



# **Scientific Advice Mechanism**

to the European Commission

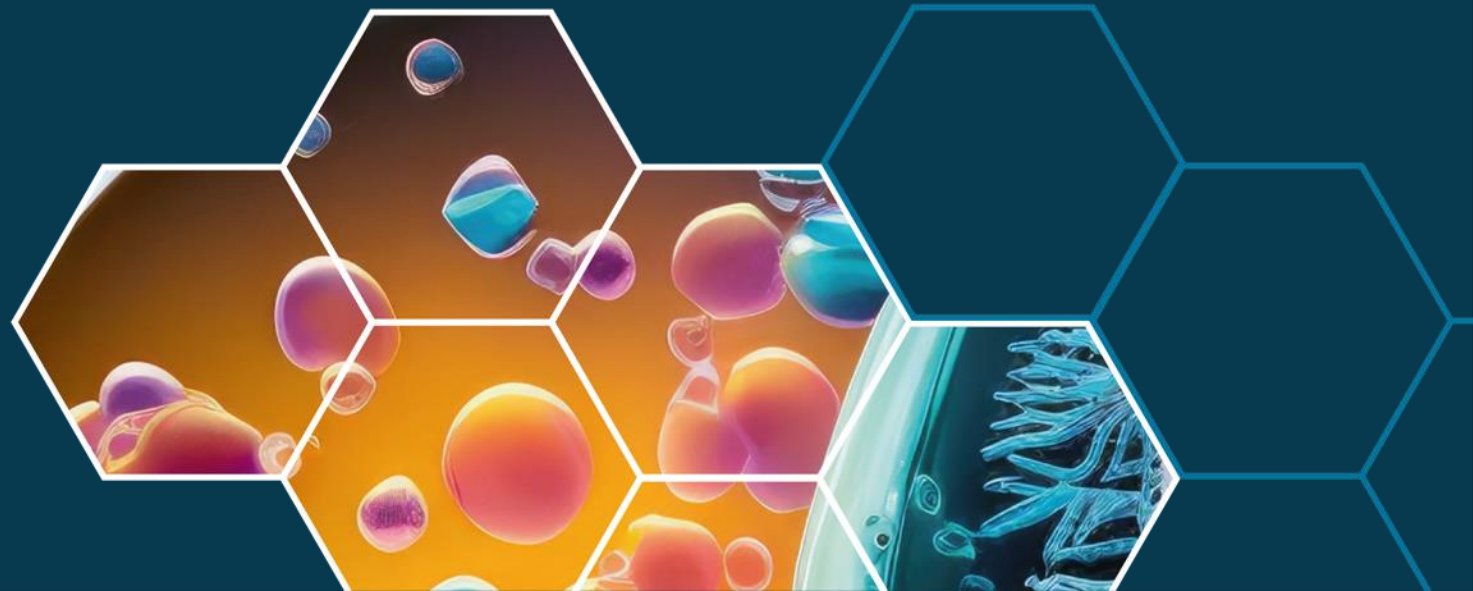




# AI and Crisis Management: Evidence for European Policy

SAPEA Rapid Evidence Review for DG ECHO

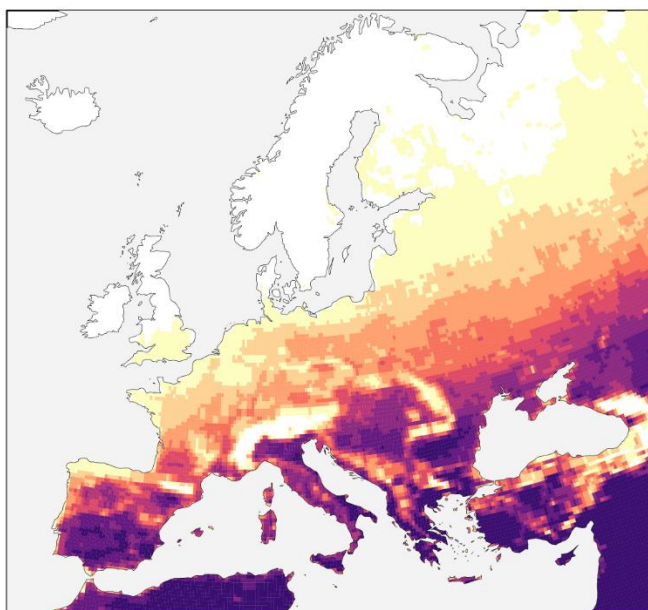
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# Crises are European

