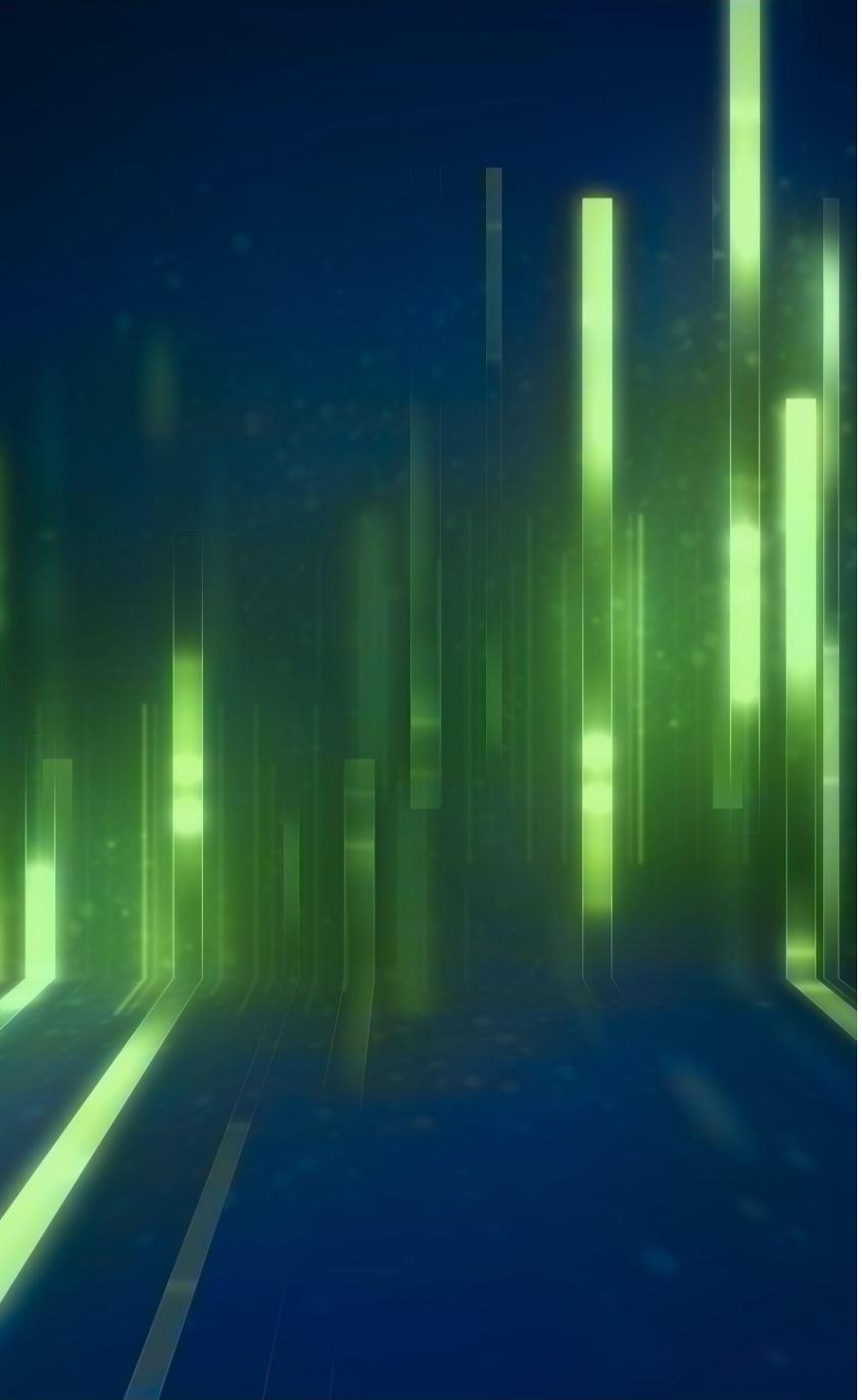
Soichiro Yasukawa

Chief of the Disaster Risk Reduction Unit, United Nations Educational, Scientific and Cultural Organization (UNESCO)

