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Hydrogeology of Ramanathapuram District, Tamil Nadu

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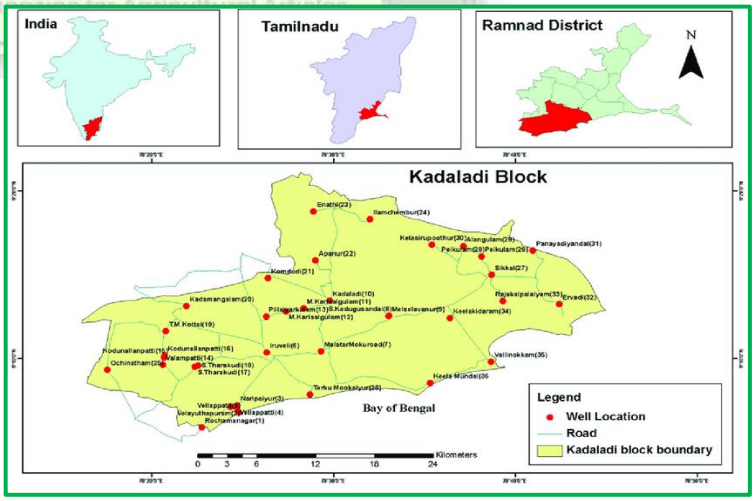
Abstract
Ramanathapuram is a coastal and drought prone district in Tamilnadu,situated between latitudes 9º10´and 9º50´N and longitudes 78º15´ and 79º27´E.The district covers an area of 4217 sq.km,and a population of nearly 11.35 lakhs.The groundwater quality in and around Ramanathapuram municipality is potable.The Agricultural communities utilized the groundwater for farming their lands.A major part of the district is covered with the fluvial,fuvio-marine,aeolian and marine sediments of quaternary age.All the people used the groundwater for domestic purposes.The district receives the rain under influence of both southwest and northeast monsoons.Most of the precipitation occurs in the form of cyclonic storms caused due to the depressions in Bay of Bengal.

Keywords: Groundwater,water scarcity,Fluctuation,Irrigation.

Introduction
A unique feature of this district is the presence of about 1731 smaller rainfed tanks.A major river,Vaigai,flows through this district.However,for most of the months the tanks and the river are dry and people meet the water demand using groundwater.When the south west monsoon rains are high in the catchment areas of kavery river in Karnataka,Dams there get filled and in turn,kavery river in Tamilnadu gets water.Groundwater occurs in the loose unconsolidated deposits in four hydrogeological zones viz.Shallow freashwater zone,Deep and confined freshwater zone,Moderate quality zone and saltwater horizons.The depth to the water table ranges from 2 to 12m below groundlevel and it is seen that the water level is continuously decreasing for the last 10 years in a few places.

Rainfall and Climate
The district receives the rain under the influence of both southwest and northeast monsoons.The northeast monsoon chiefly contributes to the rainfall in the district.The southwest monsoon rainfall is highly erratic and summer rains are negligible.Rainfall data from two stations over the period 1901-2000 were utilised and a perusal of the data shows that the normal annual rainfall over the



district is 827mm with the maximum around pamban and all along the coast and it decreases towards inland.

The district enjoys a tropical climate.The period from May to June is generally hot and dry.The weather is pleasant during the period from December to January.Usually mornings are more humid than afternoons.The relative humidity is on an average between 79 and 84%.The mean minimum temperature is 25.7ºC and mean maximum daily temperature is 30.6ºC respectively.

Long Term Fluctuation (1998-2007)

The longterm water level fluctuation for the period 1998-2007 indicates rise in water level in the range of 0.0009-0.3944 m/year and fall in the range between 0.0635-0.2693 m/year.

Material and Methods

The water samples were collected from ten sampling points in and around ramnad city.The samples were collected in a pre-cleaned polyethene canes as per standard procedures.Turbidity was measured directly from Nephelometer and the Ph of the sample was determined using a 335 systronics digital ph meter. Conductivity was measured using Elico conductivity Bridge(model CM82-T).The total hardness, alkalinity, chlorides, sulphates, calcium, magnesium, BOD, COD, total dissolved solids, fecal and total coliforms were carried out by standard methods.

Status of Ground Water Development

The estimation of groundwater for the district has shown that 1 block is over exploited and 1 block is under "critical"category.

The shallow alluvial aquifers along vaippar and gundar rivers serve as an important source of drinking water irrigation development for viruthunagar district.Dug wells are the most common ground water abstraction stuructures used for irrigation in the district.The yield of dug wells range from <50 to 200 m³/day in weathered crystalline rocks,20 to 100 m³/day in Tertiary formations and upto 400m³/day in recent alluvial formations along major drainage courses.The dug wells in hard rock terrain tapping the entire weathered residuum are capable of yielding 6-7 Ips,requiring the installation of 5HP centrifugal pumps for extraction of groundwater.

Water Scarcity

Ramanathapuram district is one of the water scarcity district in Tamilnadu state.People living outside of Ramanathapuram district always think that the district is a cursed one.The government officials considered their services period in the district as punishment in their lifetime.Water is a scarce as well as a saleable good in the district.There is no perennial river of importance to supply water.The wild rivers which carry water for a few days or hours after the downpour are connected to the tanks and ooranis and they are emptied on their way to sea.Hard clayey soil constitutes about 46% of the total soil distribution.The hard clayey nature of soil morphology restricts the availability of the deep seated fresh water aquifers.

Problems due to Water Scarcity

Water is a source of life;one can live without water for a few days can't live without water.Water is an emotional issues particularly during scare period.Fetching water is considered mostly as women's business. The competition for the limited resource will aggravate the tension among the public and conflicts among the users. The small issue will become a clash among the people in the villages.Even though each community is having own source of water,if the resource gets dried,they went to others,then it creates tension and there are cases where these situation leads to communal riots,inter village conflicts etc.Being a source of an emotional issue,it ends up with group clash and even murder.

Irrigation Practices

The nine-fold lands use classification for the district is given below.(2005-06)

S.NO	CLASSIFICATION	AREA(Ha)
1	Forests	4488
2	Barren & Uncultivable Lands	4591
3	Land put to non agricultural uses	84483
4	Cultivable waste	4245
5	Permanent pastures&other grazing lands	154
6	Groves not included in the area sown	41210
7	Current Fallows	27784
8	Other Fallow Lands	56439
9	Net Area sown	185563

Conclusion

This study attempts to identify the groundwater quality existing in the shallow aquifer horizons in the coastal aquifers of ramanathapuram district,Tamilnadu.It has been salinity problems are encountered in many places and the probable mechanism for such a contamination may be the salt water encroachment from the sea.The population in Ramanathapuram district of Tamilnadu state faces potable water scarcity through out the year in general and acute drinking water problem in lean periods of the year.To mitigate this problem,eleven reverse osmosis(RO)desalination plants were installed in problematic villages in the districts.

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