

# Chapter 2

## Diversification of Flood Risk Management Strategies – Necessity and Importance

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### 2.1 The Extent to Which Diversification Is Taking Place

As substantiated in the introduction chapter, an argument can be made that diversification of the portfolio of flood risk management strategies (FRMSs) makes countries more flood resilient (Hegger et al. 2014). As a first step towards scrutinising this assumption, it should be assessed whether and to what extent diversification is actually taking place, both in policy discourses and in practice. In all countries, the usefulness of diversification is acknowledged, although the extent to which it is actually being realised differs between countries.

*At the discursive level*, a distinction can be made between England and Sweden on the one hand and the other four countries on the other (Alexander et al. 2016; Ek et al. 2016; Kaufmann et al. 2016a; Larrue et al. 2016; Matczak et al. 2016; Mees et al. 2016). In England and Sweden, each of the five FRMSs are deemed as equally important in FRM, thus there is no overtly dominant strategy at the national scale (albeit this may vary under different local conditions). In the Netherlands and Poland, strategies other than flood defence are seen as back-up strategies used for reducing residual risks. The same is true in Belgium and France, although here prevention and mitigation are sometimes applied instead of defence. In these four countries, there is evidence of discursive dominance of certain strategies: a strong prevention discourse in France, a focus on defence in the Netherlands, on emergency management in Poland (also in practice) and on defence, prevention and mitigation in Belgium. The country-specific preference for a particular portfolio of FRM strategies is a result of the physical and institutional context in these countries. Hence, it is not possible to a priori determine whether one approach is preferable over the other (Hegger et al. 2016; Wiering et al. 2017). Ultimately flood risk governance

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should be deemed appropriate, whereby structures of governance and institutions ‘fit’ the problem at hand. Rather than imposing notions of good or poor governance, this framework advocates a more context-specific perspective on appropriateness in line with the *logic of appropriateness* described by March and Olsen (2008).

In all countries, except England, on the ground implementation of a diversified set of strategies is lagging behind discourses on diversification. While all countries can be said to be diversified in that all strategies have been implemented at least to some extent, especially in Belgium, France, the Netherlands and Poland, there is a relative dominance of the flood defence strategy. Implementation of strategies other than the dominant one is taking place but at a slow pace.

## 2.2 Drivers for Diversification

In all researched countries, we found drivers for diversification. A distinction can be made between specific actor-, discourse-, rules- and resource-related drivers (Hegger et al. 2014) as well as more general and encompassing drivers (Wiering et al. 2017).

### 2.2.1 Actor-Related Drivers

**Policy entrepreneurs** at several levels of government were found to play a crucial role in putting water safety issues on political agendas, often by exploiting windows of opportunity formed by catalyst floods that helped to facilitate change. For instance, in England policy entrepreneurs have played an important role in establishing ‘best practices’ in FRM, at both national and local scales (Alexander et al. 2016). Another example is the specially appointed Delta Commissioner leading the Dutch Delta Programme (although this programme was initiated not as a reaction to floods but in anticipation of increased flood risks). But also at local level, we found that a crucial role was played by these policy entrepreneurs in several municipalities in different countries, e.g. in Dordrecht and Wrocław. Policy entrepreneurs were generally easy to identify since several interviewees pointed to the important role played by them. Traits that were frequently attributed to them were political sensitivity, networking capabilities, the potential to familiarise themselves with the rationalities used by different actors with different interests, their charismatic leadership and their intrinsically motivated drive to improve flood policies.

**Bottom-up initiatives initiated by local actors**, including local governments and residents. Especially in France, England and the Netherlands, there are examples of such local initiatives. These initiatives hold the promise of exploiting innovative potential in society, ensuring that flood management schemes are tailored to local situations and they can serve as niches, places where learning about innovative flood management options and their implementation is taking place. The rise of bottom-up initiatives can be linked to the devolution of certain responsibilities in FRM, resulting in local actors having more powers to implement different types of

measures. Secondly, with stretched resources and strict funding rules in each country, practitioners need to look to alternative measures to address risk, because defence is not an economically viable option in all locations. Thirdly, there is scope for true ‘bottom-up’ initiatives i.e. community- or household-led initiatives which are actively encouraged in several countries.

