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# THE STUDY OF SPATIAL PATTERN OF SOURCES OF WATER SUPPLY IN MYSURU CITY

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***Abstract:*** *The five essential requirements for human existence are air, water, food, heat and light. Contamination of these elements may cause serious health hazards not only to man but also to animal and plant life. The use of water by man, plants and animals is universal. Without it, there can be no life. Every living thing requires water. The study was designed to understand the different sources of water to mysuru city, Present study focus on the different sources of water and its location, process of purification and supplying of water to consumption areas. The finding shows that the required water of the city is collected from surface water mainly the Cauvery river and Kabini river. The raw water is purified through well scientific methods and water is supplied to consumers through well planned distribution system.*

***Index Terms*** - Contamination, Hazards, Raw water, Purification, Consumption

## I. INTRODUCTION

The primary source of water for planet earth is precipitation. The principal forms of precipitation are rain, drizzle, snow, sleet and hail. Out of these various forms of precipitation, a major part of precipitation occurs in the form of rainfall and a minor in the form of snow. The contribution of the other forms of precipitation is very little and hence it is generally ignored. Rainwater, surface water, ground water and water obtained from reclamation are common sources of water supply to any urban and rural areas.

The history of water supply to Mysuru dates back to the time of Diwan Poornaiah (early 19$^{th}$ century the princely state of Mysore). He had planned for a contour canal from Krishnarajasagar to Mysuru through gravity to convey the Kaveri water to fulfill the water supply to Mysuru. But, the scheme had partially achieved the objective as the people during that period were depended on tanks and wells. Later during 1864, an arrangement was made to supply water from Karanji lake and Kukkarahalli lake. Now due to pollution water of the Karanji and Kukkaralli lake, water not fit for drinking and domestic use. The city got its first planned piped water supply in 1896 when the Belagola project was commissioned.

