

Chapter 6

Implications for Risk Governance Research and Practice

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6.1 Implications for Flood Risk Governance Research

6.1.1 *Reflection on STAR-FLOOD's Research Approach*

6.1.1.1 Key Features of the Approach

As mentioned in the introduction, STAR-FLOOD's research approach has the following key features:

- The project combined social-scientific and legal approaches, achieving dialogue and synergy between multiple disciplines.
- The project made comparisons between countries and case studies, whereby all researchers used a similar framework for analysis, explanation and evaluation.
- The work was carried out in close cooperation with stakeholders at the European, national, regional and local level. Throughout the project they were involved in workshops (e.g. case study workshops in each country, two expert panels; four international workshops and various additional sessions at conferences) and over 300 interviews. During the project, the scope of the workshops shifted from collecting information and identifying the knowledge needs of stakeholders towards disseminating research findings and validating research results.

In order to achieve dialogue between the involved disciplines, maximise comparability of the findings and link the research to policy and practice, we chose for intensive forms of cooperation. Researchers within the project had frequent exchanges of ideas with other researchers, both within and across the participating countries; the coordinator provided frequent feedback on draft products produced

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by all (including through several visits to all partners); a common conceptual and methodological starting point was developed, with the Policy Arrangements Approach as an overall framework for combining the input of researchers from various disciplines; and meetings were held very frequently, both in the form of plenary consortium meetings and in the form of Academic Master Classes (AMCs). Besides that, also frequent workshops with stakeholders were held, as reported in Choryński et al. (2016); Ek et al. (2016b); Hegger et al. (2014); Hegger et al. (2016). Overall the approach used appeared to be very fruitful, but also time consuming.

6.1.1.2 Strengths and Points for Improvement of the Research Approach

The STARFLOOD approach was evaluated by the partners during the final consortium meeting (March 2016). Based on this evaluation, the following strengths and points of improvement were identified.

Strengths of STAR-FLOOD's Research Approach

Partners and coordinator shared the overall impression of a successful and well-coordinated project. Strong points that were emphasised by several partners are:

- **Intensive interactions** between the involved researchers, including workshops and meetings in different cities. Researchers indicated that these intensive interactions fostered mutual understanding, amongst other things in terms of each other's disciplinary approaches and of the specificities of FRM systems in the different countries. An atmosphere was created in which such issues are not taken for granted, but on the other hand questioned along with approaches from other countries.
- **Learning and training by junior researchers.** The various forms of cooperation, in particular the Academic Master Classes, were highly valued. These provided the junior researchers in the project with training in various relevant research skills, including: theoretical approaches for policy and legal analysis; public administration and legal approaches for evaluating governance; skills in setting up comparative research; doing discourse analysis; setting up workshops; and writing and publishing papers.
- **Good complementarities.** The different disciplines involved in the project as well as the specific expertise of some partners were seen as complementary and enriching.
- **Good atmosphere.** All in all, the atmosphere of working together was evaluated as very positive.
- **Strict intermediary deadlines.** An approach was chosen in which partners had to make available intermediary products at specific moments, to allow for frequent exchange and feedback. This approach was endorsed.

Points of Improvement

Partners indicated the following points of improvement:

- **Be stricter on key definitions** early stage of the project. Key definitions of important concepts were discussed frequently. Amongst other things, a glossary

of key terms was developed by the coordinator with input from all partners, providing an overview of different interpretations of concepts. Halfway the project, in April 2014, this document was finalised and included for each concept a recommended interpretation for the purpose of the STAR-FLOOD project. The development of this glossary was endorsed, but it was suggested that later projects could come up with a recommended definition in an earlier stage in the project to minimise conceptual confusion.

