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POLICY BRIEF

Climate Resilience in Jordan's Jerash Camp: Integrating Government Plans, Humanitarian Action and Climate Investment

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Key Messages

1. High-risk, high impact: Jerash Camp hosts 14% of Jerash Governorate's population on just 0.055% of its land. Residents consistently experience water scarcity, seasonal floods, and extreme heat. Risk-informed climate adaptation is needed to protect lives, livelihoods, and infrastructure.
2. Climate-smart solutions: Empowering local stakeholders to drive renewable energy, resilient infrastructure, nature-based water and cooling systems, waste management, and climate education creates healthier communities, stronger livelihoods, and a more sustainable environment.
3. Inclusive, scalable governance: Connecting United Nations Relief and Works Agency (UNRWA), national ministries, municipalities, NGOs, and communities through participatory planning can unlock locally driven climate finance solutions and make Jerash Camp a replicable model for resilient refugee settlements in Jordan and across the globe.

Context

Jordan hosts **13 Palestinian refugee camps**, which together occupy only a small fraction of governorate land (0.012%–0.095%) yet house between 2.6% and 31% of local populations (Table 1). This mismatch is leading to intense pressure on land, infrastructure, and services. In **Jerash Governorate** illustrates this challenge most starkly: its two camps host nearly a quarter of the population, concentrated on less than 0.1% of the governorate's land. Such population density amplifies both social and environmental vulnerabilities, especially as climate risks accelerate. Similar patterns of overcrowding, overstretched services, and escalating climate pressures have also been documented in Irbid Governorate, highlighting how refugee settlements across Jordan experience overlapping and compounding risks (Adam-Bradford et al. 2023). This brief focuses on Jerash Camp, as illustrated in Figure 1.

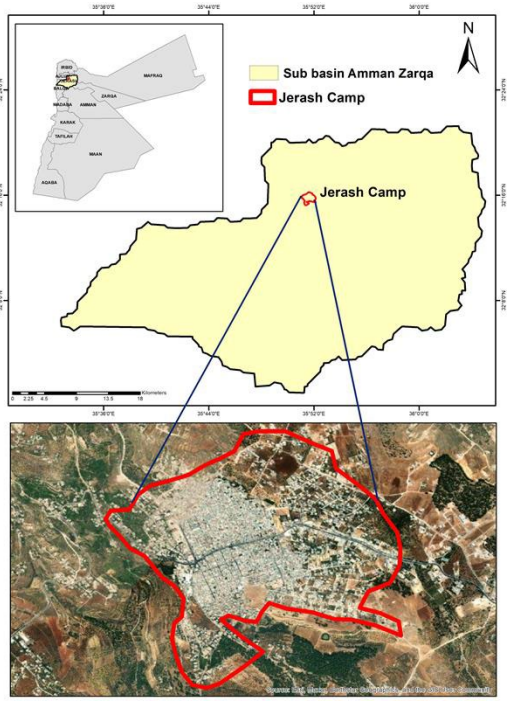

Figure 1. Jerash Camp Map
Source: IWMI 2025.

Table 1. Land and Population Share of Refugee Camps in Jordan by Governorate.

Governorate	Governorate Area (km²)	Camp Area (km²)	Camp Area as % of Governorate Area	Governorate Population	Camp Population	Camp Population as % of Governorate Population
Balqa	3,964	1.497	0.038%	412,715	128,586	31.15%
Irbid	1,572	1.007	0.064%	1,770,158	57,808	3.26%
Jerash	1,364	1.30	0.095%	237,059	54,942	23.16%
Madaba	941	0.112	0.012%	159,700	10,500	6.57%
Zarqa	4,761	1.176	0.025%	635,930	87,802	13.80%
Amman	1,680	1.16	0.069%	4,326,015	113,097	2.61%
Total	13,282	6.252	0.047% (avg)	7,541,577	452,735	6.01% (avg)

Source: Department of Palestinian Affairs (DPA) n.d.

Daily Realities Under Strain

In Jerash Camp, more than 33,000 residents live on just 0.75 km² (i.e., around 14% of the governorate's population) lives on 0.055% of its land. Families endure overlapping hazards: water is delivered only every few weeks, flash floods inundate streets and homes, and extreme summer heat regularly exceeds 40C. Schools operate in double shifts, clinics provide continued services, while waste management services cannot keep pace with demand. These daily struggles reveal how climate risks compound existing service deficits and social vulnerabilities.

