Executive Summary – 3Rs Project Final external Evaluation (2022–2025)

This Executive Summary presents the key findings, conclusions, and recommendations of the Final External Evaluation of the "Design and Implementation of Water Harvesting Practices and Policy Dialogue in Jordan (3Rs)," implemented by INWRDAM in partnership with IHE Delft and Acacia Water and funded by the Embassy of the Kingdom of the Netherlands (EKN). The final evaluation of the 3Rs Project (Recharge, Retention, and Reuse) assesses the performance and results achieved between 2022 and 2025 across three regions: Azraq, Mafraq, and the North Jordan Valley. Funded by the Embassy of the Kingdom of the Netherlands (EKN) and implemented by INWRDAM in partnership with IHE Delft and Acacia Water, the project sought to strengthen Jordan's water security and climate resilience through integrated water-harvesting, nature-based solutions (NBS), and inclusive community engagement. Rooted in a clear transformation pathway linking inputs to outputs, outcomes, and long-term impact, the 3Rs Project delivered interventions that combined hydrological engineering, ecosystem rehabilitation, capacity development, and policy reform. This systems-based approach validated the project's Theory of Change that local innovation, institutional coordination, and community ownership can produce scalable transformation in water-scarce environments.

Project Overview

The 3Rs Project aims to enhance Jordan's water security through integrated rainwater harvesting (RWH) practices, policy dialogue, and institutional capacity development. Operating in water-stressed regions including Azraq, Mafraq, the Northern Jordan Valley (NJV), Al-Muwaqqar, and Humret Al-Sahen, the project

combined infrastructure development, research, and community empowerment to promote climate-resilient and inclusive water management practices.

It is structured around four components:

- **Component 1:** Implementation of water harvesting sites and monitoring practices.
- **Component 2:** Capacity building of ministries staff, local communities, and other stakeholders
- **Component 3:** Initiation of Water Harvesting (3Rs) policy dialogue
- **Component 4: Media Lab:** Promotion of the key learnings and success stories

Jordan faces acute water scarcity, groundwater depletion, and increasing climate pressures. The 3Rs Project (Recharge, Retention, Reuse) addressed these challenges by designing and implementing hydrological structures, nature-based solutions (NBS), and local livelihood interventions across three regions:

- **Azraq** – flood-prone, arid basin requiring recharge and flood mitigation.
- **Mafraq** – semi-arid agricultural zone supporting both host and refugee communities.
- **North Jordan Valley (NJV)** – fertile but erosion-prone region ideal for NBS to support ground water recharge and intensive agriculture.

Together, these regions provided a nationally representative model integrating 2.0 MCM water-harvesting capacity, NBS innovations, and climate-resilient livelihood development. Implemented by INWRDAM, IHE Delft, and Acacia Water with support from the Embassy of the Kingdom of the Netherlands, the project is closely aligned with Jordan's National Water Strategy (2023–2040), the Food Security Strategy (2021–2030), and the

Methods

The final evaluation used a mixed-methods approach guided by OECD-DAC criteria:

- Desk review of project documentation, designs, MEL tools, financial data, and policies.
- Key Informant Interviews with ministries (MoWI, MoA, JVA), municipalities, cooperatives, universities, and donor representatives.
- Focus Group Discussions with farmers, youth, women, and community members.
- Field visits across all three regions to validate results and assess functionality of water-harvesting structures.
- Triangulation and ethics procedures to ensure accuracy, confidentiality, and informed consent.

Transformation Pathway: From Activities to Impact

The 3Rs Project built resilience through a clear chain linking inputs, outputs, outcomes, and long-term impact. The 3Rs Project demonstrated a clear and successful Theory of Change:

- **Inputs:** funding, capacity-building programs, policy dialogues.
- **Outputs:** construction of 90 hydrological intervention in 32 sites as like as (check dams, hafirs, terraces, leaky dams, trees half crescents ponds and marbs); establishment of training hubs and knowledge platforms; multi-stakeholder dialogues informing national 3Rs policy.
- **Outcomes:** improved recharge, flood mitigation, and soil stability; strengthened institutional capacities and operational systems; enhanced community ownership and coordination.
- **Impact:** greater national water security, increased climate resilience, and a shift from fragmented local interventions to a systemic national model.

The project validated that locally driven innovation can catalyze national transformation.

Main Findings (OECD-DAC Criteria)

The final evaluation confirms that the 3Rs Project was both strategically relevant and contextually responsive to Jordan's national priorities and the needs of its target communities.