- **Start earlier with comparisons, lessons/recommendations** (more iterative process). While benchmarks for country comparison were on the agenda from the beginning onwards, it can be recommended to also start with the substantive comparison from the outset. Country-comparison (WP4) and the identification of design principles (WP5) should be given a larger role vis-à-vis country-specific analysis (WP3 in STAR-FLOOD).
- **Discuss the conceptual approach and the substantive issues covered in the project simultaneously.** In Work Package 2 and at the beginning of Work Package 3, much discussion was held on the conceptual approach and the precise scope of the empirical research. Only after closure on these issues was achieved, the discussion shifted to the more substantive policy and legal issues of the project. We recommend to discuss and address both issues simultaneously, as these discussions may enrich each other.
- **Make early agreements on how to deal with differences in disciplinary reporting and publication styles.** It was ensured that the country reports (WP3) would remain relatively concise, to provide readers with easy access to the key findings. This constituted a tension, however with the need to discuss legal information in some detail. Part of the legal information in STAR-FLOOD is now not included in the WP3 reports, but in background documents that are not publicly available. Although this information is present in journal articles written on the basis of the empirical research, it would also be advisable to include the legal background information, for instance as appendices to the reports or in an online resource.
- **Provide even more structure to facilitate the interdisciplinary approach.** It was suggested that even more concrete structure could be offered to achieve more integration between policy analysts and legal scholars, for instance through case workshops, field trips, debates with practitioners etc.
- **Be more lenient regarding the content and scope of intermediary products in an early stage of the project.** Strict intermediate deadlines were evaluated as positive, but in an early stage the things to deliver could be more general (e.g. template) instead of lengthy texts, in order to avoid large time investments in products that require substantial revisions afterwards.
- **Involve end-users in the project in an earlier stage.** While intensive workshops with end-users were held throughout the project, valorisation of research and dissemination of findings will even be more enhanced if end-users are also involved as partners in the project from the start.

6.1.1.3 Overall Recommendations for Future European Projects

Based on our experiences as discussed in the preceding two sub-sections, we conclude that interdisciplinary comparative and complementary research that leads to innovative insights requires the intensive forms of cooperation and the high degree of coordination as pursued in the STAR-FLOOD project. Intensive exchanges were necessary to ensure that all researchers were taking a common conceptual and methodological starting point, that integration between social science and legal research was achieved, that the country-specific deliverables are of excellent quality and to a large extent comparable, and that a common framework for comparison and identification of design principles was used. In hindsight, it can be said that the ambition to arrive at cumulative, coherent and comparable research was challenging, required much coordination effort, but was on the other hand also extremely rewarding as it enabled us to truly adopt an integrated and comparative perspective and to arrive at nuanced findings as detailed in all STAR-FLOOD deliverables. To summarise, based on our experience we argue that project proposals for large integrated European projects (e.g. within Horizon 2020) should have the following characteristics in order to maximise the chance for success. A proposal should:

- Decide between two mutually exclusive approaches in terms of the **structure of Work Packages**. WPs can be organised according to concrete overall steps in the research (e.g. assessment framework; empirical research; comparison; design) instead of according to specific disciplinary or issue-oriented activities. While the former approach, the one followed in STAR-FLOOD, is in our view more ambitious and rewarding, applicants should be aware that it requires strong coordination efforts and may at times be challenging.
- Identify concrete actions to achieve intensive knowledge exchange between countries and disciplines as well as training activities for junior researchers.
- Identify specific **moments at which decisions will be made** regarding important issues such as the definitions of key concepts, the main features of the conceptual approach used, the scope of the empirical research, and the table of contents of specific deliverables and provide a justification for the timing.
- Involve **end-users** as partners in the project from the outset.
- Design an approach in which country and case study analyses and their comparison co-evolve through an iterative process.

6.1.2 Issues for Further Research

We see the following three clusters of potential follow-up research: (i) validation, application and further specification of STAR-FLOOD's research findings in real-life contexts; (ii) follow-up research on specific aspects of flood risk governance that were shown to be important as well as research in countries and regions other than the STAR-FLOOD countries; (iii) application of the research approach

followed in STAR-FLOOD in other empirical domains. Each of these three clusters will now be discussed in turn.