### **2.2.2 Discourse-Related Drivers**

A discursive shift away from a purely technocratic view of FRM due to the fact that **notions of sustainability and resilience** have been actively discussed (Wiering et al. 2017). Examples of rising alternative discourses include safety or risk-based discourses, integrated flood risk management and eco-system based management, climate change and environment or sustainable development. Also, the concept of ‘resilience’ itself often promotes community involvement in risk strategies, as seen in England. These discourses can lead to an increasing diversification of arrangements (e.g. the traditionally strong role of prevention in France, or the ‘making space for water’ discourse in the Netherlands and England, and Belgium strengthening prevention). However, such discourses have varying effects: the climate change debate led to increased attention to FRM and mitigation in Sweden, yet has had little visible impact in Poland, and despite minor changes in discourse has largely maintained the defence dominance in the Netherlands (Wiering et al. 2017).

### **2.2.3 Rules-Related Drivers**

**Enforceable rules and regulations.** The Water Assessment in the Flemish region in Belgium was found to be effective in forcing local actors to consider flood **risks** in urban development as it enables water managers to prohibit the granting of building permits and offers the possibility of making these permits subject to specific conditions (e.g. taking mitigating measures) (Mees et al. 2016). However, this instrument can only be truly effective when the conditions that are included in the permit pursuant to the conclusion of the water assessment, are consistently followed up in the field and subsequently enforced. Otherwise, competent authorities have no way of knowing whether this instrument is, in fact, effective. The more rules and regulations leave room for interpretation, the more they seem to enable adaptation, as the rules can be interpreted differently if changes in flood risks necessitate this (Goytia et al. 2016). On the other hand: the more room for interpretation and policy freedom, the more risk that actors keep on the old and well-known track as changes might be more difficult to implement than ‘business as usual’ and rules that leave more room for interpretation may also be more difficult to enforce. For instance, in the Netherlands, spatial planning authorities always had the power/authority and the legal instruments and a legal duty to take flood risks into account, but they were not willing to use these instruments. The focus always had been on short term profits

that go with urban development. The large amount of policy freedom and flexibility resulted in the neglect of flood risks and the minimal use of prevention and mitigation strategies. This changed when more binding rules were developed (Beleidslijn ruimte voor de rivier).

### **2.2.4 Resource-Related Drivers**

The availability of **financial resources** has proven to be a crucial determinant for diversification, but at the same time previous investment decisions may create path dependencies (Van Buuren et al. 2016; Wiering et al. 2017). In the Netherlands, there is a specially established Delta Fund which receives one billion Euros per year in order to finance improvements in water safety and fresh water supply, but it is still uncertain to what extent these finances are invested in stimulation of diversification. The CatNat recovery mechanism in France finances the Barnier fund (i.e. through retaining a percentage of the sums collected) which undertakes measures of risk prevention. The CAT-NAT scheme is financed with insurance premiums paid by citizens. This ensures that recovery is a strong strategy in France, next to defence. At the other extreme, we found that resources in Poland are lacking and that the implementation of FRM strategies in this country is dependent on revenues from European funds like the EU Cohesion Fund.

**Technical improvements** in flood risk management can be seen as an important driver: had there been no improvements in mapping and modelling risks (including improved data and knowledge such as the availability of longer historical records), implementing current spatial planning and insurance systems would be a lot more complicated, even impossible. Beyond FRM, technological progress includes remote sensing, computational power and the availability of modelling tools, amongst other things.