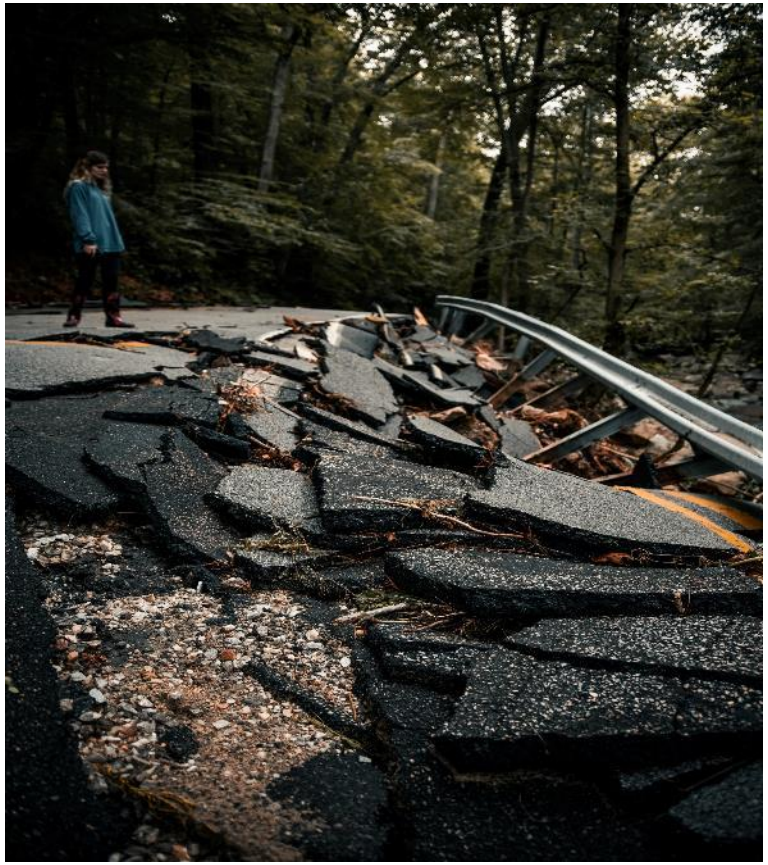


Goals:

1. Show how AI can be used in DRM,
2. Introduce key concepts, &
3. Bridge innovation with operation through international standards.

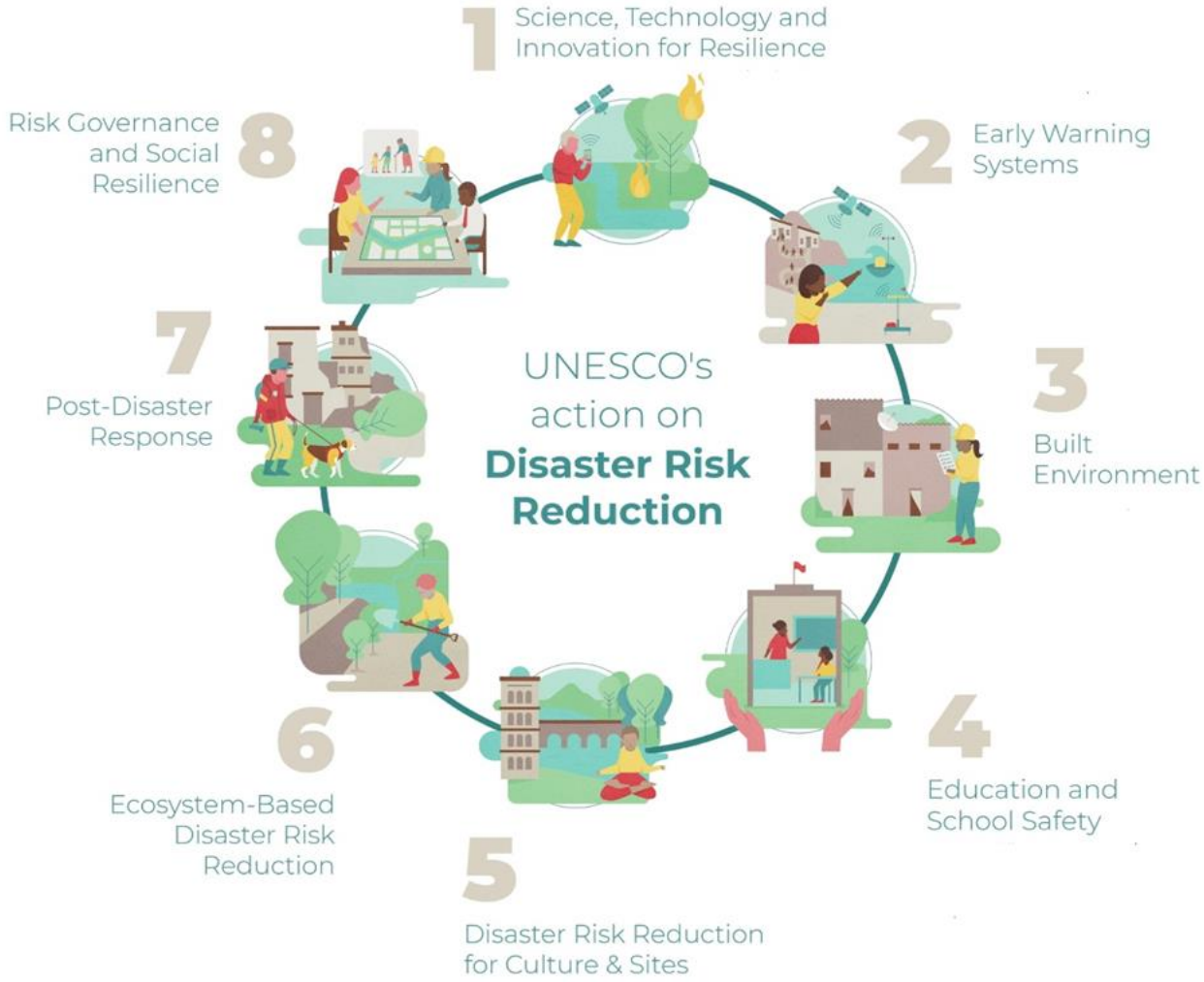
Innovative solutions for Disaster Risk Reduction

Disaster Risk Reduction Unit



UNESCO DRR 8 Thematic Areas

UNESCO operates at the interface of several disciplines, including natural and social sciences, education, culture, communication, and information. To address hazards in a comprehensive manner, UNESCO adopts **a multi-hazard, multi-disciplinary and multi-stakeholder participatory approach**.