(i) **Validation, application and further specification of STAR-FLOOD's research findings**

Within STAR-FLOOD, design principles were identified based on the findings of the empirical research. The design framework developed in STAR-FLOOD can be used for more design-oriented research efforts, in which possible improvements in FRM are studied by proposing concrete governance options to actors in the field and discussing and refining these together with them. Specifically, research and experimenting into public-private arrangements at the regional/local level should be further pursued. Also the exchange of good practices between countries and even between regions in single countries has proven to be especially inspiring both for researchers and for actors implementing FRM in practice. We therefore suggest the following (Hegger et al. 2016):

- To further pursue **knowledge co-creation projects** in which researchers collaborate with other societal actors around concrete local and regional FRM issues. In so doing, specific attention should be paid to the role of long-term visioning and imagination in this, as it was shown to enhance risk communication and the adoption of a long term perspective.
 - The design principles developed in STAR-FLOOD could be further developed into a more direct **hypotheses testing approach**.
 - Design-oriented research can be carried out by **participating in INTERREG projects** with a specific regional focus.
 - Specific follow-up research that sets forth mechanisms in countries and at EU level for improving FRG in specific countries can be carried out.
 - Follow up research on **trans-boundary flood risk management** and the improvement of the Floods Directive in this regard; including the development of shared concepts and the assessment and eventual further development of legal instruments for trans-boundary cooperation.
 - Follow up research on the effectiveness and legitimacy of the procedural governance approach taken in the Floods Directive.
 - Follow up research on the effectiveness and depth of the at this moment rather generic **participation requirements** in the Floods Directive.
- (ii) **Follow-up research on specific aspects of flood risk governance that were shown to be important as well as research in countries and regions other than the STAR-FLOOD countries**

Empirical research as carried out within STAR-FLOOD can be further extended to countries, regions and catchments regions not included in the STAR-FLOOD project. This will lead to cumulative research and complementary insights and good practices. This research should put more emphasis on the occurrence and performance of different forms of multi-level governance as well as aspects related to

trans-boundary flood risk governance. In follow-up research, the following specific aspects could be addressed further:

- Social vulnerabilities of different societal groups in relation to multiple hazards.
- Specific governance challenges related to the implementation of **flood mitigation/resilient architecture** and the role of spatial planning therein could be addressed in more detail.
- The issue of budget cuts of public authorities and how this impacts FRM could be addressed in some detail.
- The **power and effectiveness of different types of bridging mechanisms** that may help to improve links between flood risk management strategies and may avoid blurred responsibilities.
- The role of critical infrastructure in flood events and how private actors operating them acted in case of a flood.

(iii) **Application of the research approach followed in STAR-FLOOD in other empirical domains**

STAR-FLOOD's research approach for carrying out a comparative social science/legal study into governance issues can be applied to other empirical domains. For instance, the following topics could be addressed through an approach that is similar to the one used in STAR-FLOOD:

- Research on drought.
- Climate adaptation in cities and regions.
- Nature-based approaches for multi-hazard issues.
- Integrated approaches to sustainable cities and regions (including green regions, green transformations).
- Integrated multi-hazard and disaster risk reduction research.
- Flooding as a cause of pollution (Fig. 6.1).

6.2 Implications for Flood Risk Governance Practice

6.2.1 Introduction

Based on results of the evaluation of flood risk governance in terms of the extent to which it enhances societal resilience to flooding, resource efficiency and legitimacy, success conditions have been identified (Ek et al. 2016a, b) which can be formulated as design principles. Key terms are defined below.



Fig. 6.1 STAR-FLOOD End-conference, 4–5 February 2016, Brussels, Belgium (Source: N. Booister)

Defining Successful Flood Risk Governance; Success Conditions and Design Principles (see Ek et al. 2016a, b)

‘Successful’ flood risk governance is understood as governance that achieves the desired outcomes of resilience, efficiency and legitimacy.

Success conditions are those institutions, procedures, rule-types, resources etc. that need to be in place in order to successfully deliver different aspects of flood risk governance. These can be translated into concrete recommendations.

Design principles are understood as sub-objectives which are supposed to contribute to the achievement of overall goals.

We make a distinction between design principles for improving flood risk governance processes on the one hand, and more specific design principles and good practices related to each of the three desired outcomes (societal resilience to flooding, resource efficiency and legitimacy) on the other hand. Principles related to flood risk governance processes are more encompassing than those related to their outcomes, since they are not only dealing with the question of how specific desired outcomes can be reached, but also with the question of which outcomes are desired by and for whom? Furthermore, these recommendations may be conducive to several desired outcomes simultaneously. The more specific principles in Sect. 6.2.3 on the other hand, focus more on the ‘how’ question.

