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Shifting public-private responsibilities in Flemish flood risk management. Towards a co-evolutionary approach

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Abstract:

Similar to several other countries in Europe, a policy debate has emerged in Flanders (Belgium) arguing that flood risks should no longer be tackled by water managers alone but should become a shared responsibility between water managers, other governmental actors and citizens. Hence, a form of 'co-production' is advocated, whereby both governmental and non-governmental actors participate in bringing flood risk management into practice. This new approach represents a remarkable break with the past, since flood management in Flanders is traditionally based on flood probability reduction through engineering practices. The intended shift in private-public responsibilities can thus be expected to challenge the existing flood policy arrangement. Based on quantitative and qualitative research, this paper compares the attitudes towards individual responsibilities in flood protection among public officials and residents of flood-affected areas in the flood-prone basin of the river Dender. We find that whereas most public officials are in favour of sharing flood risk responsibilities between authorities and citizens, the majority of residents consider flood protection as an almost exclusive government responsibility. We discuss the challenges this discourse gap presents for the pursuit of a co-produced flood risk management and how these can be addressed. It is argued that a policy of co-production should embrace a co-evolutionary approach in which input, output and throughput legitimacy become intertwined.

1. Introduction

In the last decade, various authors have described a shift from a flood management based on resistance towards a risk-based approach (Meijerink and Dicke, 2008; Johnson and Priest, 2008; Hildén et al., 2012; Bubeck et al., 2013). According to the latter perspective, flood risk not only stems from a natural hazard but also from societal processes and responses to it. Flood risk management (FRM) assumes that interactions between water and land influence the risk of flooding (Tempels and Hartmann, 2014). Whereas traditional flood management aims to prevent flooding by interventions in the water system only, FRM recognizes that these do not sufficiently prevent flood damage and that complementary measures to reduce the

vulnerability of land use in flood-prone areas are needed. By addressing the water and the socio-spatial system simultaneously, water and land use policy thus become intertwined. In this paper, the term flood risk management refers to the actions taken by governmental and non-governmental actors, with the purpose of preventing and mitigating flood damage.

With the Floods Directive of 2007, the European Union endorsed the FRM approach by mandating each EU member state to draft a Flood Risk Management Plan (FRMP), which takes into account measures of prevention (i.e. spatial planning), protection (i.e. structural defence) and preparedness (i.e. emergency planning). In Flanders (Belgium), this has recently been anchored in the concept of multi-layer water safety (MLWS) (Flemish Government, 2013). MLWS implies that flood risk is no longer an exclusive task of the water management sector, but should become a shared responsibility between water managers, spatial planners, emergency planners, the insurance sector, the building sector and citizens. This new approach represents a remarkable break with the past, because flood management in Flanders is traditionally considered to be the exclusive responsibility of governmental water managers (Mees et al., 2016). Experience of flood events and the anticipated increase of flood risk in the future, however, have led these managers to conclude that they can no longer deal with floods alone. As a first step to bring MLWS into practice, the Flemish government commissioned a so-called 'Flood Risk Management Plan (FRMP) Study'. The FRMP study determined an optimal set of prevention, protection and preparation measures for the majority of Flemish watercourses, based on a cost-benefit analysis (VMM, 2014). The study compared the measures' costs and benefits, regardless of whether they are to be financed by public or private actors. As a result, some of the recommended actions belong to the private investment sphere, e.g. flood-proof building. Who exactly should implement and finance these measures has not yet been determined, but considering the MLWS discourse of the Flemish government administration, one can expect that greater involvement of citizens will be requested in the future. Hence, a form of 'co-production' will need to be introduced, whereby both governmental and non-governmental actors participate in bringing FRM into practice.

The precise form this intended co-production will take is not clear at this stage but it does nonetheless raise questions as to the feasibility of the new approach. Although preventing flood events is not a state responsibility by law in Flanders, the development of governmental water management organizations has created expectations among the public that the government will protect them from flooding (Mees et al., 2016). Over the course of time, state-society relationships have co-evolved towards a situation in which FRM has been placed entirely in the hands of governmental institutions. Public flood awareness and citizen involvement in FRM are low, both in decision-making and implementation (Van Rossen, 2003; Mees et al., 2016). But in a changing flood risk environment, due to climate change and urbanisation, this co-evolution has resulted in a suboptimal lock-in of the current flood risk policy. A so-called 'levee effect' (Baan and Klijn, 2004; Bubeck et al., 2013) can be witnessed, whereby investments in defence infrastructures have enabled citizens to build on floodplains, which require continuous further investment in terms of flood defences. Policymakers acknowledge that a redistribution of flood risk responsibilities and competences is needed in order to face the challenges ahead, but it is questionable whether this is possible in the current governance context. In this paper, we investigate to what extent flood-prone residents in Flanders are open to adopt greater private responsibilities in FRM and which changes in the current state-society relationship are needed to enable a shift to public-private responsibilities in FRM.

Hereto, current discourses prevailing among public officials and citizens in the Dender basin are analysed. The Dender basin is highly susceptible to flooding due to its hydro-morphological characteristics and the urbanisation of its floodplains. Based on semi-structured interviews with public officials and a survey among residents of the Dender basin, we analyse how these actors perceive private and public responsibilities towards FRM and to what extent citizens in flood-prone areas are willing to contribute to FRM and are already doing so. In the discussion, we will reflect on the following questions: (1) are the discourses of public officials and residents in agreement, (2) if not, what challenges does this pose for the government's pursuit of FRM

co-production and (3) which changes in governance are needed in order to enable this co-production?

By answering these research questions, the paper contributes both to scientific and societal debate on public-private flood risk responsibilities. The pursuit of a risk-based flood management has induced policymakers in many countries to advocate a greater involvement of citizens and communities in FRM (Bubeck et al., 2013; Kievik and Gutteling, 2011; Walters, 2015). Since this trend is relatively new in most countries, the barriers to and opportunities for citizen co-production in FRM remain underexplored. This article provides insights into the barriers to co-production and proposes a co-evolutionary approach in order to overcome them.

