

Turning Heat Resilience into Action: Digital Solutions and Innovative Financing --

'Resilient Urban Futures' initiative connecting policy-program-practice spectrum



The Challenge

The Urgency of Action:

Who Is Most at Risk?

- Low- and middle-income countries face disproportionate health burdens
- Urban populations with limited access to cooling infrastructure
- Elderly, children, and outdoor workers in high-heat regions

370% projected increase in heat-related deaths -- Without direct climate action, global heat mortality is set to surge — one of the deadliest consequences of inaction.

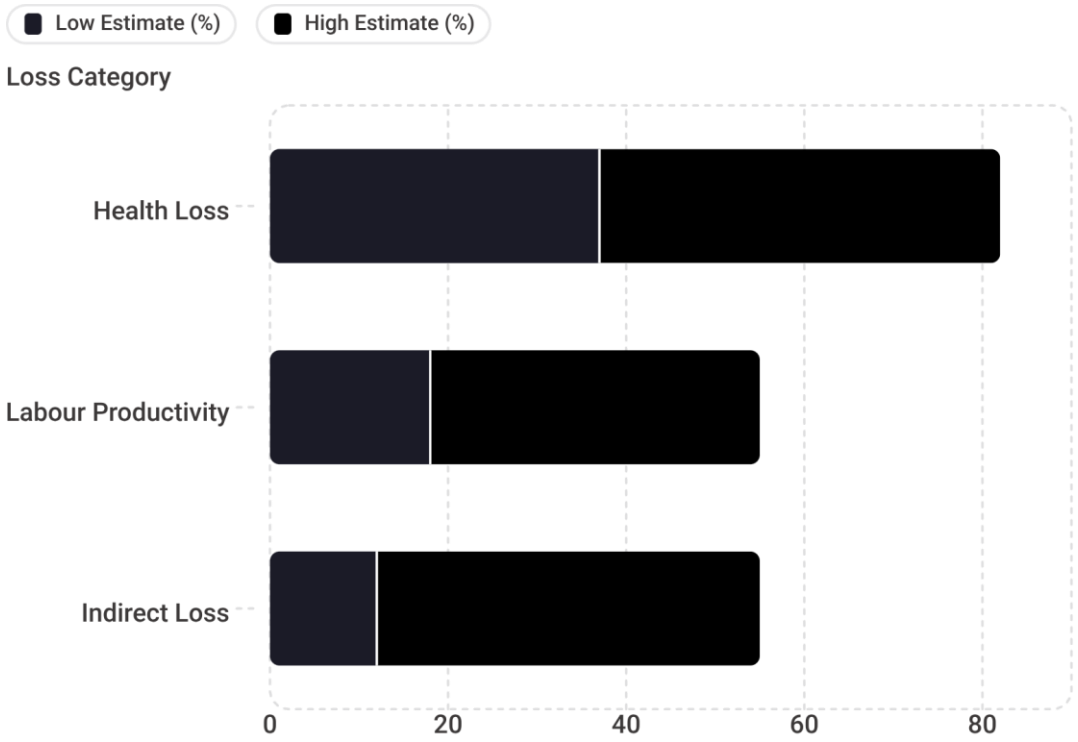
Socio-economic impact:

- UNICEF - 2bn children to face heatwaves impact by 2050
- Loss of lives, health issues, water scarcity, wildfires, economic productivity
- Increasing mortality among vulnerable segments – infants, elderly, women, low-income groups – More deaths than hurricanes, tornadoes, lightening combined
- Heat island effect intensifies impact around built environments
- Urban areas: 10-15°C higher surface temp than surroundings



⚠ The window for preventive action is closing. Every degree of warming compounds the human cost.

The Economic Cost: 0.6–4.6% Global GDP Loss by 2060



Breaking Down the 0.6–4.6% GDP Loss

By 2060, the compounding effects of extreme heat on economies will be severe and structurally embedded across three major channels:

- **Health costs** — 37–45% of total economic loss
- **Labour productivity** — 18–37% of total economic loss
- **Indirect disruption** — supply chains, services, 12–43%

Developing countries suffer **2–4× higher losses** than the global average, deepening existing inequalities.

Who suffers the most: outdoor workers and urban poor

🌾 Agriculture

Cropping sectors face up to **9% GDP loss** in high-heat regions as heat stress cuts yields and limits working hours.