UNESCO's priority areas are:

Africa

Gender

SIDS

Youth

Mapping of Innovative solutions for DRR

Product

Numerical


AI Chatbot


Satellite Imagery


Machine Learning


Drone


3D Printer

Physical

Approach

Standard/ Platform

Open Science Platform for DRR

Early Warning Systems for All

Business Continuity

Multi- Hazard Risk Assessment

Community based DRR

Localisation / Personnalisation

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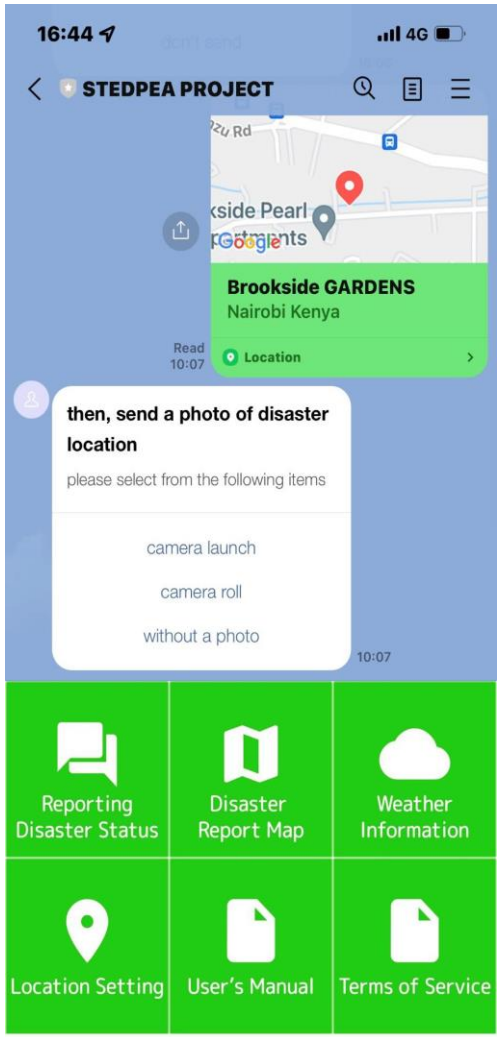
Designed by UNESCO