6.2.2 *Design Principles for Improving Flood Risk Governance Processes*

This section discusses eight design principles for improving flood risk governance processes. After introducing each principle, challenges related to its implementation are discussed, as well as concrete recommendations for addressing these challenges.

Societal actors, including public authorities, businesses, community groups and NGOs should be clear about the flood risks they are facing, the level of protection that is present and about how responsibilities for handling them have been divided.

Societal actors generally endorse this principle. It is also a principle to which public authorities need to comply in order to act in line with the Aarhus Convention on Access to Information, Public Participation in Decision Making and Access to Justice in Environmental Matters. Implementing it is, however, challenging. Public authorities are still struggling with how to undertake risk communication, and in several countries a lack of risk awareness amongst private parties has been witnessed. Amongst other things, following flood events it is tempting for politicians to promote a ‘defence paradigm’, yet this is sometimes at odds with national policy and academic consensus that a risk-based approach is the best way forward. In order to deal with this challenge, we recommend the following:

- Politicians and decision makers at different governmental levels should make the effort to pro-actively communicate which levels of flood risk, both in terms of probability and potential consequences, societal actors are facing. They furthermore need to make explicit to what level of support by authorities societal actors are currently entitled both by law and by custom. This will bring debate on acceptable levels of risk and the question of who is responsible for dealing with them into the open and ensure that businesses, community groups and citizens know what to expect.
- We recommend having an open, broad (political and societal) debate about shifting responsibilities between public and private actors. The outcome of the debate should lead to more clearly defined roles for governments/citizens, to be laid down in documents that are open for public consultation and public scrutiny.
- Public acceptance of FRM policy is challenged by the occurrence of flood events and subsequent ‘politicisation of floods’. Authorities cannot wait for risk communication until a flood occurs. On the other hand, although very challenging, improving “water consciousness” should be continuously on the agenda.
- Managing societal expectations is key. There is a need to promote consistency in communication from the EU, national to local scale.

Flood-relevant policies should adopt a forward planning approach and take into account future changes, including climate change.

- Climate change projections should be embedded in FRM policy (and vice versa) to support forward-planning, e.g. in national policy strategies, planning documents through to the design of defence schemes (e.g. adaptive management is advocated). A long-term strategic approach (ca. 50 to 100 years) to decision-making is needed that enables adaptability and flexibility (because of uncertainty) to ensure that future risks and uncertainties are accounted for.

Knowledge infrastructures should be developed, and joint knowledge production processes and cultures of learning should be stimulated.

Institutional cultures for learning appear to be well-established within several STAR-FLOOD countries, but there are limited opportunities for exchanging these lessons within and between countries, especially between research and practitioner communities. Conferences, workshops and research consortiums are one way of transferring knowledge but these often exclude practitioners. The outputs from projects provide an important means of disseminating research findings in an accessible way, but do not enable the active exchange of ideas and dialogue. Hence, to further stimulate joint learning, we recommend:

- To establish a flood risk governance knowledge exchange platform, nationally and internationally

Private actors, including business, community groups and citizens should adopt partial responsibility for their own risk.

Engagement of private parties is needed, both for substantive and for normative reasons. Also public-private synergies in the context of recovery are relevant, e.g. in Belgium where private insurance is dominant, with a public fall-back mechanism. Here, cooperation between the two entities is important. A lack of risk awareness, a lack of incentives for engaging in FRM and, often, the existence of specific rights or customs regarding divisions of responsibilities is hampering public-private cooperation. Also, while the European Commission has a large interest in stimulating public-private partnerships, in our research we did not find many examples of these and hence further insights regarding how state-business and state-society partnerships should be designed, how they could be useful and how they could enhance capability are still needed. In some cases, partnerships may even have negative effects (even more stakeholders). To address these challenges, we recommend:

- To interpret public-private cooperation as ‘multi-actor coproduction’. This includes co-planning whereby citizens participate in the decision-making process of FRM measures, e.g., development of river basin management plan, emergency plan; co-delivery; participation of citizens in the implementation of FRM measures, e.g., flood protection measures at household-level; and comprehensive co-production: participation of citizens in both the decision-making and implementation of FRM measures, e.g., development of FRM plan in cooperation with

residents, whereby both citizens and authorities are responsible for the implementation of certain measures (Mees et al. 2016). Co-production can be set up in the pursuit of societal resilience, but also to increase efficiency and distribute responsibilities more equitably.

