

## Communicating Risk in a Multi-stakeholder Disaster Risk Management System: Challenges and Insights

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Disaster risks are posing cascading threats to humankind, due to the inter-dependencies, urbanization, and growing complexity of modern societies (CaDRI, 2011; OECD, 2003, 2011; UNISDR, 2017). Although governments worldwide are increasingly aware of, and committed to reducing the adverse impact of disaster risks, the number of lives lost and assets destroyed, directly or indirectly, continues to grow rapidly (UNISDR, 2017). Faced with this evolving risk landscape, many countries have established disaster risk management (DRM) systems (Lin, 2018; Lin & Abrahamsson, 2015; Lin & Eriksson, 2016; Rivera, Tehler, & Wamsler, 2016), involving key actors at various levels of government, stakeholders with multi-disciplinary backgrounds, and representatives from both the private sector and civil society, to collectively assess the preparedness for extreme events and jointly manage disaster risks (OECD, 2010; World Economic Forum, 2017).

Taking effective actions to mitigate disaster risks and their adverse impacts, a preliminary step is to understand the risks to be managed, through a risk assessment. In today's interconnected society, no single organization can 'own' a crisis (Boin, 2009), and no-one possesses all of the relevant information concerning all of the risks. Therefore, in order to conduct a comprehensive risk assessment, all relevant stakeholders must work together to actively and meaningfully communicate risk-related information. This, however, is not easy to achieve.

The importance of effective risk communication within a multi-stakeholder DRM context has been repeatedly emphasized (Hermans, Fox, & van Asselt, 2012; IRGC, 2009; Renn, 2014; van Asselt & Renn, 2011; Veland & Aven, 2013). At the meantime, many barriers have been encountered during risk communication processes. They hamper the flow of risk communication, making it difficult for involved parties to reach agreement, thus degrading their collective ability to manage disaster risks (Kramer, 2005; Veland & Aven, 2013). It seems that in a multi-stakeholder DRM context, risk communication is destined to be associated with many challenges.

Therefore, the research presented here aims to increase our knowledge of effective risk communication in a multi-stakeholder, multi-level DRM system, with a specific focus on the exchange of risk-related information for risk assessment. It adopts Sweden as a study case, and describes a holistic picture of the risk communication issues that are relevant to the conduct, dissemination and utilization of risk assessments in the Swedish DRM system. By answering the research question "*how does risk communication, through the process of conducting, disseminating, and utilizing risk assessments, influence the multi-level multi-stakeholder DRM system, and what can be done to improve the effectiveness of such risk communication in order to improve the functioning of the DRM system?*", this study examines the challenges of risk assessment work and its associated communication issues in Sweden, and how they influence Swedish DRM practice, both positively and negatively.

By employing various research methods for data sampling, collection and analysis, the findings indicate that communication challenges exist throughout the Swedish DRM system and can be linked to the following factors: 1). a lack of standardization in the methods, tools and formats that are applied to conduct risk assessments at all levels of the Swedish DRM system resulted in difficulties to communicate risk-related information via risk assessment documentation; 2). DRM stakeholders hold very different perspectives regarding the scale and frequency (day-to-day safety issues or low-probability disastrous events) of the risks they assess, meaning that risk assessments from different actors are hard to combine; 3). the dissemination of the risk assessment is very limited, due to the lack of an appropriate distribution channel and authorities' unwillingness to disclose sensitive data and managerial shortcomings; 4). constructive feedback regarding the quality of risk assessments is largely missing at all levels, creating significant uncertainty about future risk assessment work and resulting in a one-way communication process; and 5). it is difficult to convince some stakeholders of the need to conduct

a risk assessment. High staff turnover leads to a loss of continuity and influences the quality of the assessment.

Risk assessment work and its associated communication issues influence the Swedish DRM system both negatively and positively: 1). the system seems to fail in many ways: being unable to aggregate risk-related information from various levels into a holistic risk picture; the failure to implement planned DRM activities in practice; the lack of private sector participation; and vertical, one-way communication of risk. 2). Nevertheless, the DRM system does benefit, both from carrying out the risk assessment work, and the related risk communication. It has increased interest and changed attitudes about how people think and see things from a safety perspective. The direct or indirect results of risk assessments have contributed to authorities' decision-making, emergency planning and other crisis management exercises. The risk assessment process provides DRM stakeholders with an opportunity to get to know each other, and forms the basis for future collaboration. Calls have also been made for more risk communication and stakeholder collaboration within the DRM system, as stakeholders have realized such need following their risk assessment work.

The examination of both the positive and negative influences of risk assessment work and the associated communication issues on the Swedish DRM system led to the identification of two strategies to overcome challenges. The first takes a systemic perspective. For instance, relevant feedback would improve the quality of the risk assessment and make communication of a two-way manner. Furthermore, the results of risk assessments need to be properly disseminated, balancing authorities' duty-to-disclose risk-related information and stakeholders' right-to-know about the potential risks. The second takes a content perspective, and seeks to enhance the usefulness of risk assessment documentation for risk-related decision-making and communication. It is likely that documents could be made more useful by including scenario descriptions, information concerning the estimated likelihood of events and their associated consequences and supporting background information. Moreover, quantitative and semi-quantitative scales appear to be promising ways to communicate risk-related information concerning likelihood and consequences, especially if they are complemented by narrative evidence.

It should be noted that although this research focuses on the Swedish context, the implications of the findings are not necessarily limited to Sweden. Researchers and practitioners from other DRM contexts are invited to compare this detailed

presentation of Swedish practice with their own situation, and judge if the findings and insights provided here could be applicable. It is likely that the more similar the two contexts are, in terms of risk communication, the more the conclusions will be valid.

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