## Number of days with 'strong heat stress' in summer 2024

A day with 'strong heat stress' has a maximum feels-like temperature (UTCI) exceeding 32°C



Data: ERA5-HEAT Universal Thermal Climate Index (UTCI)



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## Widespread flooding in 2024

According to the Intergovernmental Panel on Climate Change, Europe is one of the regions with the largest projected increase in flood risk.

— River network — High flood threshold — Severe flood threshold

### Valencia, Spain

From 28 October to 4 November, the national records for total rainfall in one, six and 12 hours were all broken.

The maximum 24-hour total reached 771.8 mm – the second highest amount on record for Spain.

The rainfall and flooding had devastating impacts, with at least 232 people killed in the province of Valencia and fatalities in three other provinces.

The percentage of the river network that flooded during the year was the **fifth-largest in a 32-year record** and the **largest since 2013**.

**12%** of the river network exceeded the 'severe' flood threshold

**30%** of the river network exceeded at least the 'high' flood threshold

\*Notable flood events occurred throughout the year. See the ESOTC 'Flooding' section and the interactive 'Key events map' for more details.

Data: EFAS • Credit: CEMS/C3S/ECMWF



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ECMWF



EUROPEAN  
STATE OF THE  
CLIMATE  
REPORT 2024





# An era of AI



## ChatGPT Cheat Sheet Crisis Management

Emergency Management	Strategy & Planning	Post-Crisis Analysis & Learning
<b>Initial Assessment</b> Use ChatGPT to quickly draft initial assessment reports. Get information on similar past incidents for reference. Prompt: "Draft an initial crisis assessment report for a [type of crisis]."	<b>Crisis Strategy Formulation</b> Generate step-by-step action plans. Use ChatGPT to explore potential outcomes of different strategies. Prompt: "Develop a strategic action plan for responding to [specific crisis]."	<b>Debriefing and Reporting</b> Use ChatGPT to structure debriefing sessions. Compile reports on lessons learned and performance. Prompt: "Outline a debrief report for [crisis scenario] focusing on response effectiveness."
<b>Public Communication</b> Create templates for public advisories. Tailor messages for different audiences (public, stakeholders). Prompt: "Write a public advisory for [crisis scenario] addressing safety measures."	<b>Stakeholder Communication</b> Prepare updates and briefings for stakeholders. Use ChatGPT to personalise communication for each stakeholder group. Prompt: "Write an update for stakeholders on [crisis scenario] focusing on impact mitigation."	<b>Public Relations Management</b> Draft recovery and reassurance messages for the public. Plan long-term communication strategies for ongoing transparency. Prompt: "Create a series of public messages for post-crisis reassurance regarding [crisis scenario]."
<b>Resource Coordination</b> Organise lists of resources and contacts. Develop quick-access guides for team roles and responsibilities. Prompt: "List emergency resources available for [type of crisis] and corresponding contact information."	<b>Logistics Management</b> Create checklists for supply distribution and logistics. ChatGPT can help simulate logistics scenarios. Prompt: "Generate a logistics plan for distributing supplies during [crisis scenario]."	<b>Training and Drills</b> Develop training modules for crisis scenarios. Script realistic simulation exercises. Prompt: "Write a training script for a drill simulating [type of crisis]."
<b>Media Relations</b> Formulate press releases with ChatGPT. Prep Q&A for press briefings on the crisis. Prompt: "Create a press release for [crisis scenario] detailing the current response."	<b>Risk Assessment Updates</b> Update risk assessments as new information comes in. Use AI to compare current crisis to historical data for pattern recognition. Prompt: "Update the risk assessment for [type of crisis] with the latest developments."	<b>Continuous Improvement</b> Analyse data to improve future crisis response. Use ChatGPT to identify improvement opportunities in protocols. Prompt: "Identify areas for improvement in the crisis management plan for [type of crisis]."

