Assessment Of Ground Water Quality In And Around Thuraiyur Taluk By Using Remote Sensing

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Abstract

The use of remote sensing and GIS in water monitoring and management has been long recognized. Geographical information system a tool which is used for storing, analyzing and displaying spatial data is also used for investigating ground water quality information. Management of water quality is very important as demand is increases day by day. Water is the most important source for living things on earth which is threatened on it's quality and quantity. pH, DO, COD, BOD, Chloride and Hardness are basic water quality parameter, using standard techniques in the laboratory and compared with the standards. GIS software applied to extract the boundary of the study area, the image was classified to create land use/land cover map. The land use map, geological and soil map are used for correlation between land use, geological formations, and soil types to understand the source of natural pollution that can lower the ground water quality In fact the capability of this technology offers great tools of how the water quality monitoring and managing can be operationalised in our study area. In conclusion remote sensing and GIS technologies coupled with computer modelling are useful tools in providing a solution for future water resources planning and management to government especially in formulating policy related to water quality.

Keywords: Assessment, Ground Water, Quality, Thuraiyur Taluk, Remote Sensing

1. INTRODUCTION

1.1 General

With the rapid economic and social development in recent decades, non-point source pollution to the environment from livestock, poultry, planting industries and domestic sewage to our living space. Among various pollutions; water environmental pollution, as a vital threat to human being, health, also become most remarkable issue for sustainable management. Reference reported that human activities mainly impact surface water quality through effluent discharge, using of agriculture chemicals, in addition to increase to increase the exploitation of water resources. Many river and water bodies in the developing countries are heavily polluted due to anthropogenic activities. Appropriate water quality management measures need reliable quantitative information on water quality parameter behavior. In recent years, many scientist evaluated accuracy of different spatial interpolation method for prediction water quality parameter. The need exist to study the spatial behavior of water quality parameter. Knowledge of behavior of water quality parameter is essential to interpret water quality and for making accurate prediction of water quality of particular area. According to experimental result of different geo statistical method of spatial interpolation; the most efficient and prominent method for observed data is ordinary Kriging, Reference GIS and Remote Sensing has been used extensively to the water quality all over the world. Kriging method was also used to predict spatial distribution of some ground water quality parameter. Reference analyzation of ZZ the spatial variability of ground water quality in India. They produced probability maps of ground water contaminants using indicator Kriging. Reference used Kriging to maps ground water quality parameter in Yukatam, Mexico. They classified the study area into different zones in terms of water quality for Agriculture purpose. Above mentioned researcher, the suitable method of interpolation and spatial distribution is depends on the variable type and regional factor. The aim of this research is to evaluate the spatial distribution of water parameter by interpolation method, Water quality is a general descriptor of water properties in terms of physical, chemical, thermal, and/or biological characteristics. It is difficult to define a single water quality standard to meet all uses and user needs. For example, physical, chemical, and biological parameters of water that are suitable for human consumption are different from those parameters of water suitable for irrigating a crop. Water quality is affected by materials delivered to a water body from either point or nonpoint sources. Point sources can be traced to a single source, such as a pipe or a ditch. Nonpoint sources are diffuse and associated with the landscape and its response to water movement, land use and management, and/or other human and natural activities on the watershed. Agriculture, industrial, and urban areas are anthropogenic sources of point and nonpoint substances. Polluting substances that lead to deterioration of water quality affects most freshwater and estuarine ecosystems in the world. In the United States, off-site downstream deterioration of water quality has been estimated to cost billions of dollars per year. Monitoring and assessing the quality of surface waters are critical for managing and improving its quality. In situ measurements and collection of water samples for subsequent laboratory analyses are currently used to evaluate water quality. While such measurements are accurate for a point in time and space, they do not give either the spatial or temporal view of water quality needed for accurate assessment or management of water bodies. The purpose of this paper is to review the use of remote sensing techniques for monitoring and assessing water quality.

1.2 Objective Of The Project

The objectives of monitoring water quality parameter are listed below:

(i) To rehabilitate and to improve the river water quality to achieve a clean condition.

(ii) To restore the water quality

(iii) To conserve, maintain and sustain the achieved improvement well after the project completion with the water quality status

(iv) To promote and build smart partnership between public and private sector in projects related to pollution prevention, river rehabilitation and restoration works.

