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Flood risk management in the Euregio

Guidance for local actors

December 2023

Interreg Euregio Meuse-Rhine Marhetak
EUROPEAN UNION European Regional Development Fund

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Published in the context of the MARHETAK project, with support from Interreg Euregio Meuse-Rhine.

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Table of Contents

Introduction

The floods that struck the Euregio Meuse-Rhine region in July 2021 were a landmark event in terms of their scale, dynamics, number of fatalities and the extent of the damage they caused to infrastructure and intervention resources. Moreover, the scale of the crisis prompted a re-thinking of both local and international support networks, whereby civil society, crisis management actors and water management actors were called on to work together at all levels. The events highlighted the need to bolster the preparedness of our societies for similar disasters, which are only expected to be more frequest in the future (Brajkovic et al., 2023; IPCC, 2022). Going beyond the limits of our planet, and the arrival of the Anthropocene age 1 (Keys et al., 2019; Le Gall et al., 2017; Silva Corrêa & Magnelli, 2020) have the direct and indirect consequences of increasing (unintentional) risks and (intentional and malicious) threats, but also of diminishing the resources of our societies and their capacity to deal with them (Beny et al., 2022; IPCC, 2022; Namdar et al., 2021). When reflecting on how to manage these events, it is therefore crucial to have the wherewithal to deal with crisis situations which, by definition, will take us by surprise.

Even before the events of July 2021, flooding represented the greatest risk to the Euregio Meuse-Rhine. Nevertheless, climatologists estimate that by 2035, we could experience two to three flooding episodes of similar magnitude on our territory to the one of 2021 (Brajkovic et al., 2023).

As the Sendai report states: "Evidence indicates that exposure of persons and assets in all countries has increased faster than vulnerability has decreased, thus generating new risks and a steady rise in disaster-related losses, with a significant economic, social, health, cultural and environmental impact in the short, medium and long term." (United Nations, 2015)

In this context, preventing, preparing for, confronting and learning from crises is crucial to the very survival of our societies. Emergency planning plays an essential role in this regard, and must be seen as an integral part of the operations of our municipalities. Indeed, preparation and planning are an undeniable asset in crisis management, as they enable us to organise our responses and anticipate the challenges and tasks ahead. (Direction de la Défense et de la Sécurité Civiles, n.d.). In this sense, emergency planning must be seen as a process that already represents an objective in itself, and should not be assessed in the light of whether or not a crisis will occur.

Indeed, flood prevention, preparedness and control are mandatory under Directive 2007/60/EC. Among other things, it requires member states to draw up Flood Risk Management Plans (FRMP). In this context, member states have drafted national regulations laying down the obligation to prepare and plan against flooding.

This document has therefore been conceived as a scientific guidance report on flood risk preparedness for local authorities. It falls under the "Maas-Rhein Task Force" (MARHETAK) project, co-financed by the European interregional cooperation program "Interreg Euregio Meuse-Rhine". This programme supports the ambition to bring together the various actors in the Euregio. In the context of this project, the Walloon Region, via the Centre Régional de Crise de Wallonie (Wallonia Regional Crisis Centre - CRC-W), worked with the scientific support of SPIRAL (University of Liège) to develop concrete practical support for municipalities intending to get started on a flood preparedness process.

1 (freely translated) "*The Anthropocene can be regarded as the epoch in Earth's history when human activities are having a significant and global impact on the planetary system. This neologism, derived from the ancient Greek anthropos, "human being", and kainos, "new", was coined in the early 1990s to define the overwhelming effect anthropogenic activities are having on Earth's systems. The idea behind the Anthropocene also suggests irreversibility: the trace of human activities is now inscribed in the geological and climatic history of the planet, and future scientists will be able to date it.* "(Le Gall et al., 2017)

This guidance report is intended as the first step in a project to draft a more practical guide to incorporating flood risk into emergency planning intended for the municipalities of the Euregio Meuse-Rhine. While this version develops ideas that are common to all four regions of the Euregio, it is aimed in the first instance primarily at municipalities in the Walloon Region. Indeed, the benchmarking carried out upstream highlighted the fact that there is too much variation between emergency planning and flood risk management systems between countries in order to put together an overarching guidance report. Referring in equal measure to all four regions would have been at the expense of consistency and focus in the report. An overarching report would have merely reiterated generalities which all actors from the three regions are already familiar with, and would therefore have added no value. The flood risk management system in Wallonia was chosen for this first version of the guidance report, as the research conducted enabled us to gather more information on this region. Moreover, the fact that the regional crisis centre (CRC-W) is spearheading this project means that focusing on the municipalities of the Walloon Region is a more logical choice.

