

During extreme dry seasons and high-growth scenarios, unmet demand reaches to 31% of total demand on monthly average. These projections are consistent with studies by Odwori (2022) and Odaro, Obiri, and Masika (2025), which attribute rising deficits to climate variability, land use change, and inadequate water infrastructure.

#### 4.3.6.3 Monthly average supply vs. unmet demand (2023-2052)

The monthly average supply delivered for all the demand sites from the year 2023 to the year 2052 reviewed that extended dry period, extended wet period, high population growth, increased agriculture coverage and reference scenario.

#### 4.3.6.4 Supply delivered in all demand sites

The figure below shows the supply delivered in all demand sites, which include industrial demand, domestic demand, agricultural demand, commercial demand and institution demand. Subjected to; Extended dry period scenario, extended wet season scenario, high population growth scenario, increased agriculture coverage and the reference scenario (2023-2052).



Figure 15 Supply delivered in all demand sites (Source: Researcher (2025))

January and February: Highest supply across all scenarios, particularly under the extended dry period and high population growth scenarios ( $160 \times 10^6 \text{ m}^3$ ), March to May: Significant decline in supply across all scenarios, with May having the lowest supply ( $20 \times 10^6 \text{ m}^3$  to  $30 \times 10^6 \text{ m}^3$ ). June and July: Gradual recovery begins; July sees a major rise again, especially under the extended dry period and high population growth. August and September: Supply remains relatively high but slightly lower than the January-February peak. October to December: Declining trend again, reaching minimal levels by November and December ( $20 \times 10^6 \text{ m}^3$ ).

Supply delivery is highest at the start and middle of the year and lowest during late spring and end-year months. Extended dry period and high population growth scenarios often show higher supply deliveries, while extended wet season tends to have lower deliveries across most months.

#### 4.3.6.5 Unmet demand in all demand site

The figure below shows the monthly average unmet water demand (in millions) for five demand sites under five different scenarios.

January-February very low unmet demand across all scenarios, almost negligible. March-June (Peak unmet demand period): Significant increase in unmet demand, peaking in April and May. The extended dry period and increased agriculture coverage have the highest unmet demand ( $110 \times 10^6 \text{ m}^3$  to  $115 \times 10^6 \text{ m}^3$ ). Extended wet season consistently has the lowest unmet demand during this period. July-September: Notable drop in unmet demand across all scenarios. Still, increased agriculture coverage remains relatively higher. October-December: unmet demand rises again, peaking in December. High Population Growth and increased agriculture coverage show the highest unmet demand ( $120 \times 10^6 \text{ m}^3$ ). Extended wet season has significantly lower unmet demand than others.