International Journal of Management and Economics Invention
||Volume||3||Issue||10||Pages-1336-1340||Oct.-2017|| ISSN (e): 2395-7220
Index Copernicus ICV: 72.76, DOI: 10.18535/ijmei/v3i10.01
www.rajournals.in

A Study on Great Dip in Ground Water Level among Various Districts in Tamilnadu

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Abstract: I Groundwater forms a long-term storage component of the water cycle. Ground Water shortage is a global problem. While other people in some parts of the India maybe enjoying enough supply of water, others are faced with water shortage. South India is not an exception in this regard because some do not have access to water but rely on distance conveyance. Government is under constitutional obligation to supply this basic social and economic service. This study, therefore, aimed at investigating the causes of ground water shortage and the impact thereof on the household of Tamilnadu. The data collected from all districts of this state showed that the area has a serious problem of ground water shortage. The lack of water per the findings negatively affects the livelihoods and development of the people of Tamilnadu.

I. Introduction

The state of Tamilnadu gets rainfall during southwest monsoon and northeast monsoon seasons. The district like Kanyakumari gets the chance of rainfall throughout the year. But there was no rainfall during both the seasons in past few years. The lack of rainfall in kerala during southwest monsoon is reflected in Tamilnadu as means of high temperature. The state like Tamilnadu often gets rainfall during july but this process has been changed because of this unusual change in climate. Due to this variation in climate, there was a dip in level of ground water. Unlike like other districts, vellore and tanjore are having considerate ground water. So, these districts in the group of drought is suffering from lack of drinking water. The dams in Kanyakumari were not opened on days due to lack of water sources. Because of the barren lands the formers felt bad for the threat of real estate people. To save the existing water sources these must be heavy rainfall in upcoming days. As Perscholar's survey, unless there is heavy rainfall in our state. The people should face the problems of water scarcity in upcoming days.

II. Groundwater in the water cycle:

The water cycle, or hydrological cycle, describes the endless circulation of water between ocean, atmosphere and land. It is a vast, complex process driven by the sun's energy. Because it can't be seen, groundwater is often forgotten. But it is an important and proportion at ely large part of the land-based component of the hydrological cycle. In the cycle, precipitation (rain, sleet or snow)falls on the ground and is either intercepted by plants and transpired or becomes overland flow contributing to the surface water network, or infiltrates the ground.

When surface water percolates slowly down through soil and rock, it eventually reaches allayer

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that it cannot pass through, where it slowly accumulates and saturates the ground above this layer. The top of the saturated zone is known as the water table. Groundwater usually flows through tiny pores and joints in saturated rock towards natural discharge points such as springs, where the water table intersects the ground surface. Groundwater will also discharge where the water table intersects water bodies such as streams, rivers or seas.

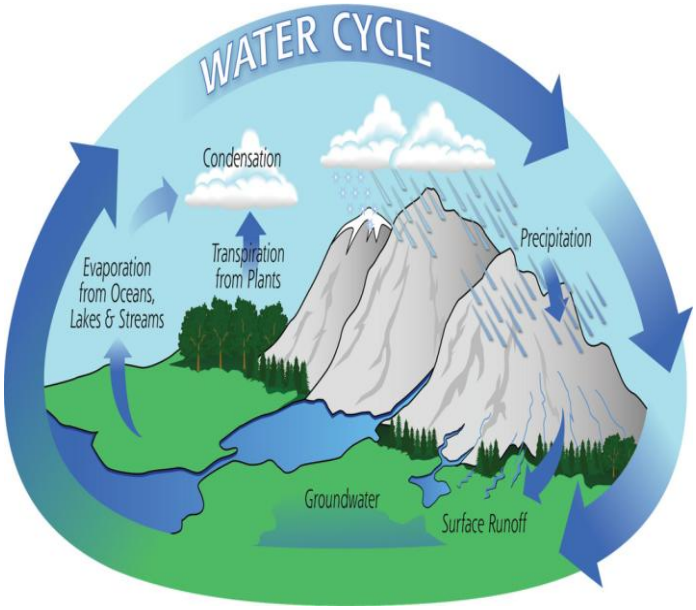

Fig 1: Life cycle of ground water

The steps of ground water cycle as follows:

1. Precipitation – it is any product of the condensation of atmospheric water vapor that falls under gravity. The main forms of precipitation include drizzle, rain, sleet, snow, graupel and hail.