2. The public-private divide in flood risk management, theories and concepts

For a long time, flood management has been considered a prime example of a pure collective good (Meijerink and Dicke, 2008). In several Western European countries and in the United States, however, there is an increasing trend towards individual responsibilities in FRM, turning it partially into a club or private good (e.g. Meijerink and Dicke, 2008; Bubeck et al., 2013; Geaves and Penning-Rowsell, 2016).

Mees et al. (2012) underline that a particular set of public-private responsibilities is driven by a certain rationale among its stakeholders. This rationale can take a juridical, economic and/or political perspective, which leads respectively to considerations of fairness, effectiveness, efficiency and legitimacy. First, the distribution of responsibilities should be well defined and lead to a reasonable share of risks, costs and benefits between and among generations (fairness). Secondly, the distribution should lead to an effective and efficient adaptation policy. Lastly, the policy needs to be approved by those directly involved or affected (legitimacy). Often, the different criteria are conflicting, depending on the specific context. Individual flood risk protection in rural areas is in some cases most efficient, but poses questions of fairness in comparison to others living in collectively protected areas, if these measures are to be financed and implemented by households themselves (Leichenko and O'Brien, 2006; Johnson and Priest, 2008; Walker and Burningham, 2011). This problem could be solved through governmental subsidies, which might in turn lead to the question why taxes should be spent on citizens who choose to live on floodplains. In these cases, issues of water management and land use become entangled. Distributing public and private responsibilities in FRM is consequently not a technical matter of calculating efficiency and effectiveness, but requires a political debate and broad social support.

2.1 Co-production and its limitations

In the growing debate on flood risk responsibilities, citizens are expected to co-produce FRM. Co-production is defined as 'the involvement of citizens, clients, consumers, volunteers and/or community organizations in producing public services as well as consuming or otherwise benefiting from them' (Alford, 1998). The concept has been employed within divergent disciplines. In planning theory, it is used to describe the participation of citizens in the strategic planning process (Albrechts, 2012), whereas scholars of public administration and services management link it to the involvement of citizens and civil society actors in the delivery of public services (Osborne and Strokosch, 2013). Analogue to Osborne and Strokosch (2013) and Bovaird and Loeffler (2013), we employ co-production as an umbrella term, which contains several subconcepts to describe citizen involvement in decision-making and delivery (Fig. 1), among which:

- Co-planning, which entails forms of public participation in the decision-making phase, i.e. in the formulation of options, adoption of decisions and in rare cases in the agenda-setting;
- Co-delivery, i.e. the involvement of citizens in the implementation of policy measures, and;
- Comprehensive co-production, where citizens are involved in the entire policy cycle (i.e. policy agenda-setting, decision-making and implementation).

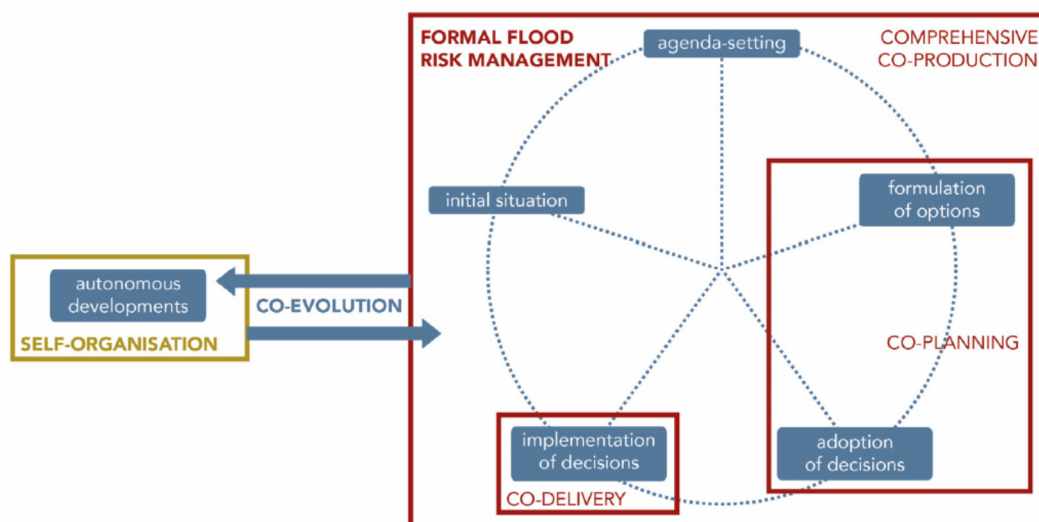


Fig. 1. Overview of the different forms of co-production, based on the stages of the policy cycle (Werner and Wegrich, 2007; Crabbé and Leroy, 2008).

The boxes indicate which phases of policymaking are included in participatory processes.

Although its definition does not explicitly prescribe it, most scholars consider co-production to be initiated by governmental actors (Watson, 2014). This implies that citizens are little or not involved in defining the issue at stake (i.e. the agenda setting phase), which is criticized by others as being counter-productive (Pierre, 2000; Purcell, 2008; Boelens, 2010; De Roo, 2012). Indeed, in practice it has proven difficult to engage non-governmental actors successfully in a later stage of governance, due to the lack of mutually understood governmental and societal goals (Rees et al., 2005; Reed, 2008). Co-produced planning processes are criticized for being too time consuming, reproducing existing power relations (Currie-Alder, 2007; Huitema et al., 2009), too focused on process and not enough on content (Wigmans, 1982; van der Cammen and Bakker, 2006), not genuinely improving the quality of output (Innes and Booher, 2000), and just resulting in a 'public support machine' (Hendriks and Tops, 2001; Woltjer, 2002). Boonstra and Boelens (2011) claim that these kinds of traditional participatory processes are the cause of new restrictive inclusionary processes; thematically, procedurally and even geographically.

