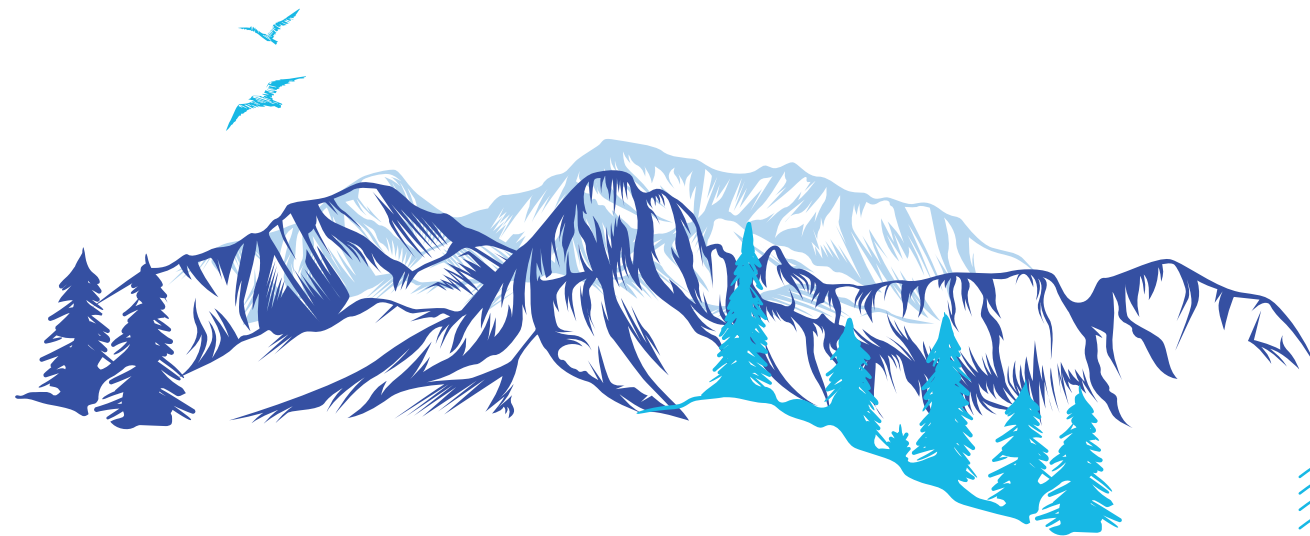
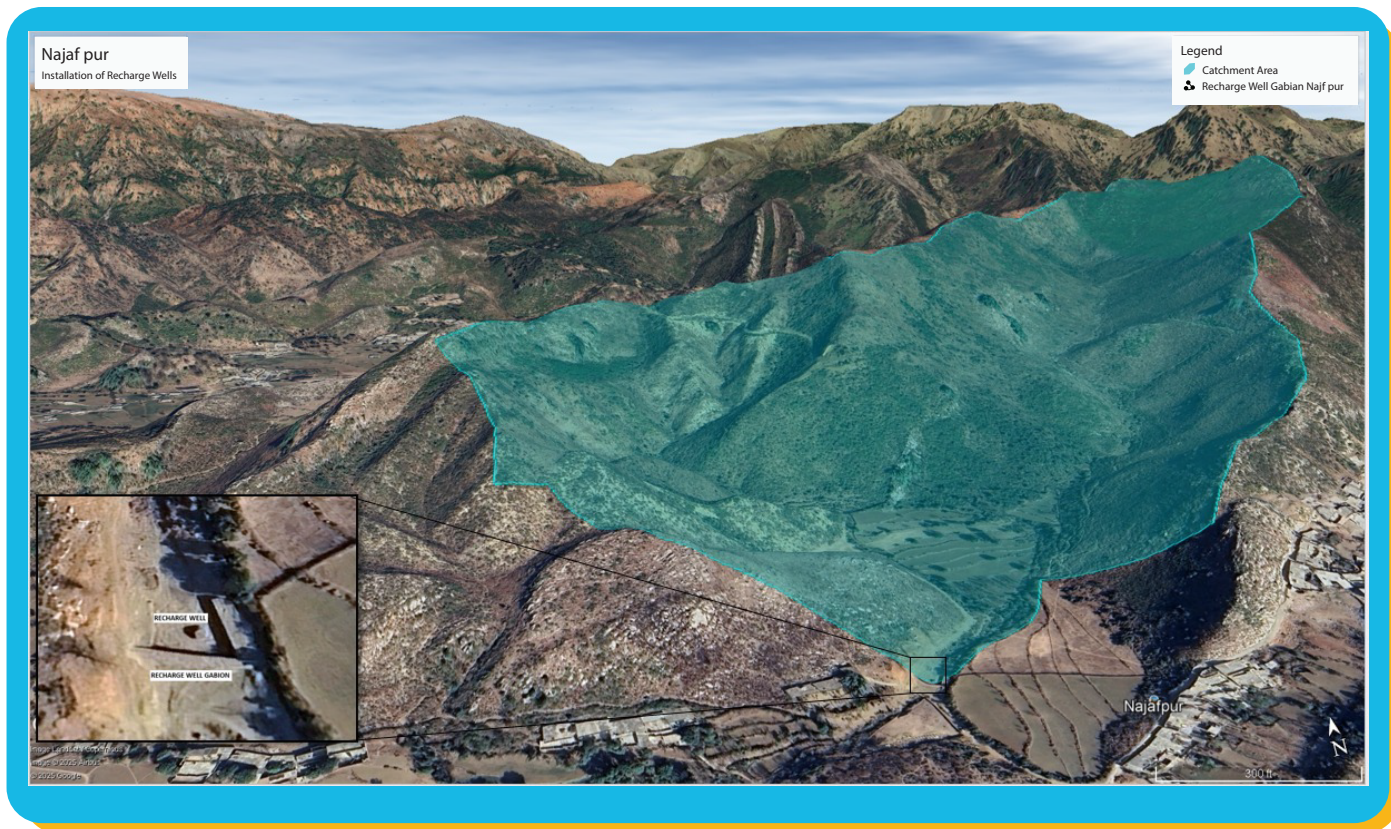




