Resilience in a Changing Climate: Advancing Research on Groundwater for Equity

Urban Indonesia

Groundwater Profile

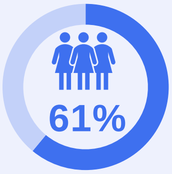
February 2025

60% of population of Indonesia resides in urban areas.

35% of urban households have access to safely managed drinking water services.

62% of urban groundwater sources used for drinking are drilled wells.

Urban water service coverage



99.2 million

urban population uses **wells or boreholes** for **domestic purposes**.

48.8 million

urban population uses **wells or boreholes** for **drinking**.

The percentage of urban piped schemes using groundwater sources is not known.

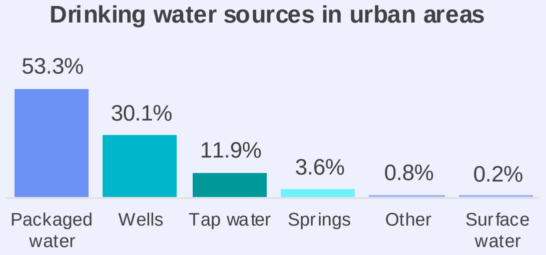


Fig. 1 – Percentage of urban household coverage for primary drinking water sources (SUSENAS, 2020).

Urban drinking water sources: 1980 - 2020

Since 2000, the use of **packaged water** as a **drinking water source** has **grown**, while dependence on **wells** and **piped water services** has decreased, although these sources are still used by more than a third of the urban population

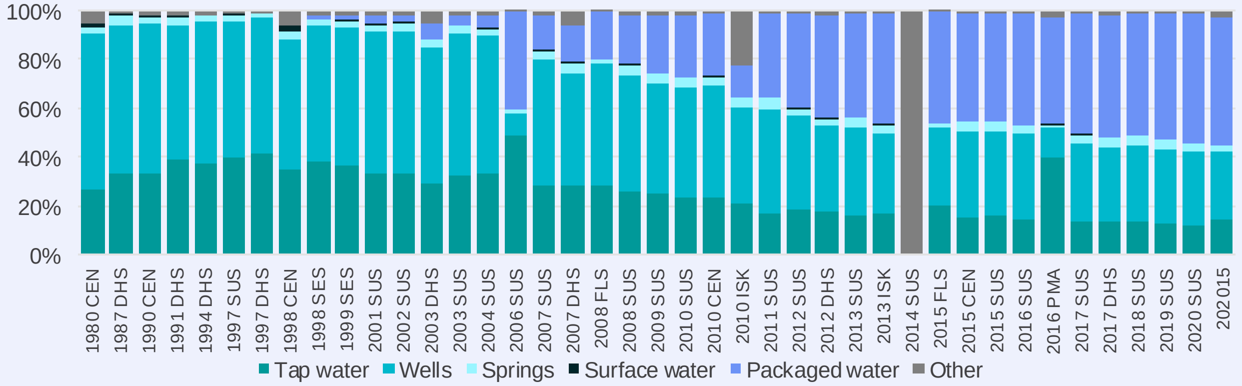


Fig. 2 – Percentage of urban household coverage for primary drinking water sources by years (UNICEF and WHO, 2023).

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Groundwater access by wealth quintile

Middle to richest income households use boreholes more frequently, while households in the poorest two quintiles rely more on dug wells.

