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REVIEW ON GROUNDWATER MANAGEMENT STRATEGY IN KANCHEEPURAM DISTRICT TAMIL NADU

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Abstract - The study has been conducted to assess the food crop production in Kancheepuram district in Tamil Nadu. Status of Groundwater Development. The estimation of groundwater resources for the district has shown that two blocks are over exploited and two blocks are under "Critical" category. The shallow alluvial aquifer along Palar and Cheyyar rivers serve as an important source of drinking water between Kancheepuram to Ayyapakkam and Chingleput to Tambaram. The important tanks, which are being used for drinking water purposes, are given below:

1) Chembarampakkam tank 88.3 m^3
2) Madurantakam tank 609.00 m^3
3) Uttiramerur tank 958.80 m^3
4) Tenneri tank 1106.70 m^3

Dug wells are the most common ground water abstraction structures used for irrigation. The yield of the dug wells range from 30 to 100 m3 in weathered crystalline rocks, 25 to 35m3/hr in recent alluvial formations along major drainage courses. Along the coast, windblown sand acts as aquifer zones and ground water extractions is by means of shallow dug wells and they can sustain for 3 to 6 hours pumping and yield is around 15 m3/hr.

The yield of infiltration wells/filter points is around 35m^3/hr. The dug wells in hard rock terrain tapping the entire weathered residuum are capable of yielding 30-100 m3/day requiring the installation of 3 - 5 HP pumps for extraction of ground water.

Keywords - Groundwater, food crops, environment impact

I. Introduction

People have reshaped the earth continually but the present magnitude and rate are unprecedented. Nowadays it is realized that it is very important to know how land cover has changed over time, in order to make assessments of the changes one could expect in the future and the impact these changes will have on peoples' lives. As people are the main users of the land, it is important for any system to be oriented towards them. Hence, land cover is a geographical feature which may form a reference base for applications ranging from forest and rangeland monitoring, production of statistics, planning, investment, biodiversity, climate change, to desertification control. Agricultural productivity declines considerably due to floods and the climatic change. The degradation of land, Siltation of rivers, pollution of soil from acid rains and industrial wastes are some of the issues that are associated with urbanization and industrialization that are strong causes of land degradation and decline in agricultural productivity. The main reasons for decreasing agriculture land use are explosion in human population; the agricultural land has gradually been converted into residential and industrial areas. The need of production of more and more food forced people to go for commercial and extensive agriculture. These practices caused serious depletion of nutrients causing loss in the agricultural productivity. Food systems in developing countries are not always as well organized and developed as in the industrialized world. Moreover, problems of growing population, urbanization, lack of resources to deal with pre- and post- harvest losses in food, and problems of environmental and food hygiene mean that food systems in developing countries continue to be stressed, adversely affecting quality and safety of food supplies. People in developing countries are therefore exposed to a wide range of potential food quality and safety risks (FAO)

II. Study Area

Kancheepuram district is situated on the northern East Coast of Tamil Nadu and is adjacent by Bay of Bengal and Chennai city and is bound in the west by Vellore and Thiruvannamalai district, in the north by Thiruvallur district and Chennai district, in the south by Villuppuram district in the east by Bay of Bengal. It lies between 11° 00' to 12° 00' North latitudes and 77° 28' to 78° 50' East longitudes. The district has a total geographical area of 4393.37 Sq.kms and coastline of 57 kms. Kancheepuram, the temple town is the district headquarters. For administrative reasons, the district has been divided into 4

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revenue divisions comprising of 11 Taluks with 1137 revenue villages. For development reasons, it is divided into 13 development blocks with 648 Village Panchayats.

The pre-monsoon rainfall is almost uniform throughout the district. The coastal taluks get more rains rather than the interior regions. This district is mainly depending on the seasonal rains, the distress conditions prevail in the event of the failure of rains. Northeast and Southwest monsoon are the major donors with 54% and 36% contribution each to the total annual rainfall. Agriculture is the main occupation of the people with 47% of the population engaged in it. Paddy is the major crop cultivated in this district. Groundnuts, Sugarcane, Cereals & Millets and Pulses are the other major crops.

