



RISK FINANCING & INVESTMENT



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CASE STUDY

RISK TRANSFER TOOLS

Strengthening Flood Risk Modelling and Sovereign Insurance Readiness in Madagascar

Madagascar faces recurrent cyclone-induced flooding that damages infrastructure, displaces communities, and threatens food security in one of the world's most climate-vulnerable countries. To strengthen financial preparedness, African Risk Capacity (ARC) supported the development of a scientifically robust, reinsurer-validated flood risk model enabling Madagascar to access sovereign flood insurance alongside existing drought and cyclone coverage.



EXECUTIVE SUMMARY

01 COUNTRY/REGION/LOCATION
Madagascar, island nation in the Indian Ocean

02 RISK ADDRESSED
Population affected and economic loss caused by riverine flood risk

03 IMPLEMENTATION PERIOD/TIMEFRAME
The flood product was developed between January 2023 and completed in December 2025

04 ACTORS/IMPLEMENTING AND LOCAL PARTNERS
EU: Funded model development and deployment. **JBA Risk Management:** Supported flood risk model development. **ARC:** Led model development, contingency planning and capacity building. **ARC Ltd:** Provided insurance coverage. **AfDB MDTF:** Financed Madagascar's USD 1M insurance premium.

05 KEY BENEFICIARIES
Households vulnerable to flooding in Madagascar are the primary beneficiaries of the insurance initiative

CONTEXT AND CHALLENGE

Madagascar is among the world's most climate-vulnerable countries, highly exposed to cyclones, floods, and droughts that repeatedly disrupt livelihoods, food systems, and infrastructure. Around 40% of cyclones in the region affect Madagascar, often triggering severe riverine and coastal flooding.

Climate change is intensifying rainfall variability and extreme weather events, while poverty, weak infrastructure, and reliance on rain-fed agriculture amplify vulnerability.

Between 75–80% of the population lives below the poverty line, and nearly 80% of households depend on agriculture. Recurrent flood shocks therefore rapidly translate into food insecurity, displacement, humanitarian crises, and growing fiscal pressure on the government.

WHY THIS ACTION MATTERS?

- The initiative is highly relevant because it addresses one of the continent's most pressing climate risks, where floods are increasing in frequency and severity and causing devastating social and economic consequences. It ensures risk transfer is provided to vulnerable households by safeguarding livelihoods, reducing displacement, and strengthening coping capacity.
- Economically, it shifts disaster management from costly emergency relief to proactive financing, easing fiscal pressures on governments while enabling faster recovery. Institutionally, it builds national capacity through training the technical working groups on model customization, monitoring as well as contingency planning.

See the intervention and results on page 2 →



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INTERVENTION AND APPROACH

The initiative supported the development of a scientifically robust flood risk model for Madagascar, linking flood monitoring, probabilistic risk modelling, and sovereign insurance mechanisms. Hazard maps, exposure data, and vulnerability information were integrated to identify flood-prone areas, populations, infrastructure, crops, and potential impacts. These datasets fed into a probabilistic flood model that generated risk profiles and estimated economic losses from flood events.

A loss module translated flood footprints into estimated damages, while predefined parametric triggers determined when insurance payouts should be activated. The insurance module then calculated potential payouts based on the severity and impacts of flooding. In parallel, national technical working groups received training on model customisation, monitoring, forecasting, and contingency planning, strengthening national ownership and operational capacity. The system complements existing ARC drought and tropical cyclone products and supports Madagascar's access to sovereign flood insurance.

The project positioned Madagascar among the first African countries to complete all technical development stages of a sovereign flood insurance product under the ARC pilot initiative. The successful rollout accelerated interest and technical progress in ten additional African countries, supporting regional scale-up of flood risk financing solutions. By integrating flood forecasting, risk modelling, and parametric insurance mechanisms, the initiative strengthened financial preparedness, improved understanding of flood risks, and enhanced national capacity for anticipatory action and contingency planning.

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PROGRAMME OUTPUT ALIGNMENT



This action contributes to Risk Transfer Tools, Preparedness, and DRR Enabling Environment outputs under the Intra-ACP DRR Programme..

OUTPUT 1.1: Expanded coverage and improved capacity of African Risk Capacity (ARC) models and tools

OUTPUT 1.2: Supported deployment of customizations of natural hazard risk models in existing and new ARC member states

RESULTS AND CHANGE

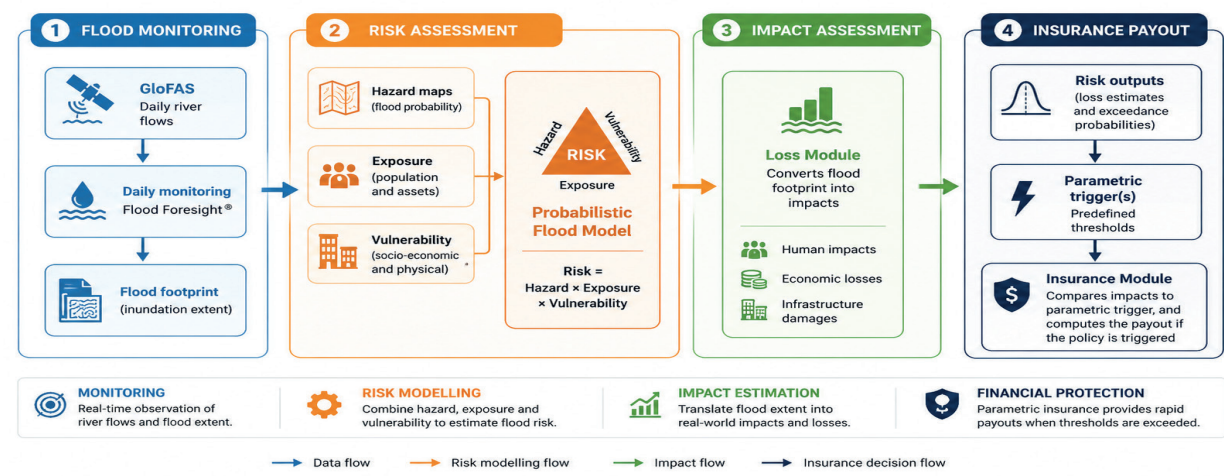
- 1 Development of the ARC flood explorer web-based tool enabling relating monitoring
- 2 The model was adapted and validated in pilot countries to reflect local contexts. All 11 participating countries aim to complete the development process by December 2026.
- 3 Underwriting readiness was confirmed with reinsurers endorsement of the model, enabling insurance coverage.
- 4 Policy adoption by Madagascar becoming the first to secure flood insurance for the 2026 wet season.

EARLY CONCRETE UPTAKE IN ONGOING INVESTMENTS:

- After addressing issues raised by reinsurers, insurance coverage was proposed for Mozambique and Malawi in December 2025.
- After that, Madagascar took insurance coverage becoming the first country to have a sovereign flood insurance coverage in Africa.

FLOOD RISK INSURANCE MODELING FRAMEWORK

From flood monitoring to insurance payouts through risk modelling and impact assessment



KEY ENABLERS OF SUCCESS

- External technical review improves the model's credibility and fitness for purpose.
- In-country customisation and validation ensured relevance to national contexts and improve buy-in.
- Engaging reinsurers and addressing their concerns enables the provision of insurance coverage.
- Local Capacity-Building and Political Engagement Strengthened Ownership
- EU financial support