

Adapting to heavy rainfall and flood risk, lessons learned from Møre and Romsdal



PHOTO: CHRISTA EDER

Key recommendations

- Local communities' knowledge and capacities are crucial inputs for municipalities and county governors in risk- and vulnerability analysis (RVA), emergency preparedness planning, and response. Facilitating knowledge exchange between citizens and municipalities is vital for effective local hazard management. Municipalities should systematically integrate local knowledge and capacities.
- When developing regional RVA, the County Governor should actively include municipalities and integrate their knowledge. In return, municipalities should utilize the regional county ROS as valuable input to their municipal RVA and subsequent municipal emergency preparedness plans.
- Due to an expected increase in frequency and intensity of extreme rainfall, communities are increasingly more vulnerable to flooding. Flooding risk spans across municipal borders therefore cooperation between neighbouring municipality should be facilitated by including them in the regional RVA.

For more information:

Laurien de Korte

Department of
Technology and Safety,
UiT The Arctic University
of Norway

Bjarte Rød

Department of
Technology and Safety UiT
The Arctic University of
Norway, and County
Governor Office in Møre
og Romsdal

Leikny Bakke Lie

Department of
Technology and Safety,
UiT The Arctic University
of Norway

The recently published White paper Meld. St. 26 (2022-2023) emphasize that “Climate change is happening faster, and the consequences are more extensive and dramatic than previously believed.” [1].

The distinctive landscape of western Norway, marked by steep mountains, long coastline, and diverse geography, exposes the region to a variety of natural hazards. The region is particularly exposed to the risk of flood events and various types of slides. With the impacts of climate change, we can expect more frequent occurrences and increased intensity of these events [2]. According to the regional climate profile of Møre og Romsdal, there is an expected annual precipitation increase of 15%, with autumn and summer receiving the most significant amounts. This increase is expected to be experienced as more short-term intense rainfall events. Such events of intense precipitation can in turn result in flash flooding— a type of flood event that typically occur rapidly, often within a timeframe of 6 hours or less. Because of the quick onset of the flood, it can be challenging to issue early warnings and take necessary precautions in a timely manner, which in turn can result in more devastating consequences. A recent study show that municipalities located along the west coast of Norway are more exposed to climate hazard and their impacts. At the same time, these municipalities are, on average, adapting less to these challenges [3]. As such there is a need for significant efforts to enhance municipal resilience in the face of these hazards.

Local communities possess invaluable knowledge of local flood risk

Climate change is often said to be a global challenge with local impacts. Especially small and remote communities are more vulnerable to current and future changes. Owing to their remoteness these communities

often possess capacities for handling hazard impacts themselves. This has grown out of necessity as professional emergency responders will not be able to immediately arrive at the impacted area.

Norwegian municipalities hold a key role in ensuring peoples safety through a statutory responsibility for managing risk and mitigating the impact of climate-induced natural hazards. Utilizing local knowledge and capacities within exposed communities can provide valuable input to local climate change adaptation strategies and emergency preparedness plans, strengthening the municipal capacity for handling unwanted events. We encourage the municipalities to engage in discussions with local communities to address the risk and prepare for impacts in a proactive manner.

“

When you have lived here your whole life - you pay attention to the wind directions - so you have in mind what your next move will be.

”

Significance of integrating local knowledge in local risk assessments.

Local communities exposed to flooding often have years of experience living with this risk. Experience and daily observations made by “the locals” are not fully utilized in practices. For instance, routines for receiving and following up on reports of concerns from resident related to flood risk are often lacking.

Moreover, emergency preparedness plans rarely include an overview of relevant local capacities that can be utilized during a crisis. Examples of this could be an inventory of relevant equipment and skills found in the exposed communities. Incorporating the valuable informal knowledge from local communities into municipal planning can be challenging. Formalized methods are needed to enhance community resilience, such as collaborative workshops between municipal representatives and selected locals to discuss specific risks and concerns. These workshops offer direct input to emergency planning and foster mutual understanding of roles before, during, and after events. Other approaches include developing joint local emergency plans tailored to local risks and conducting joint preparedness exercises. These initiatives ensure local involvement and cooperation between at-risk communities and authorities.

Policy recommendation 1: Systematic integration of local knowledge about flood risk in municipal climate change adaptation and emergency preparedness processes

Inclusion of the inhabitants' risk perceptions and knowledge enriches municipals risk assessment and plans, giving local actors and municipalities a better understanding of acceptable risk and measures needed to reduce the risk, such as cleaning the river upstream from debris. Ways of integrating this knowledge can be through;

- workshops
- joint local emergency plans and preparedness exercises
- inventory of relevant equipment in communities
- integration and follow up of weather warnings from local community members

Municipal input to regional risk- and vulnerability assessments.

Part of the County Governor responsibilities is to maintain an overview of the region's risks- and vulnerabilities and periodically conducting risk- and vulnerability assessments (regional RVA). To integrate municipal perspectives into this process the County Governor of Møre og Romsdal invited selected municipalities, infrastructure operators, emergency preparedness responders and researcher to be a part of this process. These stakeholders provided input to the development of a relevant flash flood scenario and the subsequent risk- and vulnerability assessment. Such actors have extensive knowledge from a practical viewpoint on vulnerabilities and hazards in their area. Merging this knowledge with input from the research community add scientific weight to the RVA-analysis and can provide a more holistic view on risks and their management.

As flooding occurrence and impacts are not confined within municipal borders, we advise the county to include neighbouring municipalities in the regional RVA process, promoting cross-border cooperation. This is needed as flooding can occur or create cross - border impact, thus requiring a broader response. Cooperation between municipalities can also streamline resources used during emergency response.

Bringing together different actors for input on the regional RVA can be done through digital or physical platforms. Both ways have pros and cons. Using digital platforms often increases number of participants, as it is easier to attend. On the other hand, a high number of participants might decrease the involvement, where high-ranking persons with strong personality tend to dominate the discussions.



PHOTO: LILLIAN TVEIT

Physical meeting platforms allows for better learning environment with more active discussions in smaller groups. Involvement of different actors can also be done through questionnaires and in written feedback/review-processes of analysis.

Policy recommendation 2: Include more diverse and relevant stakeholders in regional ROS analysis process.

Local and regional stakeholders have extensive knowledge on hazards and vulnerabilities that can provide valuable input to the regional RVA analysis. Workshops (digital and/or physical), questionnaires, written reviews-processes, has proven to be useful method to integrate municipalities and other actors in the regional analysis. Furthermore, including neighboring municipalities in the regional RVA process promotes cross-border collaboration.

Literature

1. Meld. St. 26. (2022-2023). *Klima i endring - sammen for et klimarobust samfunn*. Klima- og miljødepartementet
2. IPCC. Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge, United Kingdom and New York, NY, USA: Cambridge University Press; 2021.
3. Korleis fordeler klimarisikoen seg i fremtida? Norsk Klimamonitor 2023. <https://klimamonitor.no/>
4. FylkesROS Møre and Romsdal, 2022. The County Governor of Møre og Romsdal. Available at: https://www.statsforvalteren.no/nn/More-og-Romsdal/Samfunnstryggleik-og-beredskap/Risiko_og_sarbarheit/