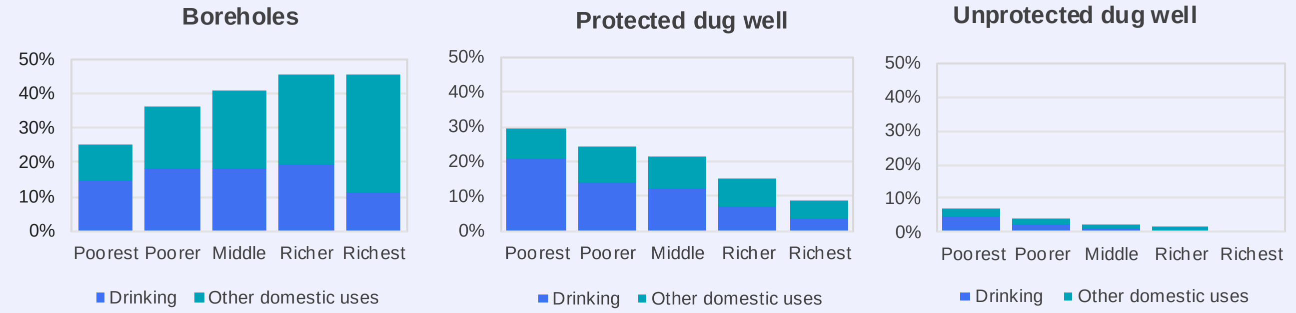


Fig. 3 – Use of groundwater sources for drinking and other domestic uses by wealth quintiles (DHS, 2017).

Water quality

Water quality is a concern across various sources – including groundwater – with unprotected and protected wells having the highest levels of *E. coli* contamination.

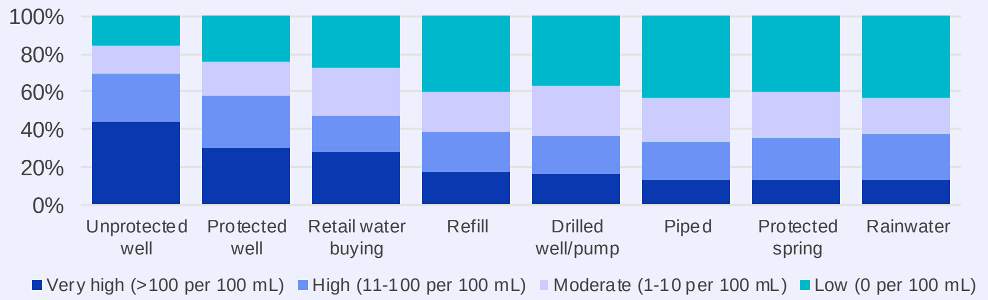
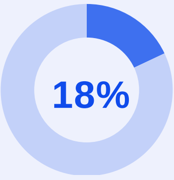


Fig. 4 – *E. coli* concentration in urban water sources (SKAM-RT, 2020).



Wells in urban areas are **within 5 metres of an on-site sanitation facility.**

7 million

People in urban Indonesia **drink water from a well** that is within 5 metres of an on-site sanitation facility and is likely to be **contaminated**.

Boreholes and dug wells with sanitary risks

Boreholes and dug wells are exposed to various contamination risks, with half of all dug wells and boreholes located within 15 metres of a sanitation system.