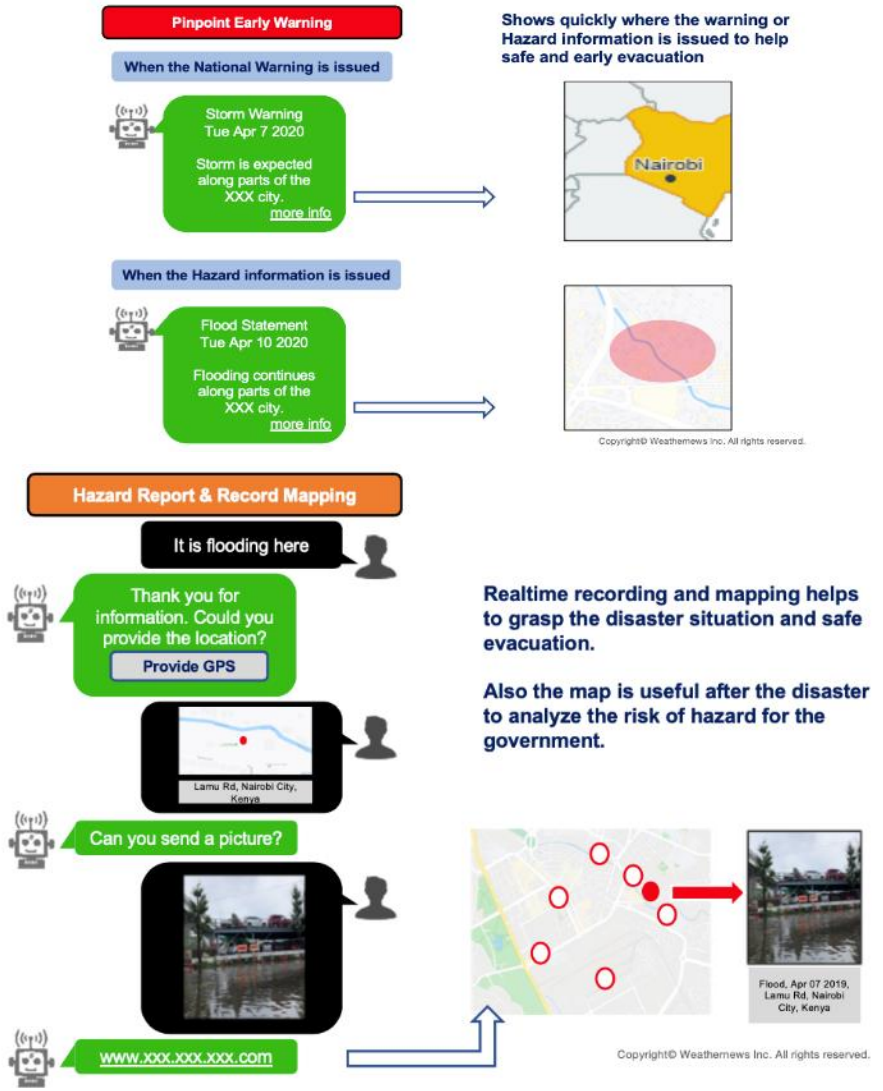
AI for efficient risk communication

Strengthening Disaster Prevention Approaches– STEDPEA

AI Chatbot (Mobile Applications)
*In **5 countries** (Kenya, Rwanda, South Sudan, Tanzania and Uganda)*
AI chatbot enable sharing information on disasters and connecting communities to expedite relief efforts during disasters.

- **Optimize the communication** between government and citizen
- **Share the information** of supplies and evacuation immediately
- **Grasp the situation** of damage/recovery accurately for both side





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Minimize education disruption with AI (Agent-based model)

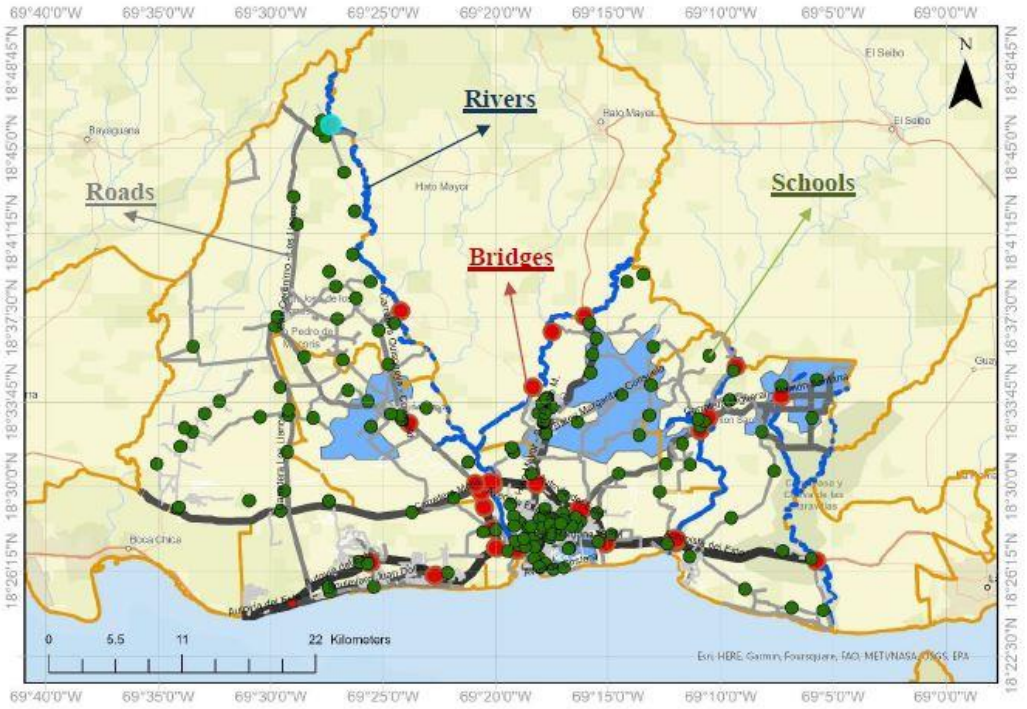


Figure shows the exposed assets in the San Pedro de Marcos city with 288 schools with 80,000 students. There are 46 bridges in the city.

There are 78 shelters in the Dominican Republic with a total capacity of around 15,000 to be used in emergencies.

- The Agent-based model was developed and employed to track the functionality recovery of the integrated School-Road Networks, under individual and sequential effects of multiple hazards
- The project was funded by Japan from 2022-2023

