



Figure 12 Industrial water demand relative to reference scenario (Source: Researcher (2025))

Industrial water demand relative to the reference scenario is presented in Figure 12. Overall, the results show that industrial water demand increases under both the high population growth and increased agriculture coverage scenarios, although the magnitude of increase differs between them. The high population growth scenario exhibits the greatest positive deviation from the reference scenario and continues to rise throughout the simulation period, indicating that industrial water demand is strongly influenced by demographic expansion and the associated growth in production activities, employment, and service needs. The increased agriculture coverage scenario also shows a positive upward trend, but its effect remains lower than that of population growth, suggesting a more moderate increase in industrial water demand, likely linked to the expansion of agro-processing activities and related infrastructure.

In contrast, the extended dry period scenario remains below the reference scenario over most of the simulation period, indicating reduced industrial water demand under prolonged dry conditions. This may be associated with limited water availability, operational constraints, water conservation measures, or reduced economic activity during drought periods. Seasonal fluctuations are evident across the scenarios; however, the long-term upward trends are more pronounced under the population growth and agricultural expansion scenarios. Overall, these results indicate that industrial water demand in the catchment is more sensitive to demographic and economic change than to seasonal wet conditions, and they highlight the need for improved water-use efficiency, recycling systems, and infrastructure upgrades to support sustainable industrial development.

#### 4.3.6 Comparison between supply requirement, supply delivered, water demand and unmet demand

##### 4.3.6.1 Supply requirement vs. supply delivered

Below is an integrated, technically detailed comparison which illustrates the water supply and demand dynamics in the Middle Nzoia Catchment from 2022 to 2052. This comparison addresses two key metrics: Supply requirement and supply delivered, while reflecting the influence of various scenarios such as high population growth, extended dry period, extended wet season, and increased agricultural coverage (Figure 13).

The left panel of Figure 13. Illustrates the supply requirement, an estimate that includes raw water demand adjusted for transmission losses, water reuse potential, and effects of demand- side management (DSM) interventions. This requirement consistently exceeds the supply delivered, as shown in the Figure 13 right panel.