

Figure 13 Comparative analysis of water supply and demand in the Middle Nzoia Catchment (2022-2052) (Source: Researcher (2025))

For instance, by the year 2052, the supply requirement was projected to reach approximately $250 \times 10^6 \text{ m}^3$, whereas the actual delivered supply lags behind at around $240 \times 10^6 \text{ m}^3$. This persistent supply deficit, averaging 4%, indicates chronic inefficiencies in distribution networks, water treatment capacities, and infrastructure operation.

This observation aligns with findings by Odwori (2021), who identified similar shortfalls in regional water utilities due to aging infrastructure and limited operational capacity.

4.3.6.2 Water demand vs. unmet demand

This comparison addresses two key metrics: water demand, and unmet demand, while reflecting the influence of various scenarios such as high population growth, extended dry period, extended wet season, and increased agricultural coverage (Figure 14).

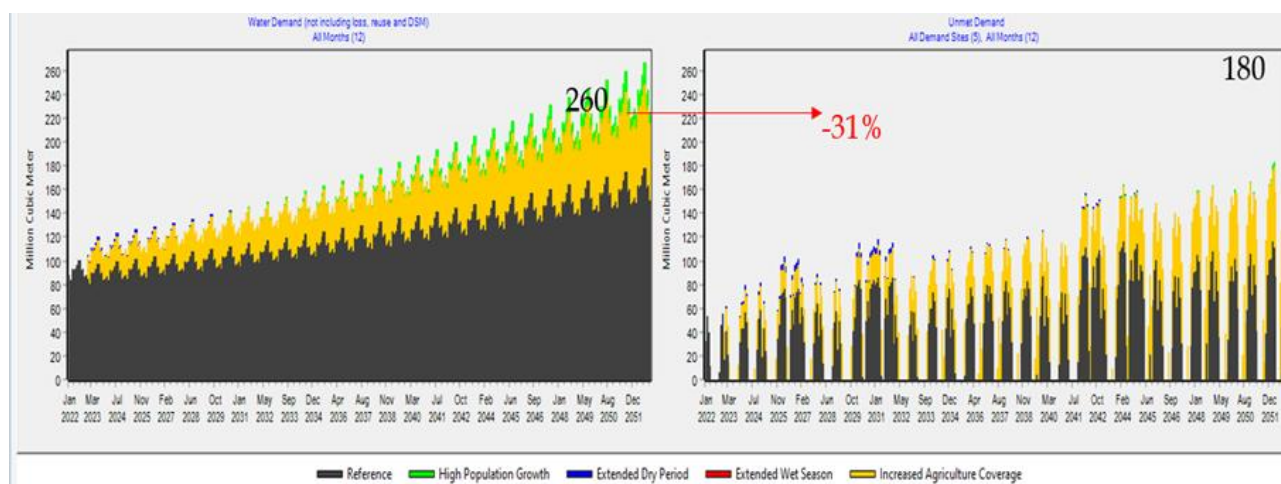


Figure 14 Comparative analysis of water supply and demand in the Middle Nzoia Catchment (2022-2052) (Researcher (2025))

The left panel of Figure 14 captures total water demand, which was projected to rise steadily from about $52 \times 10^6 \text{ m}^3$ in 2022 to nearly $260 \times 10^6 \text{ m}^3$ by the year 2052. This increase reflects growing population pressure, industrial expansion, and agricultural intensification.

In contrast, the unmet demand—shown in the lower right panel represents the volume of water required but not supplied. It starts at approximately $20 \times 10^6 \text{ m}^3$ in 2022 and was projected to climb to about $180 \times 10^6 \text{ m}^3$ by the year 2052, marking a 28% increase over the study period.