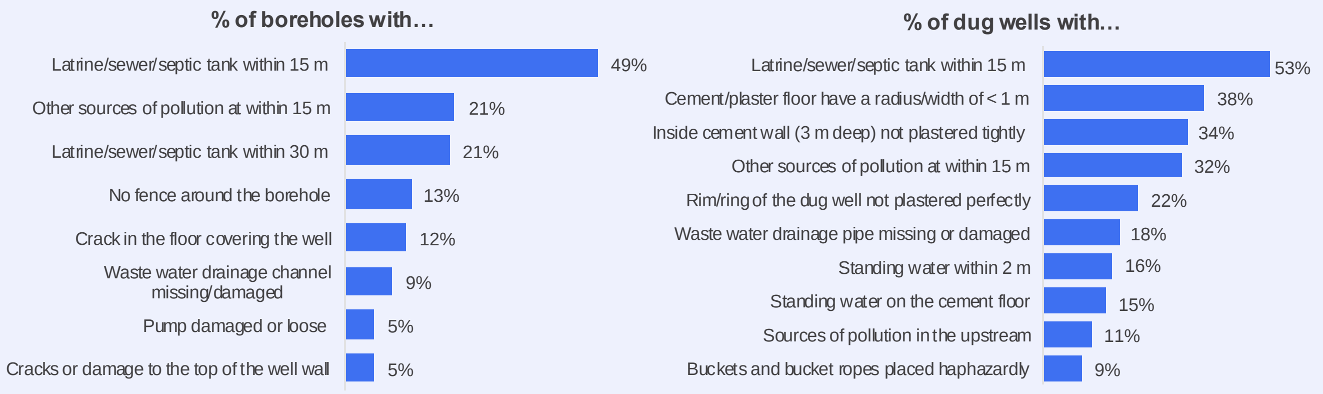


Fig. 5 – Prevalence of reported sanitary risks for groundwater sources (wells and boreholes) in urban Indonesia (SKAM-RT, 2020).

Groundwater usage by provinces

Groundwater use is **predominant** in provinces like **Riau and Lampung**. In contrast, densely populated provinces such as **West Java, Central Java, East Java, Jakarta, and Bali** show **moderate reliance** on groundwater.

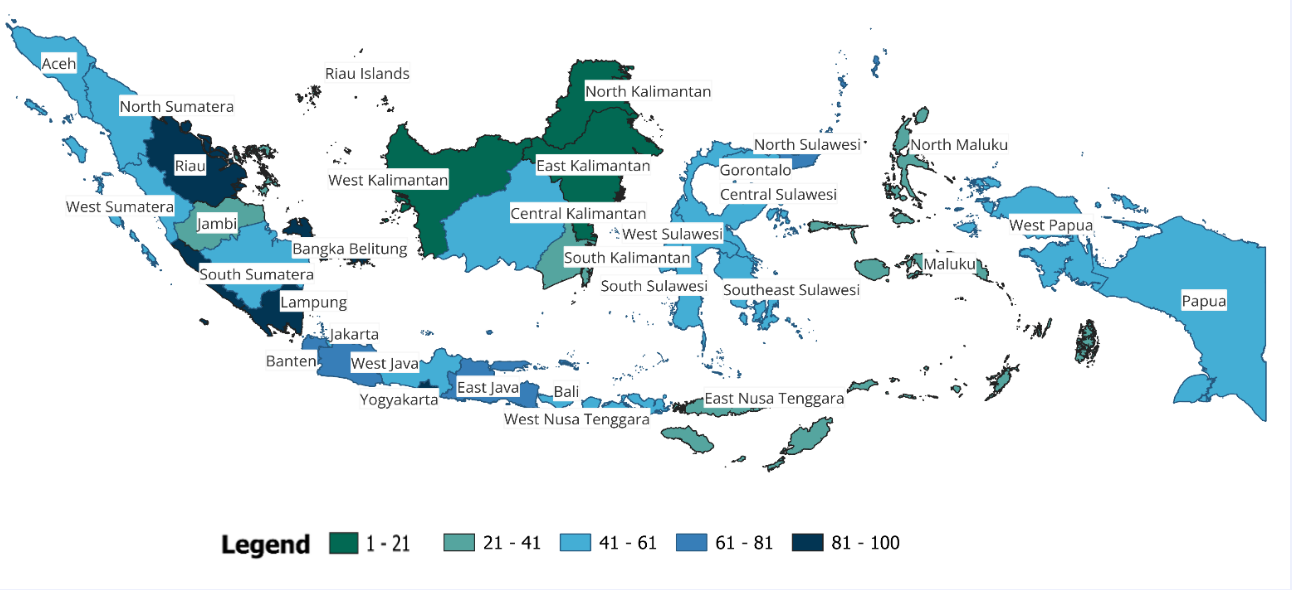


Fig. 6 – Percentage of urban population using groundwater sources (wells or boreholes) for drinking and domestic purposes (DHS, 2017).

Boreholes for water supply across Indonesia

According to the Indonesian Geological Agency, the **concentration of water supply boreholes** is highest along **the Java-Bali-Lombok corridor** and in **Nusa Tenggara Timur**

Fig. 7 – Distribution of boreholes for water supply across Indonesia (Geological Agency, 2025).

