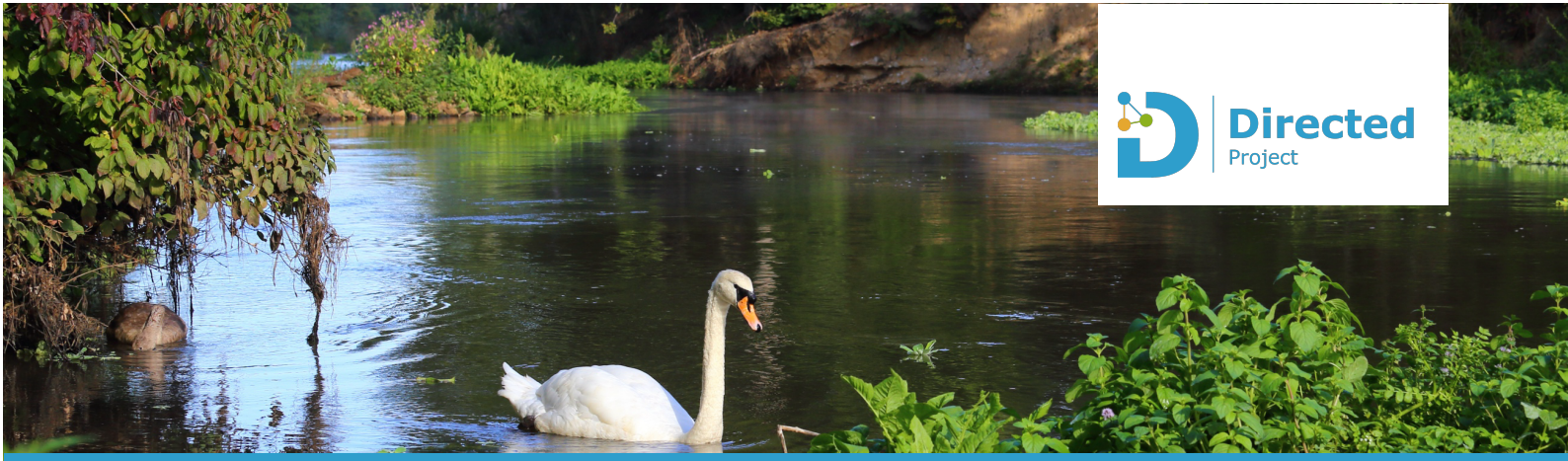

Rhine-Erft, Germany Real World Lab
Enabling disaster resilient societies

BACKGROUND OF DIRECTED

The Rhine-Erft Region, Germany has become part of the 'Disaster resilience for extreme climate events, providing interoperable data, models, communications and governance (DIRECTED) Project' funded under the Disaster-Resilient Societies Programme of the EU. The Project seeks to tackle some of the major climate change risks in the Rhine-Erft Region: flooding and drought, improving communication pathways and developing an integrated risk management strategy that is coordinated with major stakeholders in the region.

Physical, social and data scientists are coming together from across Europe with local and regional authorities and first-responders to design a new interoperable system (a 'Data Fabric'). The Fabric will bring together multiple climate and disaster risk assessment tools, forecasting and warning systems and disaster communications, organising them into one manageable system for use by relevant stakeholders. An innovative risk governance framework, Risk-Tandem, will be used to facilitate transdisciplinary, multi-risk and inclusive knowledge co-production, capacity strengthening, evaluation and learning with stakeholders in the Real World Lab.

WHAT IS A REAL WORLD LAB?

Real World Labs (RWL) create collaborative environments for learning and innovation through co-production workshops, that link the needs of service providers with user needs and provide demonstrations, training and multi-level collaborative risk governance among actors managing disaster risk and climate adaptation. RWLs seek to work with a range of stakeholder, including representatives from government, academia, industry, and civil society to understand information needs and co-produce solutions, capturing synergies across Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA) practitioners, and strengthening resilience against climate change, extreme weather and multi-hazard and multi-risk events.

RISK-TANDEM FRAMEWORK

The Risk-Tandem Framework facilitates risk governance analysis and multi-stakeholder knowledge co-production processes, using a complex systems approach. Stakeholder engagement plays a central role in Risk-Tandem, where RWLs collaboratively understand the context, identify problems, bridge scientific models and tools and co-create solutions enabling DRR/CCA systems interoperability (via a Data Fabric) and adaptive and inclusive governance through new coordination, communication, resource, and capacity strengthening mechanisms.