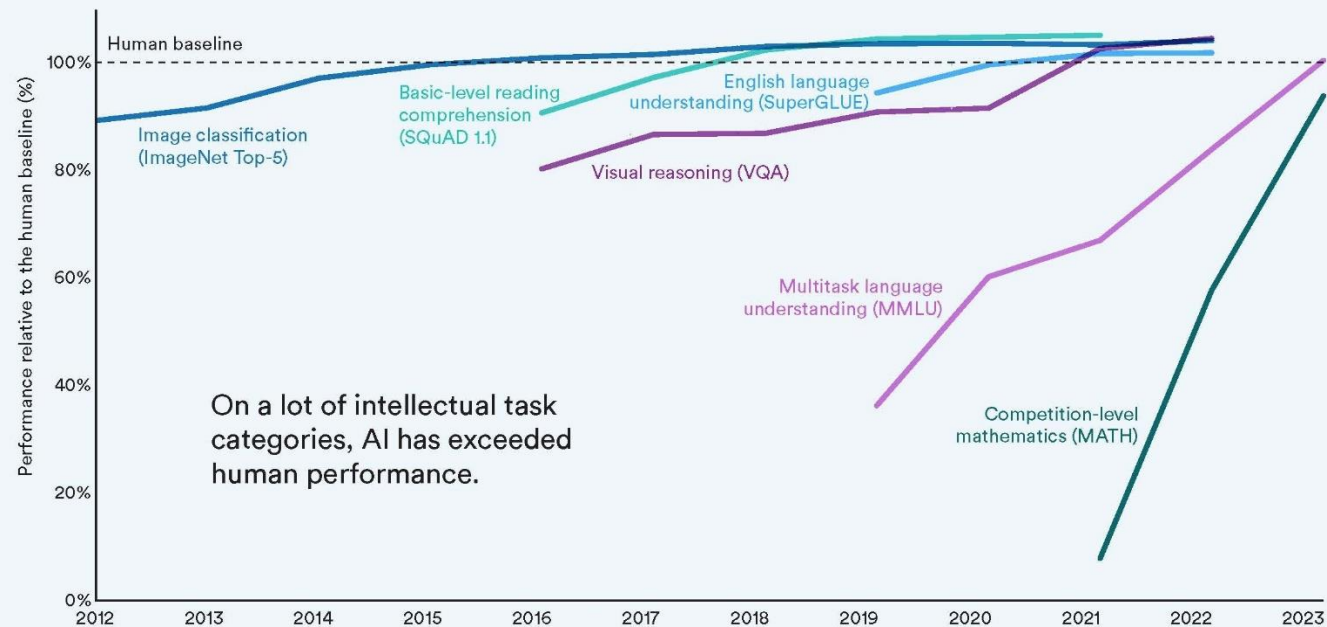
[estoreera.gumroad.com](https://estoreera.gumroad.com)



# AI performs better and better

## Select AI Index technical performance benchmarks vs. human performance

Source: AI Index, 2024 | Chart: 2024 AI Index report



# AI for Crises

*What are the characteristics, opportunities and risks of AI in crisis preparedness and response?*