Groundwater potential

High groundwater potential is found in **coastal and lowland areas of Sumatra, Java, and Papua**, indicating high aquifer productivity and reliable groundwater sources.

520 billion m³/year
of groundwater potential in Indonesia

155 billion m³/year
of safe yield

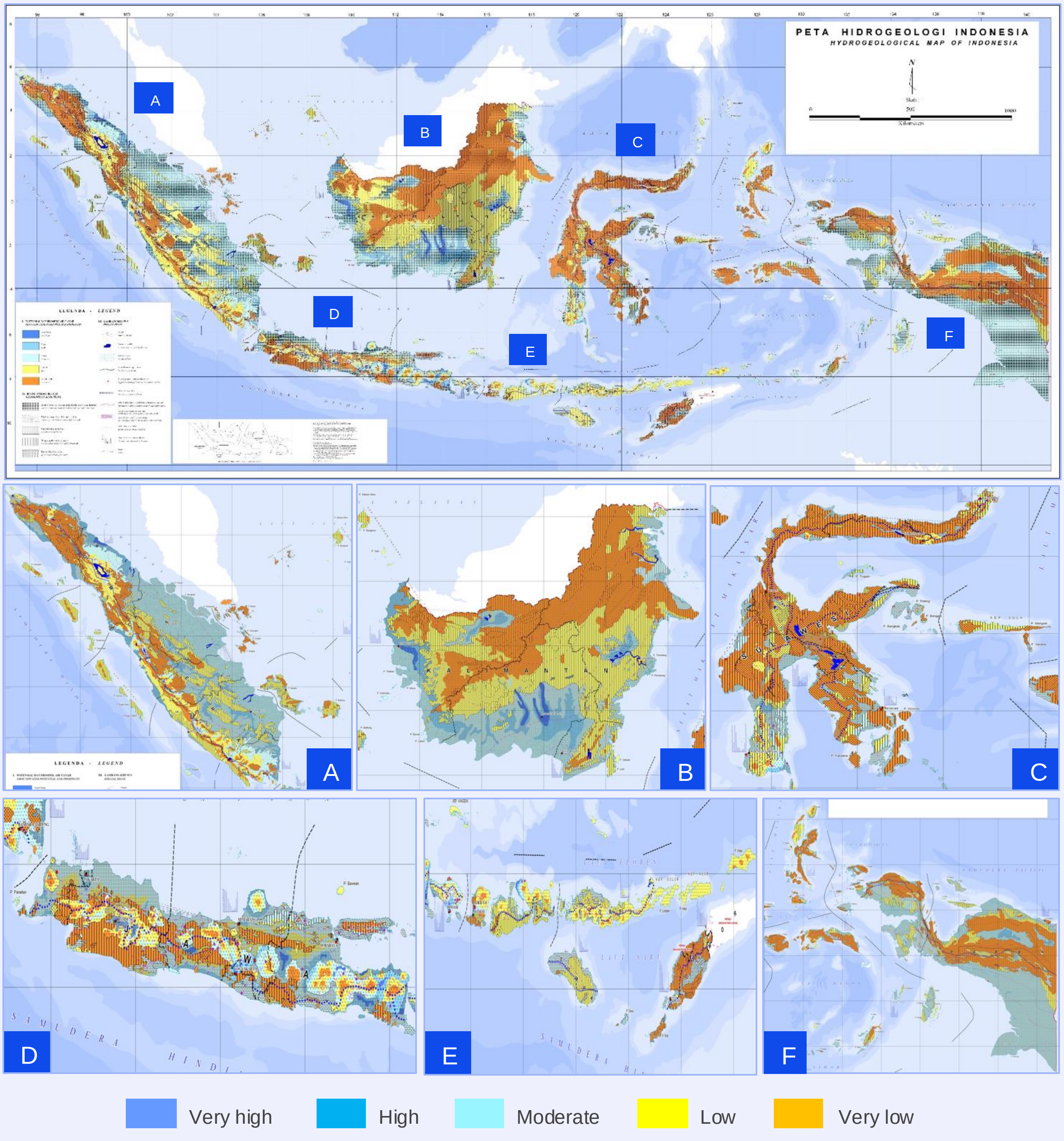


Fig. 8 – Groundwater potential across Indonesia (ADB, 2016).

