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EXPLORING THE DEVELOPMENT AND USE OF MUNICIPAL RISK AND VULNERABILITY ASSESSMENTS IN SWEDEN-CHALLENGES AND OPPORTUNITIES

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Many countries have established disaster risk management (DRM) systems to reduce disaster risks and improve societal safety. Risk assessment in the DRM system is not only an important tool to identify potential risks, but also promotes DRM through conversations among stakeholders from different functional sectors and administrative levels. The municipal risk assessment, produced at the lowest administrative level of the system, is often expected to fulfill two purposes. One is to meet municipalities' own, local DRM needs, while the other is to contribute to regional and national-level work. This article takes the multi-level, multi-stakeholder, bottom-up Swedish DRM system as a representative example to investigate the perceived challenges and opportunities emerging from the preparation of these dual-purpose assessments. Empirical data were collected through 42 semi-structured interviews and related documentation from 18 local municipalities and six regional authorities in Sweden. The findings, representing perceived challenges and opportunities were categorized into six themes: the focus of municipal RVA work; the template and evaluation criteria for municipal RVAs; municipal RVA work as a continuous process; the dissemination of municipal RVAs; feedback from the county administrative board; and the benefits and drawbacks of municipal RVA work.

Keywords: disaster risk management (DRM), risk assessment, risk and vulnerability assessment (RVA), challenges and opportunities, municipalities

I. INTRODUCTION

Worldwide, the losses caused by major crises and disasters are increasing rapidly[1, 2]. Events with disruptive consequences begin locally then spread globally, highlighting the need to improve our ability to manage disaster risks[1, 3, 4]. Many countries have established disaster risk management (DRM) systems that aim to reduce the adverse impacts of hazards and potential disaster[5]. These systems encourage stakeholders from different administrative levels and functional sectors to actively anticipate, prepare for and respond to disaster risks[6]. The risk assessment is an important tool to identify risk. The exercise enhances the awareness and knowledge of those responsible for taking decisions about risks and vulnerabilities. It provides the foundations for planning and implementing measures that reduce risks and vulnerabilities[7], and promotes DRM through conversations between organizations and individuals working in various areas, thus improving crisis preparedness and societal safety at all levels[2]. Nowadays, it is often the case that authorities are legally required to conduct risk assessments[2].

Countries such as Sweden have multi-level DRM systems based on principles of responsibility and proximity. This means that whoever is responsible for an activity in normal conditions also has responsibility in a crisis. A second principle is that a crisis should be handled at the lowest possible administrative level—often represented by local municipalities. Therefore, municipalities must not only carry out their own, local DRM tasks, but they are also expected to contribute to regional and national DRM activities. In particular, the municipal risk assessment is an important input for regional authorities and national governments who must generate a high-level overview. Therefore, the preparedness of local municipalities affects both regional and national DRM performance.

This study examines the perceived challenges and opportunities during the development and use of these dual-purpose municipal risk assessments in a DRM system. The multi-level, bottom-up Swedish system is used as a representative case study. In Sweden, authorities at all levels are legally obliged to conduct a risk and vulnerability assessment (RVA)[8, 9]. In theory, the RVA conducted at a lower administrative level should be used as input for the RVA carried out by the level

above. For example, local municipal RVAs should serve as the basis for generating regional RVAs. In turn, regional RVAs feed into the national RVA. However, previous studies have argued that the system is not functioning as it was designed[10-13]. Various investigations have tackled the issue from different angles, for example evaluating RVA documentation from a design perspective to see if it fulfills its intended purpose[10, 11]. Other studies have suggested ways to improve the quality of RVA documentation[13-16]. Researchers have explored communication challenges and stakeholder collaboration at different administrative levels[12, 17]. Finally, another study compared RVA legislation in Norway and Sweden[18]. Here, however, the focus was on the overall local municipal RVA process (not just RVA documentation) and interactions with the regional administration.

This paper explores the perceived challenges and opportunities during the development and use of municipal RVAs, which must fulfill both local DRM needs and contribute to higher-level RVAs. It addresses the specific question: *What are the perceived challenges and opportunities during the development and use of municipal RVAs, given that they must both fulfill local DRM needs and contribute to higher-level RVAs?* It is structured as follows. The next section outlines the background and principal theoretical concepts. Section III describes the methods. Next, we present the empirical findings and analysis. This is followed by a discussion of the causes of challenges and opportunities in the current DRM system, and some suggestions for improvements from a risk communication perspective. Finally, the conclusions are presented.

