

# Afghanistan Water Security: Crisis, Data and the Path Forward

Evidence-based analysis for programme design, policy development and field implementation

Maiwand Jan Alamzoi | FAO UN Roster Specialist | Afghanistan Development Initiative (ADI)

## KEY MESSAGES

- Afghanistan faces one of the most severe water security crises in the world — Kabul's groundwater is depleting at up to 3 metres per year.
- Only 36% of Afghans have access to safe drinking water, compared to a global average of 74% — a gap of 38 percentage points.
- By 2030, Kabul faces a projected annual deficit of 44 million m<sup>3</sup> between water use and natural recharge.
- Data-driven tools and integrated water management can support both immediate interventions and long-term resilience planning.
- ADI's WaterSense tool provides free, real-time water security data for Afghanistan and 80+ countries worldwide.

**36%**

Safe water access

**3m/year**

Groundwater depletion in  
Kabul

**44M m<sup>3</sup>**

Annual water deficit by 2030

**75-80%**

Kabul water from  
over-extracted wells

## 1. THE CHALLENGE — AFGHANISTAN'S WATER CRISIS

Afghanistan is facing a converging water crisis driven by rapid population growth, decades of conflict-related infrastructure collapse, climate variability, and groundwater over-extraction. While the crisis affects the entire country, it is most acute in urban centres — particularly Kabul — where a population of approximately 6 million people is almost entirely dependent on groundwater that is depleting at an unsustainable rate.

### 1.1 Kabul Groundwater Emergency

Kabul's groundwater system is under extreme pressure. The city relies on over-extracted wells for 75-80% of its drinking water supply, yet natural recharge rates are far below extraction rates. Monitoring data indicate that groundwater levels in parts of Kabul have dropped by up to 3 metres per year. Projections from FAO AQUASTAT and World Bank data indicate a 44 million m<sup>3</sup> annual gap between water use and natural recharge by 2030.

### 1.2 National Water Access Gap

Indicator	Afghanistan	South Asia avg.	Global avg.
Safe drinking water access	<b>36%</b>	72%	74%
Rural water access	<b>~25%</b>	68%	71%
Urban water access	~67%	93%	96%
Basic sanitation access	<b>~28%</b>	55%	74%

Sources: World Bank WDI 2024, FAO AQUASTAT 2023, WHO/UNICEF JMP 2023

### 1.3 River Basin Pressures

Afghanistan has five major river basins — Amu Darya, Helmand, Kabul, Harirud-Murghab, and the Northern basins — with a combined annual flow of approximately 55 km<sup>3</sup>. However, less than 30% of this water is currently utilised for agriculture, industry, or domestic use. Poor infrastructure, lack of storage capacity, and transboundary management challenges limit Afghanistan's ability to capture and distribute its water resources effectively.

## 2. DRIVERS OF THE CRISIS

<b>Population pressure</b>	Kabul's population has grown from approximately 500,000 in 1990 to over 6 million today, increasing demand on fixed groundwater reserves without proportional investment in supply infrastructure.
<b>Climate variability</b>	Declining and increasingly erratic precipitation across Afghanistan — particularly in the Hindu Kush and Pamir mountain ranges — is reducing snowmelt contribution to rivers and aquifer recharge.
<b>Infrastructure collapse</b>	Decades of conflict have destroyed or degraded irrigation canals, water treatment facilities, and distribution networks that once served rural and urban populations.
<b>Agricultural over-extraction</b>	Agriculture accounts for approximately 90% of Afghanistan's freshwater use. Inefficient flood irrigation practices in major agricultural zones contribute significantly to groundwater depletion.
<b>Governance and data gaps</b>	Limited national monitoring of groundwater levels, river flows, and water quality makes evidence-based water management extremely difficult for national and international actors.

## 3. POLICY RECOMMENDATIONS

Based on field experience, World Bank data analysis, FAO guidelines, and ADI's WaterSense modelling, this brief presents three tiers of recommendations aligned with implementation timelines and resource requirements.

**IMMEDIATE — 0 to 2 years**

1. Deploy community-scale rainwater harvesting systems in Kabul and major urban centres — targeting public buildings, schools, and health facilities as priority sites.
2. Establish urban aquifer recharge zones in Kabul — designating green corridors and permeable surfaces to support natural groundwater replenishment.
3. Install affordable point-of-use water filtration units in underserved urban and peri-urban communities — prioritising areas identified through satellite water quality analysis.
4. Launch a national awareness campaign on water conservation — targeting agricultural communities responsible for 90% of freshwater use.
5. Repair and rehabilitate existing karez (qanat) traditional underground water systems — a low-cost, culturally appropriate, and climate-resilient intervention.

