

**Impact of Drinking Water Management in Chennai**

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**ABSTRACT**

Water is a basic need for sustaining human economic activities. Also, water plays symbolic role in rituals throughout the world and is treated as a divine gift by many religions. Water is being at the very source of life, what concerns water concerns every aspects of life. Thus, be it climate change, pollution, desertification, deforestation, food production or whatever other major environmental problem that humanity is confronted with today, water constitutes one of the prime factors. Managing our water resources with care and intelligence for the use of present and future generations is major responsibility which has to be shared by governments and public alike, for no sector alone can deal efficiently with so vital a problem which affects not only the present but also the future of humanity. Sustainable water resources Development must be firmly linked to issues of population growth, poverty and resulting on water resources and development needs. The present study highlights the drinking water management in Chennai city based on the secondary source.

**Keywords:** Drinking water supply Ground water

**1. INTRODUCTION**

Drinking water is a basic requirement of the human being. The water scarcity in urban of developing countries is a major concern. In future population in urban areas will face acute water problem. The daily supply of water in developing countries is very low compared to the industrial would. Rising urbanization does not guarantee the reliable access to safe and sustainable drinking water supply.

**2. RELATED STUDIES**

**Singh (2010)** found that water is an important for the sustenance of civilization .ground water has been traditionally exploited to meet the drinking water requirements in India and other parts of the world since time immemorial. Ground water plays an important role in meeting the domestic and industrial needs of our country

**Gopal Kadekodi (2009)** stated that water resources are important environment resource every process of economic development and creates demand of water for industrial process, domestic uses and drinking water acts as a public good services.

Many of the fresh water problems of the twenty- first century will arise from increasing demands for water which stem from rapid population growth, urbanization, industrialization. The growing

demand for water is being exacerbated by the excessive pumping of ground water aquifers and the deteriorating quality of both surface water and ground water supplies.

## **SOURCE OF WATER DISTRIBUTION IS MAINLY BASED ON**

- Surface water
- Ground water

## **WATER SUPPLY CITY SYSTEM**

### **SURFACE WATER**

In the northwest along GNT road, for about six km from the Red hills lake is situated where water is drawn for the Chennai city supply. The upper supply channel which diverts the flow at Tamaraiakkam to Cholavaram Lake from there it flows to Red Hills Lake. This lake mainly receives its supply across the Poondi Reservoir. Small number of lakes are also connected in the northwest of Chennai city, where a statistical analysis report shows that for period of 39 years 95% of probability is the safe potential up to 142 m. This is because lakes are shallow and have 43% evaporation losses.

### **GROUND WATER**

In early water supply source to Chennai, people we depend on shallow wells situated in their own houses and some part if people mainly depend on public wells and tanks. At that time was no source water supply during the year 1914 protected after supply system using filtration and pumping was achieved

## **CHENNAI WATER CRISIS**

Chennai is the first city in India which is facing chronic shortage of drinking water privatization and transfer of water from surplus to scarcity is becoming popular. The supply of water in Chennai city is posing serious problems because of scarcity of water and inability of civic authorities to access new sources of potable water and that acute scarcity of water in summer months have become common.

## **WATER AVAILABILITY**

Climatic conditions are much varied in India the variation ranges from continental oceanic from extreme hot to severe cold from highly and to excessively humid and so on. The great variety of climatic and physiographic has given rise to a very complex weather pattern that influences overall precipitation, which is the main source of fresh water. The mean annual rainfall, taking the country as a whole, is 1,170mm. This gives an annual precipitation of about 4,000km<sup>3</sup> of which monsoon rainfall during June to September itself is around 3,000km<sup>3</sup>. A significant part of this precipitation evaporates away to atmosphere and seeps into the ground. The balance flows through streams and rivers and collects in water bodies adding to the surface flow. The monsoonic climate, besides the

topographical and geographical limitations, is the reason of this vast difference between the potential and the utilizable availability.

### **STATUS OF GROUND WATER IN CHENNAI BASIN**

The source of ground water are from the old well fields such as Poondi, flood plains and kannigaipair and new well fields like Panjetty, Tamaraipakkam and minjur. Ground water are getting polluted because of effluent and plastic trash were the intrusion of sea water that contain salty waste product spoils the groundwater where does not meet the permissible limit for drinking purpose.

### **STATUS OF GROUND WATER DEVELOPMENT GROUND**

Water development is related to the water supply position. The relation between water supply and ground water development makes it difficult to quantify or generalize the ground water extraction. The ground water is developed through dug wells in alluvial areas, tube wells and bore well in area characterized by sedimentary and crystalline rocks respectively. In general, the depths of dug wells varied from 10 to 15 m bgl while the tube well and bore wells are in the depth range of 60-100 m bgl. The tube wells / bore wells in general can sustain a pumping of 6 –10 hrs in a days while dug wells can sustain for 2-4 hrs a day

### **GROUNDWATER MANAGEMENT STRATEGY**

The dug wells, filter point wells, tube wells and bore wells are the most common abstraction structures in the district. The dug wells are constructed in the alluvium as well as in hard rock areas in the city. The depth of the wells generally ranges between 10 and 15 m bgl and as shallow as 4 m bgl in Marina beach and the masonry structures are common. Some of the wells in coastal tract are tapping beach sands and are brick lined with cement plastering on the top 6 m. The deepening of structures with small diameter ring well inside the open well is commonly practiced.