II. THEORETICAL BACKGROUND

DRM has been defined by the United Nations Office for Disaster Risk Reduction (UNISDR) as, "the systematic process of using administrative directives, organizations, and operational skills and capacities to implement strategies, policies and improved coping capacities in order to lessen the adverse impacts of hazards and the possibility of disaster"[5]. It is an ongoing process found at local, regional and national levels. A *DRM system* refers to the organizations, technical systems, mechanisms, etc. that participate in the DRM process[12, 19]. The DRM system involves stakeholders at multiple levels, and integrates contributions from actors with different expertise to collectively manage disaster risks.

This article adopts a *risk governance* perspective, i.e. "the totality of actors, rules, conventions, processes, and the mechanisms concerned with how relevant risk information is collected, analyzed, and communicated, and how regulatory decisions are taken"[20-22]. A DRM system is considered as the application or practice of risk governance, as all relevant actors are expected to contribute to managing the disaster risks faced by society[12]. The defining characteristic of both DRM and risk governance is the involvement of multiple stakeholders in managing disaster risks, namely *inclusion*. Inclusion does not simply mean that various stakeholders are included. Instead, they are all expected to play a key role in framing and assessing potential risks. As van Asselt and Renn[22] argue, inclusion should be both open and adaptive. However, more inclusion does not guarantee better DRM. For example, as the number of stakeholders involved in risk management increases, so does the need for good communication and information sharing. Complex bureaucracies only benefit when they strive to improve information sharing and communication[23] as communication failures will result in the failure of DRM activities[22].

Effective risk communication plays an essential role in a multi-level DRM system that brings together stakeholders with different expertise and various backgrounds, as the parties must be able to actively and meaningfully interact with each other. It provides the foundations for stakeholders to responsibly and collectively govern societal risks, and implies internal and external exchanges between policy-makers, experts, and the general public[22]. The risk assessment is seen as a principal, formal channel for exchanging information in the DRM system[12]. However, in the context of risk governance, researchers have claimed that communication is never simple[22, 24] and is always associated with barriers[23]; the same can be said of stakeholders in the DRM system who must communicate information via risk assessments. Not only do stakeholders differ in their assessment and appraisal of risks, but also in terms of their responses that are framed by their own constructs. The end result can be that one stakeholder's risk assessment appears useless to other participants. This can be the origin of many problems in DRM systems, as no single stakeholder owns all of the information, and the overall risk picture depends on contributions from many participants.

Veland and Aven[25] claim that a difference in perspective can lead to serious problems and barriers in the communication of risk-related information, which constitutes the most fundamental building block of a stakeholder's understanding. These fundamental blocks can be based on either a scientific understanding and/ or more informal concepts and judgments[25]. It has been argued that a failure to base the assessment and management of risk on solid scientific foundations is very likely to lead to failures in risk communication. Those who are responsible for the risk assessment must act professionally, and establish the scientific pillars for their work[25], otherwise risk communication may become fragmented. Fragmentation hampers risk communication and information sharing among stakeholders, and weakens risk identification and assessment. Further down

the line, it can make it more difficult for one stakeholder to use another's risk assessment as input, and diminishes the overall performance of the DRM system[11].

Another challenge related to the effective communication and management of risks is the exchange of information between stakeholders[22, 26-28]. In a multi-stakeholder DRM system, risk communication is a multi-dimensional, interactive process that consists of sharing and exchanging the results of risk assessments and other risk-related information[29]. Appropriate and timely feedback is a key part of the process. Tailored feedback offers the information sender an opportunity to reflect upon, and adjust their message. Positive feedback focused on strengths and accomplishments confirms that they are on the right track, and encourage them to continue their work. Negative feedback, on the other hand, can help to address weakness. The sender should modify their message accordingly and use other approaches to achieve their goals[30]. Both positive and negative feedback are helpful and have a role to play. However, it has been reported that little feedback is usually provided[31], which may lead to a failure to achieve intended the outcome[27].

