

# Integrated watershed and climate risk hotspot mapping in Palestine refugee camps

## Integrated Watershed and Climate Risk Hotspot Mapping

- Implemented and led by the **International Water Management Institute (IWMI)**
- In partnership with the **Ministry of Environment** and the **United Nations Relief Works Agency for Palestine Refugees (UNRWA)**
- With support from the **CGIAR Food Frontiers and Security Program**



**Our ambition:** To strengthen climate and water resilience in refugee camp landscapes and their surrounding host communities, supporting integrated risk management and planning to inform near-term response and long-term investment strategies, including access to climate finance, to ensure sustainable water and land management across fragile settings.

### Climate Proofing Refugee and Host Communities — Starting With the Case of Jordan

Refugee-hosting landscapes are at the frontlines of climate change but often remain invisible to global climate finance mechanisms. In Jordan, where refugee camps and informal settlements are increasingly exposed to climate-induced hazards such as flash flooding, extreme heat, water scarcity and drought, adaptation efforts must be both data-driven and locally grounded. The combination of degraded infrastructure, urban expansion and limited planning in these areas heightens risks for both displaced and host communities.

At the same time, the Government of Jordan and its partners, partners, including the United Nations Relief Works Agency for Palestine Refugees (UNRWA) have recognized the urgency of integrating climate risk into planning, policy and investment decisions. This approach responds to that need by developing an integrated, replicable approach for **climate and watershed risk profiling in refugee-hosting areas starting with Palestine camps in Jordan**, but with applicability across fragile and conflict-affected settings (FCASS) such as Lebanon, Palestine and Syria. **This also provides a model that can inform action in fragile areas beyond these countries.**

### Producing climate risk profiles for better planning

The approach integrates technical modeling tools with local data to produce actionable climate risk profiles for selected refugee camp landscapes in Jordan. These highlight vulnerabilities related to flash floods, extreme heat and water scarcity while identifying sensitive environmental zones such as wetlands, groundwater recharge areas and agricultural land. By overlaying this data with settlement patterns and infrastructure, the profiles will support disaster risk reduction, anticipatory action and adaptation strategies, as well as risk-informed investment planning.

**Our methodology is different from other risk mapping tools—co-designed with local communities through a participatory process and using humanitarian data, our tool integrates watershed-scale modeling with settlement-level climate risk for context-specific decision-making.**



### What we have achieved

- Program design and multi-level engagement with the Government of Jordan, UNRWA, municipal authorities and local stakeholders.
- Integrated qualitative and quantitative risk data collection to capture refugee camp and host community realities.
- Development and testing of an integrated watershed and climate risk hotspot mapping methodology, tailored to camp–community interfaces.
- Development of methodological guides, policy briefs and camp-specific climate–water–health profiles to inform decision-making.



### Next steps for scaling impact

#### For Jordan:

- Apply localized climate risk insights to strengthen adaptation planning in refugee camps like Jerash and their surrounding communities.
- Integrate environmental safeguarding measures for flood-prone and extreme-heat-affected zones.
- Align proposed actions with national and local climate priorities and connect to climate finance pipelines (e.g., GCF, AF).

#### For broader application:

- Provide a transferable and adaptable framework for other refugee camp settings in MENA and beyond.
- Promote a replicable, scalable model enabling humanitarian and municipal authorities to address shared water–climate risks.
- Develop toolkits for integrating climate risk into infrastructure, health and social protection programming.
- Strengthen cross-sector coordination between climate, environmental, humanitarian and municipal actors for coherent action.

## Climate risks in refugee camps in Jordan

In Palestine refugee camps serviced by UNRWA in other countries facing intensified rainfall, more frequent flash floods, growing population densities and the expansion of urban settlements are collectively exacerbating the exposure of vulnerable communities and critical infrastructure to flood risks. These camps are governed by distinct institutional arrangements and embedded in a complex political context that makes them a unique and urgent case for climate adaptation investment.

Jordan stands out as a refugee-hosting country that explicitly recognizes the climate-related challenges faced by displaced populations. Its National Adaptation Plan (2021) and updated NDCs acknowledge the compounded vulnerabilities of refugee-hosting areas and offer a policy

foundation for more inclusive, risk-informed adaptation planning. Government and UN partners are aligned and ready to pilot new methodologies that can feed into climate financing proposals.

This initiative provides donors with a chance to shape scalable tools and adaptation models for FCASS. While this work is rooted in the Palestine camp context, the approach is designed to be scaled, both to Palestine camps in neighboring countries facing similar climate risks, and to other camp landscapes in Jordan served by different agencies. Lessons from Jordan’s refugee-hosting geographies will directly inform programming in fragile settings across MENA and the Horn of Africa, where climate displacement is rising and data-driven adaptation tools remain scarce.

