About the Australia-Pakistan Water Security Initiative

<table>
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<th>Duration</th>
<th>Budget</th>
<th>Location</th>
<th>Implementing Partners</th>
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<td>April 2021 to June 2025</td>
<td>AUD 5.57 million (AusAID contribution AUD 5.0 million)</td>
<td>Farash Town, Islamabad and James Town, Rawalpindi</td>
<td>World Wide Fund for Nature (WWF-Pakistan) International Water Management Institute, Pakistan (IWMI) Hydrology and Risk Consulting, Australia (HARC)</td>
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Introduction

In the semi-arid lands of Pakistan, where mismanaged water resources and climate change converge; the groundwater aquifers are increasingly imperilled. As one of the primary water sources for Pakistan, it sustains rural communities, satisfies the thirst of urban centres, and nourishes the crops that provide sustenance for a growing population. However, this essential resource is on the verge of irreversible depletion, endangering both livelihoods and fragile ecosystems that rely on it. The unchecked extraction of more than 60 billion cubic metres of groundwater annually has unleashed a tsunami of environmental destruction. In spite of this precarious circumstance, a beacon of possibility in the guise of recharge interventions is visible on the horizon. A sustainable groundwater management programme, supported by the strategic implementation of recharge interventions, presents a promise of renewal and resilience as we enter an era in which evidence and nature-based solutions are essential.

Recharge Interventions

Recharge interventions encompass practices aimed at replenishing groundwater resources to mitigate urban runoff during wet seasons. There are various methods used to replenish groundwater in urban settings.

- Ablution Water Reuse
- Artificial Recharge Trenches
- Constructed Wetlands
- Infiltration Well
- Managed Aquifer Recharge
- Percolation Pits
Steps for Selection of Appropriate Groundwater Recharge Intervention

All the groundwater recharge interventions mentioned above play a vital role in sustainable water resource management, especially in regions facing water scarcity, depletion, or drought. However, it is required to analyse the situation and choose a best-suited method to recharge groundwater. This flowchart (figure 2) provides a comprehensive overview of the decision-making process involved in identifying, selecting, and implementing appropriate groundwater recharge techniques. By systematically assessing site characteristics, evaluating feasibility, and monitoring the outcomes, this flowchart serves as a roadmap for ensuring the successful implementation of interventions aimed at replenishing groundwater supplies.

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1Detailed description of these groundwater recharge interventions are available on website under “Find out more about APWASI”.
Recharge Interventions - Australia-Pakistan
Water Security Initiative (APWASI) Case Study

WWF-Pakistan under APWASI, is striving to transition two disadvantaged communities of Farash Town, Islamabad and James Town, Rawalpindi towards becoming water sensitive. Under this initiative, recharge interventions are installed as a potential option to replenish the depleting water table. These interventions are based on the feasibility assessment conducted through a partnership with Pakistan Council of Research in Water Resources (PCRWR). The results had shown that groundwater recharge in the two communities is possible but constrained by the prevailing hydrogeological conditions\(^2\). See the recommendations of the assessment in figures 3-6.

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\(^2\) Hydrogeological conditions refer to the physical and geological characteristics of underground water sources, including factors such as aquifer type, permeability, and groundwater flow patterns.

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Figure 3: Rooftop rainwater harvesting and groundwater recharge through the existing dry bore at the household and communal level.

Figure 4: Rooftop rainwater harvesting and groundwater recharge through existing dry bore with a surface storage tank (for multiple uses).

Figure 5: Establishment of soakage pits for groundwater recharge.
Under APWASI, seven recharge wells, with a total average replenishment capacity of 8000 cubic metres, have been installed based on the outcomes of feasibility assessment (See figures 7-12). These interventions include groundwater recharge through existing dry bores, dug wells and soakage pits.
Figure 9: Islamabad Model School for Girls (Street 7, Phase-I Farash Town). This recharge well utilizes rainwater harvested through the rooftop and recharges it through the dry bore already present at the household and communal level.

Figure 10: Islamabad Model School for Girls (Street 31, Phase-II Farash Town). It harvests rainwater from the rooftop and recharges groundwater through existing dry bore.

Figure 11: Naorani Mosque soakage pit. This is a typical soakage pit to recharge groundwater.

Figure 12: Pur Faisal Church and Best Tomorrow School Jamia Town, Rawalpindi. In these, rainwater is harvested from the rooftop and used to recharge groundwater through an existing dry bore.
Advantages, Challenges and Considerations

**ADVANTAGES**

- Help to mitigate urban flooding by capturing excess rainwater.
- Improve water quality by filtering and purifying storm water.
- Ensure the replenishment of aquifers, maintaining long-term water storage.
- Reduce soil erosion and sediment runoff, preserving natural landscapes.
- Play a role in preventing land subsidence by recharging aquifers.
- Can be cost-effective compared to large-scale water infrastructural interventions.

**CHALLENGES AND CONSIDERATIONS**

- Lack of community sensitization and awareness for groundwater recharge.
- Ensuring cleanliness of rooftop at the household and communal level.
- Poor runoff water quality and potential pathogenic contamination of groundwater.
- Infrastructure maintenance - to maintain acceptable water quality levels and for infrastructure longevity.
- Lack of availability of feasible sub-surface lithology and varied hydrogeological conditions suitable for recharge interventions.

**REFERENCES**