The aim of this report is to prompt reflection by providing advice and tools to local authorities on the existing methods and best practices for addressing flood risk, with an emphasis on involving civil society and stakeholders in flood risk and crisis management. Indeed, the scale of the disaster we experienced in 2021, and the disasters predicted still to come, underline the importance of involving civil society in risk management. The scale of these events far exceeds the capacities of specialist departments to contain the risk and manage the situation.

Nevertheless, this report should not be seen as a comprehensive guide providing an objective vision and a one-size-fits-all approach to planning. Nor does it claim to be exhaustive, given that there are a wide range of different approaches to emergency planning, and that many concepts and practices have yet to be conceptually and practically fleshed out and/or agreed upon across the different regions studied. Rather, the report is intended to offer a set of reflections and practical tools for the different stages of flood risk management. It is therefore aimed at the actors involved in crisis management, water management or any other stakeholder concerned. The aim is to sharpen our reflections, by offering new angles and techniques. For all these reasons, we recommend that you take a critical, contextualised look at the ideas put forward. Given the geography of the territories covered by this guidance report, the target audience is more specifically the municipalities which are confronted with the risks of river flooding and runoff. The risk analysis, and specifically the flood risk analysis (a requirement of the 2007 framework directive on flood risks), has to demonstrate whether the municipality is exposed to this risk.

In general, this report puts forward an integrated approach to flood management intended to minimise the damage (loss of life and livelihoods) caused by floods. We have taken a comprehensive approach to flood risk throughout the risk cycle, emphasising the involvement of a range of institutional and civil society actors, and taking into account the long-term implications for both the territory and the actors involved. This integrated approach to flood management is examined through the prism of emergency planning in the context of this report. Furthermore, this guidance report draws on developments in the research study report (Annex 1) and the Delphi survey (Annex 2). Consequently, various elements addressed in this report refer directly to the more comprehensive ideas put forward in these scientific reports.

Finally, through this report, the project aims to help improve risk culture, in order to enhance the capacity of territories to address the risks of the Anthropocene. In our view, risk culture encompasses a collective awareness of the dangers facing a given territory, and includes the desire to prevent these risks and mitigate the vulnerabilities of the area in question. This concept of risk culture is presented in greater detail in the research report accompanying this guidance document (Annex 1). Based on this idea, the report intends to reconnect crisis and water management actors with civil society, and to reconnect all these actors with the territory where they live. Civil society refers not only to the individuals which make it up, but also the various associative and private entities already playing a role in the region. The challenge of risk culture is to transform these parts of society into veritable actors in risk management, and to raise awareness that they all have useful resources and skills for preventing, preparing for, responding to and recovering from a crisis.

This guidance report on flood risk is based on the risk management cycle. Specifically, the guide is structured around three main phases: pre-crisis, managing the crisis and post-crisis, each subdivided into successive sub-phases. It is important to note, however, that these phases are not in isolation from each other, but rather interwoven, and therefore partly play out concurrently in reality.

Furthermore, it is essential to see emergency planning and risk/crisis management as a cyclical, non-linear process, that falls within an approach of continuous improvement (see below). Each stage of the cycle feeds the next. The cycle therefore does not end with the post-crisis phase, it feeds back again into the pre-crisis phase. The aim of this approach is to make the municipality in question more robust. More information on this subject can also be found in the research report in the first section.

In the context of emergency planning, the “planning” phase consists of an a priori analysis of the planning process that needs to be implemented, before objectives and a timetable are set out. The ‘realisation’ phase involves the actual implementation of the plan according to the timetable and objectives, and is the emergency planning process against floods as such. The ‘verification’ phase consists of checking whether the plan is fit for purpose (based on an emergency exercise or following a real-life situation). Finally, the ‘action’ phase involves grafting the lessons learned from the crisis into the plan.

As mentioned above, this guidance report was developed in parallel with the research report (Annex 1). Nevertheless, in producing this report we focused more specifically on analysing the state of the art of existing emergency planning guides against floods. In effect, the ultimate aim of this study, over and above empowering municipalities in the three provinces to improve their risk culture, is to offer them a concrete guide to bolster their emergency planning against floods. To this end, and to produce this guidance report, we selected, analysed and linked together a multitude of existing emergency planning guides against floods. As regards which data to analyse, we opted for an approach combining searches on Google and Google Scholars using keywords, applying an intensity sampling approach and the ‘snowball’ method (Harsh, 2011). The keywords entered into the search engines were “guidelines”, “guides”, “handbook”, “manual” coupled with the terms “planification d’urgence”, “emergency planning” and “floods”, “flooding”, “inondations”, “crues”. Due to limited time, this summary of the state of the art was never intended to be a systematic review of the literature. The study focused exclusively on guides for municipalities within a specific region, generic and international guides for municipalities, and guides for private companies. The underlying idea was to select guides which incorporated an operational planning aspect. Scientific studies on emergency planning against floods, and manuals on technical measures for flood prevention and protection were therefore not taken into consideration. This approach meant that we were able to collect 30 emergency planning guides, ultimately analysing 25 of them. Annex I presents a benchmark of the emergency planning guides.