⛏️ Mining

Mining industries face up to **20% GDP loss** — the most exposed sector in outdoor labour-intensive economies.

🏗️ Construction

High physical exertion combined with extreme heat cuts productivity and raises health costs in rapidly urbanising regions.

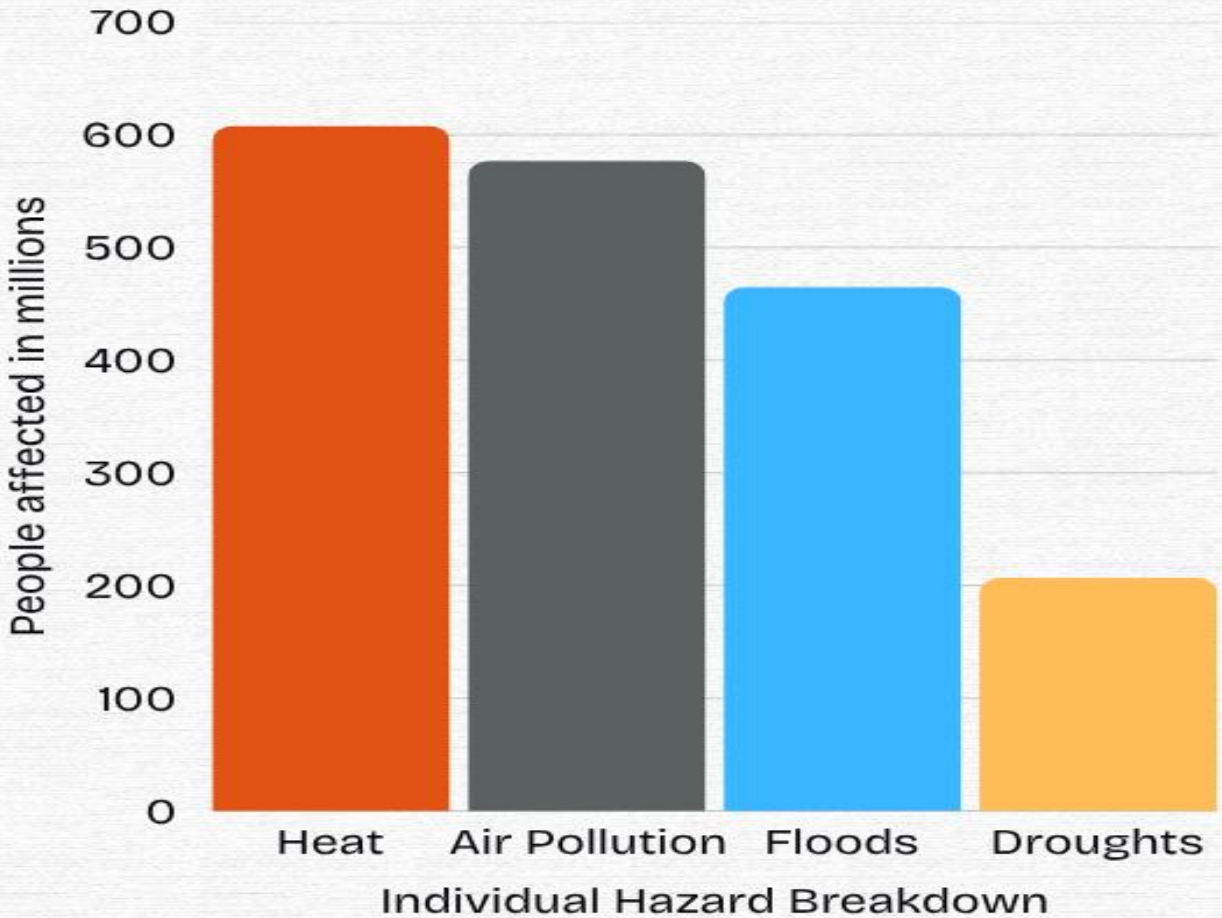
🏘️ Poor Households

Welfare losses are documented across **all warming scenarios** — low-income households have the least capacity to adapt.

These sectors represent the backbone of many developing economies — **heat resilience is an economic justice issue**.

887 Million People: The Overlapping Crises of Poverty and Climate Risk

Multidimensionally poor people across 108 countries are exposed to at least one major climatic hazard



Prolonged periods of excessively high temperatures that threaten human health and infrastructure.

High concentrations of harmful particulate matter and gases in the air, intensified in urban environments.