- ✓ **Relevance – Highly Relevant**. The project was fully aligned with national priorities on drought adaptation, groundwater protection, and livelihood enhancement. The regional approach provided adaptable solutions based on ecological realities.
- ✓ **Effectiveness – Strong Performance**. Project achievements were systematically measured against the progress and targets established in the project's performance indicators. In terms of effectiveness, the project demonstrated outstanding performance achieving more than 80 percent of its planned outputs and exceeding 15 percent of its original targets. An additional 5 percent of outputs remain underway and are expected to be completed in the near term. In terms of effectiveness. These results highlight the project's strong delivery capacity, effective implementation approach, and the soundness of its

performance monitoring and results measurement framework. Municipalities, government institutions, and community organizations expressed.

- ✓ **Efficiency – Highly Efficient**. The project applied cost-effective NBS using local materials and community labor and employed adaptive management to minimize delays and improve value-for-money. Solar-powered irrigation and digital MEL tools further enhanced operational efficiency.

- ✓ **Impact – High and Systemic**. The 3Rs Project generated both immediate and systemic change. It improved aquifer recharge and soil productivity, diversified rural livelihoods, and fostered institutional coordination across ministries and municipalities. Beyond its technical outputs, the project influenced national water policy by contributing to the development of Jordan's first National 3Rs Guidelines, embedding water harvesting and reuse into the country's broader resilience framework. The project transformed rainwater harvesting from a technical intervention into a national movement for climate resilience and inclusive development.
- ✓ **Sustainability – Strong**. Sustainability emerged as one of the project's defining strengths. Community ownership was institutionalized through cooperatives, women-led enterprises, and youth entrepreneurship programs that support continuity beyond donor engagement. In parallel, ministries and local authorities integrated 3Rs principles into operational frameworks, embedding project approaches into long-term planning and national strategies. Looking ahead, formalizing clear exit and financing strategies will be essential to ensure that the benefits achieved to date are protected, expanded, and fully transitioned to national ownership.
- ✓ **Coherence – Excellent**. The project demonstrated strong coherence and complementarity with other national and donor-funded initiatives, fostering cross-learning, knowledge sharing, and programmatic synergies. This ensured that the 3Rs model reinforced rather than duplicated broader national efforts to strengthen water and climate resilience.

Summary of How Progress and Achievements Were Measured

The evaluation confirms that the 3Rs Project's progress and achievements were assessed using a clear and verifiable set of project-specific outcome indicators, These indicators formed the foundation for measuring technical progress, institutional strengthening, and social impact across all components of the project. Performance was reviewed against the original Terms of Reference (TOR) targets, allowing the evaluation team to determine whether results were achieved, exceeded, or remained in progress. Across nearly all indicators, the project demonstrated strong delivery, often surpassing expectations. Measurement relied on engineering validation, administrative records, GIS databases, training attendance sheets, policy documentation, and field verification.

Key Measurement Areas

- **Rainwater Harvesting Infrastructure**: Progress was assessed against the target of implementing 90 structures with 2 million m^3 of combined storage capacity. The project delivered 32 validated sites and 2.1 million m^3 of harvested capacity, surpassing the TOR target and confirming strong technical output.
- **Home-Based Businesses (HBBs)**: Achievements were measured by the number of operational HBBs, and sustainable livelihoods created. The project met the target of 20 HBBs, creating 51 permanent jobs, with 50% women-led units and full youth participation, demonstrating inclusive economic empowerment.

- **Training & Capacity Development**: Measured through training records, attendance lists, and institutional engagement. Against a target of 500 trainees, the project reached 1,490 individuals, delivering 60 structured training events, representing a major over-achievement.
- **Women & Youth Empowerment Strategy**: Progress was assessed through policy adoption and outreach. The National Women & Youth Empowerment Strategy (2025–2028) was formally adopted by MoWI, reaching 1,200 stakeholders—demonstrating institutional uptake and national-level integration.
- **Monitoring & Evaluation System**: Achievement was confirmed by installation of five smart monitoring stations and the establishment of a National 3Rs Committee, fulfilling the TOR's requirement for a functional, institutionalized M&E system.
- **National Knowledge Hub & Media Lab**: Measured by completion rate and operational readiness. The Hub and Media Lab are 75–80% complete, with integrated data systems and ongoing content development classified as on track and already partially operational.
- **Policy Dialogue & 3Rs Guidelines**: Delivery was measured through documented dialogues and policy outputs. The project held four national dialogues and produced the National 3Rs Guidelines (2025) and 10-Year Water Harvesting Framework, fully achieving policy objectives.

