Climate and Environment Learning Paper

Community-Led Nature Based Solutions: Sustaining Watershed Management in Afghanistan

This paper explores how community-driven nature-based solutions can simultaneously support watershed restoration, livelihood improvement, and climate resilience.

Context

Afghanistan remains one of the world's most complex humanitarian emergencies. Recent political, social and economic shocks have resulted in a massive deterioration of the humanitarian situation. After decades of war, displacements, corruption, and natural disasters, Afghans are especially vulnerable to food insecurity, social and economic upheaval.

Afghanistan is among the world's most climate-vulnerable countries. According to the Afghanistan Climate Vulnerability Assessment (ACVA) conducted by IOM, nearly 3 million people were displaced by climate- and disaster-related events between 2021 and 2024. In 2024 alone almost 1 million experienced temporary displacement and more than 500,000 were displaced overall due to droughts, floods, and other hazards. Additionally, the ACVA finds that over 11 million people live in areas at high risk of future climate-induced disasters, and that 73% of livelihoods are climate-sensitive. Meanwhile, large fractions of villages have severely limited access to essential services as 92% lack adequate emergency services and 96% lack early-warning or rescue capacity.

Climate hazards in Afghanistan are manifesting as prolonged droughts, increasingly erratic and heavy rainfall, flash floods, shrinking groundwater, declining glacier-fed river flows, and rising temperatures. These trends threaten water security, agriculture, food production, and livelihoods.

The crisis, which has affected Afghanistan since 2021 has exposed the already-vulnerable communities to a combination of economic recession, job losses and inflation. Eighty percent of the population relies on agriculture for their livelihood, with the majority being small-scale farmers, primarily growing wheat (the staple food crop) as well as rice, maize, pomegranate, apple, grapes, tomatoes and potatoes. Despite their critical role in sustaining both their families and local communities, these small-scale farmers face increasingly severe climate challenges, including prolonged droughts and devastating floods. In recent years, such extreme weather events have severely damaged Afghanistan's already fragile agricultural sector. Yet, these men and women remain the backbone of Afghan society, playing a vital role in ensuring food security and community resilience.

Following unprecedented levels of food insecurity during the 2021 to 2022 lean season, a combination of increased poverty, reduced harvests and high food prices has led to continuing high levels of food insecurity throughout the post-harvest period. Between March and April 2025, an estimated 12.6 million people (27 percent of the total population) faced high levels of acute food insecurity (IPC Phase 3 or above) highlighting the urgent need of humanitarian food assistance (IPC 2025).

Programme Overview

Funded by the European Union, the Inclusive Livelihoods Recovery and Community Resilience in Afghanistan (FARAGIR) is a 3-year programme (January 2023 to December 2025) implemented by Concern Worldwide, Welthungerhilfe, Handicap International and lead local partner, Afghanaid in 6 of Afghanistan's 34 provinces. Concern is working in 2 of these provinces, Takhar and Badakhshan in the Northeast of the country, across 45 communities.

FARAGIR's overall goal is to safeguard the livelihoods and food security of the Afghan population and mitigate the impact of the humanitarian crisis in the country, preventing increased instability with severe security and migratory spillover effects for neighbouring countries and the wider region. The project aims to achieve the following objectives: 1) To strengthen and increase community-based employment, income-generating opportunities, and opportunities for micro and small businesses, particularly for women and people with disabilities and 2) To enhance food security in rural communities through improved climate sustainable production and processing capacity, and enhanced watershed and natural resource management.

As part of the FARAGIR programme, Concern has been implementing a Nature-based Solutions (NbS) approach to watershed management in 4 villages. Watershed management is the sustainable management of both land and water resources within a watershed (a geographic area in which all the water that falls it, drains into a common body of water such as a river or sea), to prevent flooding, enhance water quality and support ecosystem health. The health of these ecosystems requires effective watershed management as the availability and quality of water is directly impacted. The study of watershed characteristics and the implementation of plans and practices to sustain its functions are also vital.