Flood risks should be dealt with at multiple scales and flood risk governance should take place at the most appropriate level.

A multi-scale approach is needed as well as efforts to mitigate flooding at the property and community scale, either through the implementation of property-level measures to enhance capacities to resist flooding, or through preparatory activities to enhance capacities to respond and recover. To achieve this aim, the subsidiarity principle is often adhered to. This principle implies that governance should take place at most appropriate level, being the lowest level possible, but the highest level necessary. Applying subsidiarity is challenging, however. On one side, in some cases flood risk management within European countries still follows a strong top-down approach, complicating the development of approaches tailored to local situations. On the other side, subsidiarity is easily equated with ‘decentralisation’. However, decentralisation is only subsidiarity to the extent that devolution of powers to lower levels of government can be said to be appropriate and is accompanied with devolution of the necessary resources. In order to achieve the right balance between bottom-up and top-down steering, we recommend the following:

- National governments and the EU have an important role to play by **supporting** (funding & expertise) and **approving** flood risk policy planning at regional level (preferably within hydrological boundaries). Local, tailor-made solutions should be **stimulated** and **facilitated** since these are often the best way of detangling multi-actor, multi-sector and multi-level governance problems in flood risk governance.
- The EU should support local developments by providing a subsidy system for stakeholder platforms at catchment scale. These platforms include all relevant stakeholders in the sub-catchment and draft a flood risk management plan based on their objectives, which is (financially) supported by EU/national governments (Benson et al. 2012).

Flood risks should be taken into account in spatial planning and receive the level of priority that is in line with what society considers acceptable levels of risk.

Taking flood risks into account in spatial planning is challenging for different reasons. There are different experiences with the extent to which local leaders give sufficient priority to flood risks. While there are good examples of policy entrepreneurs promoting a water sensitive approach to urban development (e.g. in Dordrecht) also counter-examples can be given, and in France the mayor of a small seaside village was even sentenced to 4 years in prison for behaving irresponsibly towards flood risks. The STAR-FLOOD project has furthermore found that there is an intricate link between the strategies of flood recovery and those of flood prevention and

mitigation. It was found that in some cases strong recovery mechanisms may disincentivise prevention and mitigation, and that recovery systems should focus on preventive and mitigation measures at individual property level. For instance, the CAT-NAT system in France has been found to discourage prevention. Also in Belgium, risk prevention is promoted through the legislative insurance framework, which discourages building in high-risk areas. Moreover, we cannot ignore the legacy of past decision-making or the fact that extensive development has already taken place in areas at flood risk. In order to make next steps in reconciling flood management and spatial planning, we recommend:

- To use flood zones to direct planning decisions.
- To discourage future development in areas at high risk of flooding.
- To put provisions in place for cases in which development in flood risk areas cannot be avoided. It should be made clear who is responsible for damage (this could be the project developers who have a stake in developing an area), and it needs to be ensured that development is adaptive (e.g. raised floor heights, use of SUDS) to minimise future damages should a flood occur.
- Strategies for ‘retrofitting adaptation’ are required.
- If no further development is allowed in an area, this may lead to unintended consequences such as economic and social deterioration. Policy makers should be aware of these consequences and should develop novel ways of fair burden sharing.

Formal flood-relevant rules and regulations should be clear for all involved, enforceable and enforced.