# NATURE BASED SOLUTIONS IMPROVING CLIMATE RESILIENCE IN KHYBER PAKHTUNKHWA

## RECHARGE WELL



**Project:** Water Resource Accountability in Pakistan (WRAP)  
**Donor:** Foreign, Commonwealth and Development Office (UK)  
**Location:** : Village Najafpur, Haripur District, Khyber Pakhtunkhwa  
**Individuals Benefiting:** 4,200 individuals

**Contact:** Info@Wwf.org.pk, hrzaa@wwf.org.pk

### LITERATURE

Guidance for using the IUCN Global Standard for Nature-based Solutions: first editions. (2020).  
<https://doi.org/10.2305/iucn.ch.2020.09.en>

DETAILS FOR GALVANIZED GABION WIRE MESH WALL.  
HEXAGONAL GABION BASKETWALL GABION. 3D BOX WALL GABIONS.  
8-details-for-galvanized-gabion-wire-mesh-wall.pdf - IUCN

To counter groundwater depletion and mitigate flood impacts in Najafpur village, a recharge well has been constructed, utilizing a catchment area of 67.4 hectares. The well is designed to capture surface runoff generated during high rainfall events. Positioned near critical infrastructure, including a government tubewell serving over 600 households, the recharge well will enhance groundwater recharge, stabilize the declining water table, and reduce downstream flood damages. Combined with a gabion wall, this intervention improves local water retention capacity and strengthens the area's climate resilience.





