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Constructing risks – Internalisation of flood risks in the flood risk management plan

Matthijs M.D. Roos[a,b,*], Thomas T. Hartmann[b], Tejo T.J.M. Spit[b], Georg G. Johann[c]

[a] Omniplan, Atoomweg 50, 3542 AB Utrecht, The Netherlands
[b] Utrecht University, Faculty of Geosciences, PO Box 80 115, 3508 TC Utrecht, The Netherlands
[c] EGLV, Kronprinzenstrasse 24, 45128 Essen, Germany

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ABSTRACT

Traditional flood protection methods have focused efforts on different measures to keep water out of floodplains. However, the European Flood Directive challenges this paradigm (Hartmann and Driessen, 2013). Accordingly, flood risk management plans should incorporate measures brought about by collaboration with local governments to develop and implement these measures (Johann and Leismann, 2014). One of the challenges of these plans is getting and keeping stakeholders involved in the processes related to flood risk management. This research shows that that this challenge revolves around how flood risks are socially constructed.

Therefore it is essential to understand and explain the risk perception of stakeholders. System Theory by Luhmann provides the analytical distinction between 'internal risk' and 'external danger' as key concepts to understand whether or not stakeholders will take action (Luhmann, 1993). While perceptions of 'external danger' will not lead to action, perceptions of 'internal risk' urge stakeholders to take action.

The cases of the rivers Lippe and Emscher in the dense populated region between Duisburg and Dortmund in Germany illustrate how these theoretical concepts materialise in practice. This contribution shows how flood risks are socially constructed and how this construction is influenced by the European flood risk management plan. While clearing up some of the difficulties from the Flood Directive, the research shows a gap between the Flood Directive and the current theory and planning practice, which needs to be addressed in further research.

1. Introduction: traditional protection and the new flood risk paradigm

Due to climate change, extreme weather events will continue to increase in frequency (IPCC, 2014). In Germany and Central-Europe, the frequency of flood events doubled since 1980 (Munich Re, 2014). Floods are the most common natural hazard in Europe and account for the highest number of casualties and economic damage (STAR-FLOOD, 2014). Technical means for controlling extreme floods is limited, which became clear during several extreme weather events in past years (Pahl-Wostl, 2007). In the 1990s, one flood in Germany was described as a 'once-in-a-century' event. The press gave the same title to the floods in 2002 (Deutsche Welle, 2013). In some locations, the flood events in 2013 were worse than in 2002 (Merz et al., 2014). However, some places were better off, such as the city of Dresden, which was heavily affected in 2002 (Pahl-Wostl, 2007), but better prepared in 2013 This, however, was at the expense of areas downstream (Merz et al., 2014; Munich Re, 2014).

The inability to cope with increasing flood risks in Europe solely with technical flood protection—predominantly focusing on dikes—fosters a need for an ongoing paradigm shift in how to deal with floods (Patt and Jüpner, 2013). This shift may move the discussion from flood resistance towards flood resilience, or from flood protection to flood risk management (Jüpner, 2005; Hartmann and Spit, 2015). This would mean not just defending against floods, but at the same time managing the flood risks in such a way that in case of a flood, the damages are minimised (Klijn and Koppenjan, 2012). This includes governing the areas behind the dikes (Tempels and Hartmann, 2014).

The European Commission released the directive on the assessment and management of flood risks (Directive, 2007/50/EC), referred to as the Floods Directive (Hartmann and Spit, 2016). It aims to reduce the adverse consequences of floods to preserve human health and life, the environment, cultural heritage, economic activity and infrastructure. According to the directive, each member state has to accomplish three stages. These stages consist of creating (1) a preliminary flood risk assessment, (2) flood hazard maps and flood risk maps, and (3) a flood risk management plan for each catchment. The last stage is crucial as it institutionalises an ongoing paradigm shift from flood protection

* Corresponding author.
E-mail addresses: m.roos@omniplan.org (M.M.D. Roos), t.hartmann@uu.nl (T.T. Hartmann), t.j.m.spit@uu.nl (T.T.J.M. Spit), johann.georg@eglv.de (G.G. Johann).

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towards flood risk management.

The flood risk management plan (FRMP) implies also a shift in the modes of governance of water management. The plan foresees a close collaboration between different public stakeholders (notably spatial planning, water management, municipalities and regional administrations), but also between private and societal actors (i.e., industry, companies, or citizens) who were previously less involved in flood risk management. This is a crucial change from traditional working paradigms of water authorities (van Buuren et al., 2012). The institutions of water management and spatial planning need to collaborate to make the plan a success (Hartmann and Driessen, 2013). The schedule of the Floods Directive makes this paradigm shift very urgent. It demands a revision of the flood risk management plan and its used instruments every six years, which means the collaboration between water management and spatial planning has to be durable. Understanding the magnitude of the shift explains why this level of collaboration does not function in practice as smoothly as the European legislator intended it to in the Floods Directive. Perception, and thus awareness, of flood risks differ among governmental institutions.

The aim of this paper is to discuss flood risk perceptions of local governmental institutions in order to derive lessons for the future process of flood risk management plans. An assumption to test is if and how the process of setting up the flood risk management plan influences the risk perceptions of governmental institutions. This research allowed for the unique chance to analyse the effects of collaboration on the new instrument on risk perception of stakeholders. The study started in September 2014, which was in the middle of the planning processes of the first flood risk management plans.