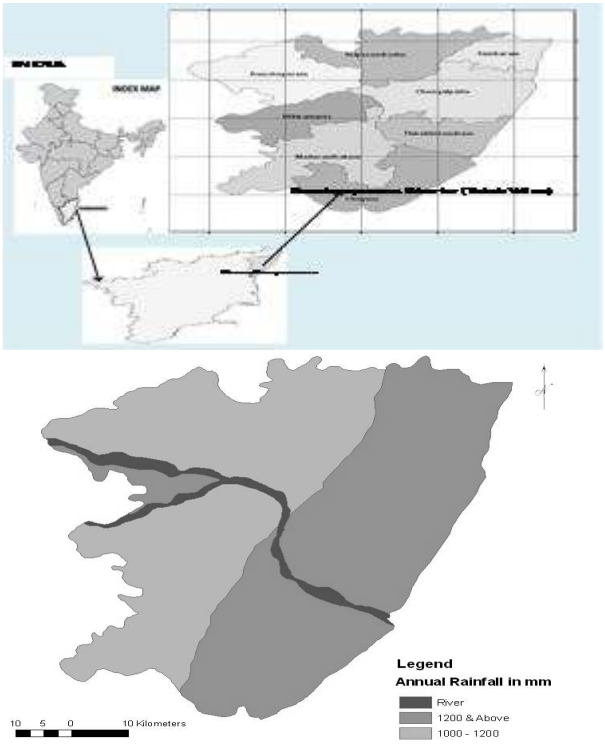

Figure: 1 shows the study area and detail of Rainfall status

III Groundwater Issue

High level of ground water development in large area in the western and southern part of the district both in hard rock and sedimentary aquifers and failure of abstraction structures with time. Sea water ingress, water logging, industrial pollution. The water level depletion in the eastern part of the district is mainly due to exploitation of ground water for domestic drinking and other purposes.

Over Exploitation and Degree of Change in Quality Due to

- Transportation of the water for (Drinking and domestic purpose) to Chennai city from rural areas of Kancheepuram district
- Development of industrial parks such as Sipcot, SEZ etc in Kancheepuram district.
- Expansion of city limit by Chennai Metropolitan Development Authoriy-CMDA and private residential township developers.

Figure: 2 shows Drinking water supply to Chennai from in an around Kancheepuram district by tapped from Ground and Surface water

IV. Groundwater Management Strategy

Groundwater Development

The ground water in Kancheepuram district is developed by dug wells, dug-cum-bore wells, tube wells, bore wells and filter points. The present demand for domestic and industrial water supply is estimated as 54.9304 MCM/annum as per Dynamic Ground Water Resources of Tamil Nadu as on March 2004. Water requirement for the year 2029 would be the reserved quantity of 58.1212 MCM. Ground water plays a major role in the irrigation activities of the district. There are about 80659 ground water abstraction structures in the district. They contribute about 49.24% percent of net area irrigated in the area. It is estimated that the average draft per dug well and shallow tube well in the district is of the order of 1.2 ha.m and 2.5 ha.m/year respectively.12 Present stage of ground water development in the district as a whole is 72.38%(average of ground water development as on March 2004). The stage of ground water development of Lattur and Uttiramerur are 109% and 111% respectively. Alluvium forms a good aquifer system along the Palar and Cheyyar rivers. The Palar riverbed is the main source of water supply to the urban areas along its course and also to part of Chennai city and industrial area of Maraimalainagar. Ground water yield prospects are poor in major part of the district and the yield ranged between 1 and 2 lps in fissured formations whereas

in Palar alluvium ranged from 5 to 10 lps and in Gondwana formations it ranged between <1 to 1.2 lps. Dug wells and bore wells are suitable for hard rocks whereas large diameter dug wells with radial is suitable for alluvial areas. Large diameter collector wells are ideal structure for ground water extraction in the alluvial tract where the granular zones are generally restricted to 35 m bgl.

V. Water Conservation and Artificial Recharge

The number and type of artificial recharge structures recommended for all the blocks in Kancheepuram district are furnished in Table 2. The exact locations of these structures, however, are to be decided on the basis of detailed field investigations. The implementation of the schemes may be taken up in phases, giving priority to blocks where the development of ground water resources is comparatively high. Central Ground Water Board is also providing free technical guidance for implementation of rooftop rainwater harvesting schemes.

VI. Area Notified by CGWA/SGWA

Central Ground Water Authority has not notified any area in the district. Government of Tamil Nadu vide G.O. No. 53 has banned groundwater development for irrigation in the over exploited blocks of Tamil Nadu.

The over exploited blocks in this district are as follow.

1. Uthiramerur

2. Lathur

In addition, Government of Tamil Nadu vide Act No 27 of 1987 published list of villages as given below in which following provisions have been made in the said act in connection with the groundwater development.13 Accordingly,

No person shall extract or use groundwater in the scheduled area for any purpose other than domestic purposes and no person shall transport groundwater by means of lorry, trailer or any other goods vehicle The list of scheduled villages is given below.

Name of the village (Village No) Taluk

Tambaram

Kottivakkam (141), Palavakkam(142), Neelankarai (145), Injambakkam(146), Sholinganallur(189), Uthandi(191), Karapakkam (East of B. Canal) (147), Oggianthorappakkam (East of B. Canal)(148), Pallikaranai (East of B.Canal) (149)

Chengalpattu

Kannathur Reddikuppam (35), Kuttukadu (36), Kovilanthangal (Kanjithotti) (44)

Sriperumbudur.