Achievements at a Glance (2022–2025)

The evaluation confirms that the 3Rs Project delivered substantial and measurable progress in enhancing environmental resilience, supporting livelihoods, and strengthening institutional systems across Jordan.

- **Environmental & Infrastructure Achievements**. The project transformed arid and degraded landscapes into functioning demonstrations of nature-based solutions.

  Key Achievements:
  - 90 validated water-harvesting intervention established across Azraq, Mafraq, and the North Jordan Valley.
  - Over 2.1 million m^3 of rainwater harvested water that previously caused erosion, flooding, and seasonal loss.
  - 400+ hectares of degraded land rehabilitated through soil bunds, semi-circular terraces, Marabs and slope-management systems.
  - 70,000+ trees revived, strengthening ecosystem health and reducing erosion.
  - 12,000 residents protected from seasonal flood risks through new hafayer and flood-mitigation structures.

- **Regional Highlights:**
  - **Azraq:** 400,000 m^3 of water retained annually.10,000 trees revived and ~6,000 residents protected from flooding.
  - **Mafraq:** more than 0.5 MCM capacity of structures built. slope-management systems stabilizing erosion-prone lands Improved productivity for host and refugee farming communities.
  - **North Jordan Valley:** A series interventions were implemented, including the maintenance of earth dams and hafyers, construction of check dams, and the creating a mountain

terraces. These measures aim to enhance water reuse, improve groundwater recharge, and better understand water behavior in sandy soils. Collectively, they support farmers and researchers in optimizing outcomes and achieving more sustainable water management. Environmental gains translated into new livelihood opportunities, particularly for women and youth.

Key Achievements:

- 20 hydroponic Home-Based Businesses (HBBs) established.
- 15 permanent jobs created in marginalized communities.
- 50% of HBBs run by women, all with strong youth participation.
- Smart irrigation improved efficiency by 30%; solar-powered systems reduced costs by 40%.

- **Capacity Building & Knowledge Transfer.** The project built a strong human-capital foundation for long-term sustainability.

  Key Achievements:

  - 750+ people trained (farmers, women, youth, students, government staff).
  - 20 public-sector professionals received extended on-the-job mentoring in water governance.
  - 1,400 university students engaged through field visits, lectures, and youth exchanges.
  - Eco-Female Journalism Initiative trained 6 female journalists on environmental reporting.
  - Institutional Legacy: National Training Centers
  - Three centers now anchor long-term technical learning:
  - Muwaqqar Station (JU)– Flood mitigation water reuse & groundwater recharge.
  - Sama Al-Sarhan Smart Site – Solar-powered hydroponics & water use optimization.
  - Princess Tasneem Station (BAU) – Climate-smart agriculture and sandy-soil research.

- **Policy, Institutional & Knowledge Achievements.** Policy engagement strengthened national systems for scaling water harvesting.

  Key Achievements:

  - National Youth & Women Empowerment Strategy (2025–2028) formally adopted by MoWI.
  - First National Water-Harvesting Guidelines and 10-Year Strategy Framework drafted.
  - INWRDAM became a permanent member of four national committees, including the Water-Harvesting Committee and the 10 Million Trees by 2030 initiative.
  - Centralized geodatabase (maps, hydrological data, engineering designs) developed for 32 sites.
  - National Knowledge Hub & Media Lab 75–80% complete.
  - Third National Water-Harvesting Policy Dialogue advanced cross-ministerial coordination.

- **Social & Gender Impact.** Perhaps the project's most enduring achievement lies in shifting community behavior and norms.

  Key Achievements:

  - Women and youth moved from passive participants to active decision-makers.

- Communities transitioned from viewing rain as a threat to seeing it as a resource for income and resilience.
- Improved flood management-built trust, reduced fear, and created a culture of preventive planning.
- Resistance to water harvesting significantly declined as collective responsibility took root.

Partnerships & Donor Collaboration.

The 3Rs Project exemplified effective multi-level collaboration. Partners included: EKN, INWRDAM, IHE Delft, Acacia Water, MoWI, MoA, JVA, Universities (Jordan, Balqa), Municipalities and CBOs. These partnerships strengthened water diplomacy and embedded participatory approaches within national systems.

Sustainability & Future Outlook. Sustainability was integrated from design through implementation.

Key Elements:

- Durable, low-maintenance NBS infrastructure.
- Cooperative-led management models (e.g., Sama Al-Sarhan).
- Private-sector linkages to improve financial viability.
- A sustainability plan that integrates capacity, finance, and institutional ownership.
- Future Priorities:
- Institutionalizing local Early Warning Systems (EWS).
- Replicating 3Rs models in additional basins.
- Operationalizing the National Knowledge Hub for long-term scaling.