2.METHODOLOGY

Figure.1 shows the methodology adopted in this study

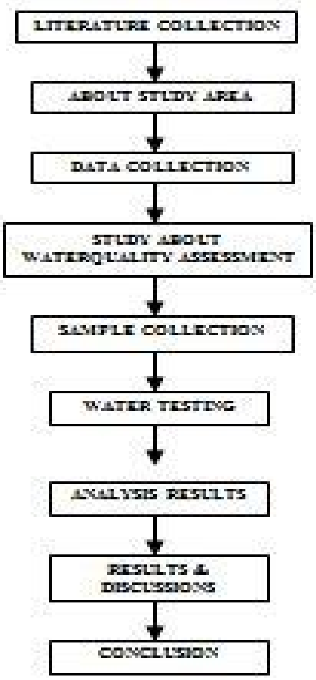

Figure.1 Methodology adopted in this study

3.STUDY AREA

Thuraiyur is a town and a municipality in Tiruchirappalli district in the Indian state of Tamil Nadu. It was upgraded to a III Grade Municipality from Town Panchayat on 17 January 1970, and to a II Grade Municipality in May 1998. It was upgraded to Selection Grade Municipality in the year 2008. It is also a taluka.The study area, Thuraiyur and Uppiliapuram block, Tiruchirappalli district, Tamilnadu. Their search work is to make a groundwater potential and groundwater quality assessment using GIS, based on the remote sensing and available physico-chemical data from 76 locations in Thuraiyur and Uppiliapuram block of Tiruchirappalli district. Data being used Landsat ETM data (Path 143 and Row 52); Water quality data from CGWB; Soil Map from NBSS & LUP Nagpur Survey of India Toposheet No 58I/7,8,11,12, latitude 78o 28'to 78o 45'E, longitude 11o 5'to 11o 20'N. Software used Arc GIS 9.3.1 surfer 9.0. Figure .2 shows Study Area. Figure 3 shows Thuraiyur Map

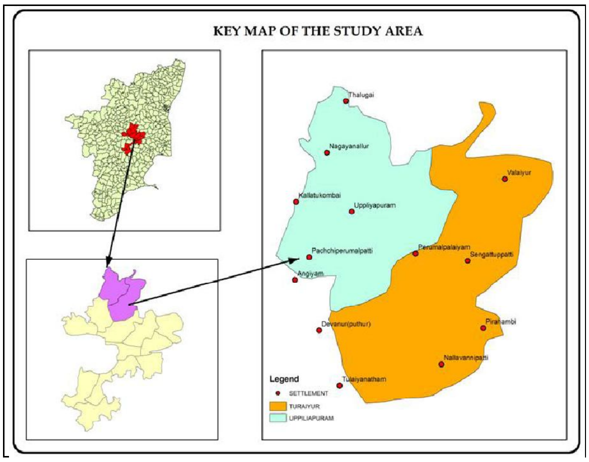

Figure 2 Study Area

Figure 3 Thuraiyur Map

3.1 Geographical Location

Tiruchirappalli district is located at the Central part of Tamil Nadu surrounded by Perambalur district in the north, Pudukkotai district in the south, Karur and Dindigul districts in the West and Thanjavur district in the East. It lies between 10°10' and 11°20' of the Northern latitudes and 78°10' and 79°0' of Eastern longitudes in the centre part of the Tamil Nadu. The general slope of the district is towards east. It has a number of detached hills, among which Pachamalai Hill is an important one, which has a peak up to 1015m, located at Sengattupatti Rain Forest.Tiruchirappalli district is one of the important districts in Tamil Nadu and had a population of 2418366 as per 2001 census and 2713858 as per 2011 census.According to the composition of urban and rural population, Tiruchirappalli district ranked 10th among the other districts in Tamil Nadu. Tiruchirappalli district comprises of eight taluks viz., Thuraiyur, Lalgudi, Musri, Tiruchirappalli, Thottiyam Mannachanallur, Srirengam and Manapparai, which included 14 blocks, 408 Village Panchayats and 1590 Villages.

4. WATER QUALITY ASSESSMENT

Water quality refers to the chemical, physical, biological, and radiological characteristics of water. It is a measure of the condition of water relative to the requirements of one or more biotic species and or to any human need or purpose.It is most frequently used by reference to a set of standards against which compliance can be assessed. The most common standards used to assess water quality relate to health of ecosystems, safety of human contact, and drinking water.