### **DETAILS OF RAINWATER HARVESTING CARRIED OUT IN CHENNAI CITY**

| <b>S. NO.</b> | <b>TOTAL NO. OF BUILDINGS</b> |        | <b>BUILDING COVERED WITH RAINWATER HARVESTING AS ON 26.06.03</b> | <b>% OF COVERAGE</b> |
|---------------|-------------------------------|--------|------------------------------------------------------------------|----------------------|
| 1             | Residential                   | 291464 | 276401                                                           | 94.83                |
| 2             | Commercial                    | 26064  | 21846                                                            | 83.83                |
| 3             | Institutional                 | 14542  | 1179                                                             | 81.08                |
| 4             | Government                    | 2999   | 2680                                                             | 89.36                |
|               | Total                         | 321978 | 300519                                                           | 93.34                |

Source: Chennai Metropolitan Water Supply and Sewerage Board

**TABLE NO 1**

**MANAGEMENT OF THE RESOURCE****WATER LEVEL AND QUALITY**

The water level varies between different regions of the city, such as sandy, clay, and rock areas. Sandy areas include New Washermenpet, George Town, Manali, Porur and Besant Nagar, where the water level stood between 5 m and 6 m in 2012. Clay areas include Kolathur, Pulianthope, Ambattur, Sholinganallur, K.K.Nagar and Virugambakkam, where the level was at 5.5 m to 6 m in 2012. Hard rock areas include Guindy, Perungudi, Taramani and Velachery, where the level stood at 6.5 metre in the same period. Unlike sandy area, recharge and dip in water level in hard rock areas is faster. The water quality too varies across the city. In 2012, the level of total dissolved solids ranged between 600 parts per million (ppm) and 1,500 ppm across the city against the permissible limit of 500 ppm

The water level and quality is monitored by the Metrowater from 145 observation wells spread across the expanded city. As of 2012, the average water level in the city ranges between 5 and 6 metre. The water level dips to its maximum during June when there is not much recharge. The level rises to a shallow depth of 1.5 m to 2m in January, immediately after the northeast monsoon.

Although Chennai scores high in the working ratio in water utility, a measure of their operational efficiency, financial health and stability, compared to most of the other Indian cities, it still shows a poor working ratio, according to a study by Ernst & Young. In 2012, the Chennai Corporation began work on construction of 5,000 rainwater harvesting structures in stormwater drains.

**WATER MANAGEMENT**

There are three sides to water management, water administration and utility management and supply and demand side management. Certain administrative programs for adaptation include upgrading customer advisories (for the user), improving utility measures, reducing water loss, surveying and provisioning effectual informatics, practical approach and goal setting for future management, enhancing education and creating awareness, improving local participation and managing grievances and feedback (GWP, 2011). Ground water extraction, pricing, fines within the regulatory system, staff regulations, and code of conduct for the public and administrative boards make up the major policies within the administrative system for utility management. The supply side policies, programs, and projects incorporate enhancement and renovation of supply infrastructures, maintenance of quality and amendment of policies to include strategies i.e., allocation, zoning, source maintenance, quality control etc. Major distribution related adaptation strategies are: inspect and renovate pipelines, maintain valves and sumps, improve service for setup of RWH and AR equipment, renovate supply infrastructures (including dams and canals), install and maintain transfer conduits and increase supply through desalination plants. While the demand side includes all the policies, programs, and projects to improve the demand related technologies and policies, i.e., conservation, pricing, pipelines and metering etc (SOPAC, 2013).

**IMPROVED WATER MANAGEMENT STRATEGIES FOR CHENNAI METROPOLITAN AREA**

**Radhakrishnan et.al**(2007) says that the purposes of the study is to examine the domestic water supply and demand scenario of Chennai Metropolitan Area from the year 1981 onwards to the present grade. For Chennai Metropolitan Area a better way of distribution of domestic water is suggested to reduce the gap between supply and demand for the future. For forecasting the population the geometric increase method is used for the study. The total water demand for the CMA is calculated as:

$$\text{Total Water Demand} = \text{Design Population} \times \text{Per Capita Demand}$$

Metropolitan Area is divided into 4 sectors as North sector, Central sector, South sector and West sector for the study purpose. Immediate steps to be taken for the drinking water requirement in challenge of meeting of such huge population

| YEAR | POPULATION (LAKHS) | DEMAND (MLD) |
|------|--------------------|--------------|
| 2001 | 17                 | 177          |
| 2005 | 19                 | 191          |
| 2010 | 20                 | 208          |
| 2015 | 23                 | 229          |
| 2025 | 28                 | 278          |

### 3. CONCLUSION

Water facilities can offer both health and socio- economic benefits, especially, for women as closer water supplies can reduce time, energy and physical strain, allowing them to redirect their labour to other important development tasks. Similarly, improvements in the health and wellbeing of children indicate progress. A vibrant water quality monitoring in India is needed desperately as contamination of ground water lakes is already devastating the ecosystems. Therefore, an integrated, interdisciplinary approach to water management is necessary.

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