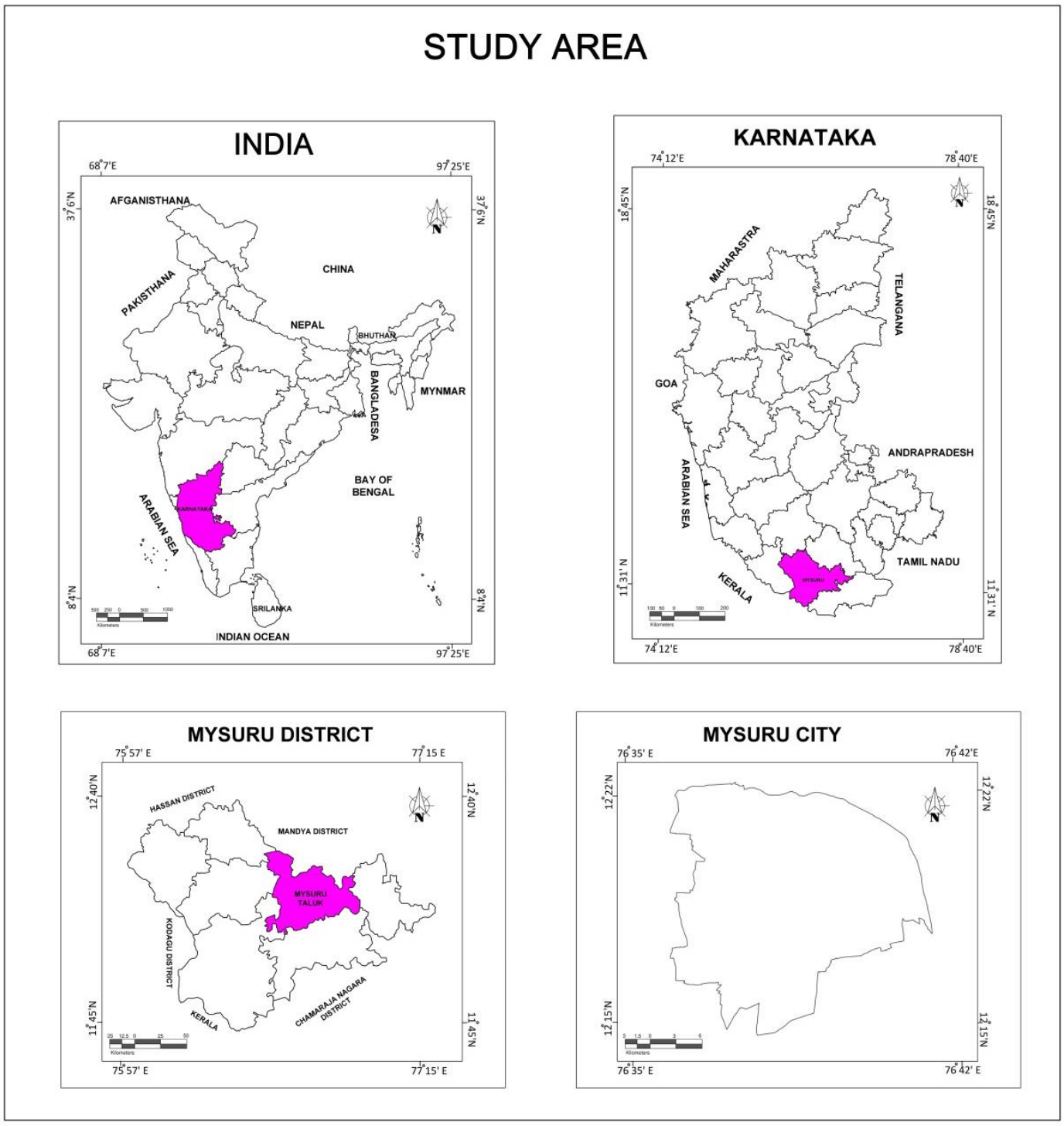
## II. STUDY AREA

Mysuru is the one of the largest city in the state of Karnataka, India, which served as the capital city of Mysore Princely Kingdom (Kingdom of Mysore) for nearly six centuries, from 1399 until 1947. Now Mysuru is considered as the cultural capital of Karnataka state. Located at the base of the Chamundi hills about 146 km southwest of the state capital Bengaluru. It is spread across an area of 128.42 km$^2$. Mysuru city corporation is responsible for the civic administration of the city, Mysuru city is also the headquarters of the Mysuru district.

Mysuru city lies northwest of Chamundi hill and midway between the Cauvery and Kabini rivers on the undulating Deccan plateau at an elevation of 2,525 feet (770 meters). The land surrounding the city is characterized by rain filled shallow depressions. It is located at $12^0\,18^{'}$ N to $12^0\,22^{'}$ N latitude and $76^0\,35^{'}$ E to $76^0\,42^{'}$ E longitude. One third of the city on the northern side is drained by the river Cauvery and the southern two thirds of the city are drained by the river Kabini. Mysuru lies on a spur, an extension of which the coorg

highlands in the west. The city acts as a water divide for many small rivulets with elevated ridges on the east and west.

According to the results of the 2011 census of India, Mysuru had a population of 914919. The total population of urban agglomeration is 983893 and the population density is 6,910.5 per square kilometer. As of 2011 census, the literacy rate of the city is 86.84 per cent, which is higher than the states average.75.6 per cent.




Map:1

## III. OBJECTIVES

1. To study the spatial pattern of sources of water supply in Mysuru city.
2. To analyse the transmission and storage process of water.

## IV. RESEARCH METHODOLOGY

Present research is based on both primary and secondary data. Primary data is collected by field visit and the required secondary data is collected pertaining to sources of water, water purification process and water storage, has been collected from Mysuru city corporation and Vanivilas water works. Location of water sources and its transmission network and storage of water in water the reservoirs shown in Mysuru city map using Auto CAD mapping software. Data preparation, tabulation and analysis are done by using Microsoft excel.