*How can these risks be mitigated?*

# Process & Starting Points

## AI supports human response

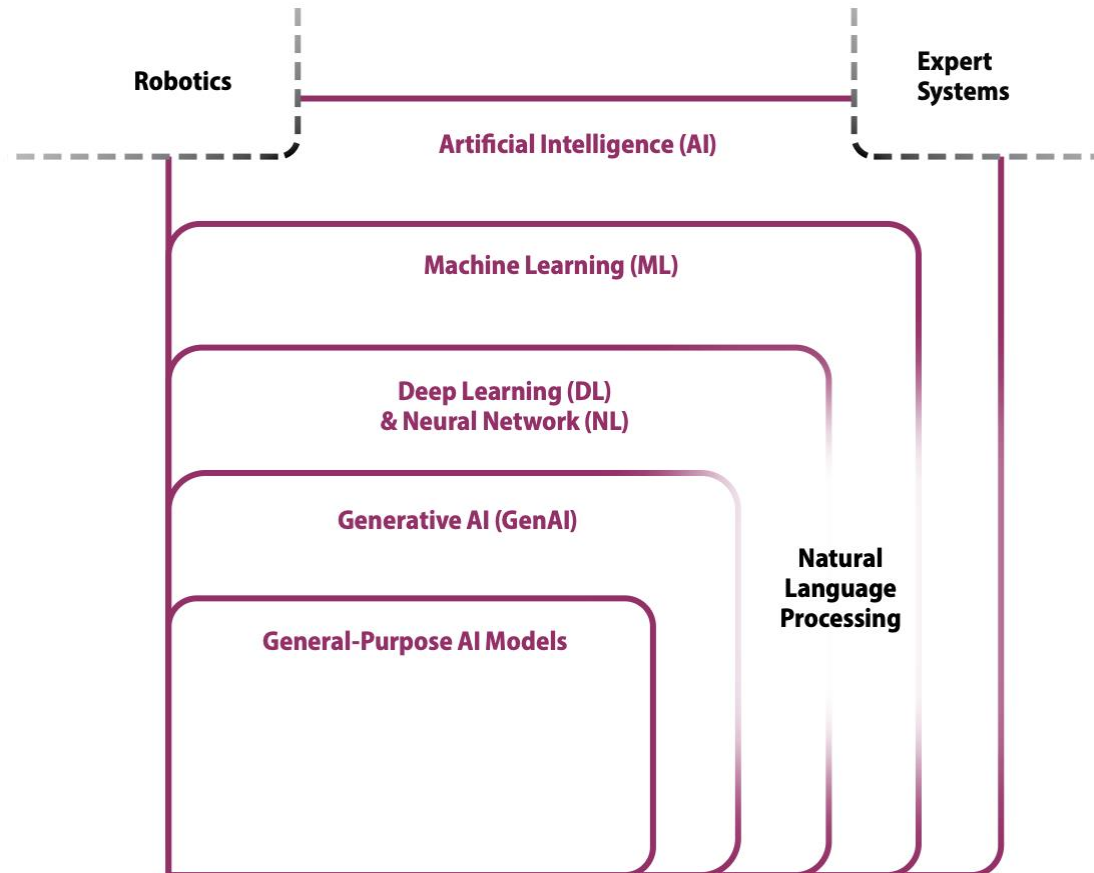
- **Rapid Review Process with a small dedicated working group over a limited timeframe**
- **AI is not chatGPT**
- **AI is rapidly developing**
- **AI must support *you***
- **Focus on algorithms, principles and checklists rather than evaluating concrete tools**

## Working Group Members

- **Tina Comes** (Chair), German Aerospace Center & TU Delft
- **Verónica Bolón-Canedo**, Universidade da Coruña
- **Joachim Denzler**, Friedrich Schiller University Jena
- **Nick Jennings**, Loughborough University
- **Thomas Kox**, Weizenbaum Institute
- **Markus Reichstein**, Max-Planck Institute for Biogeochemistry & Friedrich Schiller University Jena
- **Christian Reuter**, TU Darmstadt
- **Andrej Zwitter**, University of Groningen

