JCAR ATRACE

Stress test Rur Stakeholder Interviews

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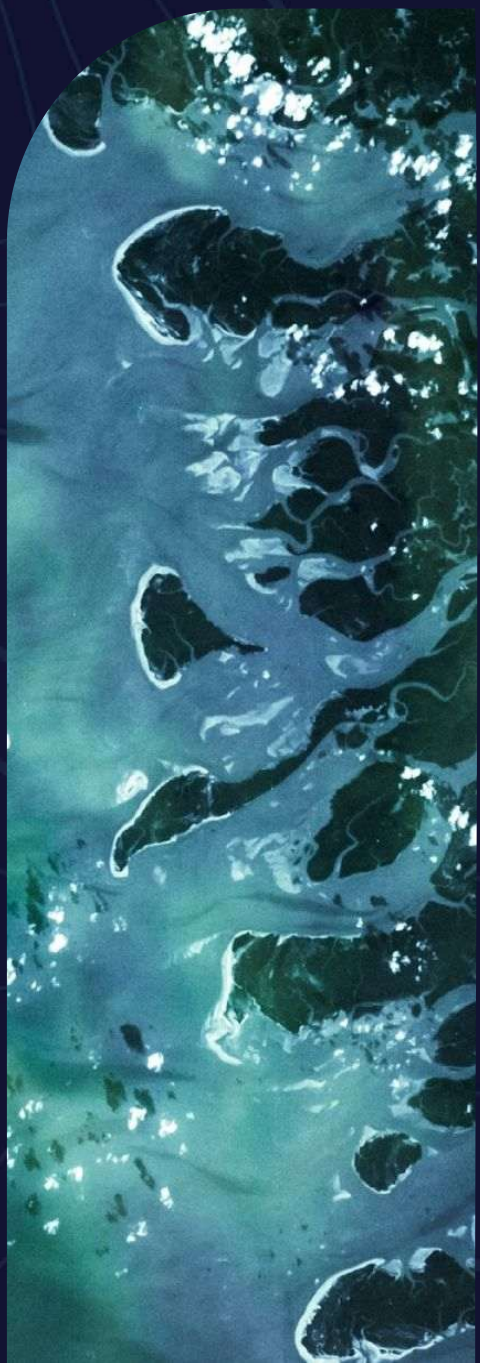

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RWTH AACHEN UNIVERSITY

Stress Test Rur

Report phase 1 - Stakeholder Interviews

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Summary

This document presents the stakeholder interviews conducted in the 'Stress Test Rur'. The aim of the stress test is to analyse the response of the Rur catchment to extreme hydrological stress and to identify potential risk mitigation measures.

The interviews present a comprehensive picture of the current challenges and priorities in flood and drought management within the Rur River basin. The key findings can be summarized as follows:

- Organizations have diverse roles, ranging from local implementation to overarching coordination. Successful management requires cooperation among all actors.
- Drought is currently not perceived as an acute risk, whereas flood protection holds the highest priority.
- Risk management focuses on foreseeable events, with climate change scenarios being increasingly considered.
- Disaster management exhibits different approaches, utilizing both formalized structures and informal networks.
- Reservoir management faces new challenges, necessitating adjustments and expansions.
- Cross-border collaboration is deemed crucial for effective risk management.
- Knowledge gaps should be addressed through improved data availability and scientific support.
- Nature conservation requirements necessitate integrative solutions to minimize conflicts.

The results of the interviews are particularly relevant for the stress test, as they provide important insights for model development. In Germany, there was a particular focus on floodplains and the effects of flooding. In this regard, stakeholders in the Netherlands showed increased interest in the discharge volumes flowing from Germany into the Netherlands. This was increasingly justified by the fact that the water from the Rur river makes a decisive contribution to the drinking water supply in the Netherlands and that minimum discharge volumes are therefore of great relevance. This highlights the different priorities of the countries involved and the need for coordinated modelling to produce the most accurate representation of risks and adaptation strategies.

Contents

1 Introduction

Originally, a stress test is a medical test of the human heart under physical exercise. In the context of the JCAR ATRACE project we investigate how a water system reacts under extreme conditions or under which conditions the system fails. Goal of a stress test is to gain a better understanding of worst-case conditions and consequences of extreme scenarios.