The communities were selected based on the following criteria:

- Areas prone to floods and droughts are prioritized for disaster risk reduction and climate adaptation.
- Hilly topography is chosen to effectively reduce water runoff and soil erosion.
- Willingness to participate in the project implementation and learn NbS methods.
- Stakeholders' DAIL (Directorate of Agriculture Irrigation and Livestock) engagement will take place during location selection approval.
- A rapid assessment to be conducted to evaluate watershed boundaries, soil quality, land use, and existing practices prior to implementation.

One of the communities selected for the NbS approach to watershed management included the village of Khwaja Khairab in Takhar, Afghanistan.

The community faced severe environmental degradation and heightened vulnerability to climate change impacts, with frequent flooding and declining livelihoods due to deforestation and overgrazing. To address these challenges, a multi-faceted NbS intervention was initiated, which included the construction of 2,500 water absorption trenches; a 24 m^3 irrigation reservoir; 110 meters of protective fencing; and the planting of 5,250 saplings alongside restorative cover crops.

To ensure long-term sustainability, a community-based Watershed Management Committee (WMC) was established. The results demonstrate that these NbS significantly improved soil fertility, and reduced flood risks. The approach also contributed to climate change mitigation by promoting carbon sequestration through reforestation and improved soil health, thereby reducing the target area overall greenhouse gas emissions associated with land degradation.

Furthermore, the initiative delivered substantial co-benefits, generating short-term economic stability by the disbursement of 2.16 million Afghanis in local wages helping to prevent negative coping mechanisms, as well as building long-term community capacity through targeted technical training including pruning, mulching, land treatment, the use of manure, pasture management and the construction of watershed infrastructures. This study concludes that a holistic NbS strategy; integrating structural, vegetative, and socio-institutional measures, is a highly effective model for building socio-ecological resilience, mitigating climate change risks, and fostering sustainable development in fragile, high-altitude environments.

The Approach

In mountain ecosystems such as Takhar, both NbS and contours offer a powerful alternative for local agricultural practices. NbS are actions which protect, sustainably manage, and restore natural or modified ecosystems that effectively address agricultural challenges including climate change, food security or water scarcity, while simultaneously providing human well-being and biodiversity benefits.

In the village of Khwaja Khairab, 63% of households rely on agriculture and livestock. Years of deforestation and overgrazing have degraded the land, depriving it of its natural protective cover. This has triggered a harmful cycle:

- **Reduced infiltration**: bare soil could not absorb rain and snowmelt.
- **Accelerated erosion and flooding**: Water ran off rapidly, causing destructive floods that damaged homes, tertiary roads connected to farmlands and crops.
- **Falling groundwater levels**: With less water absorption in the ground, springs and wells were at risk.

The community needed a solution that worked with nature, not against it.

As a result, the FARAGIR programme implemented an integrated NbS strategy, focusing on converting the existing bare land to fertile land by operating watershed's NbS practices.

NBS category	Intervention	How it supports and strengthens nature
Structural NbS	2,500 water absorption trenches	Acts by naturally slowing water runoff, allowing water to infiltrate into the ground, recharging groundwater supplies.
	24 m³ water reservoir	Functions like a natural pond, storing water for dry periods and supporting sapling irrigation.
	Agroforestry (5250 saplings)	Rebuilds the native forest ecosystem, stabilizes soil with roots, creates habitats, and provides food (fruit).

NBS category	Intervention	How it supports and strengthens nature
Ecosystem-based restoration	Cover Cropping (480 kg of Alfalfa seeds)	Alfalfa is a legume crop that hosts rhizobia bacteria in root nodules, which convert atmospheric nitrogen (N_2) into ammonia (NH_3), a form usable by plants which directly reduces the usage of synthetic nitrogen fertilizers in target area.
	Restoring Local Cumin (40 kg seeds)	Restores a native medicinal plant species, supporting local biodiversity and medicinal plant availability.
Protecting NbS	110m of Protective Fencing	A simple structure that enables natural processes (forest regrowth) to occur without human or livestock disruption.

The Impact

The NbS approach to watershed management in the Khwaja Khairab community had a positive impact with 38 hectares of bare land transformed into fertile forest which now provide a reliable source of livestock hay. The area has been fully reclaimed and appears lush and green. Rainwater is now effectively stored in trenches, increasing the groundwater table in targeted areas.

