

Demand, Resource Availability and Status of Water Supply to Mega City – Bangalore, Karnataka – **K.C. Subhash Chandra, Formerly of the Department of Mines and Geology (*Email: subcha@gmail.com*)**

The Bangalore city (BBMP) with its geographical extent of 800 sq km is located at an altitude of more than 920 m above the mean sea level. It covers the administrative limits of Bangalore Mahanagara Palike (BMP), 8 municipal units and 110 villages. Out of this 800 sq km area, nearly 560 sq km has now been a built up area forming a mosaic of concrete structures and asphalt roads. Rest of the 240 sq km extent is the open area that include new layouts which have come up or coming up in the peripheral parts of the city and areas like parks, gardens, race course, golf-club etc located within the city.

The normal annual rainfall of the Bangalore city being 830 mm, out of 66400 hectare metre (ham) of rain water received annually over an extent of 800 sq km, 17040 ham (25.66%) is accounted as surface run-off, 2125 ham (considering 6% over open area and 2% over the built up area) as recharge to groundwater body and the balance of 47,235 ham (71.13%) as evapo-transpirational losses. The population of BBMP which is now around 85 lakh is expected to cross 95 lakh by the year 2020. Considering BWSSB norm of designed supply of 140 litre of water per head per day (51 m³/year) for drinking and other domestic needs, the water requirement for the city population of 95 lakh shall be 133 ham/day or around 48,600 ham/year. As against this demand, out of the quantity of 37,375 ham/year tapped from distant river sources and allowing the conveyance and other losses of about 30%, the effective supply has remained at around 24,923 ham/year. In addition, there has been an estimated average withdrawal of 12450 ham/year of groundwater from the city aquifers to meet a part of the deficit in water supply. Thus,

there has been a shortage in supply of nearly 11,225 ham/ year which means nearly 22 lakh people of Bangalore face acute shortage in water supply. There is no realistic statistical data available even from the Government institutions or agencies about the number of bore wells under operation in the city and the quantity of groundwater being extracted from the city aquifer. However, enquiries made with the Bangalore Water Supply and Sewerage Board (BWSSB), BBMP, private drilling agencies etc. revealed the existence of nearly 3.12 lakh bore wells. This is apart from the day to day on going and unreported increase in bore-wells. Thus, based on the data so available, the groundwater draft is conservatively estimated at 12450 ham/year. While, the groundwater recharge from various sources is 3290 ham/year, the withdrawal of 12,450 ham/year amounts to 378% or nearly 4 times more than the annual groundwater recharge. The gneissic and granite formations of the Peninsular Gneissic complex that form the chief rock types of the area are in general devoid of potential joints/fractures at depths of more than 280 m. But, people have now resorted to indiscriminate drilling of bore-wells to depths beyond 250 m and up to around 300 m. Now, a stage of mining of groundwater resource has already crept in and in the event of the city aquifers going dry (which is opined to be a reality in years to come at the present rate of extraction if allowed to continue) nearly 24 lakh people who are thriving on groundwater resources face the dearth of water. Groundwater as on now has not been a sustainable resource. It need be considered only as a standby resource to be used during the period of scarcity or drought till such time the

groundwater table gets revived up to the unconfined aquifer horizon. Further, when once the groundwater table is revived, there need be an uncompromising measure by the authority concerned to restrict the exploitation of groundwater resource less than 60% of the corresponding annual groundwater recharge.

As a measure to counter the shortage in supply, the precious surface run-off of 17,040 ham/year which is wasted by getting it drained along with the sewage water load of the city, if adequately protected and conserved, can meet the water requirement of about 24 lakh people of the city i.e., nearly 25% of the city population. Further, if the total sewage load of 26316 ham/year being generated in the city is treated up to tertiary level and brought to the safe standard of domestic and drinking water usage and even 50% of such treated water if made available for use, it can serve the demand of the city population of another 26 lakh. Thus, the rainwater run-off and treated sewage water together can serve the water requirement of about 50 lakh persons i.e., 53% of the city population. Better management and judicious usage of the water resources available within the Bangalore city will negate such of the uneconomical and anti-environmental proposals that are on anvil like diversion of the water flow to the city from the west flowing rivers like the Nethravati in the Western Ghats terrain of the State and tapping water from any other distant river systems.

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