Overtopping of natural or artificial water defenses leading to the inundation of typically dry land.

A prolonged period of abnormally low rainfall, leading to water shortage and ecological stress.

Mounting Vulnerability

Focus Groups: Women, elderly, children, marginalized and multidimensionally poor face mounting vulnerability and exposure to these hazards.

UNDP-2025 Global Multidimensional Poverty Index (MPI) – Overlapping Hazards, Poverty and Climate Risks

The ‘Resilient Urban Futures’ initiative – deploying digital tools and tech solutions for heat resilience

Urban Resilience: understanding & framework

3 Dimensions

Physical/Built + Environmental + Social-Economic

5 Strategic Priorities

- Prioritize cities/locations with greatest capacity gaps
- Engage diverse stakeholders to strengthen urban governance
- Equitable socio-economic urban resilience incl gender, disability and displacement
- Secure resilient urban planning, development and investment including public-private finance
- Apply digital technologies and innovation to secure resilient urban futures

Multi-risk approach with focus on 2 emerging risks

Water-related Risks

- Water Systems & Infrastructure Planning
- Integrated & Inclusive Water Governance
- Digital Technologies for Adaptive Water Management
- Nature-Based Solutions
- Communities & Raising Public Awareness

Extreme Heat

- Mapping Heat Risks
- Heat-Resilient Urban Infrastructure
- Early Warning & Emergency Response
- Nature-Based Cooling Solutions
- Public Awareness
- Partnerships & Collaboration

Participatory governance and general inclusiveness

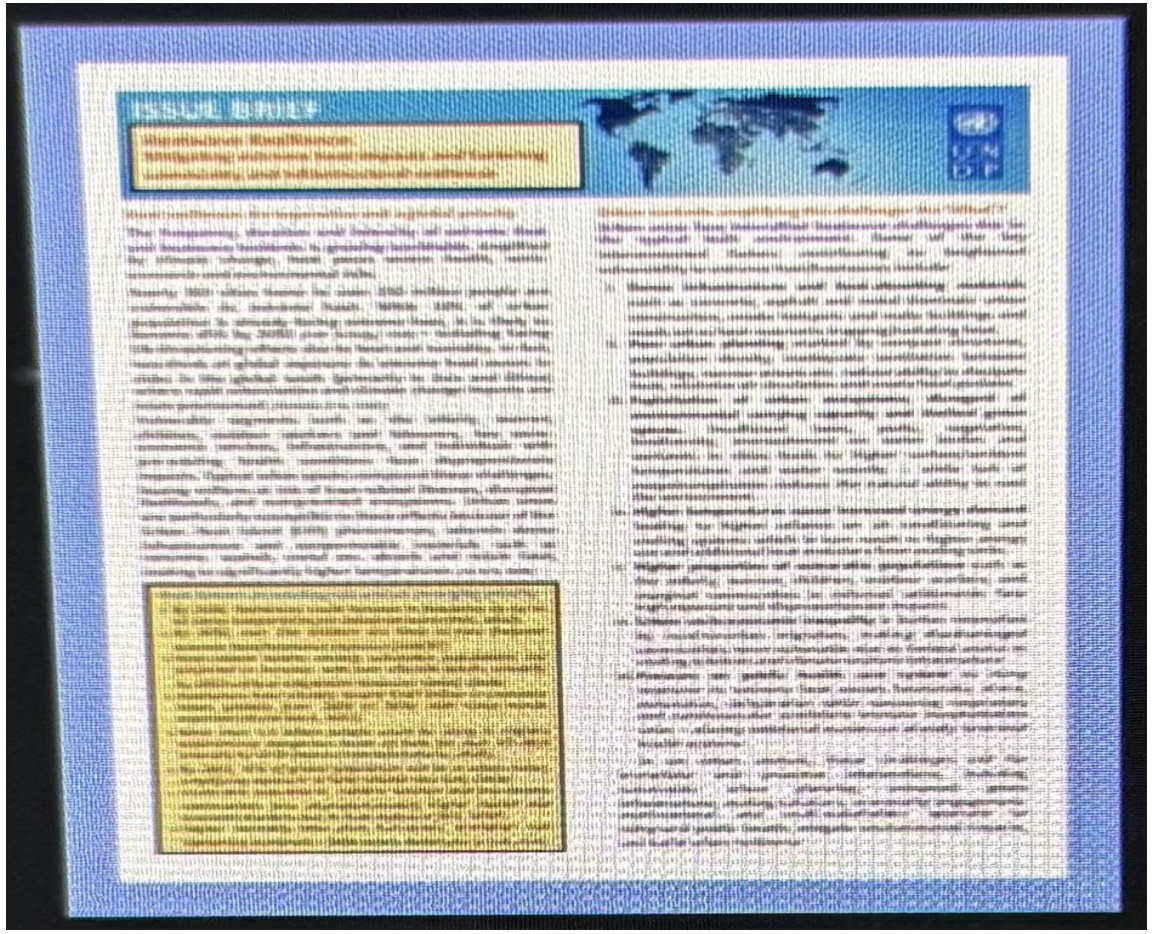
NbS-digital tech serves as a cross-cutting strategy across all risk scenarios