4.1 Standards

In the setting of standards, agencies make political and technical/scientific decisions about how the water will be used. In the case of natural water bodies, they also make some reasonable estimate of pristine conditions. Natural water bodies will vary in response to environmental conditions. Environmental scientists work to understand how these systems function, which in turn helps to identify the sources and fates of contaminants. Environmental lawyers and policymakers work to define legislation with the intention that water is maintained at an appropriate quality for its identified use. The vast majority of surface water on the Earth is neither potable nor toxic. This remains true when seawater in the oceans (which is too salty to drink) is not counted. Another general perception of water quality is that of a simple property that tells whether water is polluted or not. In fact, water quality is a complex subject, in part because water is a complex medium intrinsically tied to the ecology of the Earth. Industrial and commercial activities(e.g. manufacturing, mining, construction, transport) area major cause of water pollution as are runoff from agricultural areas, urban runoff and discharge of treated and untreated sewage.

4.2 Water Quality Assessment

Water quality is determined by assessing three classes of attributes: biological, chemical, and physical. There are standards of water quality set for each of these three classes of attributes. The national standards for drinking water are developed by the federal government's Environmental Protection Agency (EPA). All municipal (public) water supplies must be measured against these standards. Some attributes are considered of primary importance to the quality of drinking water, while others are of secondary importance. Therefore, the EPA drinking water standards are categorized as primary drinking water standards and secondary drinking water standards. Primary drinking water standards regulate organic and inorganic chemicals, microbial pathogens, and radioactive elements that may affect the safety of drinking water. These standards set a limit--the Maximum Contaminant Level (MCL)--on the highest concentrations of certain chemicals allowed in the drinking water supplied by a public water system.

Secondary drinking water standards regulate chloride, color, copper, corrosively, foaming agents, iron, manganese, odor, pH, sulfates, total dissolved solids, and zinc, all of which may affect qualities of drinking water like taste, odor, color, and appearance. The concentration limit of these contaminants is referred to as the Secondary Maximum Contaminant Level (SMCL). Examine the EPA's current drinking water standards. State agencies are responsible for monitoring public water supplies and enforcing the primary and secondary drinking water standards set by the EPA. Local water districts must test and treat drinking water and maintain the EPA standards for quality. These districts are also responsible for informing the public when any water quality standards have been violated. Given these standards, stream- and groundwater supplies should be of high quality. Generally, one compares the values for the various measures of stream- and groundwater quality at a given time and location to the average of those values across the entire **watershed**. This "average" water quality across a watershed is referred to as the watershed's "baseline."

4.3 Strategies For Water Quality Assessment

The operations involved in water quality assessment are many and complex. They can be compared to a chain of about a dozen links and the failure of any one of them can weaken the whole assessment. It is imperative that the design of these operations must take into account the precise objectives of the water quality assessment.

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4.4 Design Of Assessment Programmes

Once the objectives have been clearly identified, four steps are essential in the good design of an assessment programmed: (i) the selection of the appropriate media to sample, (ii) the determination of water quality variability through preliminary surveys, (iii) the integration of hydrological and water quality monitoring, and (iv) the periodic review and modification of the design of the programme.

5. GROUNDWATER

5.1 Characteristics Of Groundwater Bodies

Water from beneath the ground has been exploited for domestic use, livestock and irrigation since the earliest times. Although the precise nature of its occurrence was not necessarily understood, successful methods of bringing the water to the surface have been developed and groundwater use has grown consistently ever since. It is, however, common for the dominant role of groundwater in the freshwater part of the hydrological cycle to be overlooked. Groundwater is easily the most important component and constitutes about two thirds of the freshwater resources of the world and, if the polar ice caps and glaciers are not considered, groundwater accounts for nearly all usable freshwater.

Water is drawn from the ground for a variety of uses, principally community water supply, farming (both livestock and irrigated cultivation) and industrial processes. Unlike surface water, groundwater is rarely used in situ for non-consumptive purposes such as recreation and fisheries, except occasionally where it comes to the surface as springs. Consequently, ground-water quality assessment is invariably directed towards factors which may lessen the suitability of pumped groundwater with respect to its potability and use in agriculture and industry. The overall goal of a groundwater quality assessment programme, as for surface water programmes, is to obtain a comprehensive picture of the spatial distribution of groundwater quality and of the changes in time that occur, either naturally, or under the influence of man. The benefits of well designed and executed programmes are that timely water quality management, and/or pollution control measures, can be taken which are based on comprehensive and appropriate water quality information. Each specific assessment programme is designed to meet a specific objective, or several objectives, which are related in each case to relevant water quality issues and water uses.