Several authors have also critically addressed co-delivery. Nye et al. (2011), for example, attribute the trend of co-delivery observed in English flood risk governance to 'the environmental rhetoric of individuals becoming the repository of environmental responsibility' (Eden, 1996 in Nye et al., 2011). This way, it fits into a neo-liberal conceptualization of resilience, stressing the need for individual self-reliance (Davoudi et al., 2012).

2.2. A co-evolutionary perspective

To meet the challenges of co-production, this paper adopts a co-evolutionary approach to FRM. While many forms of co-production focus on the mutual implementation of fixed targets (set by governments), co-evolutionary approaches are based on mutual interactions between different subsystems. As Murmann (2003 in Ref. Kallis, 2007) states, 'a co-evolutionary explanation (...) entails two or more evolving systems whose interaction affects their evolution'. This approach is therefore more open and adaptive, making it more suitable for dealing with complex and changing conditions.

If we apply this to co-production in FRM, two relevant sub-systems are the state and society. The first comprises of water managers and spatial planners on different levels, the latter of residents, insurers, architects, contractors, etc. Within these subsystems, different (groups of) actors are directly or indirectly, actively or passively, and deliberately or unintentionally involved in the development of flood risks and ways to deal with them (Tempels and Hartmann, 2014). They interact with each other through real estate markets, building activity, spatial

developments, insurance systems, the behaviour and practices of individuals and public protection measures. This means that decisions and actions taken by the state influence what societal actors think and do, and vice versa. All actors involved in the development and management of flood risks thus have their own cycles of agenda setting, decision-making and implementation, which are being influenced by those of others.

This co-evolutionary process has shaped the state of FRM today (Pahl-Wostl et al., 2007). Co-evolution is thus an inherent part of FRM. This is different from co-production, which is part of formal FRM strategies and thus requires a conscious and active relationship between the two subsystems. While co-production is rooted in policy development and is thus a goal-oriented process, co-evolution is undefined in its result. The resulting co-evolution can be fruitful for preventing and mitigating flood damage, or it leads to a suboptimal lock-in of state-society relationships. In order to stimulate a fruitful co-evolution, policymakers can purposefully engage in the existing co-evolutionary processes. By doing so, authorities take into account the existing co-evolutions to attain common goals of security and preparedness. Boelens and De Roo (2016) call this 'planning of undefined becoming'. It means that the living micro-scale is taken as a starting point to explore a variety of options within the specific institutional setting, without pre-defining management goals. Through mutual understanding of the subsystems, anticipating feedback and adapting own strategies, constructive co-evolutions between state and society can be built (Boonstra, 2015).

In the remainder of this article, we explore how the public-private divide is constructed in Flemish FRM today and the opportunities and barriers it offers to new forms of co-production. Reflections are made on whether a co-evolutionary approach could help to overturn the current lock-in of Flemish flood risk policy, in which the involvement of citizens in any flood risk policy phase is limited, resulting in low levels of flood awareness and responsibility.

3. Methodology

3.1. Case selection and description

This paper bases itself on case study research, which is a fruitful method for applying a co-evolutionary approach. Indeed, a co-evolutionary perspective requires attention to local circumstances and conditions. Hereto, analysing FRM in depth at local scale offers an optimal basis for investigating how a co-evolutionary approach could work in practice.

We selected the Flemish section of the Dender basin as our unit for research because it is one of the most frequently flooded areas in Flanders (Fig. 2). This is particularly true for Geraardsbergen, the city in which the qualitative part of this research was conducted. The Dender has its source in Wallonia and it enters the river Scheldt in Flanders. Recent flooding occurred in 2002, 2003, 2010 and 2014. The most severe flood took place in 2010, causing damage to 1466 households (Assuralia, 2011). The Dender basin is an ideal case for investigating attitudes towards personal responsibilities in flood-prone areas. Its recent flood history and the ensuing debates make it a valuable case study for the implementation of MLWS. Furthermore, the issue of flooding continues to receive widespread attention in the area, which facilitated the cooperation of residents and officials in data collection.

3.2. Data collection and analysis

This paper brings together the results of two studies focused on FRM in the Flemish Dender basin. The first is a survey among the population of the basin conducted within the Policy Research Centre for Spatial Planning and commissioned by the Flemish government in September 2014. Next to that, the city of Geraardsbergen was studied between August 2014 and January 2015 as a case study of the STAR-FLOOD project, funded by the 7th EU Framework Programme. While the first study investigated the position of non-governmental actors, the second focused primarily on public officials. To obtain a comprehensive understanding of how the different stakeholders look at the issues of citizen involvement, these results were brought together and compared against the shared theoretical framework described above. Three different techniques were applied, namely document analysis, interviews and survey.

Firstly, existing policies and plans relevant to the Dender basin have been analysed to understand the extent to which citizen involvement in FRM has already been pursued and what kind of co-production these plans intend.

Secondly, we conducted interviews with 17 stakeholders involved in FRM, as public officials (i.e. water managers, spatial planners and emergency managers at regional, provincial and municipal level) and as representatives of civil society. Hereby, we gained insight into the different actors' views on the desired division of private and public responsibilities and forms of co-production. In order to illustrate the findings of our results section, we have extracted representative quotes from these interviews. These quotes have been anonymized to protect our respondents.

Lastly, a survey was conducted among residents of flood-prone areas in the Dender basin. Due to the size and diversity of this group, a survey was chosen as a method to make overall statements possible. The survey measured the attitudes and behaviour of residents in relation to flood risks, and more specifically, to what extent residents are willing and able to become involved in or contribute to FRM. For more information on the survey methodology, see Tempels et al. (submitted). Given the catalysing influence of a flood experience on issues of responsibility and individual protection, we only focus here on respondents with flood experience (n = 108).

Because they result from two research projects, the different methodologies were applied simultaneously but independently. In a later stage, the quantitative and qualitative data were brought together to enrich each other mutually (Bergman, 2010). The survey results demonstrated the response frequency of the investigated attitudes among the population and allowed us to make concrete observations on discourse prevalence. The in-depth interviews with public officials and residents provided insights into the under-lying rationales of discourses present in the survey and document analysis.