### **2.2.5 Drivers Encompassing Several Dimensions (Actors, Discourses, Rules, Resources) Simultaneously**

An important contextual factor is formed by a **more general shift from ‘government’ to ‘governance’**, whereby the state is only one steering actor amongst others (Driessen et al. 2012; Van Rijswick and Havekes 2012). This is reflected in the procedural approach of the Floods Directive (Priest et al. 2016). In the field of FRM, Europeanisation plays a significant role in this process. An important legislative step in the evolution towards enhanced participation has been the UN Aarhus Convention of 1998, which established the right of individuals and their associations to have access to environmental information and participate in environmental decision-making and to access to the courts. Closely related to this, EU directives such as the EIA directive and the WFD oblige member states to involve the public

in FRM decision-making. Particularly in Poland the increase in public participation was strengthened by requirements attached to investments financed by EU funds.

**Floods as trigger events** also contributed to change. In Poland, the 1997 floods were a trigger to increase attention to crisis management in FRM and to reorganise its structure (Matczak et al. 2016). Whereas earlier the main competence lay with the national army, it is now divided between State Fire Brigades and provincial, county and municipal emergency planning services, and has thus become a ‘multi-level’ responsibility. In England, the 1998 floods were a driver for more diversification by way of improved flood warning systems and the launch in 1999 of national annual flood awareness campaigns by the Environment Agency, which continued for around 10 years until they were complemented with more local awareness-raising activities (Alexander et al. 2016). The floods in 1998 in Flanders and in 2002–03 in Wallonia were also found to be drivers for diversification, and the floods of 2010 led to substantive legislative changes in the Flemish region (Mees et al. 2016). In the Netherlands, the near floods in 1993 and 1995 stimulated a shift towards flood risk mitigation through The Room for the River programme and more natural approaches to flood risks (Kaufmann et al. 2016a). In France, the Xynthia event strengthened the focus on risk on coastal areas, quite forgotten until then (Larrue et al. 2016).

**Europeanisation** in terms of the establishment of a single European market, identity and currency has had a mixed influence on diversification and dominance in FRM. In some countries (e.g. the Netherlands), EU directives like the Floods Directive were implemented along the lines of the existing defence-oriented approach, though with a stimulus to faster implement the risk approach in legislation, and as such did little to challenge the defence dominance. In England overall the Floods Directive can be seen to be only causing minor changes or reinforcements to the existing rules governing flood management. In other countries (e.g. Belgium), EU directives and participation in EU research projects did stimulate increased attention to new approaches to FRM, such as risk-based management and nature-based approaches. Europeanisation can also drive both dominance and diversification within the same country: in Poland, access to EU funds strengthened the focus on defence, but EU directives also introduced or strengthened flood risk mapping and nature-based approaches, in turn reinforcing the position of environmental NGOs. In France it increased the weight of central government power on FRM at local level.

## 2.3 Barriers to Diversification

Regarding barriers to diversification, we found three more general and encompassing barriers:

A **lack of resources** often formed an important reason for a lack of investments in flood risk governance and for a lack of diversification. For instance, Poland, while lacking resources for flood defence, still sees defence as the most desirable strategy. In Belgium, a lack of resources has been found to impede an effective flood preparation.

Various mechanisms, which can be grouped together under the heading of “**sunk costs**” and “**path-dependency**” form a second barrier. The aforementioned terms refer to the fact that any commitments made to dominant strategies (often flood defence) in the past make a diversification to other strategies less likely and desirable. We see that in all countries the past investments in structural defence infrastructure are described as stabilising forces. Existing urban development in flood-prone areas will also make diversification less likely (e.g. as in the West of the Netherlands). High financial investment in flood infrastructure – with its created flood risk expertise in epistemic communities – leads to increasing returns and ‘sunk costs’. This decreases the practical possibilities to implement alternative measures (Poland, France, the Netherlands) and might make further investments in dikes the most cost-efficient solution (the Netherlands). We also found that the incentive to change regulations (rules) tends to be limited due to high transaction costs when changing administrative arrangements and developing new expertise and infrastructure (resources), although the STAR-FLOOD project also identified examples of rules that were changed relatively easily or that in their existing form already allowed for diversification. This points to an increasing need for those actors who have responsibility, power and instruments to actually use these powers and instruments.