The aim of a DRM system is to gather information and opinions related to hazards and risks from those who are potentially affected, and interested stakeholders. This information is shared via risk assessments. Ideally, information sharing should begin at the start of the risk assessment and continue throughout the process[29]. By studying the perceived challenges and opportunities during the development and use of the municipal risk assessment, this article sheds light on our understanding of how to achieve effective mutual risk communication in DRM systems.

III. METHODS

A content analysis of semi-structured interviews combined with a review of documentation were the main research methods.

Most of the empirical data were collected through 42 semi-structured interviews, involving stakeholders from Swedish local municipalities and their respective county administrative boards. The six counties that were selected represent a wide geographical spread (from the north to the south of Sweden). In each of the six counties, three municipalities were selected with different-sized populations. Eighteen municipalities were approached, but three declined the invitation (although they were involved in the study, see below). A final total of 36 interviews were held with staff from 15 municipalities, while six involved personnel from county administrative boards. Most interviews (with municipality representatives) were completed in 2014, four were conducted in 2013 and the final three took place in 2015.

At municipal level, the process began with an interview with the safety coordinator, who provided information about colleagues whose responsibilities were closely related to municipal RVA work. This snowball sampling method[32] identified other respondents at municipal level. Consequently, all participants had an excellent knowledge of RVA work in their municipality (and the study's findings might reflect a greater level of awareness than in the general population of municipal employees). Interviews were also carried out with representatives from the six selected county administrative boards. All of these interviews were completed in 2014, with regional safety coordinators. These officials are responsible for processing the municipal RVAs within their geographic area. Some of these interviews involved more than one person at a time, depending on how many people were actually involved in this area of work. Questions focused on their opinions of municipalities' RVAs (including the three municipalities that declined to participate).

In addition to this empirical data, we collected official reports related to DRM work (e.g. RVA documentation, Crisis Management Plans and Action Plans). These reports were collected either from official websites, or provided by respondents during interviews. All municipal and regional RVAs were examined, except for one that was classified as confidential (two authorities did not have a RVA document). It should be noted that the three municipalities that declined our request for an interview were nevertheless involved in the study. The analysis of their RVA work was based on information from their websites, interviews with their respective county administrative boards, and other relevant official documents.

Content analysis[33, 34] was used to analyze the empirical data. An analysis template was developed that consisted of headings that guided the interviews, supplemented by other aspects that emerged during the interviews. All interviews were recorded and relevant aspects were identified. The most significant statements were transcribed in full. The quotations that are presented here were translated with great caution, to ensure that the original meaning was not distorted. Finally, the authors carefully examined all of the official documentation. Information about each municipality was summarized, then aggregated into one document.

IV. RESULTS AND ANALYSIS

The following six themes represent the challenges and opportunities that were identified during the development and use of municipal RVAs:

- The focus of municipal RVA work;
- The template and evaluation criteria for municipal RVAs;
- Municipal RVA work as a continuous process;
- The dissemination of municipal RVAs;
- Feedback from the county administrative board;
- The benefits and drawbacks of municipal RVA work.

IV.A. The Focus of Municipal RVA Work

Under Swedish law, all 290 municipalities must implement an RVA[8]. To support this work, regulations[35] describe its structure. Furthermore, the Swedish Civil Contingencies Agency (MSB) has developed a guide for conducting an RVA[36]. Beyond this, the legislation leaves municipalities free to decide how they conduct their RVA. Consequently, while some similarities were found in how municipalities approached their work (for instance, many use a scenario analysis methodology), there were more differences, ranging from the choice of methodology to the focus. As one informant said, "one might think that all municipalities are working in the same way, but when you come to a new municipality, it's like coming to another company. They work completely differently."

IV.A.1. Daily Safety Issues or Disastrous Events?

The municipal safety coordinator's responsibilities often include both day-to-day safety issues and preparing for extraordinary events. Our interviews highlighted these different priorities: Should RVA work focus on daily safety issues? Low-probability disastrous events? Or both? Some argued that the focus should be on day-to-day safety, rather than very unlikely disastrous events. They suggested that by taking care of mundane issues, the municipality would become better able to handle extraordinary events. "We should not adapt to something that […] will come. Instead, we do what we can to make sure it does not happen." In other words, if everyday problems are well-handled, the municipality will also be able to deal with major crises. One informant added, "we cannot cover everything, that is impossible […] but we will still be just as prepared so that we know what we are going to do". Another informant provided a different perspective: as extraordinary events are very unlikely, it is very hard to analyze them. Municipalities have very limited resources, therefore they should focus less on extraordinary events, because they almost never occur. One informant (from a county administrative board) explicitly mentioned that municipalities should not only focus on daily safety issues, but also should identify and analyze unlikely, extraordinary events. However, none of the interviewees were sure how extreme or improbable a risk scenario should be, or how much detail to provide in the RVA.