*Urban Resilience is the measurable **ability** of any **urban system**, with its **inhabitants**, to maintain **continuity** through all shocks and stresses, while **positively adapting and transforming** towards sustainability.*

– UN-Habitat

Heat Resilience: policy and programmatic framework

Heat Resilience: Policy to mitigate heat impacts and foster community-infrastructure resilience



Heat Resilience: programmatic framework for city-level implementation

MAPPING HEAT RISKS	Map Heat/Urban Heat Island (UHI) Hotspots	Heat Risk Profiles and Assessment	Extreme Heat/ Heatwave Impact on Infrastructure
HEAT-RESILIENT URBAN INFRA-STRUCTURE	Green Infrastructure	Heat Absorbing/ Reflecting and Cool Materials	Risk-Informed Urban Planning
EARLY WARNING & EMERGENCY RESPONSE	Heat/Heatwave Alerts and Advisories	Digital Tech Applications	Emergency Response and Heatwave Drills
NATURE-BASED COOLING SOLUTIONS	Hydrostations , Regreening and Eco-Friendly Cooling	Preserve Urban Wetlands/Water Bodies	Tech Applications for Water Governance and Management
PUBLIC AWARENESS	Communication and Educational Materials	Mass Media Campaigns	Local Action and Community-Led Initiatives
PARTNERSHIPS & COLLABORATION	Civil Society Engagement	Engage Academic And Technical Institutions	Knowledge and Information Sharing

Resilient Urban Futures initiative in Kisumu, Kenya

Overall approach: combining risk analytics, policy reform, digital innovation, and institutional capacity development, directly contributing to reduce vulnerability to heat- and water-induced risks

Application of digital tools and technologies:

- **Kisumu City Climate Risk Profile** –integrating historical and projected climate data with focus on floods, heat, drought and erosion as major risks by 2045
- **GIS-based Flood and Heatwave Preparedness Platform** – to provide real-time hazard monitoring, ward-level exposure mapping and multi-channel alerts via web and mobile applications
- **Operationalization of EOC** and integrated with digital EWS -- (Mobile Platform: Kisumu Watch and Web-based platform)

Inter-linkages with cross-sectoral resilience building:

- **Kisumu City Land Use Master Plan** reviewed-updated to integrate disaster/climate risks into zoning, development controls, and urban strategies, reducing future exposure
- developed risk-informed and gender-responsive **building code Standard Operating Procedures (SOPs**), promoting safer construction practices in high-risk areas
- supported formulation of **Kisumu's Solid Waste Management Policy, Act, and Regulations**, tackling waste-related drainage blockages and environmental degradation
- **Wetland Management Plan to support** livelihoods for households dependent on fisheries, papyrus harvesting, and eco-tourism sectors

Digital solutions foundation: From EWS to IoT sensor networks, mapping heat hotspots, real-time sensors, data platforms etc., digital tools are transforming how cities anticipate and respond to extreme heat — in real time.