5.2 Characteristics Of Groundwater Bodies

5.2.1 Occurrence Of Groundwater

Groundwater occurs in many different geological formations. Nearly all rocks in the upper part of the Earth's crust, whatever their type, origin or age, possess openings called pores or voids. In unconsolidated, granular materials the voids are the spaces between the grains (Figure 9.1a), which may become reduced by compaction and cementation. In consolidated rocks, the only voids may be the fractures or fissures, which are generally restricted but may be enlarged by solution.The volume of water contained in the rock depends on the percentage of these openings or pores in a given volume of the rock, which is termed the porosity of the rock. More pore spaces result in higher porosity and more stored water.

Only a part of the water contained in the fully-saturated pores can be abstracted and used. Under the influence of gravity when, for example, the water level falls, part of the water drains from the pores and part remains held by surface tension and molecular effects. The ratio of the volume of water that will drain under gravity from an initially saturated rock mass to the total volume of that rock (including the enclosed water) is defined as the specific yield of the material, and is usually expressed as a percentage. Ground water is not usually static but flows through the rock. The ease with which water can flow through a rock mass depends on a combination of the size of the pores and the degree to which they are inter-connected. This is defined as the permeability of the rock.

Materials which permit water to pass through them easily are said to be permeable and those which permit water to pass only with difficulty, or not at all, are described as impermeable. A layer of rock that is sufficiently porous to store water and permeable enough to transmit water in quantities that can be economically exploited is called an aquifer. Groundwater flow may take place through the spaces between the grains or through fissures, or by a combination of the two in, for example, a jointed sandstone or limestone. For any aquifer, distinguishing whether inter-granular or fissure flow predominates is fundamental to understanding the hydrogeology and to designing monitoring systems, particularly for point source pollution incidents.

5.3 Chemical Characteristics Of Groundwater

Groundwater often occurs in association with geological materials containing soluble minerals, higher concentrations of dissolved salts are normally expected in groundwater relative to surface water. The type and concentration of salts depends on the geological environment and the source and movement of the water.

A simple hydrochemical classification divides groundwaters into meteoric, connate and juvenile. Meteoric groundwater, easily the most important, is derived from rainfall and infiltration within the normal hydrological cycle. Groundwater originating as sea water which has been entrapped in the pores of marine sediments since their time of deposition is generally referred to as connate water. The term has usually been applied to saline water encountered at great depths in old sedimentary formations. It is now accepted that meteoric groundwater can eventually become equally saline, and that entrapped sea water can become modified and moved from its original place of entrapment. It is doubtful whether groundwater exists that meets the original definition of connate water, and the non-generic term formation water is preferred by many authors.Connate water is, perhaps, useful to describe groundwater that has been removed from atmospheric circulation for a significant period of geological time. Formation waters are not usually developed for water supplies because of their high salinity. However, they may become involved in the assessment of saline intrusions caused by the overpumping of overlying aquifers.

5.4 Biological Characteristics Of Groundwater

Groundwater quality can be influenced directly and indirectly by microbiological processes, which can transform both inorganic and organic constituents of groundwater. These biological transformations usually hasten geochemical processes. Single and multi-celled organisms have become adapted to using the dissolved material and suspended solids in the water and solid matter in the aquifer in their metabolism, and then releasing the metabolic products back into the water. constraints of the system, but they do affect their rate. Sulphides, for example, can be oxidised without microbial help, but microbial processes can greatly speed up oxidation to the extent that, under optimum moisture and temperature conditions, they become dominant over physical and chemical factors. All organic compounds can act as potential sources of energy for organisms. Most organisms require oxygen for respiration (aerobic respiration) and the breakdown of organic matter, but when oxygen concentrations are depleted some bacteria can use alternatives, such as nitrate, sulphate and carbon dioxide (anaerobic respiration). Organisms which can live in the presence of oxygen (or without it) are known as facultative anaerobes. In contrast, obligate anaerobes are organisms which do not like oxygen. The presence or absence of oxygen is, therefore, one of the most important factors affecting microbial activity, but not the only one. For an organism to grow and multiply, nutrients must be supplied in an appropriate mix, which satisfies carbon, energy, nitrogen and mineral requirements.