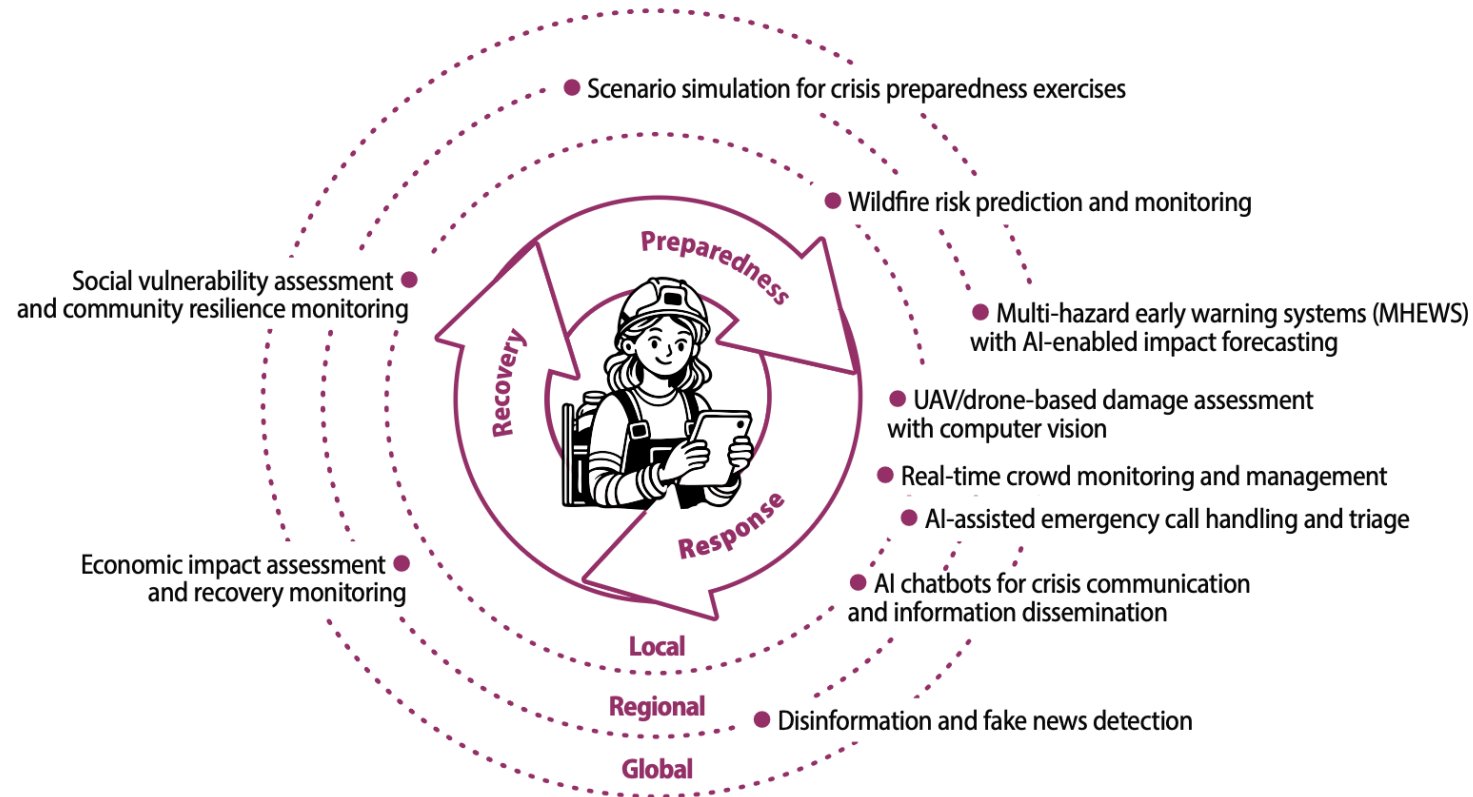
Contributor: **Olya Kudina**, TU Delft

# AI: An