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RISKCHANGES

RiskChanges is an **open-source, web-based spatial decision-support system for dynamic, local-level multi-hazard risk assessment**. It helps stakeholders analyse how risk changes under different hazard scenarios, exposure and vulnerability conditions, climate-change assumptions, and risk-reduction alternatives. By comparing options such as relocation, zoning, structural protection, building strengthening, early warning, and emergency-response scenarios, it links risk assessment directly to planning. Its main achievement is **translating risk maps into planning intelligence: combining multi-hazard risk assessment, future scenarios, risk-reduction alternatives, and decision-support methods in one workflow**. Within PARATUS, it supports systemic risk analysis, impact chains, and cross-sectoral disaster-risk management.

FASTFLOOD

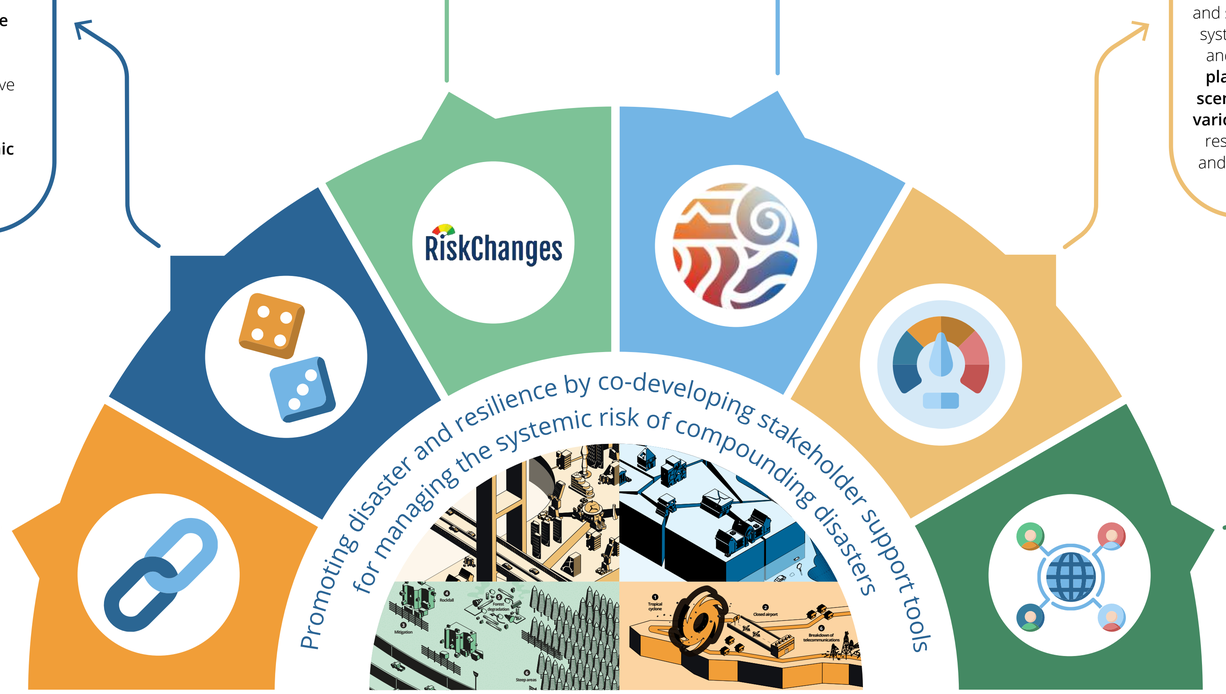
FastFlood is a **web-based flood simulation platform** developed at the University of Twente to make rapid flood modeling accessible without specialist software. It estimates flood extent, water depth, velocity, peak flow height and arrival patterns for pluvial, fluvial, dam-break, coastal and other scenarios, using global datasets or user-uploaded data. Its main achievement is the drastic reduction of computation time, allowing flood scenarios to be simulated interactively in a browser. This makes flood modelling more usable for local authorities, researchers, consultants, educators and communities, **supporting rapid hazard screening, emergency planning, climate-adaptation analysis and stakeholder communication**.

SERIOUS GAMES

PARATUS serious games, including High Water Pantano, Bucur Simulation, Saltum Montem, and Interactive Multi-Hazard Systemic Risk Mapping, are **interactive learning tools combining role-playing and scenario building to immerse players in complex multi-hazard events**. Designed for policymakers, first responders, among others, they bridge science and real-world action. Users benefit by testing adaptive strategies and exploring compounding impacts within safe, simulated environments based on realistic impact chains. Co-developed with stakeholders, these games **foster systemic risk assessment, critical thinking and transdisciplinary collaboration across diverse contexts**.

STRESS TESTING

This stress testing guide is a tool to **assess a system's exposure to multiple threats**. In stress tests, scenarios are crucial, however the ones frequently utilised usually fail to consider inner, more contextual and social elements. Stress testing reveals the vulnerabilities of specific systems (projects, plans, etc.) to different risk scenarios, both climatic and non-climatic. It helps **connect risk information with scenario planning and adaptation options by examining a wide range of scenarios, which helps us deal with uncertainty in projections for various stressors (climate, environment, socioeconomic, etc.)**. As a result, the information leveraged by projects from the humanitarian and development sectors can strengthen this approach by identifying weak points in projects and the design of activities.



IMPACT CHAINS AND FORENSIC ANALYSIS

Impact chains are conceptual models used to **analyse how climate hazards interact with exposure and vulnerabilities, generating cascading impacts across systems**. In PARATUS, they were co-developed through stakeholder engagement and forensic analysis, and built using the online tool Kumu. They support researchers and decision makers by providing standardised risk information, including references, confidence levels, and spatially explicit data accessible through GeoNode, helping **identify the factors driving risk and potential measures to address vulnerabilities**.

DISASTER RISK STAKEHOLDER HUB

The Disaster Risk Stakeholder Hub has been **co-developed with more than 30 projects** and serves as a shared repository not only for PARATUS tools, but also for all the tools developed in those projects. By making the hub accessible to all projects, PARATUS has not only strengthened co-development efforts but also fostered a more collaborative and community-driven approach across the field. The DRS Hub is hosted on the Online Community Platform, The Crisis Management Innovation Network Europe (CMINE). The DRS Hub **connects individuals and organisations in a dynamic network dedicated to advancing societal resilience and fostering diversity and innovation of thought through cross-sector, multi-stakeholder dialogues on capability gaps and potential solutions**.

PARATUS PROJECT

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