IV.A.2. Local Municipal Operations or a Geographical Area of Responsibility?

In general, municipal RVA work is seen as only relating to the municipality's own operations, rather than the whole geographic area. This does not mean that informants do not see collaboration with other actors as important, but it is seen as very hard to achieve. Many municipalities focused primarily on their own operations, at least during the first few years of working with RVAs. Consequently, external stakeholders were excluded from the very beginning. One informant emphasized the importance of trust with respect to external stakeholders. This person believed that the municipality should not interfere or take on the responsibilities of others. Data protection was a further challenge in interactions with external stakeholders as their information can be highly confidential. It is difficult to include such information in municipal RVAs that are made public.

IV.B. The Template and Evaluation Criteria for Municipal RVAs

Some informants appreciated the lack of detail in the legislation and guidance, as they were able to conduct their work in the way that suited them best. Others were keen to see more detail and explicit guidance. They described the available guidance as overly general and "very fuzzy", preferring to receive something that describes "what the RVA should look like".

Informants from the county administrative board pointed out that was difficult for municipalities to work with RVAs, because the nature of the task was unclear. Some noted that the regulations simply stated that the RVA should be conducted and that it had a purpose, while the roles of both the municipality and the county remained unclear. This becomes even more difficult when the safety coordinator works alone and has to answer the question "How and what should the municipality do?". "There are no templates and there are no educational programs to learn from," said one regional safety coordinator, "I wonder where I should go to improve my skills? What is a good RVA? From whom can I learn? Who can help me to understand it?" Informants who wanted specific methods and an RVA template were primarily from smaller municipalities. They argued that the municipality should receive more help from the county administrative board and the MSB. Some pointed out that many aspects of the RVAs are universal and should therefore be determined centrally. They considered that the task would be made simpler if they were provided with a template to fill in. Another informant wanted the MSB or another actor to describe in detail what they wanted and what the RVA should look like.

County administrative boards are required by law[37] to evaluate the quality of municipal RVAs. Municipal informants stated that the evaluation is subjective, and that there are no clear rules. While they acknowledged that it was hard to define how it should be assessed, they argued that efforts should be made to provide more detail on what a 'good' RVA looked like. Other interviewees held a different view, and argued that the focus should be on the overall objective of RVA work, rather than the 'best' way to conduct the assessment. It was argued that RVA work should be embedded in the municipality's daily activities. Unlike the MSB or the county administrative board, the municipality knows themselves the best. The choice of method for RVA work should be based on knowledge that has been accumulated during day-to-day work, suggesting less control from above. An informant at the regional level noted that many municipalities try to create a RVA that has a beginning and an end; thus the work becomes an isolated process. They argued that RVA workers should be given more freedom, and that the RVA should not have a fixed format, as the process goes beyond simply structuring, analyzing and compiling risks and vulnerabilities. This approach makes it impossible to hand out a template for municipalities to fill in.

IV.C. Municipal RVA Work as a Continuous Process

Two aspects that were identified that would ensure that municipal RVA work is an ongoing process: first, working with the same method/ process for a long time; and second, having the same safety coordinator for a long time. The latter is closely related to the former. Both the interviews and the documentation showed that very few municipalities have an active, continuous RVA process. The five municipalities that could be said to have an ongoing process all started their work many years ago; furthermore, in all cases the safety coordinator had held their position for many years. For example, one municipality began their first round of RVA work in 2005. An informant from another municipality said that it took seven years before they felt that the process had started to become embedded. Some municipalities had just begun, or planned to re-evaluate their RVA work. This happened when the municipality had just appointed a new safety coordinator (and the new person wanted to adopt a new method), or because none of the work that had been done was useful.