The "stress test Rur" aims to gain a better understanding on how the Rur catchment reacts to worst-case conditions of extreme scenarios, learn what consequences are and to identify possible measures to mitigate unfavorable consequences. By carrying out this stress-test we will further develop the stress test approach such that the stress test Rur can become a guideline for other stress tests on the same catchment or other catchments in the cross-border area between the Netherlands and Northrhine-Westfalia.

The approach of the stress test Rur follows the method for an inter-regional stress test as outlined in Menz et al (2025). The global method consists of three phases:

1. The starting points phase comprises scoping and system understanding.
2. The analysis is the stress test itself. Here scenarios are evaluated for system failure
3. Screening (of measures)

Part 1, scoping and system understanding are described in separate reports (Becker et al. 2024; Menz et al, 2025). This report focuses on aspects of part 2. By conducting stakeholder interviews, we search for relevant insights into the stakeholders' experience and priorities. This helps in the definition of stress test scenarios, interpretation of stress test results and the identification of mitigation measures.

2 Stakeholder interviews

2.1 Questionnaire

As part of the survey on flood and drought management in the Rur River basin, in-depth interviews were conducted with various stakeholders (see Becker et al. 2024). The aim was to gain a comprehensive understanding of the current challenges, priorities, and perspectives of the involved actors. The results of these interviews provide valuable insights into the needs, concerns, and recommendations of different organizations within the Rur basin. Key findings from the interviews are summarized, and critical aspects for the future direction of flood and drought management are analyzed.

Interviews were held with 16 representatives from cities, municipalities, authorities, water associations and suppliers, industry, agriculture, and political institutions (Table 1). The interview partners were deliberately selected to cover a broad spectrum of perspectives. The questions (see Table 2) focused on the role of each organization in flood and drought management, current projects, risk management strategies, disaster management, reservoir management, cross-border collaboration among various actors, existing knowledge gaps, as well as further recommendations and important concerns of the stakeholders.

The content of the interviews was systematically evaluated and thematically organized to identify central patterns and recurring themes. Particular attention was paid to frequently mentioned responses and specific challenges highlighted by the stakeholders.

Table 1: Stakeholders who participated in an interview

Stakeholder	**Function**	**Interviewer**	**Date**	**Place**
Gemeinde Hürtgenwald	Administrative assistant, Department 3 – Main and Building Authority Building yard manager (Bauhofleiter), Department 3 – Main and Building Authority	Alexander Menz, Stefanie Wolf	12.12.2024	Hürtgenwald
Städteregion Aachen	Coordinator for flood risk management in the Städteregion Aachen	Alexander Menz, Stefanie Wolf	24.12.2024	IWW, RWTH Aachen University
Gemeinde Heimbach	Head of Planning, Construction, Environment Building Authority	Alexander Menz, Stefanie Wolf	16.01.2025	Heimbach

	Urban Development, Tourism, Culture Unit			
Watershap Limburg	Political advisor at the Limburg Water Board	Alexander Menz, Stefanie Wolf, Bernhard Becker	28.01.2025	online
Gemeinde Simmerath	Mayor	Alexander Menz, Stefanie Wolf	31.01.2025	online
Bezirksregierung Köln		Alexander Menz, Stefanie Wolf	31.01.2025	online
Gemeinde Nideggen	Head of Department, II/3 – Civil Engineering and Road Construction, Planning	Alexander Menz, Stefanie Wolf	03.02.2025	online
Industrie-Wasser-Umweltschutz e.V. (IWU e.V.)	Managing Director	Alexander Menz, Prof. Schüttrumpf, Stefanie Wolf	03.02.2025	online
MUNV NRW	Head of the Flood Protection and Dam Management Division	Alexander Menz, Stefanie Wolf	10.02.25	online
Rheinischer Landwirtschafts-verband e.V. (RLV)	District Chairman of Düren	Alexander Menz, Stefanie Wolf	11.02.2025	online
Gemeinde Monschau	Mayor and General Representative	Alexander Menz, Stefanie Wolf	21.02.2025	Rathaus Monschau
Ministry of Infrastructure and Water Management NL (MinIenW NL)	Deputy Head of Department for Cross-Border Flood Resilience, MinIenW, Advisor for International River Commissions and Water Quality at MinIenW	Alexander Menz Elena Klopries Holger Schüttrumpf	14.05.2025	online
Rijkswaterstaat (RWS)	Political advisor; low water consultant at RWS, water management consultant at RWS	Alexander Menz Elena Klopries Holger Schüttrumpf	14.05.2025	online
Landtag NRW (B90/Grünen)	Member of the State Parliament	Alexander Menz Elena Klopries Holger Schüttrumpf	16.05.2025	online
Landtag NRW (CDU)	Member of the State Parliament	Alexander Menz Elena Klopries Holger Schüttrumpf	23.05.2025	IWW, RWTH Aachen University
WAG	Head of the Water Extraction and Catchment Areas Department	Alexander Menz	05.06.2025	online