There is sometimes a lack of clarity of rules. Legal frameworks could more explicitly mention when and for what they are applicable. This is especially needed with regard to the development of the multi layered safety of combined strategies. Furthermore, what is needed is enforcement of the rules we have, for instance in the field of spatial planning. In some countries, changes in legislation have proven to be a problem in itself. This is exemplified by Poland, a country that after the transition of 1989 went through massive administrative and legal changes. To improve the working of rules and regulations, we recommend:

- To improve enforcement mechanisms in spatial planning through legal instruments. This also requires political will to enforce legislation (see the next design principle), increased powers within competent authorities and detailed guidance on building on the floodplain, to name a few. Legal frameworks should pay as much attention to the scope of the legal instrument as to how the instrument should be implemented, followed up and what the consequences are in the case of non-compliance.
- There is a need to establish incentives for better cooperation between actors operating within distinct spatial planning and FRM policy domains (e.g. as seen in England) and deliver a more integrated approach.

More experience should be gained with applying catchment-based approaches to FRM

The value of applying cross-sectoral Catchment-Based Approaches (CaBA) currently encouraged in water and environmental policy continues to be debated in the FRM field. Further evidence is required to demonstrate the effectiveness of this approach for alleviating flood risk and its potential for maximising the efficient use of resources. In principle, there are various opportunities for trans-boundary flood risk governance to lead to more flood resilience. Adopting the normative starting point that flood risks should not only be addressed locally but also considered at the basin scale, trans-boundary flood risk governance is desirable and moreover required by the Floods Directive and one of the reasons for EU action. STAR-FLOOD, admittedly, has not explicitly addressed trans-boundary flood risk governance (e.g. the work of the Rhine, Meuse and Scheldt commissions) as such but has focused on flood risk governance at the country and case study level. Nevertheless, we find it surprising that we came across relatively few examples of trans-boundary FRG, and there still seems to be much room for improvement in terms of enhancing trans-boundary cooperation in flood risk management. Hence, we recommend the following:

- Public and private actors at different levels need to initiate, carry out and facilitate practical experiments and engage in knowledge exchange regarding the further stimulation of catchment-based approaches to FRM.

6.2.3 Design Principles for Improving Flood Risk Governance Outcomes¹

Specific design principles for enhancing the desired outcomes of resilience, efficiency and legitimacy have been formulated. These have been identified within Work Package 5 of STAR-FLOOD (see also: Ek et al. 2016a, b). In this Work Package, the country-specific evaluations of resilience, efficiency and legitimacy were compared and based on this a number of factors that support or constrain societal resilience to flooding amongst the STAR-FLOOD countries have been revealed.

Resilience should be disentangled into the capacity to resist, to absorb and recover, and to learn and innovate. Table 6.1 provides an overview of the three capacities and the related design principles (left-hand column). For each design principle, success conditions have been identified. The right-hand column provides some concrete examples of good practices that were found to increase the chance of meeting the success conditions.

Table 6.2 provides an overview of design principles and success conditions for improving **resource efficiency**. The right-hand column provides some concrete examples.

¹This text is largely based on chapter 3 of Ek et al. (2016a).

Table 6.1 Design principles, success conditions and examples related to enhancing societal resilience to floods (Ek et al. 2016a, b)

Design principles for flood risk governance to enhance the capacity to resist	Conditions for success	Good practices
Selected flood risk management measures (e.g. defence and mitigation) should be tailored to local circumstances (e.g. risk, vulnerability, institutional and economic context)	Sufficient resources are provided (power, knowledge and financial), also for maintaining and improving existing defence structure	Partnership funding (England is a good example of where resources have been diversified to support the implementation of more defence and mitigation-based measures
	Legislation and decision-making allows/supports adaptability	Action Programme for Flood Prevention (France)
	Cooperation, in particular between defence and prevention and between defence and mitigation management, is supported	Water assessment (Belgium and the Netherlands)
	Long term forward planning is supported	Long-term investment strategy (England) is a good example of long-term forward planning of financial resources
	Actors (citizens) are incentivized to undertake risk-reducing measures	Delta Programme (the Netherlands)
Flood risk (prevention) should be incorporated within spatial planning decision-making to discourage development in known areas of flood risk, ensure that development in at-risk areas is adaptive, and ensure that development does not heighten risk	Sufficient resources are provided (power, knowledge and financial)	Water assessment (Belgium)
	Legislation and decision-making allows/supports adaptability	Water test (the Netherlands)
	Legislation contains mechanisms to ensure implementation of spatial planning measures (enforcement)	Building regulations (Sweden)
	Cooperation, in particular between defence and prevention and between defence and mitigation management, is supported	Zoning system (France)