Microbiological activity primarily affects compounds of nitrogen and sulphur, and some of the metals, principally iron and manganese. Sulphate reduction by obligate aerobes is one of the most important biological processes in groundwater. Nitrogen compounds are affected by both nitrifying and denitrifying bacteria. Reduction of nitrate by denitrifying bacteria occurs in the presence of organic material in anaerobic conditions, leading to the production of nitrite which is then broken down further to elemental nitrogen. The possibility of enhancing natural denitrification is currently receiving attention in relation to the problem of nitrate in groundwater. Under aerobic conditions, ammonia (which may be produced during the decomposition of organic matter) is oxidised to nitrite and nitrate. Likewise iron can be subjected to either reduction or oxidation, depending on the Eh and pH conditions of the groundwater. In favourable microbiological environments, massive growth of iron bacteria can cause clogging of well screens and loss of permeability of aquifer material close to wells, and may require special monitoring and remedial action.

5.5 Groundwater Quality Issues

Groundwater quality is the sum of natural and anthropogenic influences. Multi-purpose monitoring may be directed towards a whole range of ground-water quality issues and embrace many variables. Other categories of monitoring may concentrate on a single quality issue such as agricultural pesticides, an industrial spill, saline intrusion, etc. Table lists and categorises the human activities that may potentially pollute groundwater and identifies the main pollutants in each case. These have been linked to the principal uses to which groundwater is put and to three levels of industrial development, so that the most important current and future groundwater quality issues can be identified. A major subdivision into urban, industrial and agricultural is made, although it is clear that there is considerable overlap between the first two. Some of the activities generating serious pollution risks are common to highly industrialised, newly industrialising and low development countries (mainly agricultural based economies), but those presenting the most serious threats differ significantly. Groundwater quality issues may be global, national or regional, affect the whole of one or more aquifers, or be restricted to the immediate vicinity of a single contaminant source. Therefore, the scale and type of monitoring operations required depend on the issue, or combination of issues, and the size of groundwater body affected.

5.6 Assessment Strategies

Groundwater bodies are always less accessible than surface water bodies. Consequently, obtaining the essential information on groundwater quality is technically difficult and costly. Significant limitations in groundwater quality assessment usually have to be accepted and need to be recognised in the interpretation and use of the monitoring results. This is often not appreciated by those responsible for establishing water quality goals or groundwater resource management strategies. Consequently, the information expectations placed on water quality assessments may be far beyond any ability to supply the information. It is essential, therefore, for the designer of a groundwater quality assessment programme to understand and define the information objectives, and to appreciate the several types of monitoring that can exist.

5.6.1 Types Of Groundwater Assessment

The fundamental requirement of a groundwater assessment to define the spatial distribution of water quality, applies almost invariably, regardless of the specific objective of the assessment. Three major categories of water quality assessment i.e. monitoring, survey and surveillance are defined, and the various sub-categories listed.Surveillance is generally related to the acceptability of water for a given use and/or the control of associated treatment processes. Sampling for surveillance normally comprises frequent or continuous measurements on pumped water, and there is no need for samples to be representative of conditions in the aquifer. In all other cases, the requirement is to obtain analytical results from samples which are uncontaminated by the processes of sample collection and analysis and are representative of *in situ* conditions at specific points in the groundwater system.

5.7 Anthropogenic Impacts On Water Quality

With the advent of industrialisation and increasing populations, the range of requirements for water have increased together with greater demands for higher quality water. Over time, water requirements have emerged for drinking and personal hygiene, fisheries, agriculture (irrigation and livestock supply), navigation for transport of goods, industrial production, cooling in fossil fuel (and later also in nuclear) power plants, hydropower generation, and recreational activities such as bathing or fishing. Fortunately, the largest demands for water quantity, such as for agricultural irrigation and industrial cooling, require the least in terms of water quality. Each water use, including abstraction of water and discharge of wastes, leads to specific, and generally rather predictable, impacts on the quality of the aquatic environment. In addition to these intentional water uses, there are several human activities which have indirect and undesirable, if not devastating, effects on the aquatic environment. Examples are uncontrolled land use for urbanisation or deforestation, accidental (or unauthorised) release of chemical substances, discharge of untreated wastes or leaching of noxious liquids from solid waste deposits. Similarly, the uncontrolled and excessive use of fertilisers and pesticides has long-term effects on ground and surface water resources

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5.8 Pollutant Sources And Pathways

In general, pollutants can be released into the environment as gases, dissolved substances or in the particulate form. Ultimately pollutants reach the aquatic environment through a variety of pathways, including the atmosphere and the soil. Pollution may result from point sources or diffuse sources (non-point sources). There is no clear-cut distinction between the two, because a diffuse source on a regional or even local scale may result from a large number of individual point sources, such as automobile exhausts. An important difference between a point and a diffuse source is that a point source may be collected, treated or controlled (diffuse sources consisting of many point sources may also be controlled provided all point sources can be identified).The major point sources of pollution to freshwaters originate from the collection and discharge of domestic wastewaters, industrial wastes or certain agricultural activities, such as animal husbandry. Most other agricultural activities, such as pesticide spraying or fertiliser application, are considered as diffuse sources. The atmospheric fall-out of pollutants also leads to diffuse pollution of the aquatic environment.