Overview





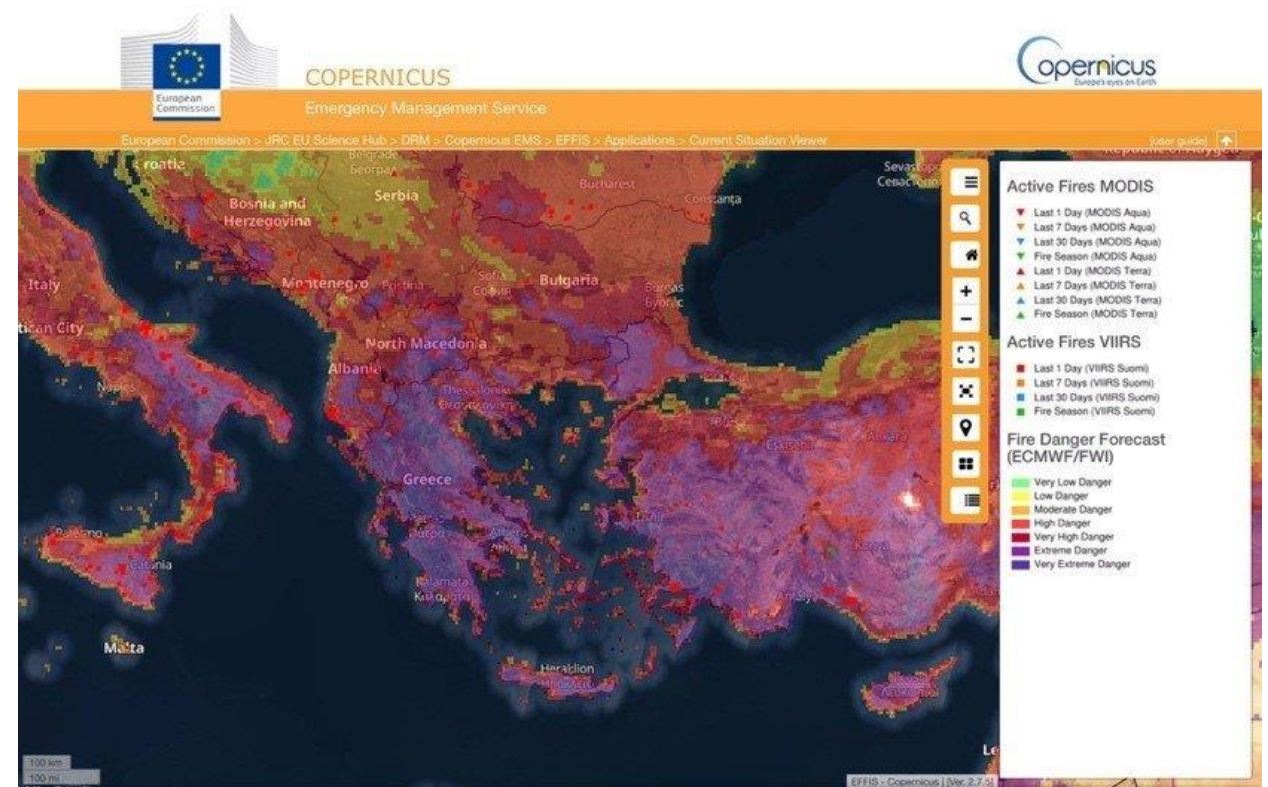
# AI can support across phases and regions



