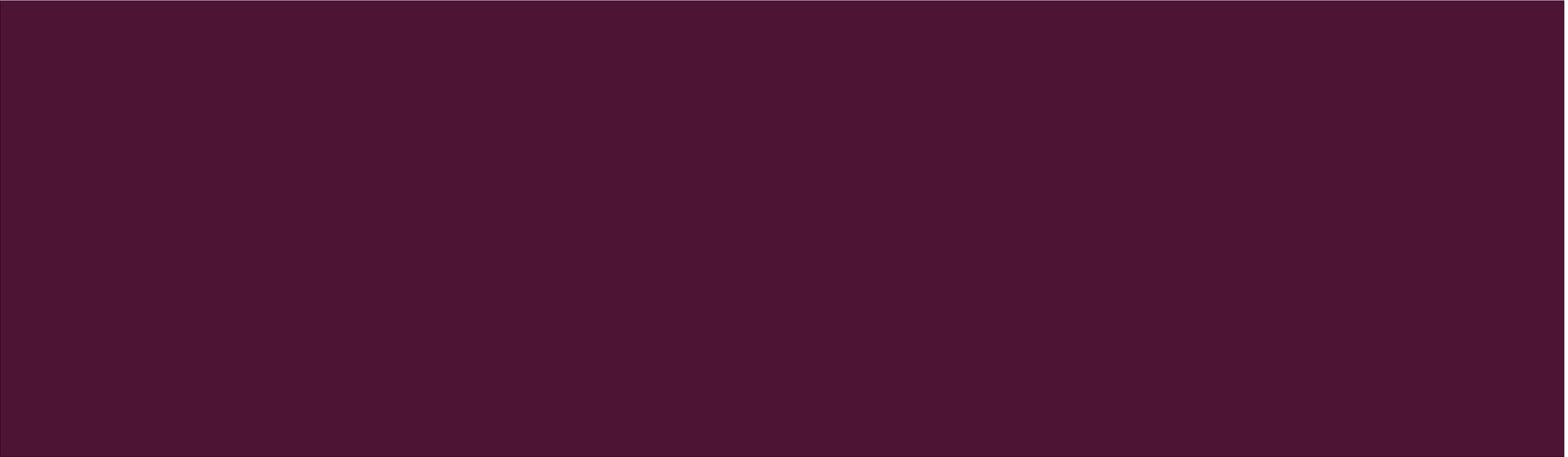


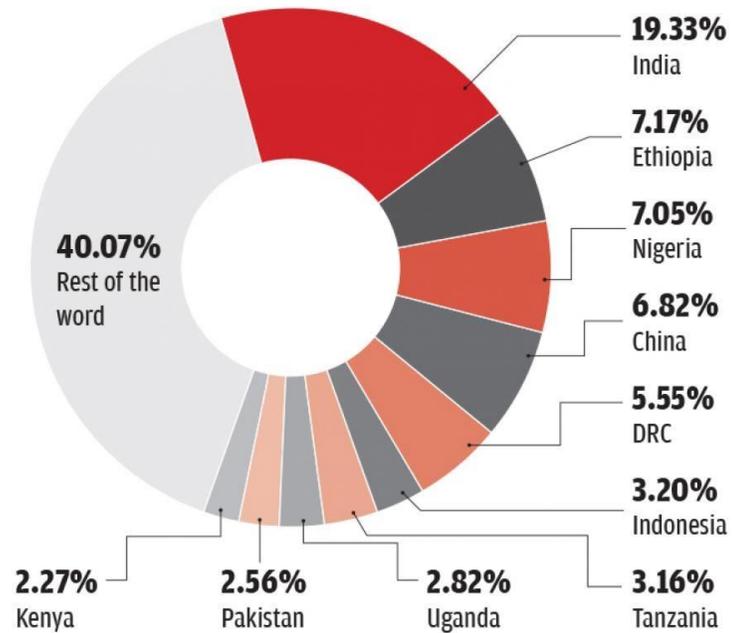


CLEAN WATER AND SANITATION



Waterless countries

Just 10 countries account for 60% of the world population without access to clean water



Source: The water gap—The State of the World's Water 2018 report by WaterAid

99 M

99 million people lack access to safe water

541 M

541 million people lack access to improved sanitation

EXISTING SITUATION IN INDIA:

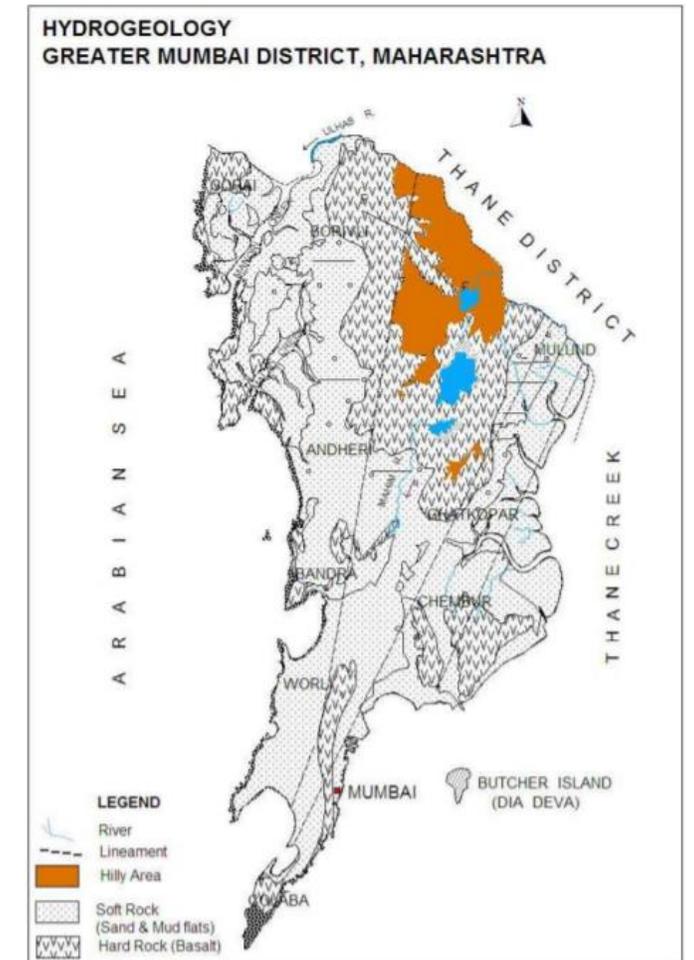
Equal access to essential health, clean water and sanitation services continue to be a priority for India, which houses one-sixth of the world's population.

Yearly :

- **37.7 million Indians** are affected by water borne diseases.
- **1.5 million** children die because of diarrhea
- **73 million working days** are lost leading to an economic burden of \$600million/yr
- Uttar Pradesh has recorded the highest deaths due to diarrhea followed by West Bengal, Assam, Odisha and **Madhya Pradesh.**

AREA OF FOCUS AND IDENTIFICATION OF THE EXISTING SITUATION:

- Area : Parel, Mumbai
- Situation :
 - 1) Complete access to clean water in Industrial/Commercial areas.
 - 2) Water supplied by the BMC to majority of residential and commercial areas (surface water).
 - 3) Ground water being the main source of water for the people living in some slum areas.



DOMESTIC WATER CONSUMPTION:

Purpose	Maximum	Average	Minimum
Drinking, Cooking & Dishwashing	50	40	30
Bathing	50	25	15
Toilet Flushing	50	40	30
Washing Clothes	50	20	15
Cleaning & Gardening	25	10	-
Car Washing	5	-	-
TOTAL	230	135	90