Groundwater challenges – overabstraction and land subsidence

Overabstraction of groundwater has led to significant **land subsidence**, especially in densely populated urban areas across Indonesia.

3.5 metres

of land subsidence since **1980 in the densely populated city of Jakarta** due to the overabstraction of groundwater.

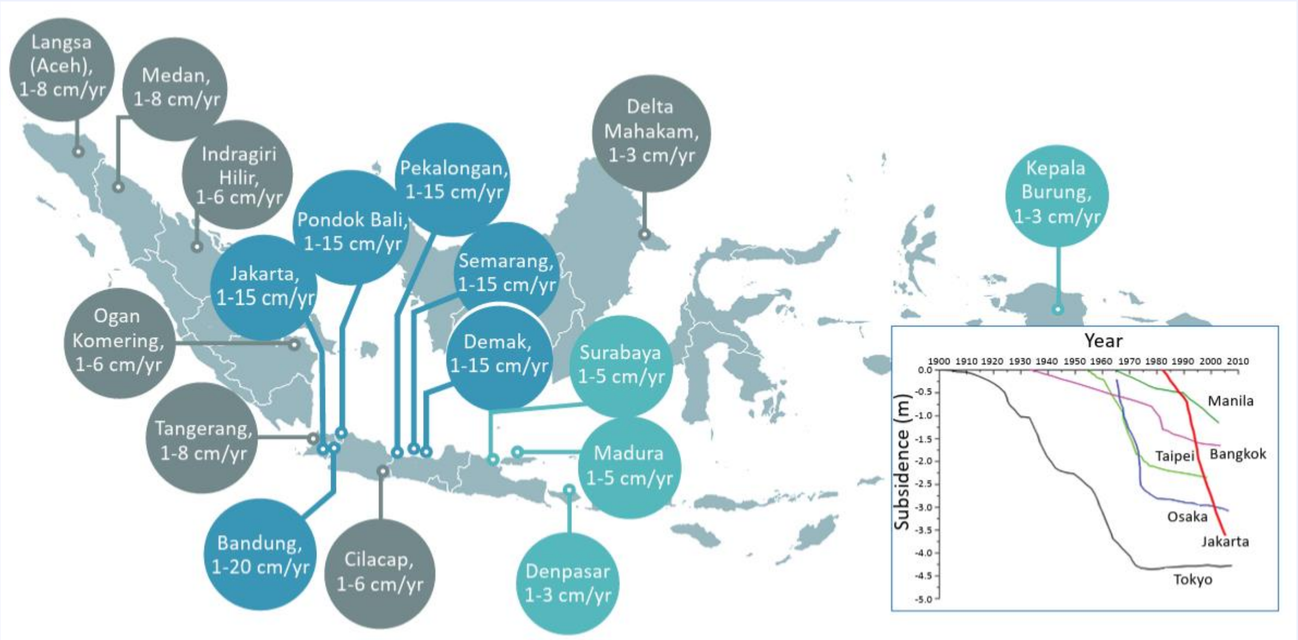


Fig. 9 – Comparative land subsidence rates across Indonesia (Khalil et al., 2021).

Groundwater management

Groundwater in Indonesia is managed by the **Ministry of Mines and Energy**.

1. **Management and monitoring**
2. **Licensing of groundwater drilling and use**
3. **Maintaining groundwater database**

To mitigate the decline in groundwater quality, the following actions are recommended (ADB, 2016):

- **Reduce groundwater abstraction** in accordance with PP 48 of 2008 on groundwater.
- **Implement regulations** across all local governments to control groundwater abstraction.
- **Strengthen** the requirements for obtaining **groundwater licences**.

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