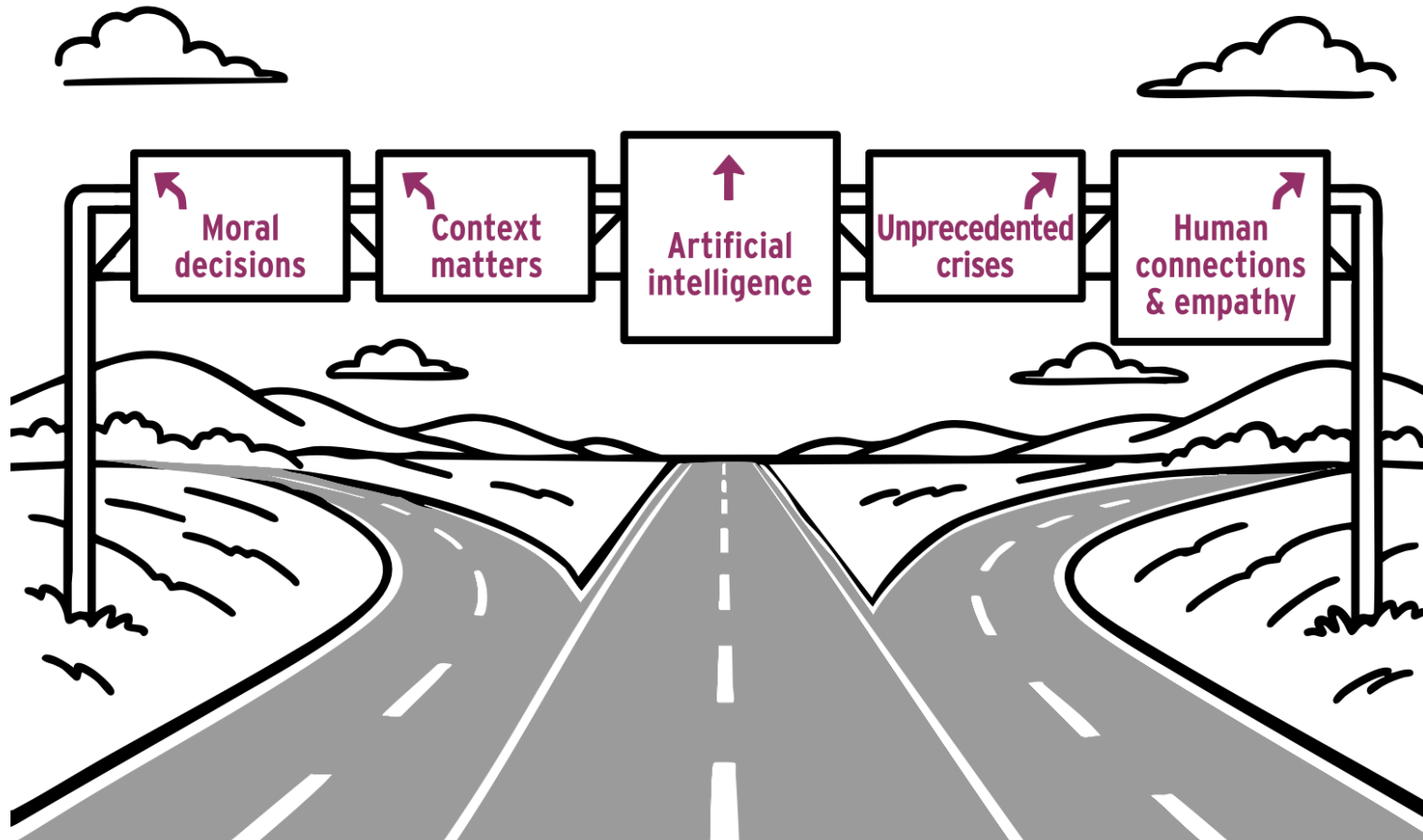
# AI has the greatest potential for

## Large-scale heterogeneous data

- Environmental monitoring
- Early warning systems
- Damage assessment (physical, direct)
- Social media processing



# AI struggles with



# Data Challenges

## AI depends on Data

1. Late access (no pre-crisis agreements)
2. Context misfit (model trained elsewhere)
3. Poor interoperability (incompatible systems)
4. Unclear provenance (trust/quality issues)