A Settlement Shaped by Displacement

Established in 1968 to shelter displaced Palestinians from Gaza, Jerash Camp has evolved from temporary tents into a permanent urban settlement (UNRWA n.d.a). Its housing, roads, and basic infrastructure were never designed to withstand today's flood, heat, and water challenges. With more than 7,300 families living in 2,850 housing units (UNRWA n.d.b), the camp's limited land and aging infrastructure intensify both climate exposure and social vulnerability, leaving little margin for coping with shocks.

Daily Challenges for Residents
Residents of Jerash Camp face multiple, overlapping hazards: Water is delivered irregularly, flash floods disrupt streets and homes, and extreme summer heat threatens children, the elderly, and patients. Overcrowded schools operate on double shifts, clinics are overstretched, and waste management services struggle to meet growing demand.

From Local Challenges to National Priority

These realities underscore why His Majesty King Abdullah II launched the **Climate–Refugee Nexus Initiative** at COP27: to place refugee resilience at the heart of climate policy and finance. Jerash camp embodies both urgent challenges and strategic opportunities. By aligning humanitarian support with long-term adaptation planning, the initiative promotes models linking inclusive governance (UNRWA, ministries, municipalities, NGOs), climate-smart solutions, and new financing pathways—signaling clear opportunities for donors to invest in resilience across refugee and host landscapes.

Our Approach

This policy brief draws on a mixed-methods case study of Jerash Camp to inform evidence-based adaptation planning and guide investment pathways. The assessment involved an integrated watershed and climate risk mapping approach that combined (i) semi-structured interviews with residents (both within and outside the camp), UNRWA staff, municipal and national authorities, and representatives of NGOs and community-based organizations (CBOs); (ii) a review of academic and grey literature; (iii) direct field observations of housing, roads, water and waste systems, informal settlements, and youth programs; and (iv) geospatial analysis of biophysical attributes of the area. Local knowledge was systematically incorporated to ensure that community perspectives shaped the analysis. By integrating quantitative and qualitative evidence, the study provides a comprehensive picture of how social vulnerability, infrastructure deficits, governance constraints, and environmental hazards intersect to influence climate risk and resilience. The purpose of this research is to generate actionable climate risk insights that strengthen local adaptation planning in refugee-hosting areas, while also informing national strategies and climate finance proposals. Lessons from Jerash are designed to be scaled—both to Palestinian camps in neighboring countries and to other camp landscapes in Jordan—offering a transferable model for fragile and conflict-affected settings across the Middel East and North Africa (MENA) region and the Horn of Africa, where climate displacement is rising and data-driven adaptation tools remain scarce. This approach is consistent with practical resources such as the Toolkit for Anticipatory Action in Fragile and Conflict-Affected Settings (Red Cross Red Crescent Climate Centre et al. 2024), which provides adaptable methods to design, test, and finance resilience-building interventions in refugee contexts.

Triple Threats: Water Scarcity, Flooding, and Extreme Heat

Jerash Camp faces three interconnected climate hazards: **Water scarcity, flash flooding, and extreme heat** — that reinforce one another and intensify residents' daily vulnerabilities. **Water scarcity** is a defining challenge. Jordan is among the world's most water-scarce countries (Ministry of Water and Irrigation 2023), with renewable freshwater resources below 100 m³ per capita annually (UNHCR 2024). In Jerash Camp, water deliveries are

infrequent — sometimes arriving only once every 20 days — forcing families to ration water for drinking, cooking, and hygiene (UNHCR 2024; UNICEF 2021). This limited access heightens health risks such as dehydration and waterborne diseases.

The water availability data for the Amman-Zarqa Basin, which encompasses Jerash Camp, illustrates the severity of this crisis in quantitative terms. Historical data (2010–2023) given in Figure 2 shows that the basin already operates below critical water stress thresholds, with annual per capita availability ranging from 192.7 to 293.3 m³ — well below the 500 m³ threshold that defines absolute water scarcity. Climate projections under the SSP2-8.5 scenario indicate further deterioration through 2045 (Figure 3), with several years projected to fall below 200 m³ per capita annually. The seasonal distribution reveals vulnerability during winter months, when availability drops to as low as 12.9 m³ per capita in December, exacerbating the already irregular water delivery schedule that forces camp residents to ration water for weeks at a time.