IV.D. The Dissemination of Municipal RVAs

IV.D.1. Limited Dissemination

In general, far more attention is given to the assessment and preparation of the RVA document than to its dissemination. Most municipalities seem to lack appropriate processes. Moreover, official documents (from e.g. the MSB) do not focus on this aspect. When asked how RVAs were disseminated, the standard answer was "it's available on our website/ intranet". A few participants reported that they had presented the RVA document at meetings or workshops in the municipality or with the county administrative board. Some informants said that they felt that the RVA was not rooted in the municipality; it was developed entirely by the safety coordinator, had very limited distribution and was consequently relatively unknown.

IV.D.2. Weaknesses and Sensitive Data

Other causes were given for the failure of municipalities to disseminate their RVAs. Informants highlighted that since RVAs focus on weaknesses, municipalities do not want to broadcast the information. Municipalities are reluctant to openly demonstrate their vulnerabilities and expose management shortcomings. Furthermore, as one interviewee said, "Confidentiality is a big concern" and sensitive information needs to be protected, "we don't want to tell potential terrorists anything […]" Finally, it was pointed out that RVAs had not been systematically communicated to the general public. Some even thought that the results should remain confidential; consequently, in some municipalities the document is classified.

IV.E. Feedback from the County Administrative Board

Under Swedish law[9], the county administrative board has a coordinating function within the region. It is mandated to follow-up on municipal RVA work[37] and must "work to ensure that […] the regional risk and vulnerability assessments are compiled"[9]. With one exception, all of the boards had given (or were about to give) written feedback on their municipalities' RVAs. This is done in conjunction with follow-up visits to municipalities, as specified in the legislation[37]. The one board that had not given feedback confessed, "It is difficult to know what to assess. It's hard to give feedback". Another regional-level informant admitted that providing feedback took a lot of time and that it was difficult to keep up. Informants at this level would have welcomed feedback from the MSB as input to the development of regional RVA work. However, interviewees noted that feedback from the MSB simply focused on whether reports had the correct headings. The problem, according to one regional informant, is that county boards give the same type of unhelpful feedback to their municipalities.

Many municipal informants stated that they had received both supervision and feedback on their RVA work from the county administrative board. County-level representatives had visited their municipalities, both officially and unofficially, to discuss safety/ RVA-related issues. Some municipalities had only received oral feedback on their RVAs, while others said that they had never received any feedback.

IV.F. The Benefits and Drawbacks of Municipal RVA Work

IV.F.1. The Benefits

DRM activities, including RVA work, have been on agenda of Swedish municipalities since 2006. It is claimed that this has led to increased interest and a change in attitudes in how people think and see things from a safety perspective. The RVA process and the final documentation have increased the awareness of decision-makers. Some municipalities have started to tackle the issues that have been highlighted in their RVA. Direct or indirect results have been used as input for decision-making.

Under Section 1, Chapter 2 of the Act on Municipal and County Council Measures prior to and during Extra-ordinary Events in Peacetime and during Periods of Heightened Alert[8], the municipality must, "with regard to the risk and vulnerability assessment […] establish a plan for how to deal with extraordinary events for each new term." The municipalities included in this study had developed such a plan (with the exception of two of the three municipalities that chose not to be interviewed). However, despite its existence, informants were unable to describe the connection between it and the RVA. Furthermore, under Section 8, Chapter 2 of the Act[8], "elected officials and employees should receive education and training in peacetime, so that they will be able to undertake their tasks in an extraordinary event." Although the law does not state the connection between RVAs and crisis management exercises, some informants said that RVAs were used to develop relevant vulnerability scenarios. The reverse link can also be made, and the results of exercises are sometimes used as input to the RVA. At the same time, some informants argued that there was no connection between the two.

RVAs are used in other, less obvious ways. Details of ongoing municipal work are sometimes provided, in addition to issues discussed during the RVA process. The document was used as a way to identify the principal potential risks for the municipality, and prioritize important issues. Some informants mentioned that the RVA process had led to further work connected to societal sustainability. Three municipalities said that the RVA was used, or would be used in their municipal planning. For example, it can be used in urban and social planning as a way to identify "municipal protection values" in major urban construction projects. Some municipalities have begun to develop a climate change adaptation plan, which, according to some safety coordinators, can be partially merged with RVA work.