### 1. Map climate and water-related risks in refugee-camp landscapes

- Compile and analyze spatial data on climate hazards, land use, flood risk, water availability and heat exposure
- Identify and map sensitive ecosystems such as wetlands, groundwater recharge zones, forests and agricultural land
- Pinpoint priority risk zones surrounding refugee camps to guide targeted planning and interventions

### 2. Develop localized climate risk profiles to inform action

- Integrate climate hazard data with settlement and infrastructure mapping
- Identify high-risk refugee and host community locations through hotspot analysis
- Produce location-specific risk maps, briefs and planning tools
- Translate risk insights into actionable adaptation strategies and environmental safeguards

### 3. Inform climate strategy and financing across the humanitarian–development–peace (HDP) nexus

- Collaborate with the Government of Jordan and humanitarian and development partners to align risk data with national adaptation priorities
- Identify and support financing pathways, including access to climate and development finance
- Enable integrated planning and action across the HDP nexus in refugee-hosting areas

#### Phase 1

Finalization of concept note and Government of Jordan engagement

#### Phase 2

Data collection and testing of watershed & climate risk mapping methodology

#### Phase 3

Drafting of risk profiles, methodological and policy briefs

#### Phase 4

Presentation of findings to stakeholders and partners



Image: Narrow ally within Jerash Camp. Credit: Maha Al-Zu'bi (IWMI)

## Acknowledgments

This brief provides information about the Integrated Watershed and Climate Risk Hotspot Mapping approach implemented by the International Water Management Institute (IWMI) under the CGIAR Food Frontiers and Security Program. We would like to thank all funders who supported this research through their contributions to the CGIAR Trust Fund ([www.cgiar.org/funders](http://www.cgiar.org/funders)).

## CGIAR Food Frontiers and Security Program

The CGIAR Food Frontiers and Security Program focuses on strengthening fragile, urban and island food systems by catalyzing innovative policies, investments and local capacities to improve food and water security, nutrition and climate resilience for the world's most vulnerable communities. <https://www.cgiar.org/cgiar-research-portfolio-2025-2030/food-frontiers-and-security/>

## Contact

**Sandra Ruckstuhl**, Project Leader, CGIAR Food Frontiers and Security Program and Research Group Leader – Fragility, Conflict, Livelihoods and Water, IWMI, Giza, Egypt ([s.ruckstuhl@cgiar.org](mailto:s.ruckstuhl@cgiar.org))

---

## Citation

International Water Management Institute. 2025. *Integrated watershed and climate risk hotspot mapping in Palestine refugee camps*. Colombo, Sri Lanka: International Water Management Institute (IWMI). CGIAR Food Frontiers and Security Program. 4p.

© 2025 International Water Management Institute. Some rights reserved. This work is licensed under a Creative Commons Attribution 4.0 International License (CC BY 4.0).

## Disclaimer

This publication has been prepared as an output of the CGIAR Food Frontiers and Security Program and has not been independently peer-reviewed. Responsibility for editing, proofreading and layout, opinions expressed and any possible errors lies with the authors and not the institutions involved. Boundaries used in the maps do not imply the expression of any opinion whatsoever on the part of CGIAR concerning the legal status of any country, territory, city, or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Borders are approximate and cover some areas for which there may not yet be full agreement.

Please send inquiries and comments to [IWMI-Publications@cgiar.org](mailto:IWMI-Publications@cgiar.org)

For access to all IWMI publications, visit [www.iwmi.org/publications/](http://www.iwmi.org/publications/)



The International Water Management Institute (IWMI) is an international, research-for-development organization that works with governments, civil society and the private sector to solve water problems in developing countries and scale up solutions. Through partnership, IWMI combines research on the sustainable use of water and land resources, knowledge services and products with capacity strengthening, dialogue and policy analysis to support implementation of water management solutions for agriculture, ecosystems, climate change and inclusive economic growth. Headquartered in Colombo, Sri Lanka, IWMI is a CGIAR Research Center with offices in 17 countries and a global network of scientists operating in more than 55 countries.

## International Water Management Institute (IWMI)

### Headquarters

127 Sunil Mawatha, Pelawatte, Battaramulla, Sri Lanka

### Mailing address:

P. O. Box 2075, Colombo, Sri Lanka

Tel: +94 11 2880000

Fax: +94 11 2786854

Email: [iwmi@cgiar.org](mailto:iwmi@cgiar.org)

[www.iwmi.org](http://www.iwmi.org)