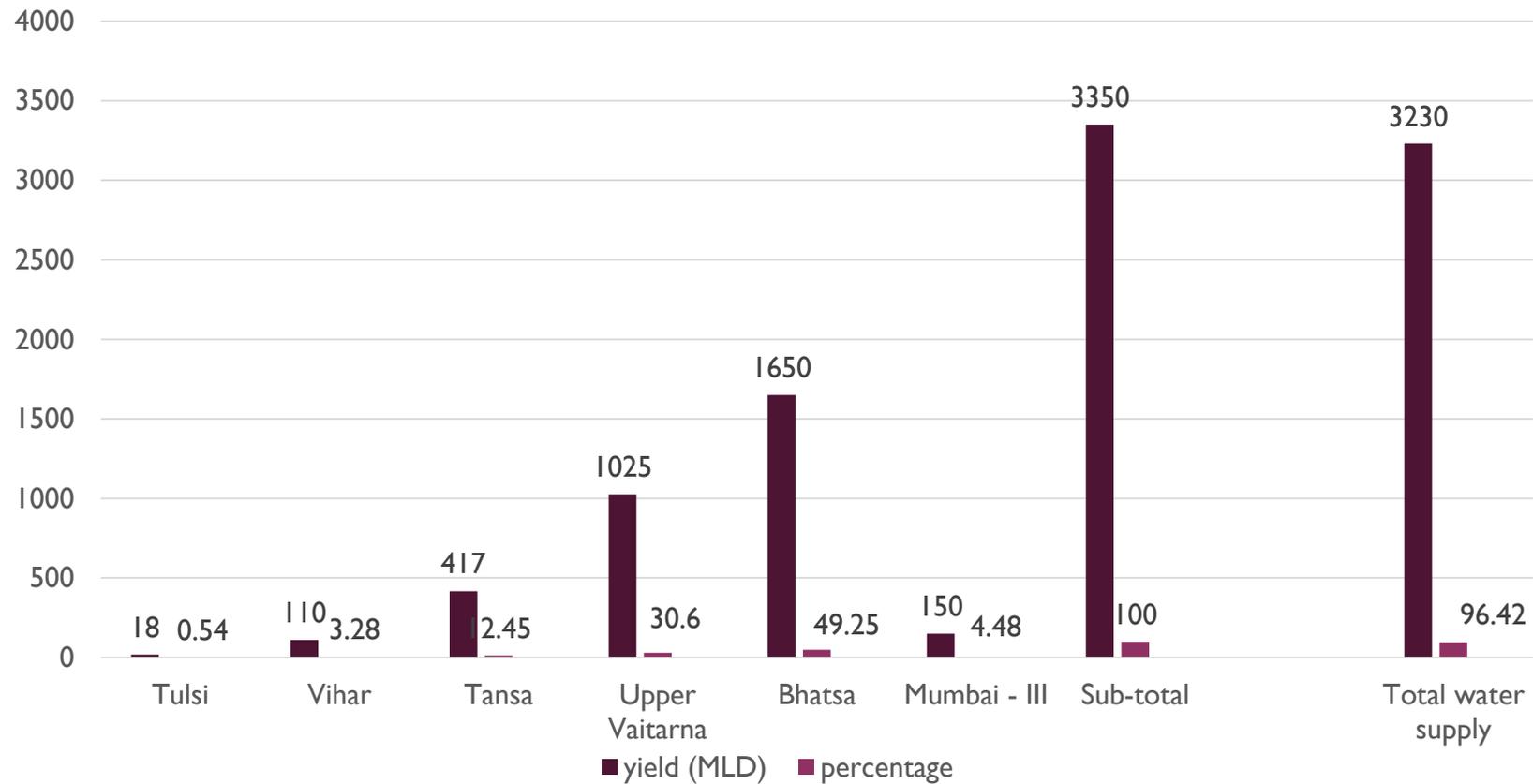
DISTRIBUTION OF WATER BY THE BMC:

- The water distribution system in Bombay is about 100 years old. Water is brought into the city from the lakes after treatment, and stored in 23 service reservoirs.
- Since two of the major sources, Tansa and Lower Vaitarna, are at a higher level than the city, not much power is required to pump the water.
- The service reservoirs are mainly situated on hills. Some of them are located at Malabar Hill, Worli Hill, Raoli, Pali Hill, Malad, Powai and Bhandup. Timings of water supply to different parts of the city vary between 2 and 5 hours.