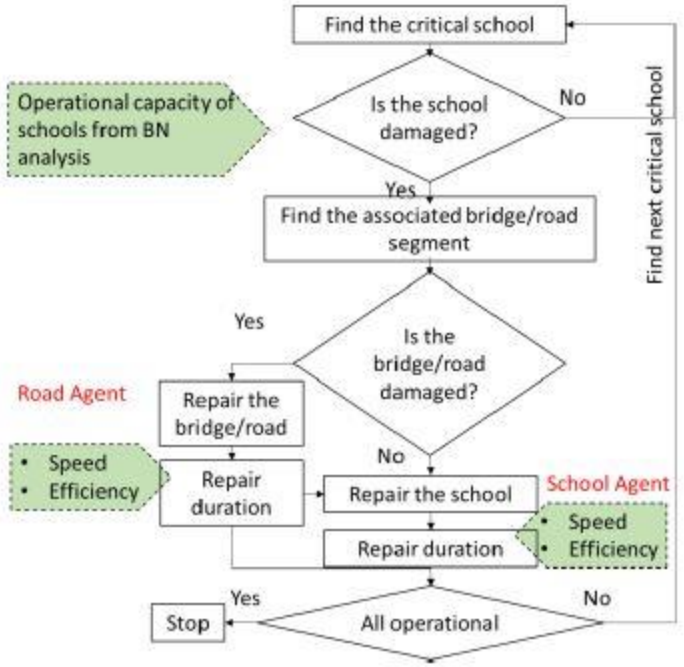
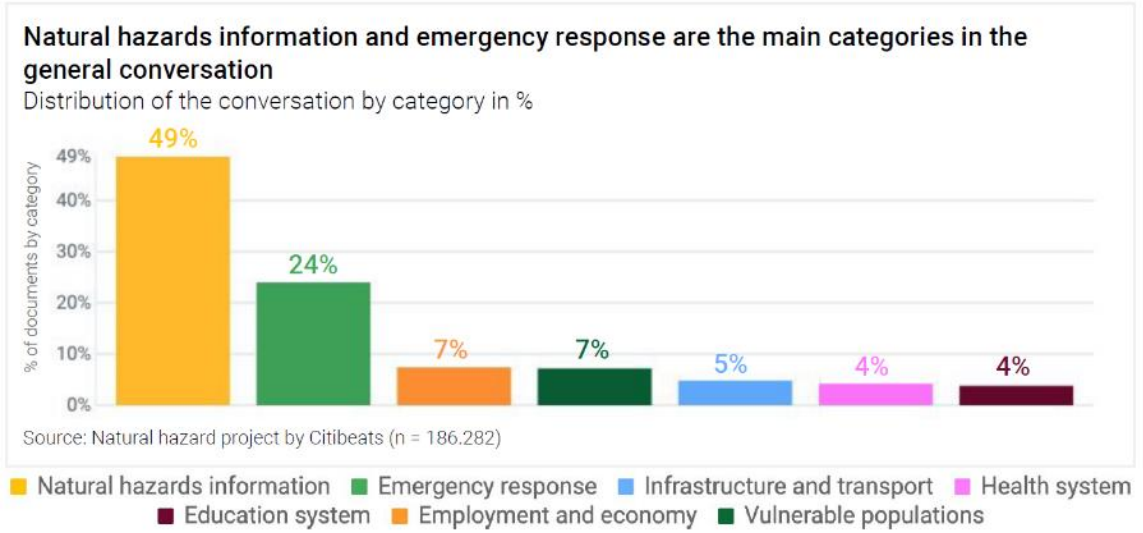


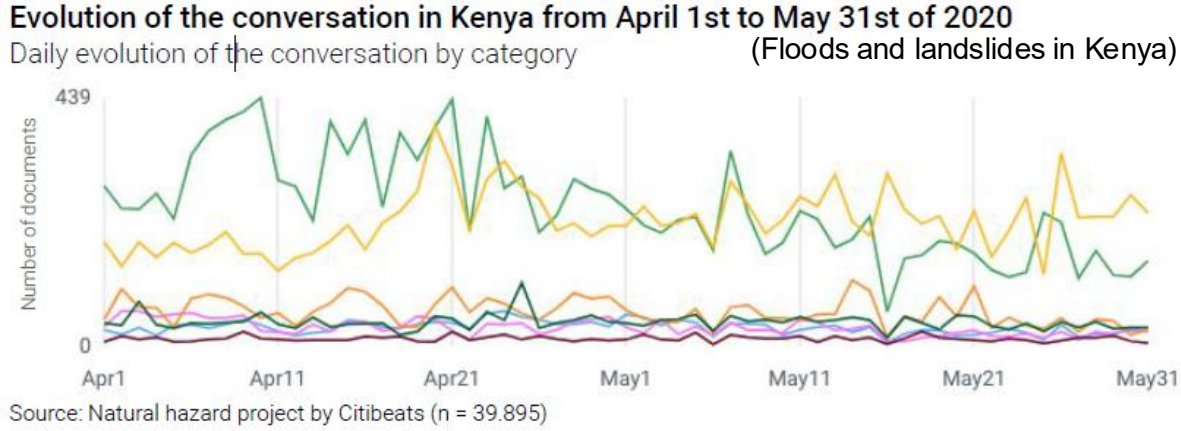
Figure models the interactive decision-makings between various stakeholders of the system, such as the Operators of the Road Network and School Network, which will be modelled as the Agents.