5.8.1 Point Sources

By definition a point source is a pollution input that can be related to a single outlet.Untreated, or inadequately treated, sewage disposal is probably still the major point source of pollution to the world's waters. Other important point sources include mines and industrial effluents. As point sources are localised, spatial profiles of the quality of the aquatic environment may be used to locate them. Some point sources are characterised by a relatively constant discharge of the polluting substances over time, such as domestic sewers, whereas others are occasional or fluctuating discharges, such as leaks and accidental spillages. A sewage treatment plant serving a fixed population delivers a continuous load of nutrients to a receiving water body. Therefore, an increase in river discharge causes greater dilution and a characteristic decrease in river concentration. This contrasts with atmospheric deposition and other diffuse sources where increased land run-off often causes increased pollutant concentrations in the receiving water system.

5.9 Elements Of Water Quality Assessment

The possible types of water quality assessment programmes are numerous. These should be designed or adopted according to objectives set on the basis of environmental conditions, water uses (actual and future), water legislation, etc. Once the objectives have been set, a review of existing water quality data, sometimes supported by preliminary surveys, determines the monitoring design. Following the implementation of the various assessment activities an important step which is often underestimated, if not omitted, is data interpretation. This should be followed by recommendations to relevant water authorities for water management, water pollution control, and eventually the
adjustment or modification of monitoring activities.

5.9.1 The Key Elements Of An Assessment Programme

- Objectives
- Preliminary Surveys
- Monitoring Design
- Field Monitoring Operations
- Hydrological Monitoring
- Data Quality Control

5.10 Data Storage Treatment And Reporting

This is now widely computerised and involves the use of databases, statistical analysis, trend determinations, multi-factorial correlation, etc., and presentation and dissemination of results in appropriate forms (graphs, tabulated data, data diskettes, etc.).

5.11 Data Interpretation

This involves comparison of water quality data between stations (water quality descriptors, fluxes), analysis of water quality trends, development of cause-effect relationships between water quality data and environmental data (geology, hydrology, land use, pollutant sources inventory), and judgement of the adequacy of water quality for various uses etc. For specific problems, and the evaluation of the environmental significance of observed changes, external expertise may be needed.Publication and dissemination of data and reports to relevant authorities, the public, and the scientific community is the necessary final stage of assessment activities.

6. TEST RESULTS

Figure 4 shows Water Samples Collecting Area – GIS Map. Table 1shows Rainfall Data