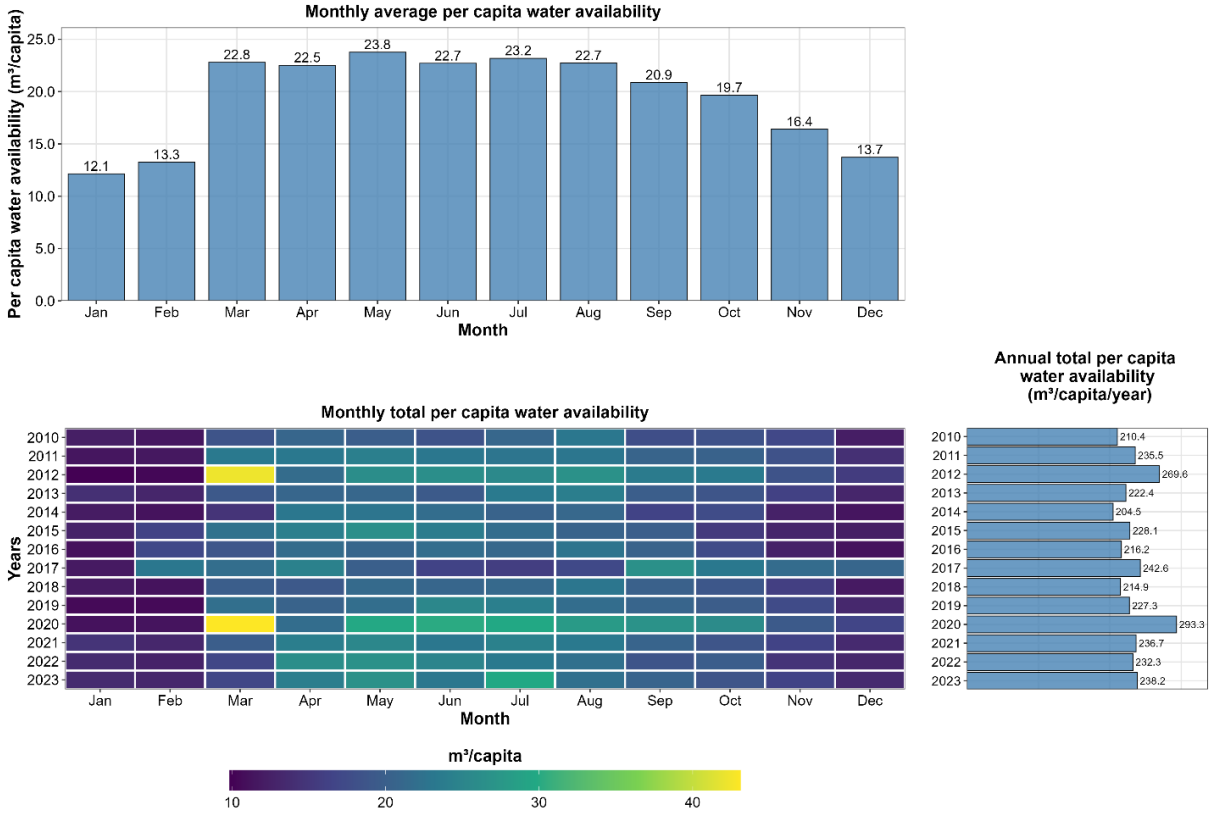

Figure 2. Monthly and annual per capita water availability in the Amman–Zarqa Basin (2010–2023 baseline).

Source: IWMI 2025.
Note: The top chart shows average monthly per capita water availability, with peak availability in May (23.8 m³/capita) and lowest in December (13.7 m³/capita). The bottom heatmaps display monthly and annual variations, with darker colors indicating lower water availability (below 200 m³/capita/year in several years).