The Emergency Management and Heightened Alert Ordinance[9] states that regional governments must "work to ensure that […] the regional risk and vulnerability assessments are complied". Accordingly[35], all municipal RVAs are expected to be structured using the same headings, so that the county administrative board can compile them into a regional RVA. However, regional representatives highlighted that RVA work is not simply drawing up an RVA document. Instead, it is a very important process that should be motivated by local self-interest, rather than the requirement to contribute to the regional/ national risk assessment. There is a need to identify local risks and vulnerabilities, and make a capability assessment of essential services and implemented measures. The purpose is to establish how the municipality will collaborate and manage extraordinary events, based on the risks and vulnerabilities that may occur. It is more important that the municipality has an

established work process than that they have a good final document. As one regional informant put it, "one of the most boring things I know is when I get a RVA document and am asked; are you satisfied now?".

IV.F.2. The Drawbacks

Regional representatives highlighted that the purpose of RVA work is to benefit municipalities. However, some municipal representatives complained that they saw no benefits; they simply had to prepare a report for the county administrative board. In some municipalities, RVA work was considered to be an isolated, obscure task. This was illustrated by cases in which RVA work only led to the preparation of one document.

According to the MSB[35], municipalities should report the "planned and implemented measures and an assessment of the need for further action on the risk and vulnerability assessment results" in Section 8 of its RVA document. Municipalities were not sure what this meant. For example, "In the RVA, the municipality must be able to point out things that need to be done but without promising to implement them." Other informants said that it would be useful to note areas where they needed help (e.g. from the county administrative board) in this section.

Last but not least, regulations[35] state that municipal RVAs should provide input to the regional overview of risks and vulnerabilities, and form part of the regional RVA document. Regional informants said that they found it very difficult to use municipal RVAs to create this document as differences in scale and methods made them impossible to aggregate. None of the boards used municipal RVAs as the only source of information to generate the regional RVA. Furthermore, informants argued that the municipal RVA would be better used as an input to the municipal DRM process. For example, one interviewee noted that the MSB assumes that RVAs are comparable, "but if you have 290 different things, it's built into the system that it's impossible to compare them, there must be differences".

V. DISCUSSION

This study notes the lack of constructive feedback given by county administrative boards, who are the recipients of municipal RVA documents. Current feedback, either written or oral (if there is any), was said to be too general. It was rarely described as helpful or insightful, due to the fact that it did not note specific strengths or weaknesses. Effective risk communication is a mutual process consisting of the exchange of risk-related information between DRM stakeholders. Constructive feedback not only ensures a two-way information exchange, but it also aids future municipal RVA work. Timely and constructive feedback can confirm whether the municipal RVA has been interpreted properly. Both positive and negative feedback will influence the quality of future RVA work[30, 38]. Positive feedback encourages good work to be continued, while constructive negative feedback pinpoints where more effort is needed. In this article, we argue that risk communication via RVA documentation is not a two-way process unless there is meaningful feedback. As van Asselt and Renn[22] point out, "risk communication and trust are delicately interconnected processes". Although trust is not the focus of this study, a breakdown in communication increases distrust among stakeholders, and may fragmentize the multi-stakeholder DRM system.

Our study highlights issues related to the dissemination of municipal RVAs and concerns about confidentiality. RVA work is not only about gathering and disseminating vital, risk-related information; it also guarantees the integrity and security of that information. It may be true that the fewer people who know about the risks and vulnerabilities of a society, the less chance that this information may fall into enemy hands. But DRM work is also a balancing art: the more people who know about societal risks and vulnerabilities, the more prepared they are for potential adverse events. The danger of being over-protective with regard to risk-related information is that secrecy can lead to a false illusion of safety. Furthermore, if the RVA documentation is not communicated there can be no learning process, which is an important part of the RVA process.

People manage disaster risks. The successful management of any societal risk largely depends on the quality of risk communication. Many factors can contribute to failure, including different risk perspectives among DRM stakeholders[25]. The empirical findings presented here show that when the legislation does not give detailed and specific guidance on how to carry out an RVA, stakeholders adopt their own risk perspective, which varies from one person to another. Although not all informants complained about their freedom to decide, there were clear consequences resulting from it. For instance, there is no agreed focus for RVA work, and it is very unclear how the RVA should be conducted and evaluated. Meaningful risk communication relies on solid scientific foundations[25]. Risk communication via RVA documentation is no exception. Our findings suggest that there are many gray areas in municipal RVA work in the Swedish DRM system, while improvements can clearly be made. As Veland and Aven put it, "if a concept is introduced, it must be given a meaningful definition and

interpretation"[25]. Unfortunately, this is not the case in many situations, including the DRM system and RVA work studied here. Sound scientific principles and methods would clarify current confusion and improve the level of professionalism. At the same time, municipalities' own needs must not be forgotten. Our study makes it clear that municipalities have very different priorities. Therefore, the development of RVA work must ensure that individual DRM needs are met, and that it will lead to an ongoing process, rather than filling in pre-printed templates.