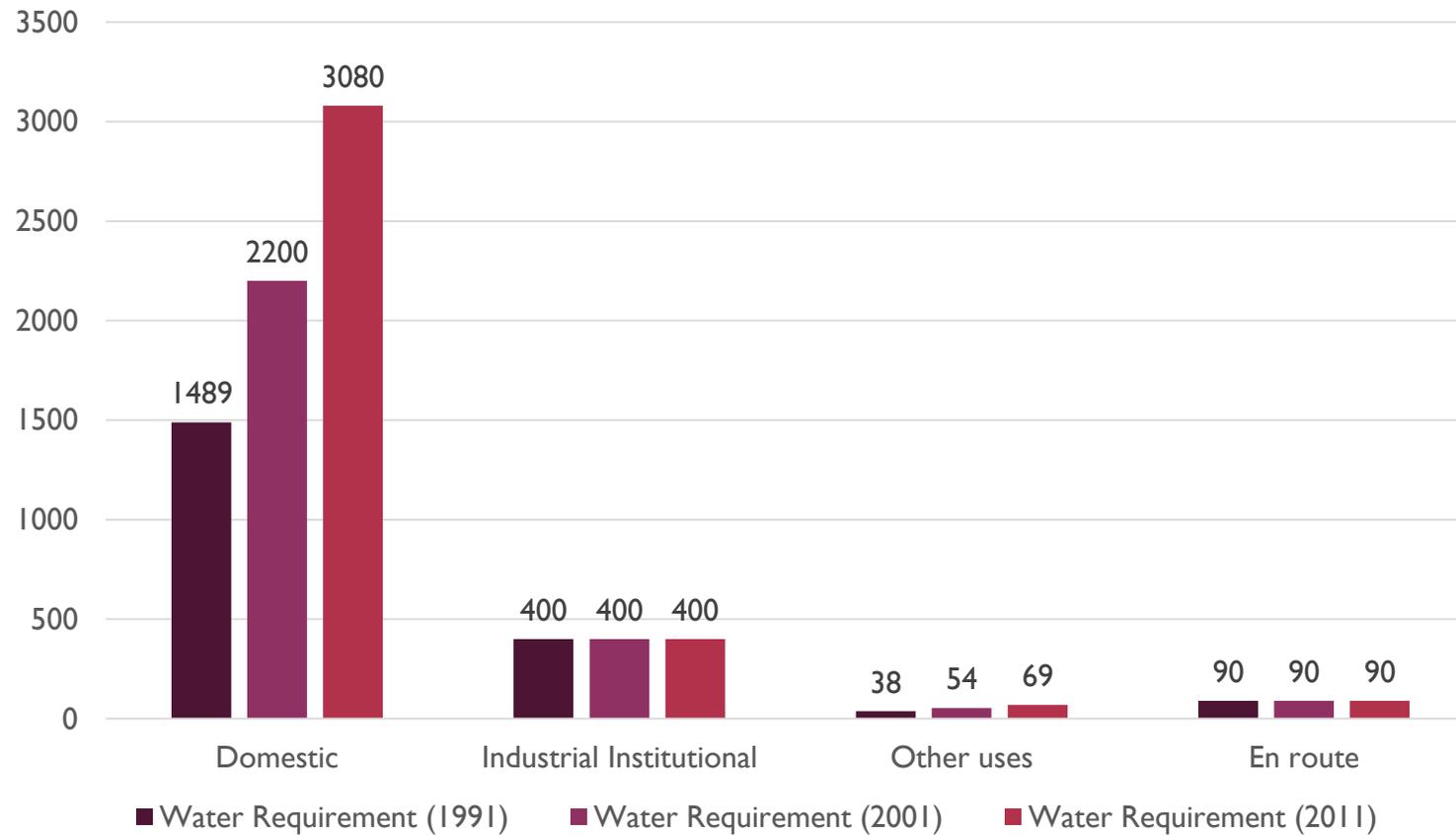
BASIN WISE WATER AVAILABILITY TO GREATER MUMBAI :

Sl. No.	Basin	Catchment (Sq. Km)	Water availability At 75% dep. (MCM)	Water Availability at 90% dep. (MCM)	Irrigation requirement as planned (MCM)	Water Available for Domestic & Industrial Supply (MCM)
1.	Vaitarna	1858	3130	2416	651	2416
2.	Ulhas	3205	6194	4881	1241	4881
3.	Patalganga	338	712	489	147	489
4.	Amba	365	403	283	146	257
	Total	5756	10439	7869	2157	7843

WATER SUPPLY SOURCES OF GREATER MUMBAI CITY :



GROSS WATER REQUIREMENT FOR GREATER MUMBAI:



DEMAND OF WATER:

- As per norms of Central Public Health and Environmental Engineering, Ministry of Urban Development, the water supply for cities with population above one lakh is 150-200 litres per capita per day (lpcd). For Greater Mumbai, the water is being supplied @ 150 lpcd at present which may rise to 200 lpcd by 2011 and 225 lpcd by 2021.

CHARGES:

- Currently the BMC earns about Rs. 4.5 billion (450 crores) a year through water charges and levies. Water production costs Rs. 24 per 10,000 litres. The BMC charges Rs. 6 for 10,000 litres for domestic consumption, and has a system of cross-subsidy by charging Rs. 150 for 10,000 litres for industrial and commercial users.
- Water Tariff Structure:

Category	Water Charges (Rs/1,000 litres)
Domestic - Stand Post	2.25
- Buildings & Chawls	3.50
Halls, Hospitals, Playgrounds, Swimming Pools etc	10.50
Industries, Dhobi Ghats, Government Premises, etc.	18.00
Refineries, Airports, Public Sector Undertakings, etc.	25.00
Race Courses & Star Hotels	38.00
<i>Sewerage charges are at 60% of water charges</i>	

PROBLEMS AND ISSUES:

- **Poor water quality** problem has also been observed in more number of habitations.
- **Inadequate resource management and institutional system** seems to be the major causes for the present problems.
- Major environmental factors causing inadequate drinking water supply **include unavailability of perennial water sources and high dependency on groundwater.**
- Another related cause for inadequate drinking water supply is **reduction in availability of surface water, particularly during the summer season.**
- **Supply capacity of surface sources like rivers, lakes, reservoirs and tanks decrease** owing to forest degradation, siltation, uncertainty and fluctuations in rainfall, etc.
- **Water borne diseases** due to the poor quality of water.