(continued)

Table 6.1 (continued)

Design principles for flood risk governance to enhance the capacity to resist	Conditions for success	Good practices
Systems for forecasting and warning (preparation) should be effective and warnings should be transmitted with sufficient lead time.	Sufficient resources are provided (power, knowledge and financial), also for investments in forecasting technology.	Use of new technologies (e.g. England and the Netherlands)
	Formal responsibilities are established for the communication of flood warnings	
	Multiple pathways for disseminating flood warnings are available.	
	Community risk-awareness and preparedness are promoted.	
Effective and proactive arrangements are in place to enhance emergency preparation and response to flooding	Requirements to assess and monitor local risks, to inform emergency planning are established.	Flood rehearsals (e.g. the Netherlands)
	Mechanisms for up-scaling and downscaling emergency response are established	Flood leaders programme (Poland)
	Arrangements are in place to facilitate inter-organizational working. Roles and responsibilities are clear.	Dike armies (the Netherlands)
Strategies to recover from flood events should be available for all citizens, and should entice flood risk prevention	Systems for compensation for flood damage (after severe floods) are in place	Large variation; solidarity principle v. beneficiary pays
		Belgium: risk differentiation approach France: CAT-NAT and Barnier Fund
Opportunities for social and institutional learning should be created	Mechanisms are in place to facilitate knowledge exchange, sharing experiences and best practices	Adaptive planning and programme cycles (the Netherlands)
	There is a clear strategy and investment in Research and Development programmes.	Independent public inquiries (e.g. England) Learning from international experiences (Belgium, the Netherlands)

Table 6.2 Design principles, success conditions and examples for improving resource efficiency (Ek et al. 2016a, b)

Design principle for resource efficient flood risk governance	Conditions for success	Good Practices
Flood risk management should secure the level of flood risk reduction that is found acceptable at the lowest possible societal cost	The process demonstrates due concern for matters related to resource efficiency	Well-developed practices for CBA, also for non-monetary impacts (e.g. England)
	Actors (citizens) are incentivized to undertake risk-reducing measures	

Table 6.3 provides an overview of design principles and success conditions for improving **legitimacy**. The right-hand column provides some concrete examples.

6.2.4 Overall Recommendations on Appropriate and Resilient Flood Risk Governance Arrangements

Social scientific and legal research, especially governance research, on FRM had received limited attention vis-à-vis natural science research. Adopting a governance perspective has been shown to provide important complementary insights that may help to improve FRM approaches in different countries. Improving societal resilience to floods implies increasing the capacity to resist, to absorb and recover and to adapt. This makes demands on the flood risk governance arrangements that are put in place to realise these desired outcomes of flood risk governance. For that reason, STAR-FLOOD’s main research question was: “what are appropriate and resilient flood risk governance arrangements for dealing with flood risks in vulnerable urban agglomerations in Europe?”. In response to this main research question, the following overall recommendations can be formulated:

- While we can endorse approaches aimed at diversification of flood risk management strategies based on our research, these approaches should **fit within the existing national and local context**. Countries differ in their approaches to diversification. In the Netherlands, Poland, France and Belgium, we see a desire to create a back-up layer of contingency. England has been diversified for 65 years, while Sweden is currently diversifying due to climate change concerns. These existing approaches form the starting point and need to be taken into account to provide the contextual understanding necessary for governance changes to be implemented.
- Steering at different levels of government (EU, national, regional/local and trans-boundary) is necessary, but with a clear division of tasks and responsibilities. Besides that, the role of citizens, NGOs and businesses should be considered. Increased experimentation with public-private partnerships is needed to demonstrate the ability and effectiveness of these partnerships within FRM.