## V. RESULTS AND DISCUSSION

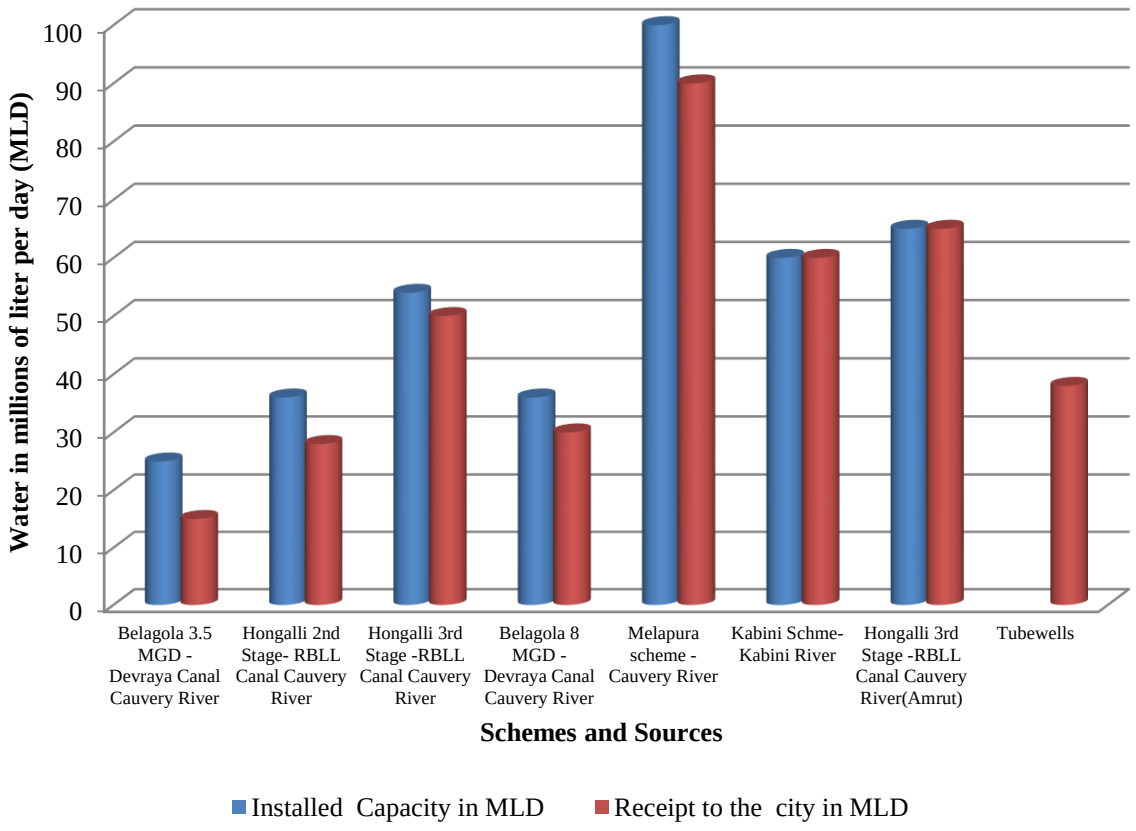
The sources of water for Mysuru city supplied from the river Cauvery and Kabini and from tube wells. Raw water drawn from the rivers from different location, located at downstream of Krishnarajasagara reservoir and Kabini river. Cauvery river sources head works are located at the downstream of Krishnarajasagara reservoir near Belagola, Hongalli and Melapura villages and Kabini river water source head works is located at Bidaragudu village. Location of sources its transmission to storage reservoir shown in map no: 2. Water supplied to Mysuru city from these rivers through various schemes as follows.