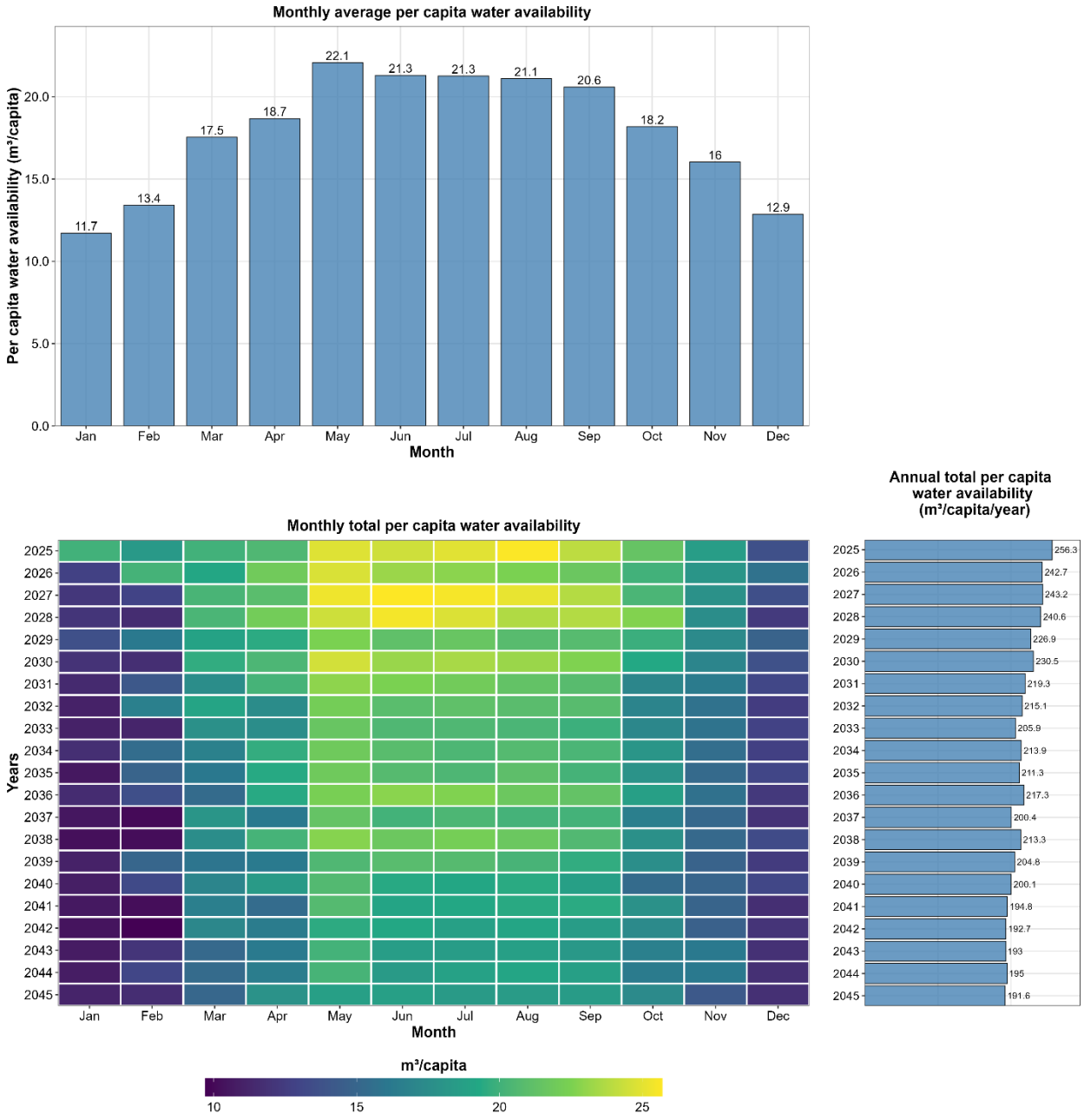

Figure 3. Projected monthly and annual per capita water availability in the Amman–Zarqa Basin under SSP2-8.5 climate scenario (2025–2045).

Source: IWMI 2025.

Note: The projections show reduced water availability compared to baseline, with peak monthly availability declining to 22.1 m³/capita in May and lowest availability dropping to 12.9 m³/capita in December. Annual projections indicate further deterioration, with several years falling below 200 m³/capita/year threshold.

When it does rain, **flooding** quickly exposes the camp's fragile infrastructure. Hilly terrain, irregular rainfall, limited drainage, and dense informal construction make Jerash Camp highly flood prone. Moderate storms can inundate homes and streets, block narrow lanes, and damage property (Al Jazeera 2018). Hydrological studies confirm high runoff potential, elevated drainage density, and short concentration times — classic flood-risk indicators (Alharahsheh et al. 2025; Kloub and Alzboon 2024).

Compounding these risks, **extreme heat** is rising in frequency and intensity. Average temperatures in Jerash have increased steadily over the past four decades (Figure 4), with projections of a 2.5–3.5°C rise by the end of the century under high-emission scenarios (Meteoblue 2025; Berkeley Institute n.d.). Heatwaves exceeding 40°C are now common. Most homes — constructed from heat-absorbing concrete with little insulation — offer minimal protection, leaving children, the elderly, and the fragile highly vulnerable to heat stress, fatigue, and illness. Water availability projections for the Amman–Zarqa Basin confirm this trend, showing a decline from current levels of 200–

290 m³ per capita annually to projected levels below 200 m³ by the 2040s under high-emission scenarios, indicating that water stress will compound heat-related vulnerabilities (Figure 4).