In the results section, discourses and practices of citizen co-production in FRM are discussed and compared. According to some authors (e.g. Laclau and Mouffe, 1985) 'no object can be outside discourse' (in Ref. Behagel, 2012) but this article employs the analytical framework of Behagel (2012), which presents discourse and practice as two positions at opposite ends of a spectrum. Discourse constitutes social reality through articulation, whereas 'practice' does so through activity. In Behagel's framework, articulation describes the constitution of discourse in political action, while a logic of practice shows how activity unfolds over time in specific local conditions. Consequently, both offer useful insights into how social reality develops.

4. Co-production in discourse and practice in the Flemish Dender basin

4.1. Discourses prevalent among public officials

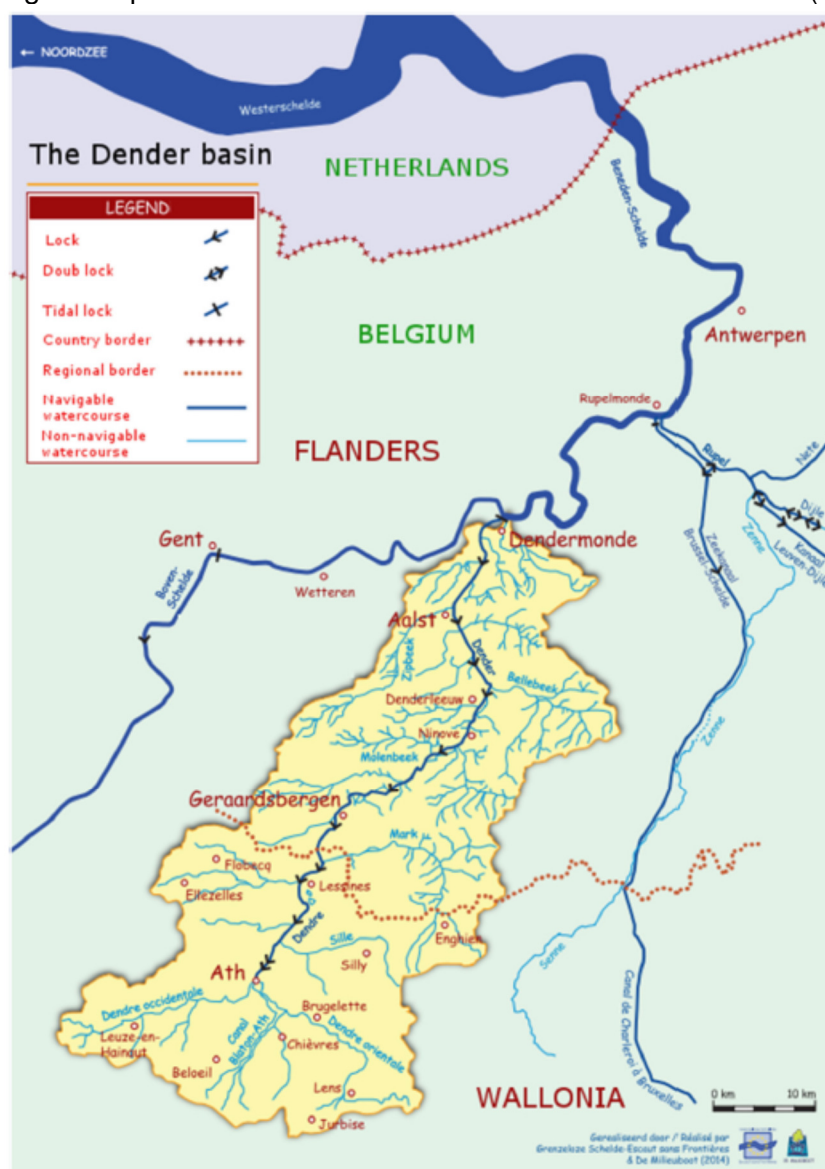
Among governmental actors, a distinction can be made between public officials at regional level (Flemish government), provincial level (Province of East Flanders) and local level (City of Geraardsbergen).

Within the Flemish government, several officials are in favour of sharing more responsibilities with non-governmental actors in the context of MLWS, i.e. with the insurance sector and citizens.

"Multi-layer water safety is about being aware that as a water manager, you are not the only one responsible. Before the French Revolution, it was the private owner who was responsible so he did not build in flood-prone areas. But due to several legislative acts we arrived at a situation where governmental water managers became solely responsible... not spatial planning, not citizens. If there was permission to build somewhere, nobody cared about water; the government would ensure that the land remained dry. Now, we are in the process of bringing these actors back into the management, but of course it's not something that can be changed with one piece of legislation or one flood." (Translated excerpt from an interview with an official from the Flemish Environment Agency)

In their view, the involvement of spatial planners, citizens and other private actors has become indispensable due to two developments external to flood management. The first is the increasing urbanisation of floodplains. With the creation of the Regional Zoning Plans in the 1970s, a significant number of flood-prone areas were assigned as 'residential areas'. In subsequent decades, these zones were gradually built up, which reduced their water storage capacity and increased the demand for ever more flood defence infrastructure. Urbanisation outside floodplains also contributed to the flood problem, due to increased surface run-off. Secondly, projections of climate change predict an increase of winter flooding and intense weather conditions (Flemish Government, 2012). As a result, the Flemish water managers consider the involvement of additional actors necessary to maintain and increase the effectiveness of FRM in the future.

Fig. 2. Map of the Dender basin. Source: Grenzeloze Schelde (2014).



Apart from increasing effectiveness, the discourse to involve new actors in FRM results from cost-efficiency considerations. Cost-benefit analyses in preparation for the FRMPs have shown that in some cases property-level measures are preferable over collective protection. Hence, following the framework of Mees et al. (2012), the discourse is dominated by economic considerations. According to the officials interviewed, it remains unclear how considerations of 'fairness' should be dealt with, i.e. who should be responsible for implementing and paying for

these measures. According to some, a subsidy system would be recommendable but this has not yet been debated within the government administration or at political level.