In this contribution, before elaborating on the cases, the theoretical approach by Luhmann on risk perception is outlined and the analytical distinction between 'internal risk' and 'external danger' is derived from Social System Theory by Luhmann (Luhmann, 1993). Then the illustrative cases of the rivers Lippe (1) and Emscher (2) in Germany are presented. Those cases have not been selected because they are specific to a particular issue, but rather because they are representative of the average regional rivers in Europe.

Using Social System Theory as the theoretical approach has methodological implications. To gain insights in the social systems, three methods have been combined in this research: *exploratory observations*, *semi-structured interviews* and *policy analysis*. The exploratory observations were conducted at several meetings of the flood risk management planning process in North Rhine-Westphalia to gain an understanding of the actors and issues involved in the discussions. During these meetings, the involved actors discussed the progress they had made and the measures that had to be taken for the flood risk management plans. The semi-structured interviews were then used to investigate the underlying notions and motives of actors. The structured interviews provide consistency in the results and makes them comparable. Along with these two data collection methods, a policy analysis was conducted on local, regional and national water management policies. This was done both before and after the interviews to contextualise the findings.

The two case studies in North Rhine-Westphalia, Germany investigate how perceptions of various actors differ and whether the flood risk management plan triggers changes in their risk perception. The crucial question is: when do stakeholders take action in flood risk management?

Previous research on risk perceptions of flood risks provides the background information for this study (Raaijmakers et al., 2008; Hartmann, 2011; Tempels and Hartmann, 2014; Douglas and Wildavsky, 1983; Renn, 2008). This research will use Luhmann's System Theory as the main theoretical framework. From Luhmann's work, his distinction between risk and danger is of particular interest for this research. The use of Luhmann's System Theory in case studies of flood risk perceptions is rather unusual. The use of the System's theory is mainly theoretical and used in a variety of disciplines (Boldyrev, 2013; Gershon, 2005; Kihlström, 2012; Parks and Roberts, 2010; van Raak and Paulus, 2001), but rarely as the basis for case studies (Hatfield and Hipel, 2002). The combination of Luhmann's System Theory and the flood risk management plan in a case study brings an abstract "grand theory" into action by using a practical case (the rivers Emscher and Lippe). By doing so the study provides a new perspective on current European flood risk management.

2. Risk as a social construct

The term risk is a social construct, which makes defining the term risk one of the main problems when measuring risk perceptions. "Human beings have invented the concept risk to help them understand and cope with the dangers and uncertainties of life. Although these dangers are real, there is no such thing as 'real risk' or 'objective risk'" (Slovic, 1998). The worldview of a certain actor determines which dangers are magnified, while obscuring other threats, selecting others for minimal attention, or even disregarding some (Dake, 1992; Slovic, 1998; Pidgeon, 1998). Since risk is a perceptual concept, it is challenging to provide one clear definition of the term risk (Aven and Renn, 2010). Renn states that all concepts of risk have one element in common (Renn, 2008): the distinction between possible and chosen action. All definitions of risk contain three elements: outcomes that have an impact upon what humans value, the possibility of occurrence (uncertainty), and a formula to combine both elements (Renn, 2008).

The Floods Directive's definition also contains those elements: "'flood risk' means the combination of the probability of a flood event and of the potential adverse consequences for human health, the environment, cultural heritage and economic activity associated with a flood event" (European Parliament and European Council 2007). While the definition itself is not that relevant for this study, the way it is applied and given meaning by the respective stakeholders, such as water engineers, spatial planners and policy makers, is important. The concept of risk characterises a peculiar, intermediate state between security and destruction, where the perception of threatening risks determines thought and action (Beck, 2000).

Which meaning do governmental institutions give to flood risks? This depends on the perception the governmental institutions have on flood risks. In this respect, risk is not just a matter of costs, which can be calculated beforehand and weighed against the advantages. Risk is rather a decision based on what can be foreseen and what will be subsequently regretted if a preventable loss, that one hoped to avert, occurs. The decision is the actual risk taken. As such, a decision could be made that permits actions that would cause avoidable loss—if the estimated degree of loss appears acceptable (Luhmann, 1993).

When are risks perceived as consequences of peoples' decisions and actions or when are they considered 'an act of God'? This question is crucial if individuals feel responsible and capable to prevent or manage risks (Lupton, 2013; Renn, 2008; Aven and Renn, 2010). Climate change, for example, is increasingly seen not as an 'act of God' but rather that humans have a level of control over it and its consequences (Renn, 2008). However, it is still possible for risk managers to cover their own mismanagement by referring to the alleged randomness of the event (Aven and Renn, 2010). Others have claimed that risks have become more globalised, less identifiable and more serious in their effect. Therefore, manageability decreased and anxiety towards risks increased (Lupton, 2013). With this understanding, risk managers might be held accountable for events which they could not possibly provide protective actions in advance (Aven and Renn, 2010).

2.1. 'Internal risk' and 'external danger'

When it comes to risk, Luhmann makes a distinction between internal and external conditions. Conditions within a subsystem are manageable, and called risks. External conditions are not manageable by the system and are instead called dangers (Luhmann, 1993; Aven