Table 2: categorised questions for the stakeholder interview partners.

Category	**Question**
Rur stress test	What do you understand by a stress situation for the Rur?
Organisation and role	What role does your organisation play in flood and drought management and what is your role in this?
	Are you currently implementing flood/drought management projects? Who is involved and what are the tasks involved?
	How do you support local authorities and other stakeholders (or companies) in implementing these projects?
	Are there any projects or programmes that could promote preventive flood and drought management and improve the functioning of the catchment area?
	Are there approaches that specifically address the effects of climate change?
	Which water law or water management issues are currently particularly relevant from your point of view?
	In your view, is there potential for synergies between economic interests and preventive flood protection?
Risk management	What rules, guidelines, strategies or measures are in place for flood/drought risk management? (e.g. emergency plans, local regulations)
	Do these take into account the changing availability of water?
	What additional formal agreements would be necessary in your view?
	Are there (promotion of) informal agreements on flood/drought risk management?
	What flood protection measures are currently in place in your municipality?
	How does the Ministry support local authorities and district governments in the implementation of flood protection measures?

	How are these adapted to the changing climatic conditions?
	Do you prepare for extreme situations that go beyond what is currently expected? What specific preparations are you making?
Disaster management	What formal (and informal) agreements exist for disaster management in the event of floods/droughts?
	Do other special rules apply during a flood or drought?
	Are there evacuation strategies for extreme flooding events (in your municipality)?
	What other agreements would be necessary?
	How is cooperation with neighbouring municipalities or districts (or other authorities and organisations) organised in the event of a disaster?
Dam management and retention	What specific needs/requirements do you have (or challenges do you see) with regard to reservoir management?
	How do you see the future requirements for water supply and flood protection?
	How do you see your role in the coordination between dam operators and local authorities, particularly with regard to flood protection and water supply?
	What changes do you expect due to climate change or social developments that could affect dam management? How do you think these changes will affect your community?
	Which scenarios do you consider realistic with regard to the future utilisation of water resources in your region?
	In your opinion, what would be important criteria/facts that should be taken into account when developing new operating rules?
Cross-border collaboration	How do you coordinate cooperation with other municipalities or regions or Belgium or the Netherlands on flood and drought management?
	Are there formal or informal agreements? If so, which ones?

	Are there specific challenges, e.g. differences in regulations or communication structures?
	Are there any obstacles to cooperation between the organisations in the wider Rur catchment area?
Knowledge Gaps	What knowledge gaps do you see in relation to flood and drought management that are relevant to your community?
	What support could authorities or scientific organisations offer to strengthen resilience?
Further concerns	What other organisations do you think we should talk to about drought and flood risk management?
	Are there specific challenges or concerns that you see in the area of flood or drought management that have not yet been discussed?
	What additional measures or support do you think would be helpful to improve flood and drought management in your region?
	Are there any topics or developments that you consider to be particularly important for the future of flood and drought management?

2.2 Organization and Role

The first set of questions referred to the interviewee's organization and its role in flood and drought risk management. The interviews shed light on these aspects as follows:

Municipalities and Local Actors

The municipalities in the Rur River basin play a crucial role in local flood and drought management. They are responsible for watercourse maintenance, the implementation of on-site flood protection measures, and raising public awareness. Their tasks include maintaining watercourses, servicing flood protection structures, and developing local flood protection concepts. The municipalities work closely with water associations and lower water authorities to ensure effective and coordinated implementation of measures.