Before Concern's intervention, the community suffered from devastating floods that caused soil erosion and placed clay on roads and streets. According to a community elder, wildlife has returned, and birds can be heard each morning from the watershed area.

The FARAGIR programme successfully planted 5,250 fruit (walnut, mulberry, apple, appricot, pistachio and almond) and non-fruit (russian willow, pine and pashakhana local tree) saplings, with a 90% sprouting rate, creating a future source of income. The community hired a guard to protect the area when the project ended, funding his wages from the sale of the first crops as well as hay. Additionally, 36 labourers received temporary employment for two months during a time of job scarcity. Through training, these workers learned NbS techniques, such as using an A-frame for land levelling converting barren land to agriculture land, digging trenches, contour farming, constructing check dams, establishing plant nurseries, and compost production. These skills have empowered them to replicate the project in other parts of the community.

Landscape view of Khwaja Khairab prior to plantation. Photo: Najibullah Asim/Concern Worldwide.

Landscape view of the reclaimed watershed at Khwaja Khairab. Photo: Najibullah Asim/Concern Worldwide.

Lessons learned

Technical solutions are not enough. In Khwaja Khairab, the integration of the community was the key driver that ensured that the NbS was successful and sustainable.

Collaborative design: The project started with Focus Group Discussions (FGDs), ensuring the NbS addressed the community's perceived needs and incorporated their knowledge. The discussions established community agreements regarding labour, wages and security, water availability, farming skills, and soil suitability for reforestation.

Economic and social integration: A cash-for-work model (based on the Food Security and Agriculture Cluster guidelines) enabled 36 community members to be paid for the construction of the trenches and fencing. This provided immediate livelihood support and fostered a sense of ownership and vested interest in the project's success.

A committee for the future: A 15-member Watershed Management Committee (WMC), including 3 women, was established. This committee ensures the long-term maintenance and protection of the NbS interventions. Members were selected based on specific criteria including literacy level, influence within the community, knowledge of the areas including their natural resources and vulnerabilities, as well as an overall focus on equality, protection and inclusion.

Technical and social support: Both technical (trenches, traces, check dams, gully plugs) and social support (WMC, community engagement in the labour process, and guards) are key to NbS success.

Multiple benefits: The project delivered simultaneous benefits: environmental (less flooding, better soil); economic (short-term wages, long-term fruit yields); and social (increased knowledge, community cohesion). This multi-functionality is a symbol of effective NbS.

Indigenous knowledge matters: One of the crops selected for the watershed was local cumin, chosen for both ecological and cultural reasons. Traditionally used for medicinal purposes and valued for its fragrance, the crop had previously disappeared due to overgrazing. Leveraging and valuing local knowledge increases adoption and project success.

Protection is necessary: In degraded areas, natural regeneration needs additional support. The fencing was a crucial, low-cost intervention to allow the NbS (saplings, grasses) to establish themselves.

Site guard irrigating sapling. Photo: Najibullah Asim/Concern Worldwide.

Site guard irrigating sapling. Photo: Najibullah Asim/Concern Worldwide.

Conclusion

The Khwaja Khairab watershed project is a testament to the power of community led-NbS . By investing in the landscape's natural ability to heal itself and empowering the people who depend on it most, the project created a resilient system that will continue to provide water security, food, and livelihoods for years to come. This model provides a valuable blueprint for sustainable development in mountainous, climate vulnerable regions worldwide.

Testimonial

Mohammad, a 57-year-old participant from Khwaja Khairab village, expressed that the establishment of a 38-hectare watershed area in his village has significantly changed their community.

Mohammad in the watershed at Khwaja Khairab. Photo: Najibullah Asim/Concern Worldwide.

Previously, winter rains caused severe erosion, flood water entered to houses. However, after the creation and rehabilitation of trenches and the planting of saplings, water and soil erosion have significantly decreased, keeping the road accessible. The planted saplings, providing income, supporting indigenous vegetations and ecosystem. Furthermore, the implementation of Cash-for-Work projects generated temporary two-month employment for 36 individuals, disbursing a total of 24,00 Afghanis per labour to enhance economic stability at the household level.