Previous studies have shown that information generators often tailor their messages to suit whatever they believe the target audiences wants to hear or read[23]. This so-called *audience tuning* means that the communicated information tends to be selectively presented. Similarly, one municipal informant claimed that RVA documents were only useful to the county administrative board, and of no benefit to the municipality. While the municipal RVA document is designed to serve two purposes, this safety coordinator selected the information that they thought the county administrative board wanted to see, leaving aside anything that might be useful to the municipality itself. On the other hand, the different risk perspectives and needs found at the municipal and regional level mean that RVAs that are consistent with what the municipality thinks its regional board wants to hear do not always match the boards' expectations. Furthermore, the lack of detail in feedback to municipalities means that they do not know where to focus their efforts, and makes it difficult for them to improve. In the end, neither party is satisfied with the results.

DRM is not just about minimizing risks; it is also expected to stimulate resilience. In order to be able to withstand or tolerate adverse events, social learning is needed to identify what risk information should be communicated to whom in which phase. Therefore, the RVA process must be open and continuous. Furthermore, the sources of risk-related information must be explored, and the different risk perspectives of stakeholders must be identified. The operation of a multi-level system in which stakeholders undertake complementary work relies on knowing what other stakeholders (especially close collaborators) label as risk problems.

This study complements previous studies of the Swedish DRM system, which have focused on RVA-based risk communication and stakeholder collaboration[12, 17], the preparation of RVA documents that are useful for risk-related decision-making[15, 16], the evaluation of the Swedish RVA system[10, 11], and legislative regimes for RVAs in the context of decision-making[18]. It provides empirical evidence that can help both scholars and practitioners to better understand the multi-level, multi-stakeholder, bottom-up DRM structure, by investigating the development and use of municipal RVAs. This explorative study has raised other questions regarding municipal RVA work, and future work is planned. Follow-up studies will look into issues related to the municipal RVA process and the final RVA documentation. Many informants highlighted that the RVA process is more relevant than the documentation in the context of the DRM system. This is not a new observation, and has been highlighted in the disaster management literature, notably concerning the relationship between the disaster planning process and disaster plans[39, 40]. Although the RVA document is simply a description of the RVA process at a specific point in time, countries such as Sweden (and the European Union) have put considerable effort into emphasizing its importance. In practice, the system relies on higher administrative levels being able to aggregate the lower levels' RVA documents. It would be very interesting to base our next study on topics such as the interconnection between the RVA process and the RVA document, how the RVA process could lead to the development of a truly useful RVA document, or discuss what is really meant by a 'good' municipal RVA. Such follow-up work would add even more value if it could answer questions such as, Is the current DRM system (in particular RVA work) well-designed, or does it fail to meet its intended purpose?

VI. CONCLUSIONS

This article studied the development and use of the municipal RVAs in the Swedish DRM system, based on information from stakeholders at both municipal and regional level. It explored perceived challenges and opportunities concerning municipal RVA work, which is designed to fulfill two DRM purposes simultaneously. The major findings relate to six areas: the focus of municipal RVA work; the template and evaluation criteria for municipal RVAs; municipal RVA work as a continuous process; the dissemination of municipal RVAs; feedback from the county administrative board; and the benefits and drawbacks of municipal RVA work. Understanding the challenges and opportunities perceived by practitioners helps to bridge the gap between how the system was designed to work and what happens in practice. Finally, our study raised a new, interesting question, "What needs to be changed?". Is it the design of the RVA system, or is it how RVA work is currently performed? While this study takes the Swedish DRM system as its subject, there are indications that the challenges and opportunities identified here are not limited to Sweden, and our work may shed light on the function of other multi-level, multi-stakeholder DRM systems in similar settings.

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