Water Associations

Water associations in the Rur basin have overarching and coordinating functions. However, their powers and responsibilities differ among Belgium, the

Netherlands, and Germany. In the German North Eifel region, they are responsible for managing a large part of the reservoirs—drinking water reservoirs are operated by local water suppliers—and other hydraulic structures. They play a key role in planning and implementing large-scale projects to improve flood protection and water supply. The Wasserverband Eifel-Rur (WVER) maintains watercourses in most parts of the Rur catchment downstream Obermaubach, services flood protection structures and develops local and regional flood protection concepts. Water associations collaborate closely with municipalities, authorities, and other interest groups to ensure integrated water resource management. They provide expertise, conduct hydrological and hydraulic studies, and support the development of flood risk management plans.

Authorities

Authorities at the state and district levels are responsible for the legal framework, approval of measures, and provision of funding. They monitor compliance with environmental and nature conservation regulations and are responsible for creating flood hazard maps and reports. Additionally, authorities coordinate the cooperation of various actors and ensure the implementation of national and European directives on water resource management.

2.3 Risk Management

The second set of questions focused on the interviewee's point of view with regard to risk management in the Rur basin and how the interview partners define stress situations with regard to their area of work.

Stress Situations on the Rur

A central finding from the interviews is that drought and low water levels in the Rur are currently not perceived by many actors as a priority risk. Due to the existing reservoirs and dams in the catchment area, the water supply is considered largely secured even during dry periods. It was repeatedly emphasized that usage demands can be met over extended periods, providing the region with a certain resilience to dry spells. In the long term, it is also necessary to consider climate change scenarios more carefully in order to address possible future risks more effectively

In contrast, flood risk is clearly at the forefront. There is increased sensitivity to flood events, especially following the flood incidents in 2021. Many interviewees are increasingly focusing on preparing for and managing flood events. Extreme scenarios such as dam breaches are acknowledged as possible, but the focus remains on preparing for regularly occurring flood events

with a statistical return period of up to 100 years. Adapting existing infrastructure and implementing preventive measures play a central role.

Changing Precipitation Distribution

Actors recognize the need to adapt risk management to changing climatic conditions. It is expected that annual precipitation sums will remain largely constant, but climate change will lead to a more uneven distribution of precipitation, potentially causing more frequent heavy rainfall events. Integrating climate projections into the planning and design of flood protection measures is therefore considered essential. Some organizations are already considering scenarios exceeding the 100-year flood event (HQ100) to prepare for possible occurrences. Extreme events far beyond HQ100 such as dam breaches or a HQ10,000 scenario could be valid worst-case scenarios for a stress test. However, dam breach scenarios contain sensitive information and are taken care of directly by administrative organizations.

Importance of Tributaries

A recurring theme in risk management is the significance of the tributaries to the Rur. Smaller tributaries can rapidly swell during heavy rainfall events, leading to local flooding. Precise knowledge of the runoff behavior of these watercourses is essential for effective risk assessment. There is a desire to improve hydrological data collection and establish additional gauging stations. Through more detailed monitoring of the tributaries, early warning systems can be designed more accurately, and protective measures can be implemented more effectively.

2.4 Disaster Management

Similar to risk management, the interviewees were asked about their organization's role in disaster management in the third set of questions.

Different Structures and Strategies

Depending on the organization, there are different approaches to disaster management. Some actors have formalized structures with established emergency plans, crisis teams, and regular exercises. These organizations have developed specific action directives for various scenarios to enable rapid and coordinated responses in emergencies. Particular attention should be paid to the most vulnerable groups.

In other areas, disaster management is based more on informal agreements and the use of existing networks. Here, experiential knowledge plays an important role, relying on established structures and close cooperation with local emergency services.

Evacuation Strategies and Protection of the Population

Some actors have developed detailed evacuation plans for particularly vulnerable areas. These plans include established reporting chains, evacuation routes, and assembly points for the affected population. Regular review and updating of these plans are deemed necessary to respond to changing risk scenarios.

However, it was also noted that in some regions, due to specific topographical and hydrological conditions, the necessity for comprehensive evacuation strategies is considered low. Nonetheless, there is consensus that the protection of the population is a central aspect of disaster management and requires continuous attention.

Collaboration with Relief Organizations

Effective collaboration with fire departments, technical relief organizations, private companies, and other aid organizations is considered crucial for disaster management. Some actors emphasize the importance of joint exercises and training to improve coordination and communication in emergencies. The exchange of resources and know-how exists and is particularly valued in cross-border situations.