## Need to shift to a European Data Preparedness Framework



# Use of AI



## UNDER-TRUST

- AI ignored in crisis
- Wasted capabilities
- Manual overload

## OVER-TRUST

- Automation bias
- Loss of control
- Blind acceptance

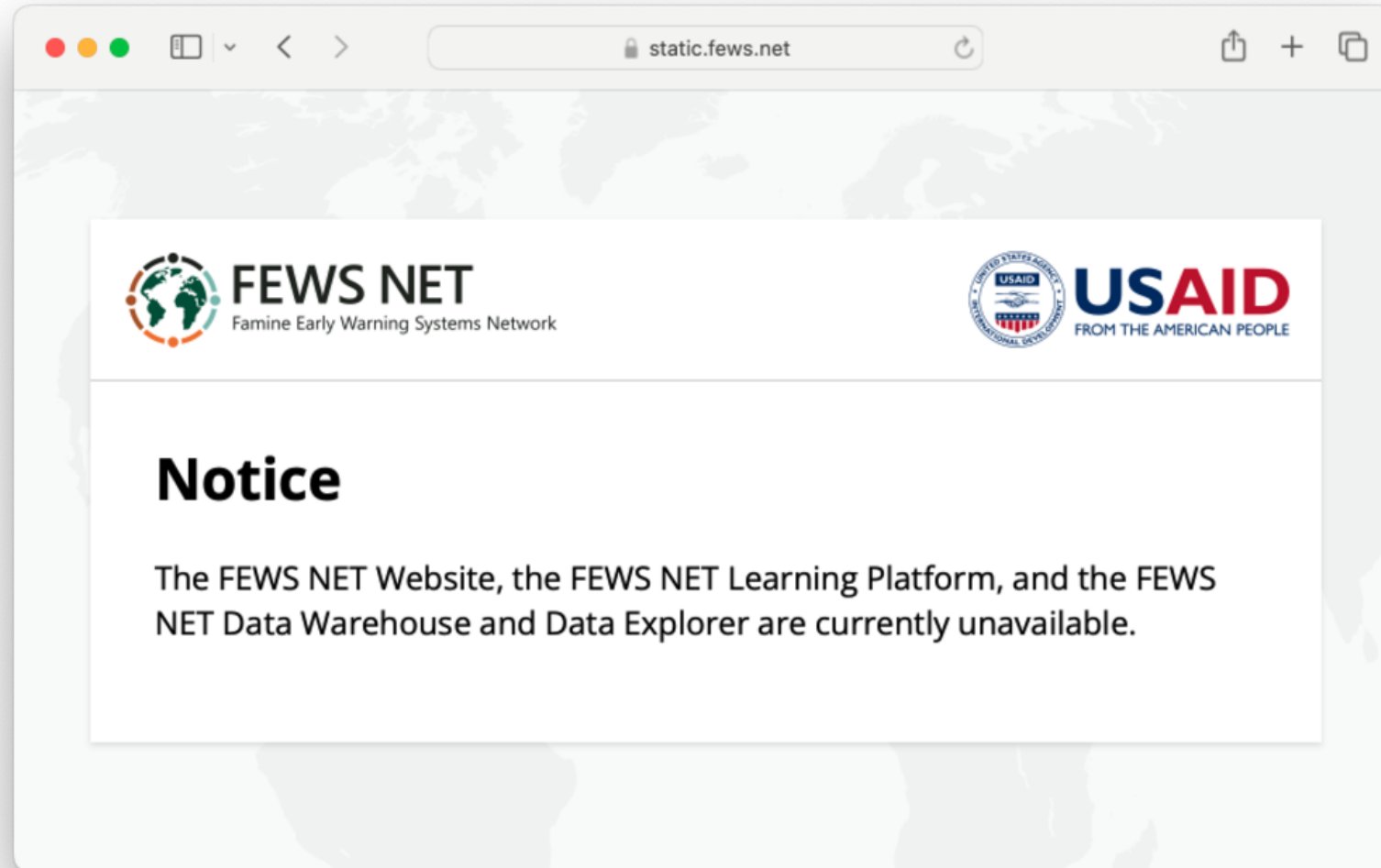
## CALIBRATED TRUST

### *Requires:*

- Transparency & uncertainty indicators
  - Training in UCPM programmes
  - Clear operational boundaries



# Dependencies



# AI Literacy & Training



## AI Benchmarks for Crises are missing

### Design

- Define purpose, scope, and structure of the benchmark
- Determine tasks, datasets, and evaluation metrics processing

### Documentation

- Describe benchmark tasks, datasets, and evaluation metrics
- Explain design decisions and limitations
- Provide resources for benchmark usage

### Retirement

- Communicate retirement plan to stakeholders
- Archive benchmark data, code, and documentation and mark benchmark as 'retired'

### Implementation

- Construct the benchmark by collecting, processing, and annotating datasets
- Protections against contamination and gameability

### Maintenance

- Address issues and incorporate feedback
- Assess relevance of benchmark

# Effective use of AI for Crisis Management

*What are the characteristics, opportunities and risks of AI in crisis preparedness and response?*

*How can these risks be mitigated?*

Data preparedness  
across borders

Harmonized training  
& standards

Strategic autonomy  
for critical systems

Human-centered  
implementation