Also among officials from the municipal and provincial government, a discourse is prevalent that preventing flood damage should be a shared responsibility between citizens and the government. The government should take the actions needed to protect citizens but there are measures citizens can and should take in addition.

“Since 2010, the city tries to promote self-reliance among citizens. Because there is always someone who pays and now it’s the community. I think it is normal that if there is a problem you first try to solve it yourself.” (Translated excerpt from an interview with an official from City Geraardsbergen)

“There was a house where the water reached up to 2,10 meters. In such cases, you need real infrastructural measures, which are not affordable for citizens, so it should be the community that provides them. But people can take measures to resist small flooding problems, e.g. water barriers, etc.” (Translated excerpt from an interview with an official from City Geraardsbergen)

However, local governmental actors also claim to understand the general view among the population that if they have been allowed to build somewhere, they should also be protected against flooding. In addition, city officials consider it unjust to refuse property owners the right to build in residential zones. Here again, the present discourses offer no clear viewpoint from a fairness and legitimacy perspective. This creates a self-reinforcing situation, in which the government is neither able to prohibit citizens from building in flood-prone zones nor to demand that they adopt self-protective measures.

“These people have been permitted to live here. So is it the fault of the citizens, the permitting authorities or the Regional Zoning Plan? The city has given them a permit but only in conformity with the Regional Zoning Plan. The real mistake is that these areas were designated as building zones about 30 years ago.” (Translated excerpt from an interview with an official from City Geraardsbergen)

There is a reluctant response by provincial and city officials to the FRMP study. In contrast to the Flemish government, cost-efficiency concerns hold a less prominent place in decision-making at local level. Respondents point out that the assumptions under-lying a cost-benefit analysis inherently contain certain biases and preferences. Therefore it should be used as a guiding but not a determining tool.

“Interviewer: ‘Do you use the 3Ps within the city as well, the concepts of prevention, protection and preparation?’

Respondent: ‘Yes, in future we’ll have to. We actually don’t apply them to measures for which we are fully responsible. Our administration departs from the rule that if we can take a certain measure, we should take it. But for more complex and thus expensive projects, we do order a study and there might be aspects for which we don’t have the required resources.’ (Translated excerpt from an interview with an official from City Geraardsbergen)

The fact that the FRMP study prescribes individual instead of collective protection measures in a number of cases, leads to concern among local actors from a legitimacy perspective.

“Recently, the Flemish Environment Agency offered us the 3Ps, which state that not all responsibility should be passed on to the government, and that it is also expected from citizens. .. But with communicating this message to the citizen, we still stand at the start. Is this politically feasible? [. . .] Citizens won’t accept this; when there is flood damage they always think it’s the water manager who is responsible.” (Translated excerpt from an interview with an official from Province East Flanders)

Indeed, a clear statement from politicians at regional level on the responsibility of citizens is missing. The discourse is prevalent in the administration in charge of policy preparation, and also the Flemish Minister of Environment publicly stated that “water security should be a shared responsibility of water managers, spatial planners, citizens and emergency services” (Schauvliege, 2013). But what this means in practice remains unclear.

Most public officials interviewed are in favour of enhanced co-delivery in FRM but few statements are made on co-planning or comprehensive co-production. Water managers at

regional and provincial level recommend that citizens should be informed rather than more actively included in the decision-making process. According to them, it is important to first have a well-developed plan before presenting it to the public. In most cases, society is represented in decision-making by two types of actors belonging to the governmental structure; citizens by the municipalities and NGOs by the different government departments.

4.2. Discourses prevalent among the population

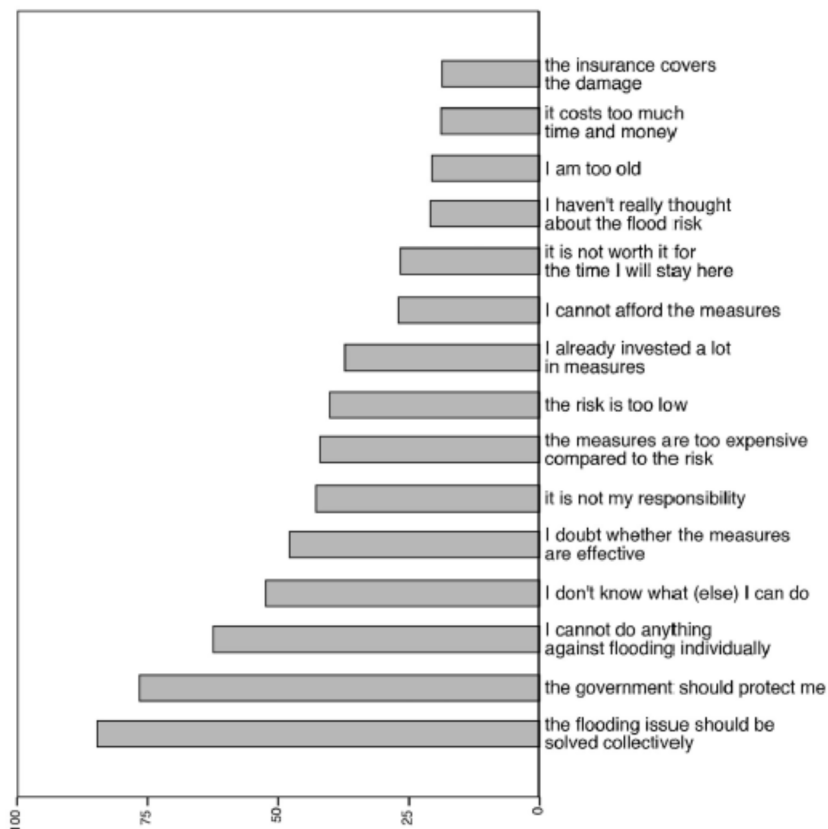
The dominant discourse among the population is primarily fed by fairness and legitimacy considerations. Our interviews with members of the citizen committees of Overboelare and Zandbergen, two subdivisions of the Geraardsbergen municipality, revealed widespread frustration with the fact that housing and building plots in the neighbourhood lost value due to flooding concerns, which only became problematic at the end of the 1990s. This frustration is translated into passing on responsibility for the problem and its solutions to the government. Also, the vast majority of respondents to the survey (86.4%) believe that the Flemish government is responsible for existing problems, while only 10.7% agree that residents are (also) responsible. Consequently, residents consider their personal responsibility as limited to non-existent.

