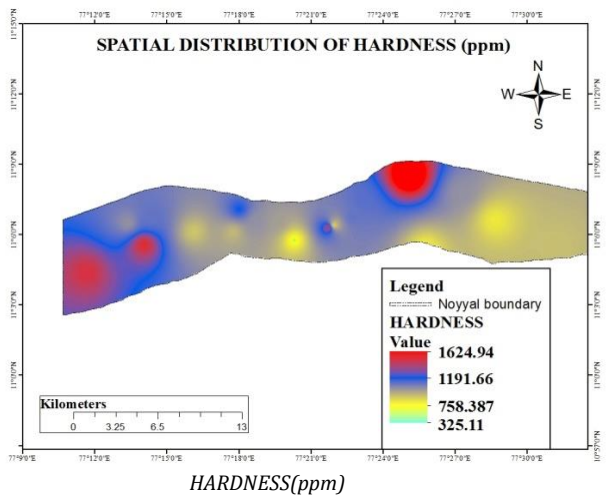
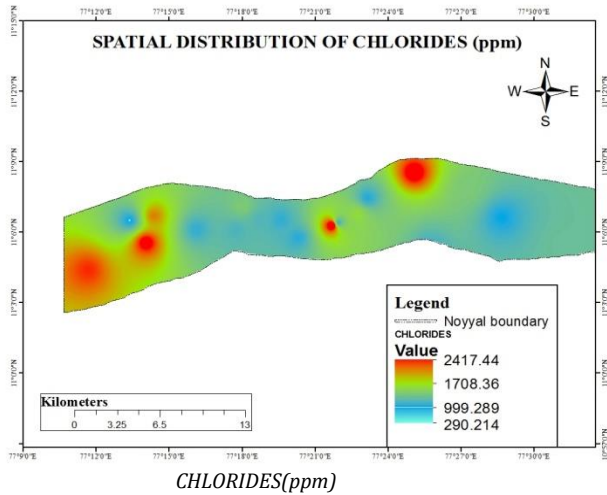
Sample No	Colour and Odour	Turbidity
		NTU
1	Agreeable	1.6
2	Agreeable	3
3	Agreeable	1.6
4	Agreeable	2.7
5	Agreeable	2.5
6	Agreeable	3.1
7	Agreeable	3.1
8	Agreeable	1.5
9	Agreeable	2.1
10	Agreeable	1.3
11	Agreeable	1.5
12	Agreeable	2.2
13	Agreeable	1.4
14	Agreeable	3.8
15	Agreeable	3.9
16	Agreeable	2.5
17	Agreeable	1.2
18	Agreeable	1.3
19	Agreeable	0.6
20	Agreeable	3.8

**CHEMICAL PARAMETERS**

Sample No	pH	TDS	DO	Hardness	Cl
		ppm	ppm	ppm	ppm
1	8.12	2312	2.6	1225	1925
2	7.94	2947	2.3	1250	2094
3	7.18	739	1.8	525	394
4	7.66	593	1.5	575	512
5	7.41	359	2.2	325	364
6	7.69	846	2.5	500	467
7	7.46	409	1.9	375	468
8	7.49	429	2.5	525	498
9	7.99	2896	1.6	1150	2425
10	7.56	1349	1.9	850	1197
11	7.16	743	1.9	400	297
12	7.33	493	1.9	550	713
13	7.43	769	1.7	675	388
14	7.11	3497	2.9	975	925
15	7.36	935	2.2	725	290

**ArcGIS Mapping**





**Conclusions**

The study has revealed the impact of the ground water contamination due to the Agricultural and Industrial activities. The ground water is contaminated due to the poor effluent treatment methods and poor agricultural practices in the Tiruppur district. The range of the physico-chemical parameters exceeds the permissible limits in most of the samples. Except pH and Turbidity of the water samples all other parameters exceeds the permissible limits. The physico-chemical parameters of most of the regions along the banks of the Noyyal river is more than the permissible limits.

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