## BENEFITS

- Recharge of Depleted Groundwater Aquifer
- Stormwater Management
- Protection of Agricultural Land
- Supports Sustainable Water Management
- Strengthens Local Water Security

## CO-BENEFITS

- HIGH**
- Ground recharge
  - Sustainable agriculture
  - Climate resilience
  - Soil health improvement
- MEDIUM**
- Sedimentation control
  - Source of Drinking Water for Avifauna
- LOW**
- Avifauna biodiversity
  - Aesthetic value
  - Carbon sequestration

## TECHNICAL DESIGN

Potential runoff estimation at Recharge Well site			
Rainfall (mm)	Catchment Area (m²)	Runoff Coefficient	Potential Runoff (m³)
25	674000	0.54	9099
50			18198
75			27297
100			36396

## WHAT'S UNIQUE

- NbS approach:** Groundwater depletion, identified by the community, was addressed through a nature-based solution—the recharge well—that restores natural hydrological cycles and supports drought resilience. Integrated with a gabion structure that creates pondage and channels runoff, the intervention also applies an Eco-DRR approach, using natural processes to reduce flood risks, enhance infiltration, and protect local infrastructure.
- Demonstrated Value for Money (VFM):** The intervention demonstrates strong value for money by being cost-effective, locally appropriate, and delivering multiple environmental and social benefits compared to conventional alternatives. VFM analysis shows the design of intervention has a Benefit Cost Ratio of 2.64, demonstrates strong economic viability, delivering £2.39 in benefits for every £1 invested.

## WHAT'S UNIQUE

- Adaptive management:** The recharge well is managed through continuous Monitoring, Evaluation, and Learning (MEL) to maintain effectiveness and sustainability. Activities include data collection for impact assessment, seasonal debris removal during dry period if siltation is excessive, repair and reconstruction if needed and integration of community feedback. Safety measures, such as fencing with local materials, are adapted based on monitoring and stakeholder input to address emerging risks and ensure long-term sustainability and upscaling.
- Protection of Agricultural Ecosystem:** Shields 1 hectare of vulnerable agricultural land from seasonal flooding, securing livelihoods dependent on agriculture.
- Groundwater Filtration:** The internal filter media (boulders, gravel, and sand) filters water before it recharges aquifer, improving water quality.
- Runoff Integration:** Capture and redirection of natural surface runoff transforms potential flood hazards into valuable water resources.
- Complimentary Interventions:** The gabion wall with wingwalls retains and channels runoff toward the recharge well, enhancing infiltration efficiency and protecting nearby infrastructure like the community graveyard and girls' primary school.
- Biodiversity Support:** Indigenous plants *Salix babylonica* (commonly known as Weeping Willow) planted for soil protection enhance local biodiversity and contribute to ecosystem resilience.

## IMPACT

- Groundwater Recharge:** Designed to recharge approximately 982.0 m3 of runoff annually (subject to rainfall and catchment characteristics).
- Climate Resilience Strengthening:** Helps communities better cope with seasonal variability of ground water.
- Erosion Reduction and ecosystem benefits:** By stabilizing soils and managing runoff, the structure protects 1 hectare of farmland from degradation, supporting ecosystem restoration and livelihood resilience. This enhances food and water security while promoting biodiversity through sustained land and vegetation cover.erosion over the decades.
- Infrastructure Protection:** Gabion wall supports the protection of key community assets, such as a graveyard and primary girls schools ensuring long-term benefits.

## NBS SELF-ASSESSMENT RESULTS:

Using the International Union for Conservation of Nature's NbS self-assessment tool, the intervention was evaluated for its degree of adherence with all the 8 criteria and 28 indicators. The assessment showed an overall 74% score with 'in adherence status' for the intervention, as shown in the figure below.

NbS self-assessment overview

Criterion	Your Criterion Score	Maximum Criterion Score	Normalised criterion	FINAL OUTPUT Your Criterion %age
1. Societal challenges	8	9	0.89	89%
2. Design at scale	7	9	0.78	78%
3. Biodiversity net-gain	5	12	0.42	42%
4. Economic feasibility	10	12	0.83	83%
5. Inclusive governance	15	15	1.00	100%
6. Balance trade-offs	7	9	0.78	78%
7. Adaptive management	6	9	0.67	67%
8. Sustainability and mainstreaming	5	9	0.56	56%
Total Percentage match				74%
Is this in adherence with the IUCN Global Standard for NbS?				In adherence

NbS self-assessment overview