Lessons Learned

The 3Rs Project generated several lessons with strategic implications for scaling water harvesting and nature-based solutions across Jordan:

- **Community Ownership Drives Sustainability.** Interventions that were co-designed with communities such as in Sama Al-Sarhan and Azraq showed higher levels of maintenance, adoption, and behavioral change. When cooperatives, women, and youth were engaged early, resistance diminished, and long-term stewardship improved.
- **Nature-Based Solutions (NBS)** Provide High Value When Matched with Local Contexts. The strongest outcomes emerged where hydrological designs were tailored to ecological realities (e.g., sandy soils in Humret Al Sahen NJV vs. sloped agricultural lands in Mafraq and Azraq). This demonstrates that NBS are most effective when rooted in localized hydrological assessments rather than standardized engineering templates.
- **Integrated Capacity Building Creates Systemic Change**. Combining technical training with policy engagement, university partnerships, and field mentoring created a comprehensive ecosystem for learning. This multi-tiered approach students, farmers, government staff, journalists strengthened long-term institutional uptake and sector-wide knowledge diffusion.
- **Digital Tools Enhance Monitoring, Transparency, and Decision-Making**. Installation of five smart monitoring stations, GIS-integrated databases, and digital dashboards significantly improved how

data is collected, analyzed, and shared. Real-time monitoring not only strengthens project accountability but also supports policy coherence and climate-risk forecasting.

- **Policy Engagement Requires Iterative Dialogue,** Not One-Time Outputs. Policy achievements such as the National Youth & Women Empowerment Strategy and the 3Rs Guidelines were successful because they emerged from repeated consultations, technical validation, and ministry engagement. This underscores that policy reform is a process of co-creation, not mere document production.
- **Leveraging Universities and Youth Accelerates Innovation**. Engagement of 1,400 students and the establishment of national training centers created a new pipeline of young professionals equipped with climate-smart skills. This proved essential for innovation, knowledge transfer, and long-term sector renewal.

Recommendations

Based on evaluation findings, the following recommendations are proposed for government partners, INWRDAM, and future donor investments:

- Scale and Institutionalize the 3Rs Model Nationwide. The technical and social success of the project warrants replication in other basins. Priority should be given to areas with high flood risk, over-abstraction, or agricultural vulnerability building on the validated design templates and geospatial data developed under the project.
- Strengthen Long-Term Maintenance and Financing Mechanisms. To ensure durability of NBS structures, the evaluation recommends:
  - Dedicated municipal and cooperative maintenance budgets.
  - Public–private partnerships to sustain HBBs and agribusinesses.
  - Integration of water-harvesting O&M into MoWI and JVA annual plans
- Finalize and Operationalize the National Knowledge Hub. Completing, launching, and institutionalizing the Knowledge Hub and Media Lab should be an immediate priority. It should serve as:
  - A national repository for water-harvesting data
  - A training platform for engineers, journalists, and students
  - A coordination space for ministries and donors
  - Deepen Local Early Warning Systems (EWS). Given improved flood control and data monitoring, the next phase should integrate community based EWS linked to digital MEL tools, allowing early alerts and risk mitigation for vulnerable communities.
- Expand Inclusive Livelihood Opportunities for Women and Youth. Future programming should:
  - Scale hydroponic HBB models
  - Explore new climate-smart agribusiness opportunities.
  - Strengthen cooperative management, marketing, and finance skills.
- Continue Policy Dialogue and Embed 3Rs into National Regulations. To secure national ownership, the evaluation recommends:
  - Formal endorsement and dissemination of the National 3Rs Guidelines
  - Integration of 3Rs design standards into permitting and planning processes

- Strengthening MoWI's inter-ministerial coordination on water harvesting and climate resilience

Overall Conclusion

The evaluation concludes that the 3Rs Project delivered significant, measurable, and sustainable results, meeting or exceeding, nearly all TOR indicators and achieving high performance across OECD-DAC criteria. The project successfully demonstrated that nature-based solutions, when combined with strong community engagement, digital monitoring tools, and cross-sectoral policy partnerships, can generate transformative improvements in water security, institutional stability, and rural livelihoods.

The project not only exceeded key technical targets including the construction of 90 water-harvesting intervention in 32 sites and the mobilization of 1,490 trainees but also achieved systemic impact through national policy integration, innovative youth and women empowerment, and the creation of a long-term knowledge ecosystem. With strong foundations for sustainability already in place, the 3Rs Project represents a credible national model that can be replicated, scaled, and embedded into Jordan's long-term climate resilience and water management strategies.