“If I buy a building plot, I also expect the government to protect me from flooding, otherwise it should not be designated as a residential area.” (Translated excerpt from an interview with the citizen committee of Overboelare)

75.5% of respondents indicate that they deem the government responsible for protecting them against flooding, because it allowed them to settle there. Only 15.5% follow the argument that citizens who have chosen to live in this area are responsible for protecting themselves against flooding. The survey indicates that people affected by floods attribute even more responsibility to the government than the general population in flood-prone areas. The perceived link between building permits and the obligation to provide protection is quite remarkable, because building permits do not make statements about suitability for construction nor do they include a legal obligation for the government to provide protection.

The population of affected areas is very sceptical about individual adaptive measures for existing buildings. According to the survey, only 17.9% believe that residents can help resolving the issue. The main reasons given for not taking individual action primarily stem from fairness/legitimacy considerations and only in second order from an effectiveness perspective, namely (1) they believe the flooding issue should be solved collectively (84.9%), (2) the government should provide protection (76.8%) and (3) they can-not do anything against flooding individually (62.6%) (see Fig. 3). Residents interviewed in Overboelare stated that only when the government has taken all possible steps to protect them, they would consider doing something on top of that. Only in second order, the survey respondents indicate that they do not know what (else) they can do (52.6%) or that they doubt whether the measures are effective (48.0%), that it is not their responsibility (42.9%), that the measures are too expensive in comparison to the risk (42.1%) or that the risk is too low (40.3%). However, several citizens interviewed did visit the information market organized by the city that presented individual protection measures and considered applying them. But, most actions appeared relatively costly and their effectiveness was not guaranteed. As a result, citizens returned to the conclusion that it was actually the government's responsibility to protect them.

Fig. 3. Reasons why respondents do not take action, measured in percentage of respondents. (n = 108).



4.3. Governmental actions towards co-production

Although the Flemish government refrains from making a clear political statement for enhanced private responsibilities in FRM at present, it has taken some first steps towards bringing co-delivery into practice. In 2011, a brochure and an interactive website were published with guidelines on 'flood resistant building'. The government also organizes training sessions for building professionals on the topic in cooperation with the Flemish architects' association (NAV). Because there is a considerable lack of knowledge on the potential and costs of adaptive building measures, the government conducted a pilot study on flood resilient building in 2013–2015. In this study, 85 existing buildings were investigated on their potential to implement flood damage reducing measures and the costs thereof. Based on these investigations, general information files have been drafted per type of measure, which provide information on technical details, possible applications and pricing (VMM, 2015).

In addition, a number of pilot projects have been set up in 2014 and 2015 to bring the FRMP study into practice. In the catchment of the Maarkebeek, for instance, the set of measures presented by the FRMP study has been discussed among all involved governmental parties and a 'river contract' has been signed (CIW, 2015). This river contract includes among others the adaptation of a small number of houses located in flood-prone areas. Discussions as to whether public or private funding should finance these measures continue among the water managers involved.

Apart from knowledge development and dissemination, the first legislative steps have been taken to increase individual flood risk responsibility. Starting from the idea that only an informed resident can be held responsible for his actions, the Flemish government introduced the Duty to Inform in 2013.¹ According to this legal prescription, the vulnerability of properties to flooding must be declared in real estate advertisements.

Also at local level, governmental actors have taken action to stimulate the implementation of protective measures by private households. After the flood of 2010, City Geraardsbergen organized an information market to present several flood resilient building products to the

¹ Decree of 18 July 2003 related to the Integrated Water Policy, Belgian Official Journal, 1 October 2013.

public. Moreover, the City offers a small subsidy of 250 euro for households taking adaptive measures. This has been awarded 26 times in 2011, 11 times in 2012, once in 2013 and once in 2014 (personal communication). The majority of requests related to the installation of pumps and some floodgates.

Although they form important building blocks for closing the public-private divide in flood risk responsibilities, the impact of the measures mentioned above has been limited. For now, stimulating private action forms only a marginal part of the FRM measures pursued by government. This is even less the case when it comes to establishing co-planning and comprehensive co-production. (Organized) citizen involvement in the decision-making is generally limited to more passive forms of information sharing and 1 Decree of 19 July 2013 modifying various provisions of the consultation at later stages of the planning process (i.e., public hearings, information markets). After the 2010 flood, however, more direct citizen participation was organized by City Geraardsbergen, whereby citizens in the different districts could articulate their concerns and offer suggestions. In the meantime, a system of neighbourhood councils has been set up to enable more structured and permanent participation.

4.4. Private actions towards co-production

According to the residents of Overboelare and Zandbergen, very few households adapted their houses after the 2010 flood. The information market did not convince them of the effectiveness and affordability of these types of measures, and the subsidy offered by the municipality was too small to compensate. However, 72% of survey respondents indicate that they have taken precautionary measures, of which 75.3% purchased sandbags or a pumping installation and 32.5% took structural measures (e.g. waterproofing of outer walls). Among those who took measures, 11.7% did not spend any money, 65% invested less than D 1000, 15.6% between D 1000 and D 5000 and 7.8% invested more than D 5000. In addition, 54% of respondents with flood experience indicate being in principle willing to take structural measures to limit flood damage under the current conditions. Under conditions of increased frequency of flooding and governmental subsidies, respectively 83.9% and 81.9% would be willing to take measures. After the 2010 flood, residents of Overboelare and Zandbergen gathered together in neighbourhood groups in order to deal with the consequences of flooding collectively. Their activities were on the one hand directed towards collectively preparing insurance dossiers, and on the other, to lobbying the relevant authorities for flood protection.