Table 6.3 Design principles, success conditions and examples for improving legitimacy (Ek et al. 2016a, b)

Design principles for legitimate flood risk governance	Conditions for success	Good practices
The decision-making process should be characterised by a high degree of public participation, social equity and perceived accessibility	The process demonstrates due concern for matters related to social equity	Mechanisms for “pushing” warnings and “pulling” vulnerable people in advance (England)
	Stakeholder involvement for informed and outcome-oriented contributions to the design and implementation of flood risk management strategies and measures are guaranteed	Community engagement (England)
	Attention is paid to under-represented categories and newcomers, including property developers and institutional investors	Duty to inform (Belgium)
	The process and outcomes of stakeholder engagement are regularly evaluated in order to foster learning and improvement (also in terms of use of resources)	
	Information about the way in which and to what effect resources are spent on the management of flood risk is publicly available	
	The process for decision-making is determined by including: the expected use of stakeholders’ input; plans for mitigating power imbalances between different stakeholder-groups (e.g. experts vs. non-experts) and reducing the risk that the consultation process is taken over by overly loud or over-represented groups	

<p>Mechanisms/arrangements are in place to ensure accountability</p>	<p>Decision-making in FRM is subject to independent reviews and public scrutiny</p>	<p>Independent reviews (England)</p>
<p>Citizens are aware of their rights and responsibilities in connection with the planning and implementation of Flood Risk Management measures.</p>	<p>Decision-makers can be held accountable Citizens are informed of their responsibilities Citizens are informed of how they can carry out their responsibility in practice</p>	<p>Multi-layered safety (Belgium) Duty to inform (Belgium)</p>
<p>The FRGA is characterised as transparent i.e. the decision-making process, outcome and impact of this process are made visible for all stakeholders</p>	<p>All policy and legislation relating to flood risk governance is publically available FRM is subject to public and/or independent inquiries to evaluate its performance</p>	<p>Principle of public access (Sweden)</p>
<p>Mechanisms/arrangements are in place to ensure access and delivery of procedural justice</p>	<p>There are opportunities for stakeholders to challenge decisions made by public authorities and seek justice The process of resolving disputes is considered to be just</p>	<p>Low costs for litigation (Belgium, Sweden, the Netherlands)</p>

- There is a need to develop connectivity between different flood risk management strategies, between governmental levels and between flood-relevant policy domains such as spatial planning and crisis management. A better coordinated and complementary (rather than undermining) suite of strategies will ensure effective flood risk management. This requires different types of bridging mechanisms: coordinating actors; procedural duties and instruments; formal rules and regulations; financial and knowledge resources and bridging concepts.
- Linked to the point above, diversification of flood risk management strategies needs to be accompanied with suitable investments in the development of these strategies. Financial investments and other resources inputted into one strategy should not lead to under-investment in other strategies. Diversification also implies investments in legal frameworks, for instance building requirements in the field of spatial planning or emergency management frameworks.
- Legitimacy is a well-established principle of good governance and seen as essential for effective governance. Establishing legitimacy requires enhancement of public participation in policy making and increased flood awareness of citizens. Greater attention in policies and legislation needs to be paid to how effective participation, rather than consultation, can be delivered.
- Flood risk governance arrangements require long-term planning (visioning) to underscore adaptive approaches and to enable the sustainable use of resources. The short-term measures should be delivered part of this longer-term perspective on flood risk management. Proactive, rather than reactive responses, to flooding are required.
- The Floods Directive has a greater role to play in stimulating the development of appropriate flood risk governance arrangements that increase societal resilience to floods. For instance, for the next implementation round of the FD, a substantive requirement regarding the content of Flood Risk Management Plans should be added to explicitly address the issue of responsibilities of actors. Bridging mechanisms could also to some extent be included in the FD, for instance the duty of property sellers to inform potential buyers of flood risks (as is currently the case in the Flemish Region). Second, it would be worthwhile to critically re-evaluate the content of the FD for enforceability by citizens and to make clear what they can ask for in the courts. Furthermore, the FD should further stimulate trans-boundary flood risk governance.

Overall, our research has shown that there are **no one size fits all solutions**. Besides physical/geographical factors, historical flood risk management, societal and cultural norms, administrative and legal frameworks are all important factors that influence flood risk management and governance. Contextual, historical and contemporary flood risk debates all have implications for how policies and legal frameworks should be shaped and the desirable scope of European policies and funding schemes.

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