



## Dependence, trust, and influence of external actors on municipal urban flood risk mitigation: The case of Lomma Municipality, Sweden

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### ABSTRACT

Floods constitute a major problem that cross geopolitical, administrative, and sectoral boundaries, and must as such be jointly governed by a web of actors. The patterns of social relations among these actors are fundamental for society's capacity to mitigate flood risk. The purpose of this study is to contribute to our understanding of flood risk governance by investigating the social organization of formal actors that contribute to mitigating urban flood risk in Swedish municipalities. It applies Social Network Analysis to examine what patterns of dependence, trust, and influence of external actors emerge in the accounts of politicians and civil servants in Lomma Municipality, Sweden. The results indicate interesting patterns in type of input, as well as the role of personal relationships and different forms of authority for trust and influence. There is also a horizontal decoupling between municipalities along the river, as well as a vertical decoupling between the municipal and the national level, where withdrawing national authorities leave a void increasingly filled by private companies. These patterns of social relationships between municipal and external actors contributing to mitigate urban flood risk are important for understanding flood risk governance in society.

### 1. Introduction

Floods constitute a major global problem and are the most common recorded disasters around the world [1], increasing particularly in urban areas [2]. Flood risk is of great concern in Europe and threatens to undermine the sustainable development goals of the European Union [3], especially since it is expected to escalate with climate change and the other processes of change continuously redrawing the risk landscape [4]. Floods tend not to be bounded by geopolitical or administrative borders and involve various sectors of society. It is therefore not possible for one individual or organizational actor to analyse, evaluate and manage flood risk in society alone. It must instead be jointly governed by a web of actors [5] who are not independent of each other, but dependent on various resources and affected by the decisions and actions of others [4]. The patterns of social relations among these actors are therefore fundamental for society's capacity to reduce risk [6]. While the importance of social relations for risk governance has been investigated from many angles [7–11], this social organization of resources and influence has not been studied in relation to the mitigation of urban flood risk and is likely to vary with the differing models of

governance across Europe. These models are relatively similar among the Nordic countries,<sup>1</sup> with both responsibilities and resources largely decentralized to the municipal level [12].

Swedish municipalities are relatively large and complex organizations with a broad range of responsibilities. Although all have the mandate of mitigating urban flood risk within their jurisdiction, it is interesting and important to investigate what external actors contribute and how the municipalities depend on them. Being dependent on some input from another actor introduces the importance of trust as an expectation that is based on incomplete knowledge about the likelihood of receiving the needed input, as well as incomplete control over that happening [13]. Moreover, dependence connotes a power relationship [cf. 14], and it is interesting and important to also investigate the influence external actors have on the municipalities' ability to mitigate urban flood risk.

The purpose of this study is therefore to contribute to our understanding of flood risk governance by investigating the social organization of formal actors that contribute to mitigating urban flood risk in Swedish municipalities. In an effort to reach that goal, this paper intends to answer the following research question:

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<sup>1</sup> Here limited to Sweden, Denmark, Finland, Norway, and Iceland, but also acknowledging the autonomous constituent country of Greenland and Faroe Islands belonging to Denmark, as well as Åland belonging to Finland.

*What patterns of dependence, trust, and influence of external actors emerge in the accounts of municipal politicians and civil servants who contribute to urban flood risk mitigation in a Swedish municipality?*

## 2. Theoretical framework

This section of the paper aims to do two things. It attempts to provide brief conceptual clarifications of a number of concepts that make up the core of the research question, and it introduces the theoretical perspective used in this study.

First of all, the context of this study is urban flood risk mitigation, which involves four central concepts: *urban*, *flood*, *risk*, and *mitigation*. Although there is no universally accepted definition of what is meant by *urban* [15], it is usually considered as a range on a rural–urban continuum that includes (sometimes villages) towns, cities, metropolitan areas and megacities. This study focuses on the mitigation of flood risk that affects the town of Lomma, clearly falling within this *urban* range, and does not consider flood risk affecting the countryside around the town. The next central concept that requires clarification is *flood*, and then mainly to provide background to the selection of the case of Lomma described in the methodology section. *Flood* can be simply defined as ‘the temporary covering by water of land not normally covered by water’ [16]. The processes behind floods are, however, complex [17] and it is important to note that they are vital for wetlands, biodiversity, certain farming practices, etc., making flood risk governance particularly challenging [4]. There are at least five main types of floods (Table 1), but any one particular flood event may be a combination of several types [4].