**Table 1: Schemes and sources of water supply**

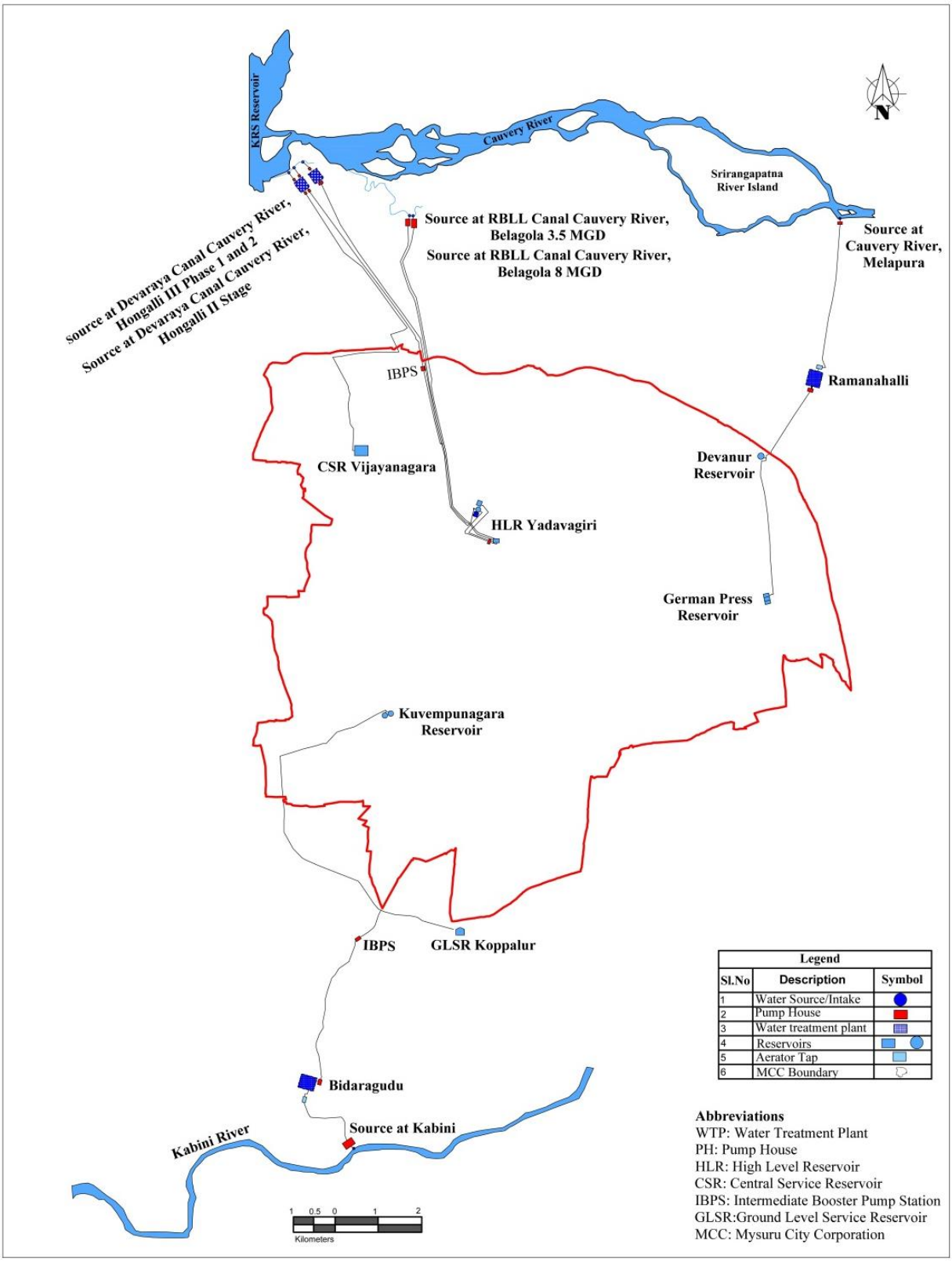
| Sl. No | Schemes | Location of Source | Year of installation | Installed Capacity (in MLD) | Receipt to the city (in MLD) |
|---|---|---|---|---|---|
| 1. | Belagola 3.5 MGD | Devraya Canal Cauvery River | 1896 | 25 | 15 |
| 2. | Hongalli 2nd Stage | RBLL Canal Cauvery River | 1968 | 36 | 28 (Standby) |
| 3. | Hongalli 3rd Stage | RBLL Canal Cauvery River | 1979 | 54 | 50 |
| 4. | Belagola 8 MGD | Devaraya Canal Cauvery River | 1998 | 36 | 30 |
| 5. | Melapura scheme | Cauvery River | 2002 and 2007 | 100 | 90 |
| 6. | Kabini Scheme | Kabini River | 2012 | 60 | 60 |
| 7 | Hongalli 3rd Stage (Amrut) | RBLL Canal Cauvery River | 2021 | 65 | 65 |
| 8. | Tube wells | - | - | - | 38 |
| **Total Quantity** | | | | **376 MLD** | **348 MLD** |