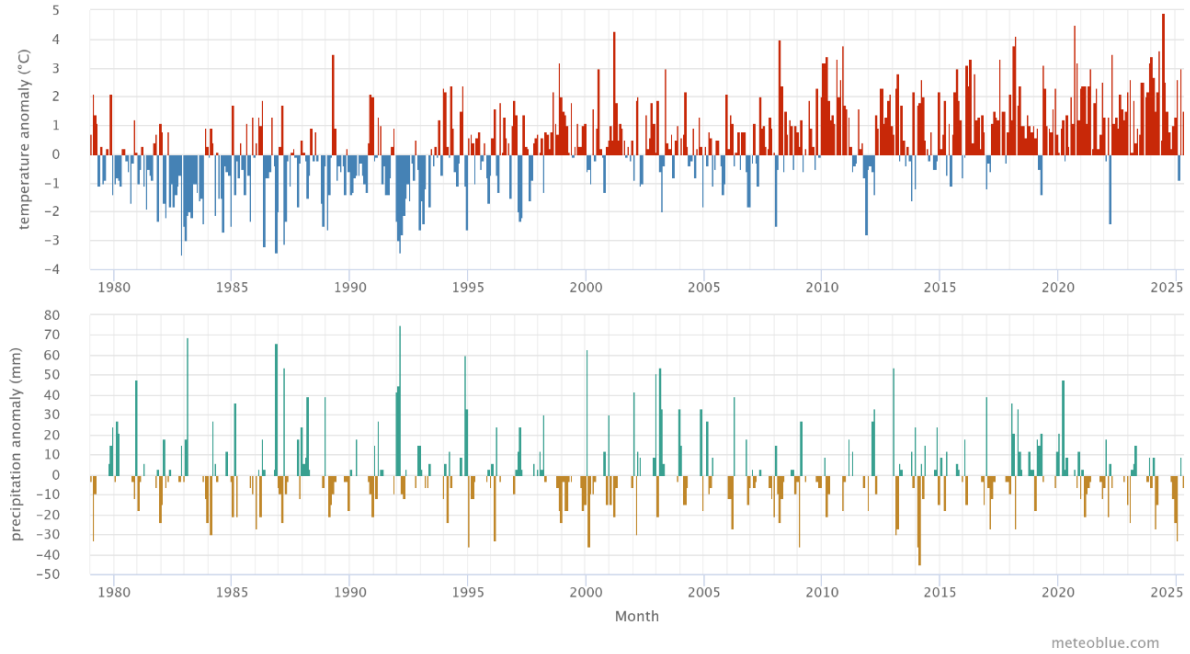

Figure 4. Monthly anomalies for temperature (top) and precipitation (bottom) in Jerash, Jordan (1979–2025).
Source: Meteoblue 2025.

These hazards do not occur in isolations — they reinforce one another to create systemic risks. Water scarcity reduces the ability of households to cope during heatwaves, while flooding damages already limited water infrastructure and worsens sanitation conditions. Together, these overlapping stresses amplify health risks and erode livelihoods. Overcrowding, substandard housing, and chronic underinvestment in infrastructure further magnify these vulnerabilities, leaving residents with little buffer against climate shocks (Adam-Bradford et al. 2023, 2024) These compounding risks underscore the urgency of integrated governance and targeted climate investment, ensuring that refugee-hosting areas like Jerash are fully included in national adaptation and financing strategies.

To break the cycle of escalating climate risks, Jerash Camp requires targeted adapation measures that both reduce immediate exposure and build long-term resilience. Priorities include heat-resilient housing, passive cooling designs and shaded community spaces to protect residents during rising temperatures; reliable water access through rainwater harvesting and improved storage to address chronic scarcity; and community-led drainage and retention systems to reduce flood impacts. Strengthened healthcare services are also essential to respond to climate-related health risks.

Together, these interventions can improve living conditions, safeguard livelihoods, and position Jerash Camp as a model for inclusive, climate-resilient refugee settlements. Experiences from Jordan and other refugee-hosting countries show that anticipatory action, through early warning, preparedness planning, and community participation, can further reduce disaster impacts and strengthen adaptive capacity (Adam-Bradford et al. 2024).

Socio-Economic and Governance Linkages to Climate Adaptation in Jerash Camp

Climate adaptation in Jerash Camp is closely linked to on-the-ground socio-economic realities and governance structures. Household livelihoods, service delivery, and institutional mandates directly shape how residents experience and respond to climate risks. Research findings revealed that resource management must intersect with inclusive social frameworks and human security, ensuring that equity, participation, and rights are central to sustainable and just resource governance (Al-Zu'bi et al. 2024).