4.5. Comparing divergent discourses and practices

Our results show a clear gap between the discourses prevalent among public officials and residents of the flood-prone areas in the Dender basin. Most governmental actors believe precautionary actions at household level can in some cases form a useful flood risk strategy and should therefore be encouraged. By contrast, the majority of citizens appear very sceptical about property-level flood measures and deem the government primarily to exclusively responsible for their protection. While the discourses present within governmental administrations are primarily inspired from an economic perspective, considerations of fairness and legitimacy dominate the discourse among residents.

Between these discourses, however, a number of bridging points are present, which offer the opportunity to link them. Indeed, the Flemish government itself has not yet developed a clear viewpoint on the implications of the MLWS discourse for the distribution of costs and benefits. Its public officials are in favour of encouraging flood protection measures at property level and are taking the first steps to achieve this, but it has not yet been explicitly defined whether citizens should take the financial responsibility for this protection as well. A political debate on this topic still needs to take place within Flemish and provincial governments. Among governmental authorities, a wide variety of viewpoints exists on individual flood risk responsibilities. In general, local authorities show more reluctance towards citizen co-delivery in FRM, most likely because they are more sensitive to the possible electoral consequences of the new approach and thus argue from a legitimacy rather than an economic perspective. Public

officials at all levels acknowledge that the emerging discourse is not in line with the dominating attitude among the population. Although formal law does not grant property owners in residential areas an automatic right to build, informal norms make it almost impossible to refuse building permits in these zones. Some of the interviewed officials argued it would be 'unjust' to refuse owners a building permit on a plot they had bought for residential purposes, despite its flood vulnerability.

On the other hand, residents are not entirely hostile to individual protection measures either. 72% claim to have taken some form of precautionary action, of which 32.5% structural measures. Residents of Overboelare state that only when the government takes sufficient action, they would make an additional effort. Hence, they do not outright refuse private responsibility, but expect it to be preceded by governmental commitment. Although residents mention 'flood protection is a government responsibility' as one of the principal reasons for not taking measures, our research data revealed that 54% would be willing to take measures.

These bridging points offer opportunities to align the divergent discourses in place. We believe this will be necessary to maintain and enhance the effectiveness and legitimacy of the current policy on flood risk, as we explain below.

5. Closing the gap: from co-evolution to co-production and back

In our theoretical framework, we stated that FRM is defined by co-evolutionary processes between state and society. In each of these subsystems, actors develop their own flood risk strategies. Which strategies are decided upon is influenced by developments taking place in the other subsystem. In the Flemish basin of the Dender, FRM has long been presented as a governmental responsibility. Consequently, citizens have invested little in developing active flood risk strategies themselves. In the context of increasing flood risk, however, this co-evolution appears to have become sub-optimal; while residents take little or no action, water managers are increasingly faced with the fact that they can no longer manage flooding on their own. Therefore, it is argued by policymakers that responsibilities should be shared between state and society, by including them in the delivery of FRM. This way, a more fruitful co-evolution could emerge.

Following the framework of Mees et al. (2012), however, the division of public-private responsibilities needs to take into account considerations of fairness, effectiveness, efficiency and legitimacy. Current discourses among public officials and citizens generally appear to have a limited focus on respectively the effectiveness/efficiency or the fairness/legitimacy criterion, which challenges the shift pursued by the government.

Today, Flemish FRM is focused on input/output rather than throughput legitimacy; i.e. it legitimizes its FRM through authorized institutions delivering effective output rather than including citizens in its decision-making (see Ref. Hartmann and Spit, 2016). Although active public involvement is strongly encouraged by the EU Floods Directive (Art. 10), public participation in Flemish FRM is generally limited to later phases of the decision-making process and more passive forms of interaction (Van Rossen, 2003; Mees et al., 2016). Overall, the Flemish population accepts its limited participation possibilities since FRM is considered exclusively the competence of the government. But if the government proceeds to transfer flood risk responsibilities to private actors it will weaken its input and output legitimacy, because it relies on actions taken by these actors for its effectiveness. Considering the currently prevailing attitude among the population of the Dender basin, it is unlikely residents will accept this new role without more intensive opportunities for participation.

Indeed, several scholars point out that a shift towards sharing flood risk responsibilities with private actors cannot be accomplished without including them in the decision-making as well (Steinführer et al., 2009; White et al., 2010; Roth and Winnubst, 2014). Hence, a plea is made for a shift from input and output to throughput legitimacy (Hartmann and Spit, 2015). In their comparison of the US, Australia, UK and the Netherlands, Meijerink and Dicke (2008) observed that shifts towards FRM based on private interests are accompanied by increasing possibilities for private actors to participate in policymaking. Whereas Dutch flood risk policy remains

strongly directed to public interests but is limited in its opportunities for public participation, the opposite applies to the UK.

Remarkably, we do not witness a similar trend in Flanders. While the Flemish government strives for enhanced citizen involvement in the implementation of its policy, no corresponding involvement is provided for in its decision-making. In its 'progress report on water nuisance' of 2015, the government announces that water safety plans will be drafted at catchment scale, based on the results of the FRMP study (CIW, 2015). While this could be a good opportunity to open up the decision-making, current pilot projects include in the early stages only governmental stakeholders. Nonetheless, the survey of Tempels et al. (submitted), found that about 42% of the population wishes to be involved in finding solutions to the flooding issue in the Dender basin.