### MEDIUM TERM — 2 to 5 years

1. Develop a national drip irrigation programme for the Kabul river basin and Khosh Tapa canal zone — targeting a 40% reduction in agricultural water consumption through precision irrigation.
2. Establish provincial groundwater monitoring networks — deploying sensor-based measurement stations across all 34 provinces with data feeding into a national open water portal.
3. Design and implement water-smart urban infrastructure standards — integrating water recycling, grey water reuse, and permeable surface requirements into new construction regulations.
4. Initiate formal transboundary water dialogue with Iran and Pakistan on the Helmand and Kabul river basins — supported by neutral data from international monitoring agencies.

### LONG TERM — 5 to 10 years

1. Develop a National Water Security Framework — integrating groundwater management, surface water governance, agricultural water use, and climate adaptation into a single national policy document.
2. Build large-scale water storage infrastructure — dams and reservoirs on the Amu Darya and Helmand river systems to capture seasonal snowmelt for year-round use.
3. Establish a National Groundwater Monitoring and Open Data Platform — providing real-time, publicly accessible data on aquifer levels, river flows, and water quality across Afghanistan.
4. Develop climate-resilient water infrastructure standards — designing all new water infrastructure to withstand projected climate scenarios through 2050.

## 4. DATA TOOLS AND IMPLEMENTATION SUPPORT

The Afghanistan Development Initiative (ADI) has developed open-source tools to support evidence-based water management planning and monitoring. These tools are freely available to UN agencies, NGOs, researchers, government officials, and field practitioners.

Tool	Description	Access
<b>WaterSense</b>	Interactive water security dashboard — Afghanistan deep dive, groundwater crisis data, water access trends, river basin analysis, and global country comparisons. Live data from World Bank API.	<a href="https://watersense-zgfumfyhmddeghxyww3hjy.s.treamlit.app">watersense-zgfumfyhmddeghxyww3hjy.s.treamlit.app</a>
<b>SoilSense</b>	Soil health screening tool — soil health score, erosion risk, degradation probability and FAO-grounded management recommendations for 124 countries.	<a href="https://soilsense-npwqjrrz7pqkrtq5eidw4v.streamlit.app">soilsense-npwqjrrz7pqkrtq5eidw4v.streamlit.app</a>

<b>EconomySense</b>	Economic indicators dashboard — GDP trends, trade data, poverty indicators and development finance data for Afghanistan and global comparison.	<a href="#">economicsense-qbgckhbvnoyqywuxbmi7hs.streamlit.app</a>
<b>ADI Platform</b>	Full ADI platform — tools, publications, data resources and policy briefs covering all six development pillars.	<a href="#">afghanistan-development-initiative.github.io</a>

## 5. DATA SOURCES AND REFERENCES

- [1] World Bank. (2024). *World Development Indicators — Water and Sanitation*. [data.worldbank.org](#)
- [2] FAO. (2023). *AQUASTAT Database — Afghanistan Country Profile*. [fao.org/aquastat](#)
- [3] WHO/UNICEF. (2023). *Joint Monitoring Programme for Water Supply, Sanitation and Hygiene (JMP)*. [washdata.org](#)
- [4] GRACE-FO Satellite Mission. (2024). *Terrestrial Water Storage Anomalies — Central and South Asia*. [grace.jpl.nasa.gov](#)
- [5] Poggio, L. et al. (2021). *SoilGrids 2.0: producing soil information for the globe with quantified spatial uncertainty*. *SOIL*, 7, 217-240. [doi.org/10.5194/soil-7-217-2021](#)
- [6] FAO. (2017). *Voluntary Guidelines for Sustainable Soil Management*. [fao.org/documents](#)
- [7] CHIRPS. (2024). *Climate Hazards Group InfraRed Precipitation with Station Data*. [chc.ucsb.edu/data/chirps](#)
- [8] World Bank. (2023). *Afghanistan — Water Supply and Sanitation Sector Review*. [openknowledge.worldbank.org](#)
- [9] UNEP. (2022). *Afghanistan Environmental Assessment*. [unep.org/resources](#)
- [10] Alamzoi, M.J. (2026). *WaterSense — Afghanistan Water Security Dashboard*. *Afghanistan Development Initiative*. [github.com/afghanistan-development-initiative/watersense](#)

This policy brief was produced by the Afghanistan Development Initiative (ADI) — an independent, open-access research and knowledge platform. ADI produces evidence-based tools, datasets and policy briefs across six development pillars for Afghanistan. All ADI tools and publications are freely available at [afghanistan-development-initiative.github.io](#)