RECOMMENDATIONS:

- Water Quality Monitoring.
- Operation and Maintenance.
- The Bangalore Water Supply and Sewerage Board is responsible for providing water supply, sewerage system and sewage disposal services to the Bangalore Metropolitan area. Such initiatives should be taken by our district government as well.
- Rain Water Harvesting & Ground Water Use.
- Water Recycling and Water Conservation.

FUTURE WATER SUPPLY:

- The projected demand of water for Greater Mumbai for the year 2021 is estimated to be 5355 Million Litre Per Day (MLD). To meet this additional requirement of water, four water supply projects are under construction and by the completion of these projects the total supply will rise to 5479 MLD.

THE SOURCES IDENTIFIED FOR AUGMENTATION OF WATER SUPPLY ARE AS BELOW:

Source of Sater (Future Projects)	River	Water Supply Capacity (MLD)
Middle Vaitarna	Vaitarna	455
Gargai	Vaitarna	455
Pinjal	Vaitarna	865
Kalu	Ulhas	590
Shai	Ulhas	1067

WATER SUPPLY IN SLUM AREAS:

- The main source of water for the slum areas is the **ground water** (borewells, dug wells, etc.).
- Some areas do **have pipelines** provided to them for political reasons, while some have **no source** and hence have to **steal water** from the pipelines providing water to the industrial areas.

GROUND WATER SUPPLY:

- Ground water is **not suitable for drinking purposes**. In order to mitigate the risk of epidemic, Brihanmumbai Municipal Corporation (BMC) and Government of Maharashtra (GoM) have banned the use of water from wells and ponds for domestic use.
- However, the population growth in the city is very high as compared to other parts of the country and to meet the shortfall in water supply, ground water supply as a supplementary source has been used for all purposes than domestic.
- Total **3950 dug wells and 2514 bore wells** (BMC records) are under operation for water supply purpose in the city.
- The aquifers in the district are of limited areal extent and of limited thickness.

STATUS OF GROUND WATER DEVELOPMENT:

- Ground water development depends on many factors viz., availability, crop water requirement, socio-economic fabric and on the yield of the aquifers existing in that area.
- The ground water development in the district is mostly through dugwells and borewells. In addition to this, new borewells are being drilled in every upcoming society/colony to partially cater to the domestic requirements. Similarly new borewells are taken up in the industrial areas to cater to their partial needs.

GROUND WATER MANAGEMENT AND DEVELOPMENT:

- At present there is less significance of ground water development in the district owing to the limited availability as compared to huge demands of large population. The ground water development is quite low due to quality issues and low yielding nature of aquifers etc.
- Even though ground water is available in the area, more emphasis is given on creating surface water reservoirs, rather than developing ground water in a planned way.

PROBLEMS AND ISSUES:

- The **pollution of ground water** as well as surface water is the major problem in the district. The creeks in the region have become the dumping ground of sewage and industrial effluents. In addition to this, various industrial effluents from oil refineries, reactors, fertilizers plants at Chembur have polluted the sea water in eastern part and are hazardous to marine life.
- Ground water **exploitation for commercial purpose** is carried out in entire district and the water is extracted from existing dugwells and borewells, even new borewells are also being drilled for this purpose. The ground water is used for construction purposes, hotel industry and for domestic purpose of the housing societies.
- Ground water is quite vulnerable to **contamination from sewage disposal** and other human activities. The **over pumping** may also lead to sea water ingress.

RECOMMENDATIONS:

- The availability of ground water resources is limited to ground water worthy areas mostly located in Salsette island and limited areas of Bombay and Trombay islands. About 500 to 800 wells can be constructed if the yield of wells is considered to be 30 to 50 m³/day.
- In these areas the ground water can be developed through dugwells and borewells/tubewells.
- The conjunctive use of available surface and ground water in systematic and planned way will be the best solution for meeting present and future demands of water.
- Ground water exploitation for commercial purpose needs to be regulated as the ground water is extracted from existing dugwells and borewells, even new borewells are also being drilled for this purpose leading to saline water intrusion in beach and coastal areas.
- Roof top rain water harvesting is also feasible by storing rainwater in storage tanks in areas with shallow water levels, thereby supplementing the main source of water.

CITATION:

- <http://www.isec.ac.in/Drinking%20Water%20Supply.PDF>
- <http://www.bcpt.org.in/articles/watersupply.pdf>
- http://cgwb.gov.in/District_Profile/Maharashtra/Greater%20Mumbai.pdf
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- https://en.wikipedia.org/wiki/Water_supply_and_sanitation_in_India
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