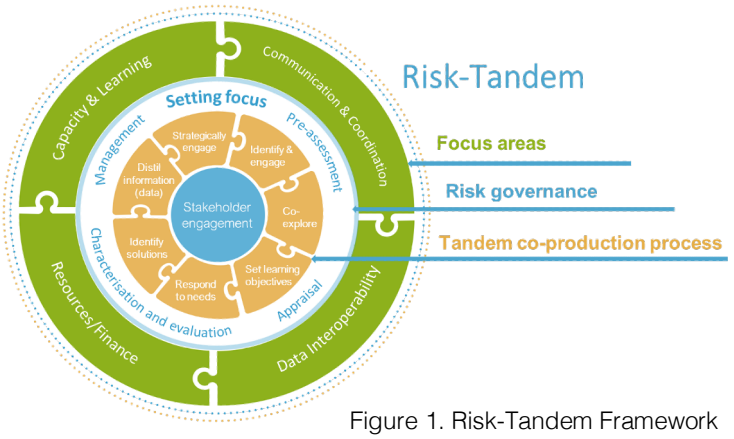

Figure 1. Risk-Tandem Framework

WHO IS LEADING THE REAL WORLD LAB?

The Real World Lab in the Rhine-Erft Region is being led by Erftverband, a public water association, committed to management of the Erft habitat and holistic water management. Erftverband develop sustainable concepts and future-orientated action strategies for water management in the Rhine-Erft region.

If you would like to become involved in the Rhine-Erft Real World Lab or would like more information we would love to here from you. Please get in touch on: email: julian.struck@erftverband.de

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Rhine-Erft Real World Lab
Climate Change Challenges

RHINE-ERFT REGION CLIMATE CHALLENGES

The Erft River catchment was heavily impacted by the devastating flood in July 2021. The hydrological responses to extreme rainfall (up to 180 mm within 15 hours) produced unprecedented flooding along the Erft River and its tributaries causing loss of life and huge economic losses.

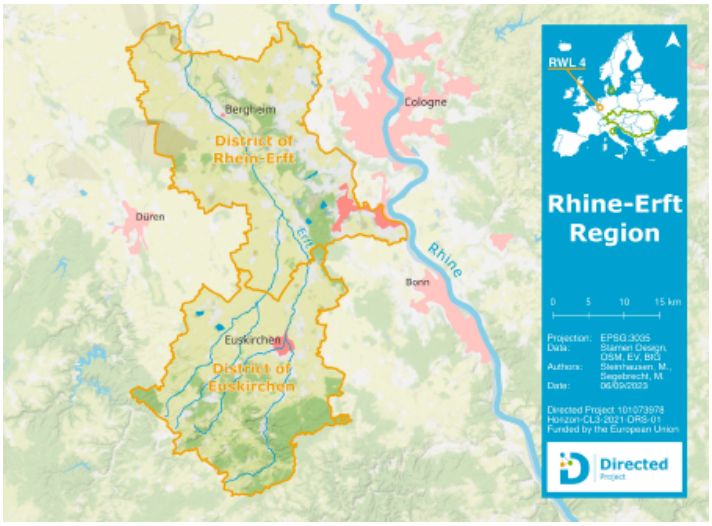

Figure 2. Rhine-Erft Region Map

The southern part of the catchment area of the Erft is located in the low mountain range Eifel. Due to the pronounced relief, hydrological reactions are faster in those areas. During the flood in 2021, huge amounts of water also caused severe damage in the northern part of the catchment. In this area, the groundwater level is lowered because of the impact of active open pit mining, which enabled infiltration of the flood waters. This resulted in lower damage in the northern part of the Erft catchment.

While the risk of flood events is already present in the Erft catchment, the opposite extreme, drought, is also a risk. Recent observations show that air temperatures, as well as precipitation patterns, are changing. Observations indicate it has become warmer and drier compared to the past. It is reasonable to assume that heavy rainfall events will also increase, which could lead to devastating events such as the flooding in 2021.

Both hydrological extremes, severe flooding, and drought,
impose challenges to communities living and working in the Erft River catchment. Major challenges that need to be addressed are related to how climate extreme events need to consider risk assessment, management, and governance. The definition of future scenarios will need to consider climate change projections to derive disaster risk reduction strategies covering structural and non-structural measures.

Picture 1. Flood Damage - Erft

Picture 2. Flood defence damage

Picture 3. Drought - Erft

Picture 4. Drought - Erft

Unfortunately, it is acknowledged that no structural measures would have been able to control the amount of runoff generated from precipitation in July 2021.

However, risk awareness and its communication need significant improvements to enhance the management of flood events in the future. Learning from past events must be accounted for in risk governance. Furthermore, by 2030 the end of open pit mining will significantly change the runoff regime in the lower catchment area. Water pumped out of open pit mines currently contributes to up to 70% of the Erft River discharge in more than one third of the catchment. In view of such structural changes, the assessment of future hydrological risks is challenging and poses important requirements for integrated multi-risk governance.

Goals of the Lab

- Enhance existing communication paths for hydroclimatic extreme events
- Co-develop an integrated risk management strategy that is coordinated with relevant stakeholders
- Investigate how climate-change impacts will affect the frequency and severity of future floods to obtain a robust estimation of design values for structural and non-structural measures
- A better understanding of climate impacts on different planning scenarios of the Erft river
- To build capacity and become part of a lasting European RWL partnership

Directed Partners

Funded by the European Union