Social media analysis using AI

- **Artificial intelligence is used to Identify how people's needs and concerns change before/during/after a natural hazard from the social media**
  - ✓ Citizens' opinions was collected in **5 countries** (Kenya, Rwanda, South Sudan, Tanzania and Uganda) from social media before/after 2 weeks.
  - ✓ The collected data was categorized into **7 categories** by AI.
  - ✓ The data was analyzed by AI to better understand the people`s needs for decision maker.

citibeats





Change of people's concern among 7 categories

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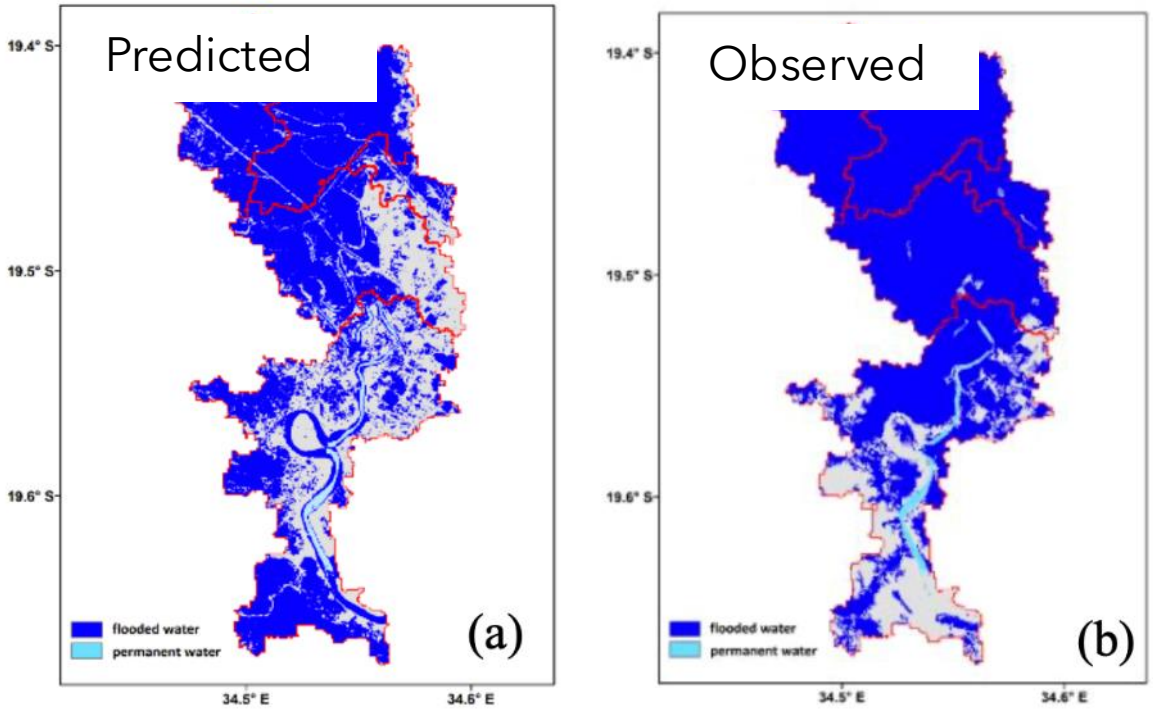
AI predicts upcoming floods

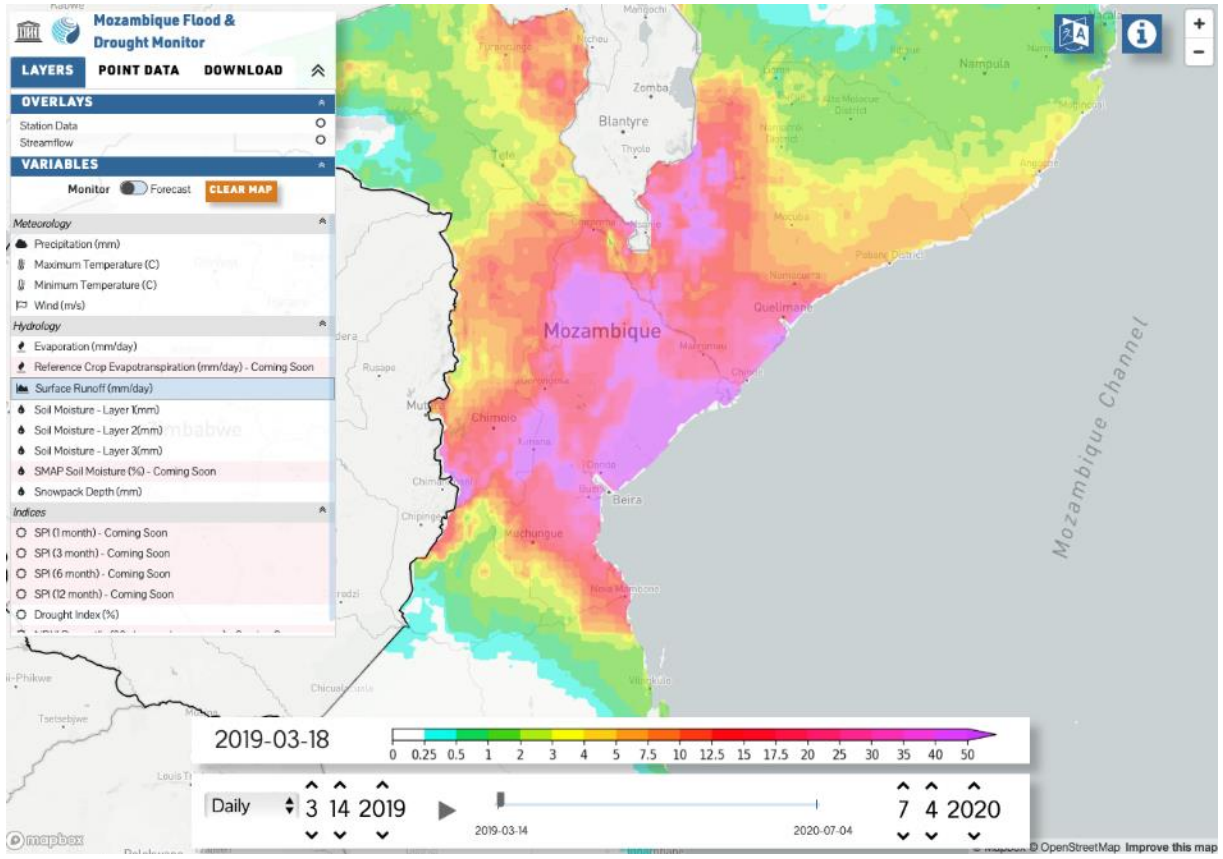
- **Artificial intelligence is used to predict areas with a high probability of flooding in the next 24 hours.**