Source: Vanivilas water works, Mysuru city corporation

**Figure:1 Schemes and sources of water supply**



# Spatial Pattern of Sources of Water Supply




Map: 2

**1. Belagola 3.5 Million gallons per day - Devaraya Canal, Cauvery River**

Devaraya canal near Belagola village was the first water supply scheme of Mysuru city. This scheme was implemented in 1896. Water source of this scheme is the Devraya canal of river Cauvery near Belagola village. Raw water is directly pumped to Vanivilas water treatment plant with the help of three 400 hp pumping machines through vertical turbine pumps. The diameter of the pipeline from source to the water treatment plant is 350/400/600 millimeter and covers the distance of 8.8 km. Daily 15 millions of liter per day

(MLD) of water supplied from this scheme and after treatment water is distributed to city through service reservoirs.

**2. Hongalli 2nd Stage- Right bank low level canal, Cauvery River**

Hongalli 2nd Stage scheme was implemented in 1968. The water sources of this scheme located in the right bank low level canal of river Cauvery near Hongally village. Raw water is pumped to 31.74 millions of liter per day capacity water treatment plant, located near the water source with the help of 1000 hp two pumping machines. Treated water supplied through vertical turbine pumps to 22.70 millions of liter per day capacity of Yadavagiri high level service reservoir. The diameter of the pipeline from source to the water treatment plant is 600 millimeter and covers the distance of about 12 km. Daily 28 millions of liter per day (MLD) of water supplied from this scheme and this scheme is used as standby or alternative source by the city corporation.

**3. Hongalli 3rd Stage - Right bank low level canal, Cauvery River**

Hongalli 3nd stage scheme was implemented in 1979. The water sources of this scheme located in right bank low level canal of river Cauvery near Hongally village. Raw water is pumped to water treatment plant located near the water source with the help of 1100 hp two pumping machines. Treated water pumped through vertical turbine pumps to intermediate booster pumps station near JK tyre factory, Metagalli with the diameter of 750 millimeter pipeline. Then the water pumped to 54.50 millions of liter per day capacity central water reservoir of Vijayanagara. The distance between source to reservoir is about 12 km and Daily supply of water from this scheme is 60 millions of liter per day (MLD).

**4. Belagola 8 Million gallons per day - Devaraya Canal, Cauvery River**

Water source of Belagola Million gallons per day scheme is located at Devaraya canal of river Cauvery near Belagola village. Raw water is directly pumped to Vanivilas water treatment plant with the help of two 820 hp pumping machines through vertical turbine pumps. The diameter of the pipeline from source to the water treatment plant is 750 millimeter and it covers the distance of 8.8 km, Daily 28 millions of liter per day (MLD) of water supplied from this scheme and after treatment water is distributed to city through service reservoirs.

