

Current and future water supply for Makassar



Water security in Makassar City is affected by population, infrastructure, climate, economic development and natural environment in the greater MAMMINASATA area. Understanding how these factors can change water supply and demand is important to ensure that the government and people can develop strategies to secure enough water for daily living and economic development for future generations.

Current water supply

About 72 percent of Makassar has access to water from the regional water utility (PDAM), but most residents, industry and commerce also use groundwater as a supplementary water source. The residential sector is the major user of 81 percent of total PDAM supply.

PDAM Water is sourced from the Lekopancing canal (Maros river) and the Jeneberang river. Supply in the Lekopancing canal is limited in the dry season due to reduced seasonal flow and so requires transfer of water from the Jeneberang to Pannaikang water treatment plant.

The Jeneberang river provides a reliable supply via Bili-Bili dam but, since the collapse of the Mt.Bawakaerang, experiences high turbidity which increases the cost of treatment.

The lack of distribution infrastructure, and 30 percent leakage in existing distribution, restricts the availability and quality of water reaching customers. As a result ground water is widely used but very little is known about current reserves and how long it will last. There have also been reports of salinization of groundwater in coastal areas which may indicate potential over-extraction.

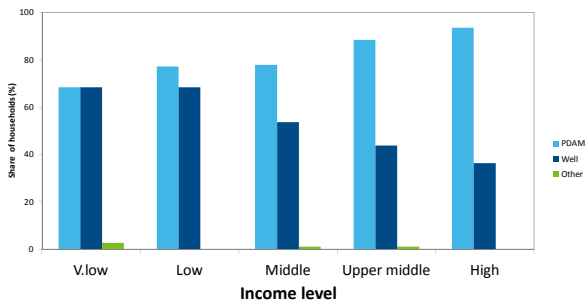


Figure 1: Water supply for households in Mamajang, Tallo, Ujung Tanah and Makassar (Source Selintung et al. 3)

Future climate impact

Climate change projections indicate potential for stronger seasonal effects on water supply-demand, with draw-off of water reserves during the dry season when considering urban demand alone. If other sectoral water demands are added there will be further draw-off of storage.

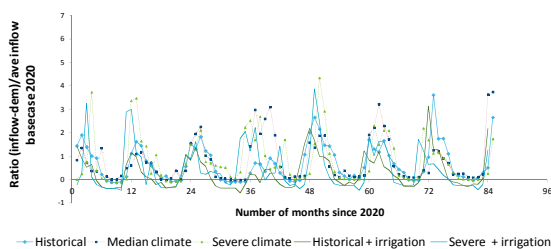


Figure 2: Ratio of difference between inflows into reservoir and outflows to supply urban demand compared to historical trends. Dashed lines show urban demand only. Full lines show urban demand plus the historical agricultural demand from 2010.

Future water supply

Projected supply-demand of Makassar

Impact of population on demand

Population is expected to grow from 1.3 million to 1.8 million by 2035 and water demand from 117 to 190 liters per person per day. The majority of the growth is expected to occur to the north of the city.

Masterplan

PDAM plans to expand water supply coverage to 85 percent, reduce distribution leakage to 15 percent and upgrade its treatment plant capacity from 2375L/s to 4575L/s by 2022.

Construction of Bonto Sunggu dam has not been modelled.

In the future population and infrastructure will be the two main factors impacting water security.

If individual water consumption could be maintained at 160 liters per person per day this can delay the need for infrastructure by about 10 years, if other factors are not considered

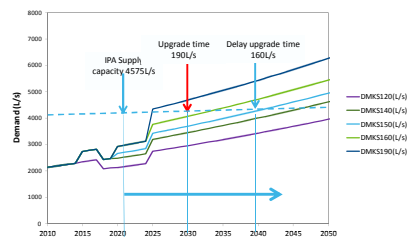


Figure 2: Impact of individual water consumption on total water demand

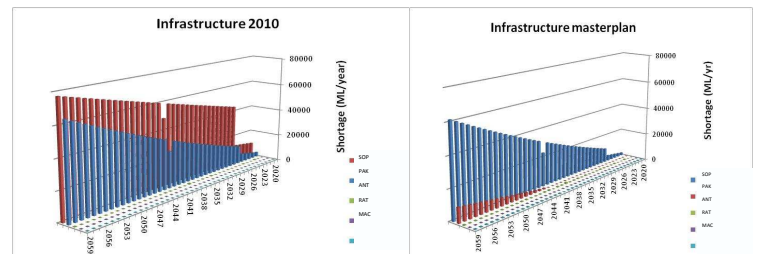


Figure 3: Water shortages per water treatment plant distribution area with and without Masterplan upgrade from 2020

Upgrade of infrastructure according to the Masterplan will allow security of supply for most of Makassar plants of over 90 percent up to 2039. Water shortages from Somba Opu (SOP) would occur only after 2040. However, Pannaikang would still experience some shortages on a seasonal basis mostly after 2026.

How do we investigate?

Water supply and demand depend on many factors: the amount of water in rivers and ponds, climate, infrastructure for water supply and distribution, water needs for different sectors (agricultural, industrial, environmental and residential) which depends on population size and water use patterns.

To examine future supply and demand for Makassar we used the REsource Allocation Model (REALM) to combine projections for climate¹, streamflow², population increase and infrastructure plans³, to create future scenarios of water supply and demand from 2020 to 2039.

The scenarios examined how water supply and demand change in monthly and yearly steps with and without the Masterplan infrastructure (leakage reduction, capacity upgrade) and water use patterns under different climate scenarios.