Third, while **floods** have been shown to play an important role in putting water safety issues on political agendas, as in Poland and all other countries, in some cases they were also found to have a tendency to **mainly reinforce the dominant logic of flood defence** (safety first). Such reasoning has been found amongst other things in the Netherlands and Poland (Kaufmann et al. 2016a, b). Seen in this way, floods are not necessarily just a driver for diversification, but also for strengthening specific existing strategies. For instance, the 1998 and 2000 floods in England led to significant improvements to emergency management and flood warning.

## 2.4 Lessons for the Necessity of and Possibilities for Diversification<sup>1</sup>

STAR-FLOOD’s first starting assumption deals with the question of to what extent having a diversified and aligned set of strategies in place leads to resilience. This question cannot be answered in a straightforward way, but should be approached from at least two perspectives. A first perspective, with which e.g. Liao (2012) would agree, is that diversification of FRM strategies is indeed necessary to achieve resilience. Reliance only on flood defence and – seemingly associated – increasing capacity to resist is undesirable when taking into account current and potential future flood risks in times of urbanisation and climate change. An approach solely reliant on resistance is not sufficiently flexible to easily take these new risks into

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<sup>1</sup>The text in this section is largely based on Hegger et al. (2016).

account while at the same time there might be failure of the infrastructure or a flood above design standards. Seen from this perspective, a country like the Netherlands is taking a significant risk because the actual consequences of floods are likely to be dramatic (with a large degree of societal disruption). While part of the risks taken are the result of choices made in the past combined with inescapable physical circumstances, we have also found that e.g. in current planning decisions flood prevention has a relatively low priority compared to other spatial functions. Put in other words, perfect, absolute flood resistance is not possible. A system may withstand load, but not without limits. According to a statistical design concept, defences should withstand a design flood, e.g. 100-year flood, but may fail if the actual flood is much higher. Therefore, at least from the first perspective, a more disaster-conscious society needs to be built. The dominating stance should be to seek safe-fail (safe in failure) in addition to unrealistic fail-safe (safe from failure) solutions, (cf. Kundzewicz and Takeuchi 1999).

From a second perspective, which is a potential criticism on the first perspective, diversification does not (necessarily) guarantee resilience. After all, a retrospective evaluation shows that countries in which all strategies are in place to a large extent and that have a high capacity to absorb and recover and capacity to adapt are not the countries with the lowest casualties and losses, and one could even argue that a resilience approach does not explicitly aim to avoid these. In England, there still seems to be room for improvement in terms of further risk reduction, although this criticism should be viewed in the light of normative viewpoints held in England, in which it has been accepted that some floods may happen while it is intended to resist some other (large) floods. England is more resilient to flooding by having this diversification and flooding has not (yet) caused a complete rethink of flood risk management, which may be indicative that to a great degree the system seems to be working, although it has prompted significant reviews, including the current Government's National Flood Resilience Review.

These observations necessitate us to nuance our starting assumption that diversification leads to more/increased resilience. Diversity of FRMSs in itself is not enough to guarantee societal resilience, indeed each strategy must be effective in its own right. Moreover, the analysis performed by each STAR-FLOOD country demonstrates the importance of effective mechanisms and processes connecting certain FRM strategies, policy domains and actors (Wiering et al. 2017). Therefore, returning to the project's starting assumption, it is clear that diversification of FRMSs is only a partial prerequisite for societal resilience. Another crucial observation is that the diversification of FRMSs is motivated by different factors. In the Netherlands, Poland and to some extent France and Belgium, efforts to develop FRMSs beyond flood defence are partly driven by the desire to create a back-up layer of contingency (or 'fail safes') should defence measures fail. This is not the case in England, where diversification simply characterises the approach to flood risk governance that has been established for ca. 65 years. Diversification of FRMSs in Sweden is primarily motivated by an increased number of actual events, combined with the increased risk for floods that is assumed to accompany climate change. We conclude that diversification of FRMSs does not necessarily guarantee resilience but that it





**Fig. 2.1** STAR-FLOOD team on quay in Antwerp

may contribute to it as being one of the essential preconditions. However, as we have seen, also other factors increase resilience (Fig. 2.1).

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