Resilient Urban Futures initiative in Hawassa, Ethiopia

Overall approach: combining risk analytics, policy reform, digital innovation, and institutional capacity development, directly contributing to reduce vulnerability to heat- and water-induced risks

Application of digital tools and technologies:

- Foundational **Study for Promotion of the Application of Digital Technologies and Innovations** to Improve Municipal Services, Functionality, and Governance
- Categorization and **multi-criteria analysis of heat wave trends**, projections, and vulnerability in Hawassa City to ultimately support risk-informed planning
- **Protocols and SOPs** for Multi-hazard Emergency Management and Disaster Preparedness for Hawassa City

Inter-linkages with cross-sectoral resilience building:

- Established multi-stakeholder **city resilience platform** (MCRP), a collaborative approach involving various actors including government, private sector, academia, NGOs, CSOs
- Conducted disaster risk profile and developed **multi-year city resilience investment strategy** and implementation plan and validated by Govt.
- Comprehensive water resources assessment and development of a **risk-informed water master plan** for Hawassa city

Anticipate-Monitor-Respond: Digital tools provide cities the intelligence to act before heat becomes catastrophic and connect heat resilience action with other key socio-economic development sectors and infrastructure

The ‘Resilient Urban Futures’ initiative – innovative financing solutions for heat resilience

Innovative finance for heat resilience

- Unlike other hazards, heat stress not triggered significant policy, programmatic and financial response by global community and in-country stakeholders
- Rising interface between formal and informal economies across geographies has placed formal and gig economy workers in an increasingly vulnerable and unprotected position
- *'Resilient Urban Futures'* initiative seeks to address the challenge by –

i. Develop innovative financial tools like micro-insurance, pay-outs to informal workers to stabilize incomes, cover health costs and incentivize preparedness

ii. Integrate pre-agreed risk reduction and mitigation interventions to reduce exposure and improve preparedness pro-actively

iii. Foster sustainability through institutionalization with local governments and corporate entities (hiring informal workers) for lasting impact through combination of insurance-DRR approach into heat action

iv. Integrate digital tools/technologies to ensure efficiency and scale up

- Aim: to help overcome barriers related to financial viability and scalability of insurance; institutional capacity gaps; lack of protection for gig economy workers; and limited private sector engagement in DRR

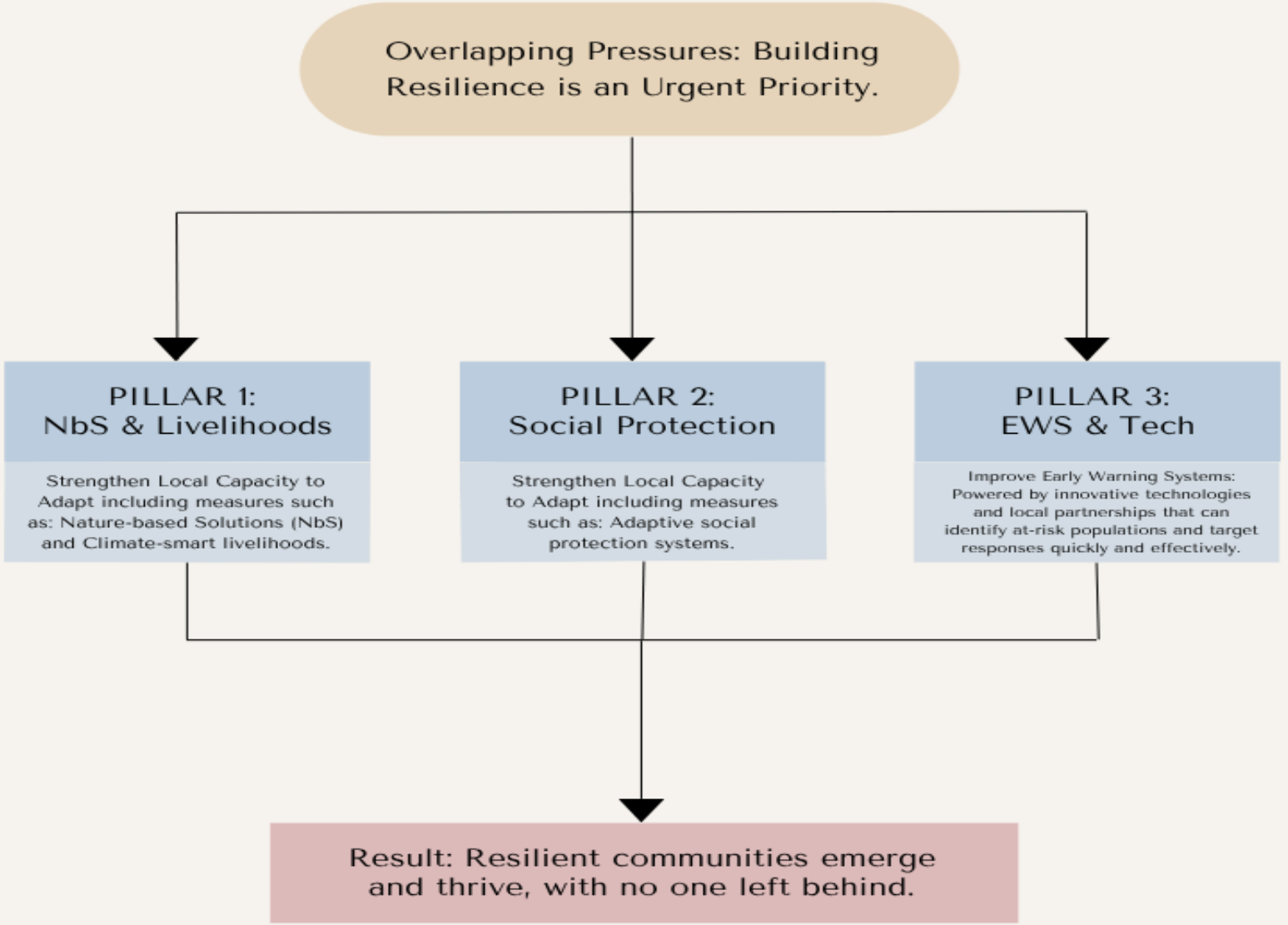
Catalyzing insurance and risk financing for heat resilience