**5. Melapura scheme, Cauvery River**

The water source of the Melapura scheme river Cauvery near Melapura village. Raw water is directly pumped to existing water treatment plants located at Ramanahalli village through vertical turbine pumps with the help of two 1000 hp and one 1555 hp pumping machines. Treated water is pumped to 11.50 millions of liter per day capacity Devanur water reservoirs and 17 millions of liter per day capacity German press water reservoirs. With the help of the 604 hp three pumping machines. The diameter of the pipeline from head works to reservoir is 1100 millimeter and covers a distance of about 12 km. Daily 90 millions of liter per day (MLD) of water is supplied from this scheme.

**5. River Kabini**

Kabini scheme was implemented in 2012 under Jawaharlal Nehru National Urban Renewal Mission project (JNNURM). The water sources of this scheme located in Jackwell point of Kabini River, near Bidaragudu village. Raw water is pumped to water treatment plant located at Bidaragudu village with the help of four 450 hp pumping machines. Treated water pumped to intermediate booster pumps station at Pinjarapol with the help of three 600 hp pumping machines then the water is pumped to Kuvempunagara water reservoir and Koppaluru master balance reservoir with help of 500 horsepower pumping machines. The diameter of the pipeline from source to the reservoirs is 1100 millimeter and covers the distance of 24 km, Daily supply of water is 60 millions of liter per day (MLD).

**6. Hongalli 3rd Stage - Right bank low level canal, Cauvery River (Amrut)**

Hongalli 3rd Stage scheme was implemented in 2021. The water sources of this scheme located in the right bank low level canal of river Cauvery near Hongally village. Raw water is pumped to water treatment plant located near the water source with the help of two 1500 hp pumping machines. Treated water pumped through vertical turbine pumps to intermediate booster pumps station near JK tyre factory Mettagalli with the diameter of 1200 millimeter pipeline. Then the water pumped to Yadavagiri high level service reservoir. The distance between source to reservoir is about 12 km and daily 65 millions of liter per day (MLD) of water supplied from this scheme.

**7. Tube wells**

Presently Mysuru city has 1025 hand and electrical pumps located in various part of the city, 38 millions of liter per day (MLD) water being supplied from these tube wells.

The total available water from bulk sources and tube wells is 348 millions of liter per day. Out of which 15 % of water that is around 47 millions of liter per day (MLD) water is lost in leakage during transmission process. Remaining 295.8 million of liter per day of water is available for public use. As per guidelines of Central Public Health and Environmental Engineering Organisation and Urban and Regional Development Plans Formulation and Implementation, Government of India, minimum standard of water supply is 135 liters per capita per day (MLD) for domestic use and 270 liters for per day (MLD) for per capita use. But in Mysuru city actual supply is 194 liters per capita per day this indicates more water supply available than the normal standards for domestic use and less water supply for per capita use according to normal standards.

## VI. CONCLUSION

Collecting of water for any urban or rural settlements from water sources determined by various factors such as location of water, quality of water, availability of water during different seasons, topography of the intervening area, elevation of the source of supply etc. Keeping all these aspects in mind, good water sources have been devised for Mysuru city. City gets sufficient water for domestic use throughout the year. But facing water shortage for per capita use. Mysuru city gets more water supply from recently implemented schemes such as Melapura, Kabini and Hongally 3$^{rd}$ stage compare to old schemes such as Belagola and Hongally 2$^{nd}$ stage because installed capacity of the scheme is less and operation technology of water collection and conveying also not advanced compare to recently implemented schemes.

Demand of water for domestic use and per capita use in the city is increased due to various factors such as increasing of population, increasing of inflow of people from surrounding areas for commercial, education and health purpose, increase of tourist and increase of industrial water demand due establishment of new industries and companies. Therefore full filling of these water demands Kabini and Hongally 3$^{rd}$ stage water supply schemes was established. In the future more water schemes and sources are required for city. Thus local governing body needs take action for implementing new schemes.

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