2. Infiltration / recharge - Groundwater recharge or deep drainage or deep percolation is a hydrologic process where water moves downward from surface water to groundwater. Recharge is the primary method through which water enters an aquifer.

3. Water table - The *water table* is the upper surface of the zone of saturation. The zone of saturation is where the pores and fractures of the ground are saturated with water.

4. Runoff – the next stage of water table is Runoff, that is from surface to reach the level of ground.

5. Groundwater discharge - It is the term used to describe the movement of groundwater from the subsurface to the surface. There is natural discharge which occurs into lakes, streams and springs as well as human discharge, which is generally referred to as pumping.

6. Groundwater flow - In hydrogeology, groundwater flow is defined as the part of streamflow that has infiltrated the ground, has entered the phreatic zone, and has been discharged into a stream channel, via springs or seepage water. It is governed by the groundwater flow equation.

7. Evaporation - Evaporation is a type of vaporization of a liquid that occurs from the surface of a liquid into a gaseous phase that is not saturated with the *evaporating* substance.

8. Transpiration - It is the process by which moisture is carried through plants from roots to small pores on the underside of leaves, where it changes to vapor and is released to the atmosphere. It is essentially evaporation of water from plant leaves.

III. Extraction and use of groundwater by humans:

Humans have extracted groundwater for centuries, and it continues to provide the primary water supply for many settlements around the world.

Groundwater use in Tamilnadu - Tamilnadu' s reliance on groundwater supplies has increased in recent decades because of growing competition for surface water resources combined with frequent periods of drought, which rapidly deplete

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surface water supplies. Water for towns, industry and agriculture can be sourced from both surface water and groundwater. In some areas, surface water is the primary resource, and water users will rely on groundwater only when surface water is temporarily unavailable. In some regional areas and major cities, particularly in arid and semi-arid Tamilnadu, groundwater is the only reliable source of fresh water.

Agricultural - Throughout Australia, groundwater is used to irrigate crops and pasture, provide water for stock and increase agricultural productivity.

Urban and domestic - Groundwater provides reliable town water to many communities, particularly those in rural and remote areas. Individual urban households and community facilities may also use groundwater for irrigation.

Industry and mining - Many large-scale mining projects and much of the petroleum production industry across the arid zone are wholly dependent on groundwater.

IV. Analyzed Data:

The details of ground water level collected from various districts are given in table1. There are 31 districts totally in Tamilnadu. Among these districts, the greatest dip in Tirunelveli district, ground water level is 4.94 meters and the lowest dip in Niligiri district is 0.43 meters. The district vellore and tanjore are the only districts having the raise level in ground water as 1.05 and 0.15 meters respectively. Comparing last two years, there are enormous changes in lot of the districts.