Project	**Kisumu Heat and Drought Resilience Insurance Initiative (KHDRI)** – to develop and test a data-driven parametric insurance solution for at least 20,000 low-income urban and peri-urban households, workers, and micro-enterprises
Objective	Catalyze insurance/risk financing solutions for improved risk reduction and management for outdoor formal (police, utility services, postal, transport and others) and informal (gig economy, delivery agents, roadside shops, vendors and others) sector workers as well as their employing entities/businesses. **Demonstrate** a scalable, financially viable and replicable model for climate-risk protection in small/middle-sized cities in the Global South
Approach	Building upon the ***GIS-based Flood and Heatwave Preparedness Platform launched under the 'Resilient Urban Futures' project in Kisumu***, will use satellite, geospatial, and climate analytics to trigger payouts transparently and quickly, reducing friction and improving trust. **Integrate** risk reduction measures with insurance or risk financing facility and bundling insurance with practical DRR-CCA action while advancing public awareness and public-private sector alignment.

Catalyzing insurance and risk financing for heat resilience

Focus areas	I. **Finance:** design and pilot dual-risk parametric insurance solution covering heat and drought/water stress – with rapid and transparent payout II. **Inclusion:** cover 20k holders through entity or group-based and digital distribution channels
Complementarity	With 'Resilient Urban Futures' initiative activities related to (i) risk reduction (combining heat-health insurance and DRR); (ii) institutionalization (city and county planning agencies); and (iii) replication (generate lessons, evidence and implementation tools)
Product	A. **Micro-level** protection for households, workers and micro-enterprises – To receive automatic mobile-money payouts on a pre-agreed climate threshold and avoid loss assessments by using objective, third-party climate data B. **Meso-level** protection for associations and local response actors -- to MSMEs, private companies, worker associations, cooperatives, etc. to fund protective action and risk reduction measures for public-benefit.
Triggers	A. **Heat:** calibrated threshold using satellite, reanalysis, met data and alerts generated by the Flood and Heatwave Preparedness Platform and Kisumu Watch mobile platform B. **Drought:** calibrated threshold based on rainfall anomaly, vegetation or soil-moisture stress, and/or water availability indicators derived from geospatial and met deptt

From Recognition to Rapid action



Focus Areas of UNDP's Heatwave Resilience Action

HANDS ON Urban Resilience:

Project	A comprehensive offer mapping digital **technologies and** nature-based solutions for mitigating urban heat and water-related risks
Output-1	Developing and strengthening risk intelligence – data analytics and risk monitoring using digital tech
Output-2	Risk-informed urban planning and integrated governance – augment urban governance systems, policies, capacities and structures
Output-3	Climate-resilient water infrastructure – advance grey-green urban infrastructure and community assets development
Output-4	Nature-based solutions for dual benefits – implement scalable NbS that function as catalysts for urban resilience to risks and sustainability
Output-5	EW and emergency management systems – impact-based EWS enabled by digital tools and strengthened emergency management systems
Output-6	Catalyzing enabling environment and action – foster a sustainable ecosystem for resilience through finance, innovation, community leadership and partnerships

Contact

Thank you!

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