Economic Vulnerability and Adaptive Capacity: More than 60% of camp residents, and nearly 80% of women, face limited and irregular income opportunities, with many households depending on daily labor wage. This economic insecurity reduces the ability to absorb shocks such as floods, heatwaves, or prolonged water shortages. Food insecurity remains a persistent risk, particularly for women-headed households (UNICEF 2022; Anera 2023). Informal economic activities, such as small-scale trade and services — including selling goods, running food stalls,

tailoring, hairdressing, childcare, or local delivery — remain a vital source of livelihoods and resilience for many families. Strengthening livelihood opportunities, expanding skills development, and improving market linkages can enhance adaptive capacity and reduce reliance on short-term coping strategies, while mindful support can help manage pressure on scarce resources.

Governance and Infrastructure Constraints: Governance and infrastructure gaps further compound these socio-economic pressures. The Department of Palestinian Affairs (DPA) oversees refugee affairs in Jordan, while UNRWA delivers core services such as education and health. Yet neither institution has the mandate nor resources to undertake major infrastructure upgrades, and the municipality's role is limited inside the camp. This fragmented system leaves schools overcrowded, clinics overstretched, and waste and drainage systems inadequate, while informal construction continues in high-risk flood zones. Stronger institutional coordination and the integration of climate considerations into planning and service delivery to reduce these vulnerabilities and build more resilient infrastructure.

Coping Mechanisms and Long-Term Risks: Coping strategies in Jerash Camp often rely on seasonal or informal work, such as agriculture, which can reduce school attendance and limit youth skill development. These livelihoods are highly climate-sensitive: for example, this year's olive harvest produced less than 20% of the previous year yeild due to low rainfall and heat stress. The sharp drop in production reduced household income and food security, reinforcing cycles of poverty and vulnerability. Over time, dependence on such fragile livelihods limits to ability of households — especailyl women and youth — to build skills, accumulate assets or invest in long-term resilience.

Taken together, these socio-economic pressures, governance gaps, and fragile coping mechanisms highlight the need for adaptation strategies that combine livelihood security with more inclusive, climate-informed governance - ensuring that refugee-hosting areas like Jerash are fully integrated into national planning and financing frameworks.

Climate Governance in Refugee Settings: Lessons from Jerash Camp

Jordan has demonstrated leadership in advancing ambitious climate and development agendas while hosting one of the world's largest refugee populations. At COP27, His Majesty King Abdullah II launched the Climate–Refugee Nexus Initiative, underscoring Jordan's commitment to placing refugee resilience at the heart of global climate dialogue. This positioned Jordan as a pioneer in drawing international attention to the intersection of humanitarian needs and climate action.

National frameworks such as the Nationally Determined Contributions (NDCs), the National Adaptation Plan (NAP), and sectoral climate strategies provide a strong policy foundation (Ministry of Environment 2021). At the same time, a diverse landscape of ministries, municipalities, basin authorities, UNRWA, NGOs, and development partners Is engaged in addressing climate and refugee challenges (Figure 5). While this breadth of engagement signals commitment, it also illustrates the complexity of governance in settings like Jerash Camp, where mandates overlap and coordination mechanisms are often stretched.