24-hour, AI-powered forecast of flooded areas in Mozambique's flood-prone areas

Be Resilient
BIOSPHERE RESERVES
CLIMATE CHANGE OBSERVATORIES

Government of Flanders



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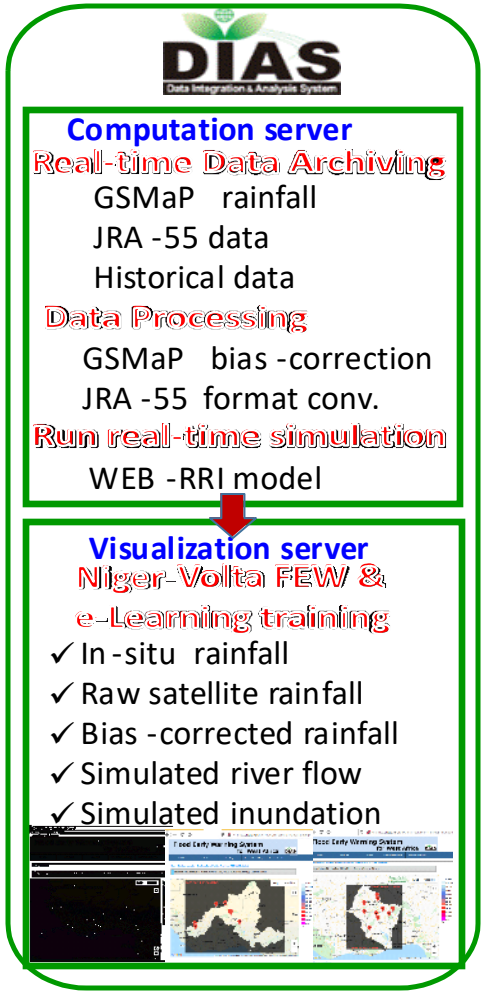
Satellite datas for climate change adaptation



Water disaster platform (WADiRE-Africa)

Using satellite data to complement the ground data for flood forecasting

Benin, Burkina Faso, Cameroon, Chad, Côte d'Ivoire, Ghana, Guinea, Mali, Niger, Nigeria, Togo

Schematic diagram of the flood early warning system (FEWS) prototype version 1.0 for West Africa on Data Integration and Analysis System (DIAS).

Using low cost, low power AI devices

Using low cost, low power AI devices: TinyML

Sound

Keyword Spotting

Vibration

Motion & biometric

Vision

Image Spot

Tiny machine learning (TinyML) is a fast-growing field of machine learning, capable of performing on-device sensor data analytics at extremely low power consumption and with low-cost devices. It does not require an internet connection, making it ideal for remote/rural areas.

TinyML can be used to detect wildfires and floods using sound.

System designed by The Abdus Salam International Centre for Theoretical Physics (ICTP), UNESCO