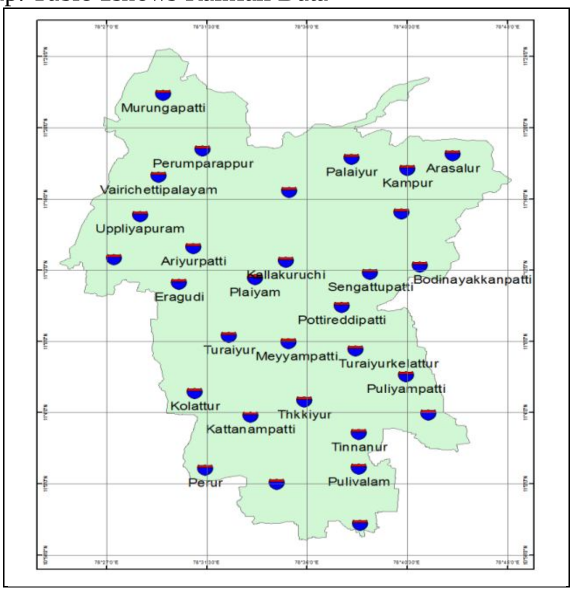

Figure 4 Water Samples Collecting Area – GIS Map

6.1 Rainfall Details(In Mm)

Name Of The Rainfall Station: Thuraiyur

Table 1 Rainfall Data

YEAR	MONTH												Total
	JAN	FEB	MAR	APR	MAY	JUN	JULY	AUG	SEP	OCT	NOV	DEC	
1995	2.00	-	17.30	-	139.80	3.40	109.60	197.50	155.6	62.9	83.5	-	771.6
1996	-	2.20	-	43.60	28.20	86.10	10.50	51.70	124.6	143.4	46.7	235.6	772.6
1997	-	-	6.10	-	69.40	80.50	11.00	13.80	-	-	-	-	180.8
1998	-	-		-	89.50	3.00	25.80	270.50	170.2	122.3	320.3	182.5	1184.10
1999	-	-		50.10	59.80	14.40	27.00	65.00	52.4	179.60	275.0	27.20	750.5
2000	-	12.20		99.60	35.30	-	17.40	183.00	123.2	214.6	112.8	80.20	878.30
2001	0.00	-	-	79.60	41.60	6.20	10.40	27.40	63.5	160.6	93.60		527.6
2002	-	13.00	7.00	14.00	132.00	73.00	19.00	98.00	147.0	243.44	30.0	2.0	778.44
2003			98.00	56.00	95.00	41.00	62.00	127.00	87.0	208.7	100.7	22.0	897.40
2004	-		-	18.00	318.20	11.00	120.00	1.00	211.5	108.10	151.0	4.0	942.8
2005	-		37.00	165.00	150.00	5.00	155.00	156.60	133.8	417.0	385.6	62.7	1667.7
2006	-		54.20	35.80	134.60	46.20	-	72.00	176.0	106.5	117.4	1.1	743.8
2007	-		-	103.00	104.00	46.00	72.00	-	60.0	226.0	28.0	156.0	795
2008	-	11.00	74.00	49.00	89.00	10.00	42.00	110.00	115.0	167.0	80.0	173.0	920
2009	-		7.00	4.00	61.00	24.00	-	163.00	103.0	71.0	214.0	72.0	719
2010	-		-	3.00	112.00	115.00	22.00	90.00	78.0	78.0	169.0	72.0	739
2011	-		-	226.40	5.00	2.00	18.00	125.00	61.0	246.0	147.0	142.0	972
2012	-		-	114.00	64.00	-	24.00	36.00	93.0	170.0	75.0	4.0	580
2013	-		5.00	2.00	70.30	11.00	5.00	71.00	80.0	140.20	95.0	38.0	517.5
2014	-		-	-	112.00	69.00	16.00	39.00	112.0	98.0	49.0	22.0	517.0
2015	18.00	1	-	185.00	134.00	185.00	9.00	131.00	139.0	204.0	187.0	24.0	1217
2016	-		-	1.00	138.00	7.00	85.00	36.00	7.00	41.0	6.00	41.0	362.0