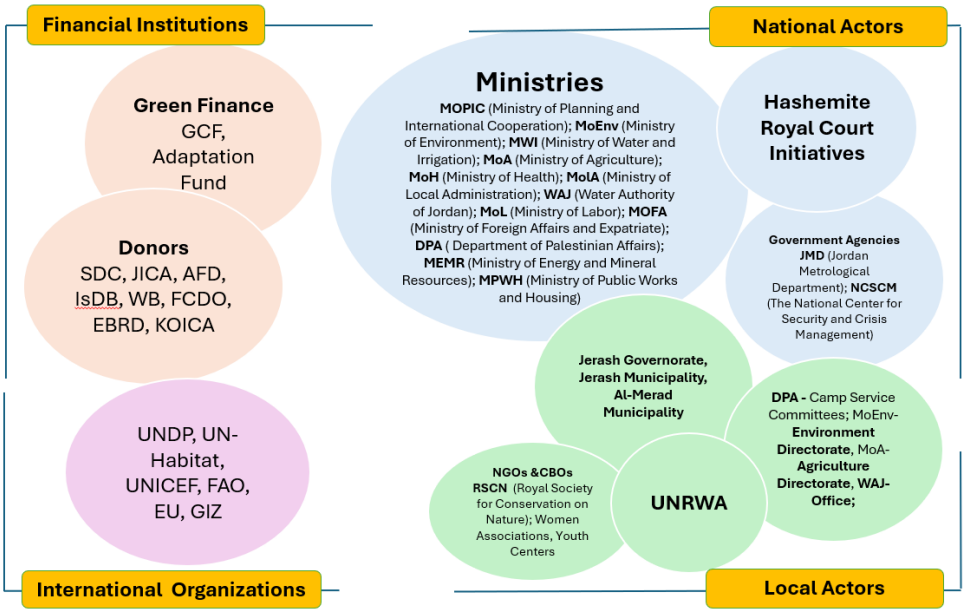

Figure 5. Climate Governance Landscape in Jerash camp setting.
Source: IWMI 2025.

Camps occupy a unique position between national and international systems: Jordan's climate policies primarily target citizens, while international refugee frameworks emphasize protection and service delivery. This divide makes it difficult to fully integrate camps into long-term resilience planning. Humanitarian financing ensures essential services but is rarely connected to global climate finance instruments such as the Green Climate Fund or Adaptation Fund. As a result, refugee-hosting areas remain underrepresented in adaptation proposals and national financing pipelines.

Knowledge gaps reinforce this challenge. Camp-specific climate risk data — on flooding, water scarcity, or heat stress — is not systematically captured in national assessments. For instance, while basin-level water availability projections show declining resources in the Amman-Zarqa Basin, these data are rarely disaggregated to reflect the acute vulnerabilities experienced within refugee camps like Jerash, where population density amplifies water stress impacts. This data gap makes it difficult to prioritize investments and design targeted interventions. In addition, refugees, particularly women and youth, often lack opportunities to participate in decision-making forums such as municipal councils or basin committees, despite their lived experience of resilience strategies.

The key challenge is therefore not a lack of effort, but rather the need for stronger coordination across humanitarian, national, and local actors, supported by international partnerships. By aligning governance reform with financing opportunities, refugee camps could serve as demonstration sites for innovative climate solutions — such as nature-based adaptation or WEFE (Water–Energy–Food–Ecosystems) approaches — that benefit both refugees and host communities. Lessons from Jerash highlight the potential for refugee-hosting areas to be fully integrated into national adaptation strategies and climate finance frameworks, turning governance complexity into an opportunity for inclusive, scalable resilience.

The Governance–Adaptation Nexus in Jerash Camp

Climate adaptation in Jerash Camp is inseparable from socio-economic development and effective governance. Yet assessments of current anticipatory approaches highlight fragmented implementation and limited integration into governance systems gaps that financing frameworks must address (Schindler et al. 2023).

A structured **hybrid governance** model — linking vertical institutions (DPA, UNRWA, ministries) with horizontal actors (municipalities, CBOs, youth groups, NGOs) — can transform overlapping mandates into coordinated, community-driven action.

Key priorities for action include:

1. **Strengthened coordination**: Align interventions across DPA, UNRWA, ministries, and municipalities to close institutional gaps.
2. **Integration into national frameworks**: Embed camp-level adaptation into municipal and national strategies to ensure access to technical support and climate finance.
3. **Inclusive livelihoods and education**: Expand sustainable income opportunities, particularly for women and youth, to reduce reliance on environmentally harmful coping strategies.
4. **Community empowerment**: Support local organizations to co-design and implement adaptation initiatives, fostering participatory, locally relevant solutions.
5. **Climate-smart infrastructure**: Invest in water-harvesting systems, flood preparedness, renewable energy, and nature-based interventions.

By linking governance improvements with socio-economic and climate-sensitive interventions, Jerash Camp can move from reactive coping to anticipatory, community-led resilience. This integrated approach benefits both camp residents and surrounding host communities. By combining governance reform, participatory planning, and evidence-based decision-making, Jerash Camp demonstrates how refugee-hosting areas can advance inclusive, climate-resilient solutions across Jordan, the wider MENA region, and other fragile or conflict-affected settings. With these measures, Jerash can serve as a replicable model for inclusive, scalable, and resilient refugee settlements, reinforcing Jordan's leadership under the Climate–Refugee Nexus Initiative launched at COP27.