As discussed above, sharing responsibilities (co-delivery) without involving residents in decision-making (co-planning) challenges the legitimacy of FRM. We thus argue that the government should open up the debate and allow residents to participate in FRM decision-making processes. However, this should be done carefully. Boonstra and Boelens (2011) argue that public participation processes set up by government are too strongly based on governmental preconditions, resulting in many cases in a 'public support machine'. In contrast to the hierarchical structure in place today, sharing responsibilities requires a horizontal governance system (Boonstra, 2015). Instead of merely complementing co-delivery demands with co-planning, we therefore believe it would be more desirable to strive for a comprehensive form of co-production, which anticipates and responds to co-evolutions taking place within the society subsystem. Hence, co-production should not only be comprehensive in terms of the different stages in which citizens are involved, but also by paying attention to developments evolving outside the policy cycle itself. In deliberation, the scope of the problem, the objectives of FRM and the measures to be pursued should be discussed, as well as the role of all parties involved in bringing these into practice.

Through comprehensive co-production, a more balanced distribution of responsibilities could be achieved, setting conditions to make co-evolutionary planning processes possible. Instead of pre-defining objectives and measures, water authorities and spatial planners would engage with the dynamics in place in other FRM subsystems. The exact ways in which societal goals (such as lowering flood damage) are reached are thus unknown beforehand. This 'planning of undefined becoming' is not aimed at developing policies, but at building networks and dynamics of mutual action (Boelens and De Roo, 2016). In deliberation, authorities and citizens should define their mutual roles and responsibilities in FRM. Instead of introducing top-down objectives and solutions or exclusively supporting bottom-up initiatives, policymakers horizontally cooperate to capitalize, strengthen and complement existing social and economic capital. All the actors involved, i.e. authorities, residents and other societal actors, have relative independence in their particular sphere of action. Therefore, policymakers should acknowledge the discourses and framing of problems and solutions prevalent among non-governmental actors. Consequently, the results of these processes will never be fixed, but emerge in the co-evolving domains of actors, their networks and changing surroundings.

This dual approach sets out two complementary roles for governments. On the one hand, co-produced policies allow policymakers to set legitimized conditions for increased personal flood risk responsibilities. By including citizens both in FRM agenda-setting and decision-making, input, output and throughput legitimacy become intertwined. On the other hand, governments can participate in co-evolutionary processes, so that FRM is not only a matter of governmental action, but that all actions that influence flood risk, including those of societal actors, become aligned.

6. Conclusions

Similar to several other countries in Europe and beyond (e.g., Johnson and Priest, 2008; Bubeck et al., 2013; Walters, 2015), authorities in Flanders show an interest in increasing the involvement of citizens in the delivery of flood risk management (FRM), in order to improve its

effectiveness and efficiency. Given the fact that the trend towards co-production in FRM is relatively recent, literature remains unclear as to what are the opportunities for and barriers to higher citizen involvement in the implementation of FRM. Following the framework of Mees et al. (2012), this paper compares discourses and practices on citizen co-production among the population and public officials within the Dender basin, and more specifically Geraardsbergen, from the perspectives of fairness, effectiveness, efficiency and legitimacy. By doing so, the paper provides insights into the barriers to co-production and reflects on how these could be overcome.

Our research revealed a significant gap between the viewpoint of governmental water managers and residents of flood-prone areas concerning flood risk responsibilities. While public officials expect from an effectiveness/efficiency perspective that citizens share responsibility in handling flood risk, residents of flood-prone areas in the Dender basin consider it a main or even exclusive responsibility of government (fairness and legitimacy perspective). We argue that this misfit in discourses can potentially severely hamper the effectiveness and legitimacy of FRM. In order to make co-produced FRM possible, a clearer distribution of responsibilities is required. Today, the boundaries between public and private responsibility in Flemish FRM are blurred: informal norms assume that the government is responsible for protecting land from flooding, even though the law does not define this. As Mees et al. (2014) point out, an explicit distribution of responsibilities is key for legitimate FRM. In the UK, France and Germany, the first steps towards this were made with respectively the 'Making Space for Water' strategy (2004), the Act on the modernisation of civil security (2004) and Wasserhaushaltsgesetz (Johnson and Priest, 2008; Hartmann and Albrecht, 2014; Larrue et al., 2016). In Flanders, the shift towards increased citizen responsibility has not yet been institutionalized in any formal policy document.

Institutionalizing flood risk responsibilities would be a first but insufficient step to engage citizens in a more fruitful co-evolution between public and private flood risk actions. Several authors claim that an increase in citizen co-delivery should be accompanied by increasing opportunities for public participation in decision-making (co-planning) (Steinführer et al., 2009; White et al., 2010; Roth and Winnubst, 2014). In this paper, we argue that the government should aim for comprehensive co-production, which not only includes citizen participation in every stage of the policy cycle but also acknowledges and respects the co-evolutions taking place outside the policy cycle. Instead of pre-defining management goals, policy development should allow a 'planning of undefined becoming' (Boelens and De Roo, 2016). In deliberation with societal actors, such a process defines common goals and roles of competences and responsibilities. By doing so, policymakers and citizens can foster a more fruitful co-evolution between the state and societal subsystems of FRM.

How could such an approach be applied in the Dender basin? In the near future, the Flemish government intends developing water safety plans at catchment level. For now, it remains unclear how participation will be organized in the draft of these plans. We argue that it would be wise to involve the residents of these catchments from the start, e.g., through the existing action committees and neighbourhood councils. The results of the FRMP study could form a useful starting point for discussion but should not pre-define the objectives of the deliberation process. These objectives, the actions to reach them and the role of the involved parties should be determined through the deliberation itself, acknowledging existing social and material capacities within society. In this way, the planned water safety plans could be a first chance to establish a more fruitful co-evolution.

By suggesting a co-evolutionary approach to FRM, this paper elaborates further on co-evolutionary planning theory and contributes to the debate on public-private responsibilities in FRM. The concept of co-evolution has found its way to the theory of spatial planning, because it provides a useful tool for addressing the complex relationships between different land use functions (Boelens and De Roo, 2016). Within the shift towards flood risk management, we believe the co-evolutionary perspective offers valuable insights for the reciprocal adaptive management of land and water as well. Further research is needed to identify conditions to make co-evolution between governments and residents in FRM more fruitful. Through the method of pilot cases the potential of this approach could be tested and demonstrated.

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