*Risk* is a contested concept with various definitions [18], and there is no room to elaborate on it here. *Risk* is thus simply defined as uncertainty about what could happen and what the consequences would be [18], focusing only on negative consequences [5]. When contemplating what could happen, how likely that is to happen, and what the consequences would be, if that happens, you are analysing risk [19]. However, answering these questions in relation to floods requires consideration of location, magnitude and spatial extent, speed of onset and duration, as well as likelihood of various potential flood events [4]. It also requires explicitly considering what is valuable and important to protect in the areas potentially flooded and how susceptible that is to be negatively affected by the impact of the water [4]. It is important to note that estimations of any of these factors are fraught with uncertainty [18]. Finally, *mitigation* is here broadly defined as comprising all proactive activities that reduce the likelihood of flood events and/or their consequences before occurring [20], but leaving out preparedness for effective response and recovery.

Secondly, Ingold and colleagues [6] argue the critical importance of the structural patterns of social relations to understand collective capacity to reduce risk. The theoretical perspective used in this study assumes that it is these patterns of social relations that together constitute social organization [21]. Social organization can, in other words, be elicited from direct empirical observation of the social interactions

that constitute these social relations. It is thus important not to conflate social organization and social structure [22], which captures the importance of social institutions, norms, and behavioural expectations [23,24] that are generally considered persistent, continuous, pervasive, and maintained through repetition [25]. However, social organization is not random or implying accidental patterns, but orients to socially defined goals. Even under the forces of social structure, the ordering of action and of relations in reference to given social ends still allow room for individual choice [22]. Social organization is thus both a social process and an outcome in terms of the arrangement of social action towards particular goals – the mitigation of urban flood risk in this case. Such goal must have some element of common significance for the actors involved, although it need not be identical, or even similar, and might be opposite for some of them [21].

This relational focus makes social network analysis a suitable theoretical perspective [26] that has been applied to a range of research problems in risk governance [6,10,27–29]. Structural analysis has long been suggested a useful approach when attempting to grasp complex social reality [30,31], but has through coevolution of thinking and technology come to encompass an immense variety of theories, techniques, and tools [32,33]. Hence, only parts are applicable to investigate the patterns of dependence, trust, and influence of external actors among municipal politicians and civil servants contributing to urban flood risk mitigation, which are elaborated on in the methodology section below.

Finally, the aspects of social relations investigated in this study entail three additional central concepts: *dependence*, *trust*, and *influence*. Many scholars point out *dependence* between actors as crucial for organizations’ capacity in general [34], and for understanding risk and their capacity to mitigate risk in particular [e.g. 4,5]. It is therefore important to study dependencies of required inputs between actors. There are numerous types of input that actors contributing to urban flood risk mitigation might require to be able to perform their specific tasks, and there are many ways to categorise them. To be able to study this at all, seven types of input were elicited from literature. These include reports of activities [35], equipment and material [36], funding [37], technical information [38], rules and policy [38], advice and technical support [34], and pepping and moral support [36]. Although not including every possible input, these types of input are deemed to cover sufficient width to investigate *dependence* between actors in this context.

Being dependent on some input from another actor introduces the importance of *trust* as a basis for reducing complexity in terms of the range of action or non-action by that actor to consider [39]. It is thus of utmost importance for the cooperation [40] that is necessary for risk governance [5]. *Trust* is an incredibly complex concept with many definitions and uses across several disciplines [41]. However, it is here applied as an expectation that is based on incomplete knowledge about the likelihood of receiving the needed input, as well as incomplete control over that happening [13]. *Trust* is, in this study, therefore about the level of confidence actors have that they will get the input needed to perform their tasks from each other actor they are dependent on.

*Dependence* and *trust* are both related to *influence* [39,40], which denotes the capacity of one actor to have an effect on the performance of another [cf. 42]. It is obvious that being dependent on a particular input from another actor confers influence to that actor over you, but *influence* entails more than such *dependence* [cf. 39]. It entails authority, regardless if based on legal, traditional, or charismatic grounds [43], or on the competent authority of expertise [44]. It is also related to friendship [45]. *Influence* is thus in itself a fundamental part of the social relations between actors contributing to mitigating urban flood risk in the municipality. Let us now empirically investigate the patterns of *dependence*, *trust*, and *influence* of external actors as they emerge in the accounts of municipal politicians and civil servants who contribute to *urban flood risk mitigation* in Lomma Municipality, Sweden.

**Table 1**  
Types of floods.

Type of flood	Description
Pluvial flood	caused by insufficient drainage from local topographical lows
Fluvial floods	caused by too much water in a watercourse
Coastal floods	caused by storm surge or sea level rise
Groundwater flood	caused by rising groundwater
Breaching flood	caused by water breaching natural or man-made retention barriers

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