Scaling Resilience, Not Just Pilots

Jerash Camp illustrates how localized interventions can inform scalable models. Building on hybrid governance and participatory approaches, Jerash Camp can move beyond one-off projects toward systemic, long-term resilience. The IWMI-led integrated watershed and climate risk mapping project provides a practical foundation, generating location-specific risk profiles and actionable strategies for flash floods, water scarcity, and extreme heat. These data-driven insights support anticipatory planning, inform national adaptation strategies, guide donor investments, and help prioritize interventions that benefit both camp residents and host communities.

The value of this approach lies in its scalability. Within Jordan, lessons from Jerash can be applied across the country's 10 other Palestinian refugee camps, adapting to their specific contexts. At the regional level, the model can inform UNRWA's work in camps across Lebanon, Syria, and Palestine, strengthening the agency's capacity to integrate climate risk into service delivery. Globally, the experience provides transferable insights for other refugee agencies managing camp and settlement landscapes, many of which face comparable climate threats. In this way, Jerash serves not only as a local case study but as a replicable model for climate-resilient refugee governance and investment worldwide.

Linking Jerash to Climate Finance Pathways

To translate lessons from Jerash into finance-ready interventions, the roadmap can be understood through four complementary pathways reflected in global climate finance practices. First, evidence and safeguards ensure that camp-level risk data feeds directly into national adaptation planning, reducing the risk of maladaptation. Second, scaling inclusive models allows proven solutions — such as women-led cooperatives, climate-smart farming, and community-led drainage — to expand across Jordan's 12 camps and UNRWA's wider regional portfolio. Third, embedding refugee resilience in national platforms ensures that camp adaptation priorities are aligned with Jordan's NAP, NDC, and water strategies, opening structured access to international climate finance. Finally, digital and adaptive tools — from participatory GIS mapping to early-warning dashboards and visualization tools to equip UNRWA, municipalities, and ministries with systems to anticipate shocks and prioritize investments

Table 2 outlines how these pathways come together in practice — sequencing action from foundational governance and data integration, through medium-term investments in livelihoods and education, to infrastructure upgrades that embed climate resilience.

Table 2. Sequenced Roadmap for Scaling Climate Resilience in Refugee Camps.

Priority Actions	Description / Focus	Expected Outcome
Foundational (0–2 yrs)		
Governance Coordination	Strengthen existing coordination forums between DPA, UNRWA, municipalities, ministries, NGOs, and CBOs, by adding a climate and resilience focus, including regular information-sharing and joint priority-setting	Reduced overlap and clearer mandates; coordinated planning that avoids duplication and improves efficiency.
Data Integration & Risk Mapping	Collect climate risk data at camp level (flood zones, water scarcity, heat hotspots) using GIS and verifying with community participatory methods. Feed results into municipal and national adaptation plans.	Evidence-based decisions that formally include camps in landscape-level risk management and funding pipeline.
Policy Alignment and Climate Finance	Translate camp-level adaptation plans into NAP, water strategy, and climate finance frameworks. map pathways to climate finance tools that will champion targeting of refugee-hosting contexts.	Camps become eligible for international climate finance, opening pathways to structured, long-term investment.
Medium-Term (2–5 yrs)		
Inclusive Livelihoods	Scale women-led cooperatives, integrate climate-smart urban farming and water-efficient horticulture, and provide accredited vocational training linked to labor-market demand.	Diversified income, improved food security, and reduced dependence on fragile day-labor or environmentally harmful coping strategies.
Community Empowerment	Support youth councils and women's committees to co-design climate projects; provide small grants and microfinance schemes for locally led initiatives (e.g., rooftop gardens, recycling).	Stronger community ownership, accountability and sustainability of adaptation measures.
Climate Education	Incorporate climate awareness and water conservation modules into UNRWA schools; run community workshops on energy efficiency and household water management.	Better-informed residents who adopt resilient behaviors and pass knowledge across generations.
Infrastructure (3–7 yrs)		

Water Systems	Install household and communal rainwater harvesting, improve storage and delivery and co-design drainage systems with residents.	Reliable water access during scarcity and reduced flood damage in heavy rains.
Renewable Energy	Deploy multi-purpose solar solutions for lighting, cooling systems (especially in schools and clinics), and water pumping.	Lower energy costs for UNRWA and households; reduced emissions and more reliable services.
Flood Preparedness & Nature-Based Solutions	Build flood retention basins, green spaces, and shaded public spaces; restore vegetation on slopes to slow run-off.	Reduced flood risk, improved microclimate, and more livable camp environment.

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- Front cover photo: Narrow ally within Jerash Camp.
- Back cover photo: Sky view of Jerash Camp.

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