Veeraraghavapuram (9), Parivakkam (10), Panavedu Natham (11),Pidari Thangal (12), Kolappancheri (13), Kulathuvanchery (45), Srinivasapuram (46), Kattupakkam (47), Chennerkuppam (48), Koparasanallur (49), Ayyappanthangal (50), Thelliaragaram (51), Mugalivakkam (53), Mangada (42)

Table 1: The block wise and source wise net area irrigated in Ha is given below

S. No	Block	Net area irrigated by					Total Net Area irrigated
		Canals	Tanks	Tube wells	Ordinary wells	Other Sources	
1	Kancheepuram	24	2809	1878	3206	-	7917
2	Walajabad	30	4493	1831	2860	-	9214
3	Uttiramerur	0	3719	282	7162	-	11163
4	Sriperumpudur	0	6535	508	1692	-	8735
5	Kundrathur	0	2801	1464	2798	-	7063
6	Thiruporur	0	5925	405	1967	-	8297
7	Kattankolathur	0	3070	242	1878	-	5190
8	Thirukalukkundram	0	7205	840	2425	-	10468
9	Thamaimalai	0	1036	2	1518	-	2556
10	Madhurantagam	220	8345	439	4774	-	13778
11	Acharapakkam	220	7076	518	4874	-	12688
12	Chittamur	0	4020	2357	8301	-	14678
13	Lathur	56	3700	1400	3797	-	8953
	Total	550	60732	12166	47252	-	120700

(Source: Department of Economics & Statistics, Govt. of Tamil Nadu)

Table 2: Stage of groundwater development of kancheepuram district in (Ham)

Ground Water Assessment Unit District	*Blocks*	*Net Ground Water Avil Ability*	*Existing Gross Draft For Irrigation*	*Net Ground Water Avilability For Future Irrigation Development*	*Stage Of Ground Water Development*	*Categorization For Future Grounwater Development Safe/Semi/Critical/ Over Critical/ Over Exploited*
Kancheepuram	*Acharapakkam*	*8355.48*	*5799.74*	*2199.52*	*73*	*Semi Critical*
Kancheepuram	*Kancheepuram*	*9996.49*	*3685.04*	*5890.27*	*41*	*Safe*
Kancheepuram	*Katankulathur*	*7506.20*	*4340.26*	*2626.02*	*65*	*Safe*
Kancheepuram	*Kunrathur*	*7889.65*	*4339.25*	*3048.44*	*61*	*Safe*
Kancheepuram	*Lattur*	*8744.55*	*9297.01*	*-845.37*	*109*	*Over Exploited*
Kancheepuram	*Madhuranthagam*	*10385.78*	*6188.32*	*3823.93*	*63*	*Safe*
Kancheepuram	*Sittamur*	*10967.37*	*10526.01*	*97.67*	*99*	*Critical*
Kancheepuram	*Sriperumbudur*	*12062.35*	*2251.86*	*9445.27*	*22*	*Safe*
Kancheepuram	*St.THOMAS MOUNT*	*3744.96*	*1877.29*	*906.73*	*74*	*Semi Critical*
Kancheepuram	*Thirukalukundram*	*10292.26*	*9107.00*	*679.18*	*93*	*Critical*
Kancheepuram	*Thiruporur*	*10211.09*	*7913.39*	*1915.03*	*81*	*Semi Critical*
Kancheepuram	*Uthiramerur*	*12698.57*	*13666.21*	*-1381.06*	*111*	*Over Exploited*
Kancheepuram	*Wallajabad*	*11606.69*	*5385.82*	*5865.47*	*49*	*Safe*

VII. Recommendations & Conclusion

Steps to be taken up to evolve suitable measures for de-silting of Palar spring cannels and all the existing tanks in the district to improve their store activity. Effective steps to be carried out to remove the encroachments. A rapid urbanization and industrialization all along GST road have registered its own adverse impact on ground water regime. To counter this, roof top rainwater harvesting techniques with suitable structures be adopted in urban areas. In fissured formations, wells can yield for 6 months at a rate of 3 hours of pumping per day and suitable short term crops viz., ground nut, soybean, vegetables and flowers, may be encouraged

VIII. Agriculture Land Use

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The study clearly shows the degradation of agriculture land use in the study area, this is caused by process of urbanization from the Chennai city and the migration of population along the transport network and coastal areas, the process of urbanization and migration of population has been converted the agriculture land use into built up land use, if the current process of converting agriculture land use into other use continues, the production of agriculture products will be decreased, the government has to take necessary steps to manage the conversion of agriculture land use into other land use.

IX. Groundwater

Water level Steps to be taken up to evolve suitable measures for de-silting of Palar spring cannels and all the existing tanks in the district to improve their store activity. Effective steps to be carried out to remove the encroachments. A rapid urbanization and industrialization all along GST road have registered its own adverse impact on ground water regime. To counter this, roof top rainwater harvesting techniques with suitable structures be adopted in urban areas.

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