6.2 Hardness

Figure 5 Shows Hardness Chart

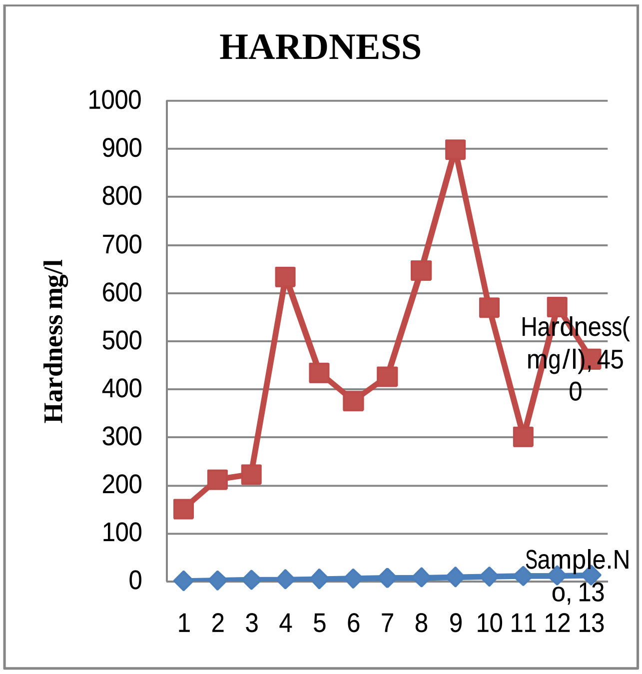

Figure.5 Hardness Chart

6.3 Chloride Content

Figure 6 shows Chloride Content Chart

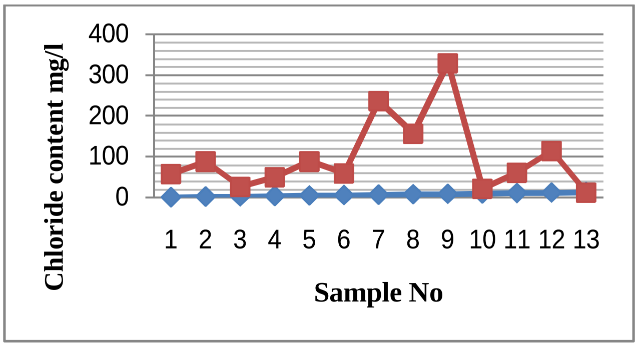

Figure 6 Chloride Content Chart

6.4.Sulphide Content

Figure 7 shows Sulphide Content Chart

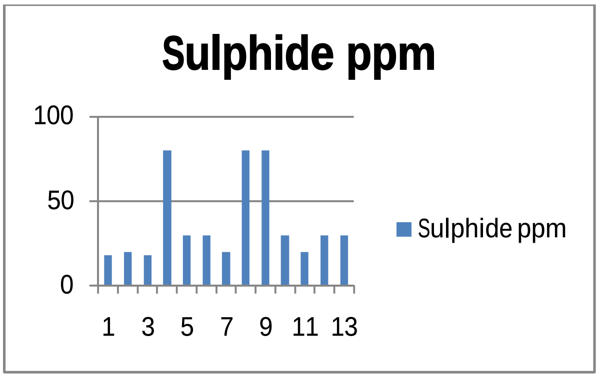

Figure 7 Sulphide Content Chart

6.5 P^H

Figure 8. shows P^h Chart

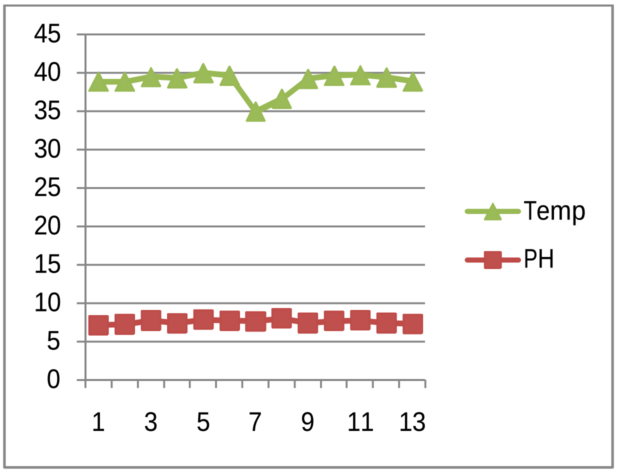

Figure 8. P^h Chart

7. ABOUT SOFTWARE

7.1 Geographical Information Systems (GIS)

Geographical Information Systems (GIS) can be described as general-purpose computer-based technologies for handling geographical data in digital form in order to capture, store, manipulate, analyse and display diverse sets of spatial or geo-referenced data. In essence, GIS are spatial databases of digital maps which store information on various phenomena and their locations. Modelling.Basic Functions of a GIS. (GIS have been used in a multitude of applications as 'scientific tool[s] in natural resource management (forestry, agriculture, conservation), cave and karst research, environmental management, health and environmental health research, mining and petroleum research, hazards management and Earth science, among others' (Walker, 2004, p. 3). Therefore, the skills and knowledge students acquire through GIS use in school may also enhance their future career prospects.

7.2 Satellite Remote Sensing

Remote sensing is the acquisition of information about an object or phenomenon without making physical contact with the object and thus in contrast to on-site observation. Remote sensing is used in numerous fields, including geography and most Earth Science disciplines (for example, hydrology, ecology, oceanography, glaciology, geology) it also has military, intelligence, commercial, economic, planning, and humanitarian applications.

8.CONCLUSION

Water quality assessment should always be seen in the wider context of the management of water resources, encompassing both the quality and quantity aspects. The usefulness of the information obtained from monitoring is severely limited unless an administrative and legal framework exists at local, regional, or even international, level. To obtaining this in our project as per the samples analysed result and rainfall data which is collect from the rain gauge stations were interpreted in remote sensing and GIS has generate the computer modeling tools to provide a solution for future water resources planning and management to government especially in Thuraiyur Taluk which is highly draught in water quality. In our project we conclude that based on quality assessment the water is rich in chloride, hardness, and sulphide and normal in ph factor which is considerable for drinking and cultivation has been predicted.

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