2.5 Reservoir Management and Retention Capacities

Since the Rur basin is strongly characterized by all its dams and reservoirs, the fourth set of questions refered to reservoir management, retention capacity and the interviewees view on adaptation capacity to changing conditions.

Central Role of the Reservoirs

The reservoirs in the Rur basin play a central role in both water supply and flood protection. They ensure stable water flows and have significantly contributed to drought not being perceived as a priority risk. In flood protection, they serve as buffers to absorb peak flows and alleviate downstream areas up to the Netherlands.

Adaptation to Changing Conditions

In light of expected climatic changes, actors see the need to adapt reservoir management strategies. This includes reviewing and updating operating regulations to meet both the increased need for water retention during heavy rainfall events and the assurance of water supply during dry periods.

Increasing Retention Capacity

The need to enhance retention capacities by raising dams or constructing new retention basins was emphasized multiple times. For example, the elevation of an existing dam is planned to improve both water supply and flood protection. Expanding the network of reservoirs with additional tunnels between reservoirs in the North Eifel is suggested as an idea for drought preparedness and flood protection. It is considered an important measure to respond to the increasing variability of precipitation. Simultaneously, environmental and nature conservation concerns must be considered, adding complexity to the planning processes.

Potential of the Inden Rest Lake

The future Inden Rest Lake, which will emerge after the cessation of lignite mining, was mentioned by several actors as a potential resource for water resource management. There is interest in utilizing the lake for both flood retention and water provision during dry periods. Additionally, the lake is considered a means of enhancing regional ecosystems and encouraging recreational activities. This approach requires careful planning and cross-border cooperation to effectively harness the lake's potential. Currently, this option is taken into consideration by several actors as a long-term measure. At the moment, the schedule for the lake’s filling shows that it will be finished earliest by 2055.

2.6 Cross-Border Collaboration

The last set of questions referred to cross-border collaboration. Since it holds a lot of importance in the context of future changes, risk management and disaster management, the interviewees had the opportunity to give their view freely on this and their visions for how collaboration should look like.

Cross-border collaboration with neighboring countries like Belgium and the Netherlands is regarded as an important component of flood management. There are formal agreements at various administrative levels and regular communication channels to enhance information exchange and coordination. Effective collaboration helps to minimize cross-border flood risks and develop joint solutions. Obstacles such as language barriers are considered relatively minor.

Some actors highlighted positive experiences with inter-municipal collaboration in water resource management. Basin-wide planning and measures successfully implemented in other regions, such as the Erft basin, serve as models. There is interest in establishing similar cooperation models in the Rur region to exploit synergies and increase the efficiency of flood protection measures. First inter-municipal collaborations have already been

implemented parallel to the Erft: the flood cooperation Urft-Olef is an official collaboration between municipalities, Kreis, Bezirksregierung, and WVER to create a master plan. Two more master plans already exist for the Inde-Vicht-basin as well as for the Wurm basin which were created together with municipalities and the WVER.

2.6.1 Knowledge Gaps

Some stakeholders point out existing knowledge gaps:

Improvement of Data Availability

A central concern is the expansion of the hydrological data base, especially for the tributaries. Additional gauging stations and continuous measurements can improve the quality of risk assessment.

Integration of Local Know-How

Linking and exchanging local experiential knowledge with scientific findings and modern modeling techniques is considered necessary to achieve a holistic understanding of the situation. Enhanced collaboration with scientific institutions can help close knowledge gaps and develop innovative solutions.

2.6.2 Further Concerns

Additionally, the following concerns and recommendations were articulated:

Challenges Due to Nature Conservation Requirements

Nature conservation aspects pose significant challenges for many actors in implementing flood protection measures. Conflicts arise when planned construction measures conflict with the requirements of nature reserves or Natura 2000 areas. It was reported that projects could not be implemented due to conservation concerns. The necessity of early coordination with nature conservation authorities and seeking compromises were identified as essential steps to ensure both flood protection and conservation.

Resources and Funding

Ensuring sufficient financial and personnel resources is considered necessary for implementing the planned measures. This includes the efficient use of funding and the development of new financing models.

Raising Public Awareness

Raising awareness and involving the local population regarding risks and appropriate behavior in flood events is of great importance. Through educational offerings and information campaigns, awareness can be strengthened, and self-protection can be promoted.

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