Digital Innovation Hub

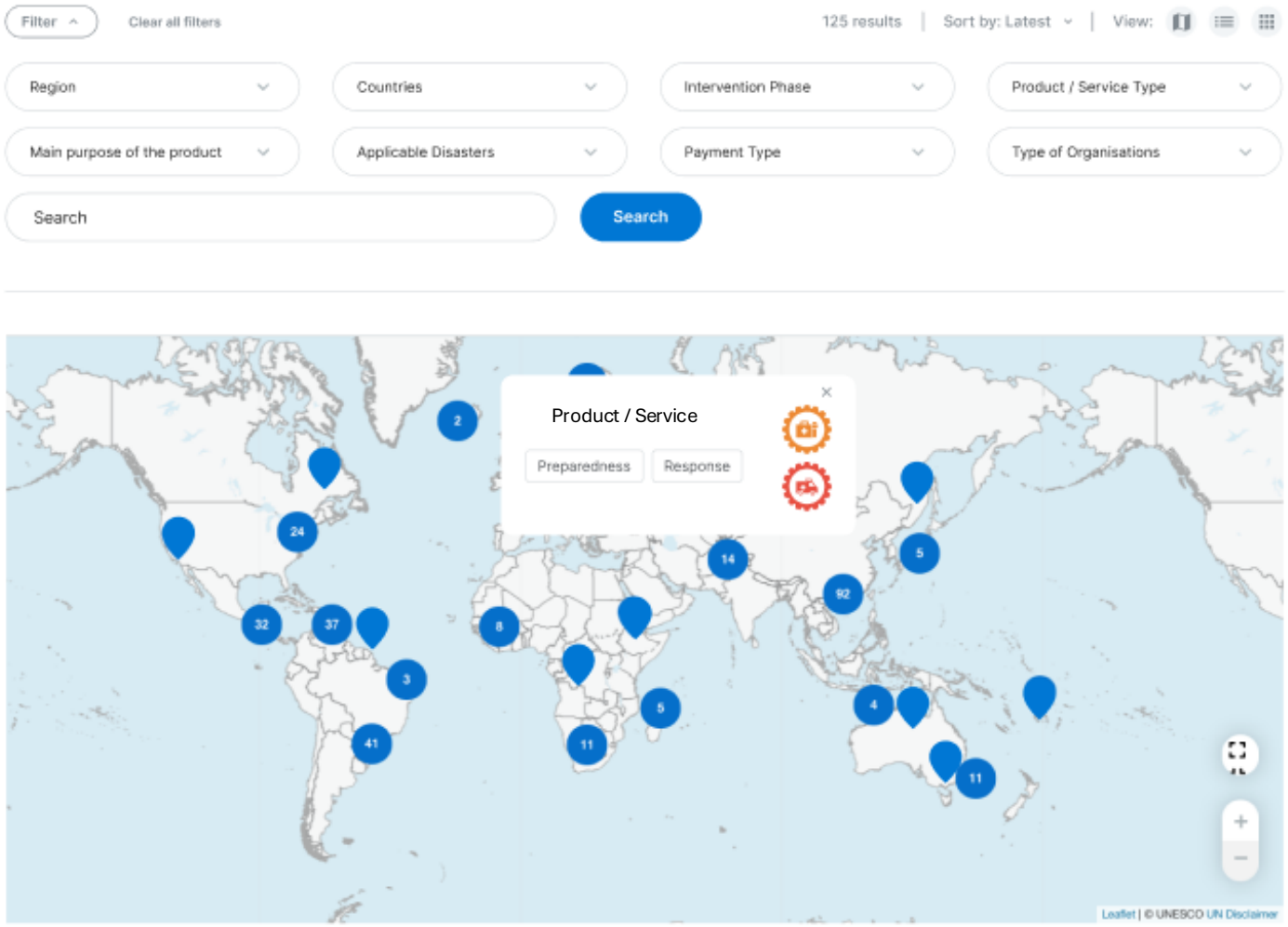
To enable governments, donors, private companies, and academic institutions to collaborate and scale innovative approaches for building resilient societies,

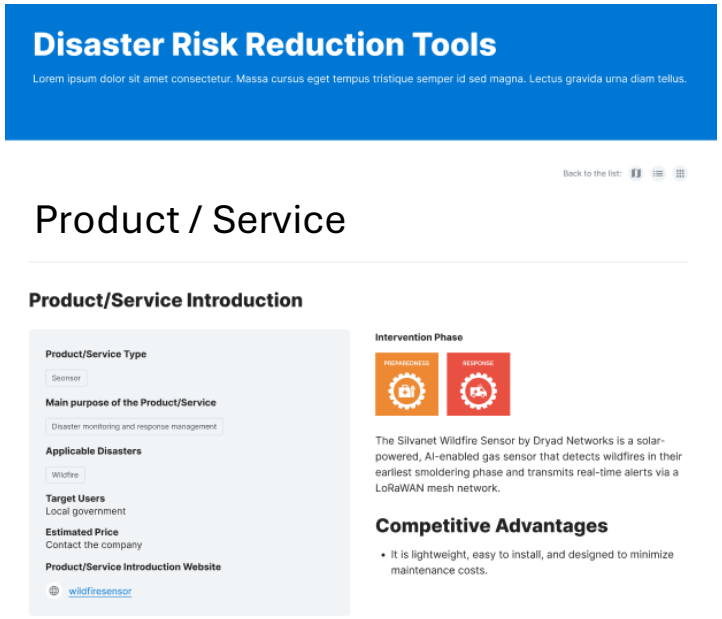
UNESCO is developing a digital innovation hub to help governments, donors, and stakeholders identify appropriate DRR and climate adaptation solutions based on their needs.

Key Features
Searchable catalogue: where private sector actors can register innovative solutions and services.
Efficient matching: between solution providers and users.
Market stimulation: by creating new entry opportunities and promoting competitive pricing.
Open submission feature for new tools: collected 1200 solutions globally, but more tools can be added.

Digital Innovation Hub

Search Practices





Drafts of the platform visuals

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Investing 1 dollar in prevention saves 7 dollars spent after a catastrophic event

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