Table1: Raise and Dip table of ground water level

Sl No	District	2016	2017	Raise (in Meter)	Dip (in Meter)
1	Tiruvallur	4.48	6.32	-	1.86
2	Kanchipuram	3.88	6.22	-	2.34
3	Tiruvannamalai	5.81	10.38	-	4.57
4	Vellore	11.53	10.48	1.05	-
5	Dharmapuri	8.47	11.28	-	2.81
6	Krishnagiri	8.11	11.58	-	3.47
7	Cuddalore	5.67	7.65	-	1.98
8	Villupuram	6.43	9.88	-	3.45
9	Tanjore	4.37	4.22	0.15	-
10	Tiruvarur	3.3	5.22	-	1.92
11	Nagapattinam	2.83	4.63	-	1.80
12	Tiruchi	9.07	12.97	-	3.90
13	Karur	5.15	8.24	-	3.09
14	Perambalur	7.10	12.55	-	5.45
15	Pudukottai	7.73	9.99	-	2.26
16	Ariyalur	5.72	6.43	-	0.71
17	Salem	10.77	13.81	-	3.04
18	Nammakal	11.91	15.16	-	3.25
19	Erode	9.41	13.12	-	3.71
20	Coimbatore	14.46	17.63	-	3.17
21	Tiruppur	11.25	14.64	-	3.39
22	Niligiri	2.30	2.73	-	0.43
23	Dindigul	9.98	13.43	-	3.45
24	Madurai	7.50	9.34	-	1.84
25	Ramnad	4.67	5.74	-	1.07
26	Sivagangai	7.18	9.79	-	2.61
27	Theni	11.51	14.04	-	2.53
28	Tuticorin	4.81	8.81	-	4.00
29	Tirunelveli	5.26	10.20	-	4.94
30	Virudhunagar	7.56	10.93	-	3.37
31	Kanyakumari	4.36	8.81	-	4.45

V. Precautions and safety Measures:

The current crisis comes as an opportunity to fix this problem. The Union government is about to declare a drought relief package for the Tamilnadu region. It has made substantial commitment for water conservation and irrigation. But governments haves pent huge amount of money

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earlier also in drought relief. What is needed now is long-term relief from drought. To do this government must fine tune its policies to community needs and wisdom.

• **Appropriate ground water management based on the ecology:** Overdependence onground water must be curtailed. There is a need to make a shift from the current groundwater extraction to surface water utilization and management. Rain water harvesting must get precedence as water scarcity has been a problem of management rather than availability. Unless this is done, no matter how much it rains, there will be water scarcity. Revival of traditional tanks under schemes such as NREGA, Drought Prone Area Program and Desert Development Program in addition to creation of new assets is inevitable. For this to be effective we need to have appropriate integrated and and water development programmes.

• **Making government schemes effective:** There are many government schemes that cater to or related to drinking water needs. There must be serious and sustained effort to revive them and to fine tune them to local needs. Without this we may keep on creating infrastructure but without much impact on local drinking water availability.

• **Promotion of appropriate industries, not water intensive ones:** Government must do water availability and impact assessment before allowing industries or other activities that need huge amount of water. Village water security should get precedence.

• **Agriculture policy must be redrafted:** Current agriculture policy has not been able to take care of rain fed agriculture needs. Rather it prescribes a cropping pattern that is not suitable for rain fed situations. So, there is an urgent need to change agriculture policy that takes care of local ecology and does not promote water intensive crops.

• **Government and communities must be partner in long-term crisis management and Ground water security:** Government needs to initiate large-scale awareness campaign on water conservation to avert situation like Tamilnadu in long run. Communities must also put in their efforts in water conservation at their own levels.

• **Civil society monitoring of government programmes:** There is no dearth of government programmes and funds. Problem lies in effective implementation and monitoring. Civil society groups and the community must play a proactive role in monitoring such programmes. That will not only help government getting feedback on its programmes but also put it under constant public scrutiny.

VI. Conclusion:

The depth of ground water level reduced more in many districts of Tamilnadu. Due to Constant deficit rainfall, has contributed to the current crisis. Based on the above data, the recommendation is that districts should be in consultation with the community. But what has precipitated it is the decline of the traditional water harvesting structures created to face such crisis. The decline, on the other hand, is a result of long-term policy failure. As many studies and policy reviews indicate, the modern system should have learnt and retained the traditional system while drafting new policies.

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Dr.M. Soundarapandian, working as Professor, Department of Rural Industries and Management, Gandhigram Rural Institute, Deemed university, Gandhigram. His interested areas are Economics, Management and Rural Development. Under his guidance, 24 candidates awarded with PhD and 64 candidates awarded with M-phil. He had published more than 26 books.

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