Flood risk

Before starting our analysis of the flood risk management cycle, we believe it is crucial to define flood risk and the legal framework associated with managing it.

What is a flood?

Flood risk is all too familiar in the Euregio. However, its different forms and characteristics are still relatively complex and need further clarification. This section is devoted to clarifying the various concepts relating to floods.

A flood can be defined as an overflow of water associated with a lake, river or stream that endangers safety and well-being of individuals and/or damage to public and/or private property. Floods can be caused by natural phenomena (e.g. weather conditions), structural failures (e.g. dams) or human intervention (e.g. diverting a watercourse (Bath & North East Somerset Council, 2012; Zurich Insurance Group, 2022).[2]

In other words, floods occur when the amount of water flowing into an area exceeds the capacity of the system to hold it within its natural limits, when the amount of water arriving on land (from rainfall, snowmelt, surface runoff, runoff into streams or flooding from the sea) exceeds the capacity of the land or drainage system to discharge this water. Floods can happen anywhere, but primarily on land adjacent to waterways (Hegger, 2020; Raadgever & Hegger, 2018).

There are different types of floods. River flooding, floods from runoff, flooding by capillarity, coastal flooding or the breaching, overflow or failure of a dam or dike. Some floods have slow [3]kinetics (slow-onset), while others have rapid kinetics (rapid-onset) [4] (SFG Liège, 2023; United Kingdom Enviornment agency, 2012).

The legal framework

European framework

Flood risk management in Europe is governed by the Floods Directive of 23 October 2007, the objective of which is to "establish a framework for the assessment and management of flood risks, aiming at the reduction of the adverse consequences for human health, the environment, cultural heritage and economic activity associated with floods in the Community" (Directive, 2007). The directive requires states to draw up a flood risk analysis in 3 stages, to be renewed every 6 years.

The first step required by the directive from 2007 is a preliminary flood risk assessment. This assessment is based on past floods in a given area and the risk of similar floods in the future. The second stage consists of flood risk maps, including flood hazard maps for different scenarios. Finally, the third stage consists of 'managing' flood risk by putting in place flood risk management plans (FRMP).

Furthermore, the directive stipulates the administrative division into sub-basins for the purpose of drawing up FRMPs. A sub-basin is a subdivision of a river basin, corresponding to the catchment area of a river. However, although the directive provides for a level of action divided into river basins and sub-basins, it does not require that states have a specific body to implement the objectives of the directive. As we will see, this gives rise to a variety of water management interpretations within the various territories of the Euregio.

In Wallonia, flood risk management is based directly on this legislation. The flood risk management system is presented in the research report. In addition, the Walloon Region adopted a decree on risk and crisis management in 2023, which sets out the Region's different areas of action in risk management, including developing a risk culture (Walloon Region, 2023a, p. 20).

2 Article 2 of the 2007 Flood Management Directive defines a flood as "*the temporary covering by water of land not normally covered by water. This shall include floods from rivers, mountain torrents, Mediterranean ephemeral water courses, and floods from the sea in coastal areas, and may exclude floods from sewerage systems.*"

3 Slow-onset floods are characterised by a rise and fall in water levels ranging from several hours to several days, and a duration under water ranging from several days to several weeks.

4 Rapid-onset floods are characterised by a rise and fall in water levels ranging from ten minutes to several hours, and a duration under water ranging from ten minutes to several hours.

Crisis management

The different regions of the Euregio Meuse-Rhine have their own legal frameworks for emergency planning and crisis management. These specify the actors involved in crisis management, their methods of coordination, and the general procedures and processes for emergency planning and crisis management.

In Belgium, the Royal Decree of 22 May 2019 governs emergency planning and crisis management; in Germany, the "Gesetz über den Brandschutz, die Hilfeleistung und den Katastrophenschutz (BHKG)" from 2015[5] addresses with these matters; while the Netherlands has "Wet veiligheidsregio's (Wvr)"[6] from 2010.

Although distinct, these legal frameworks all specify the coordination between operational and strategic levels, the different stages of emergency planning, the scaling up of crisis management resources according to the scale of the crisis, and the roles of the emergency planning and crisis management actors.

Involvement of civil society and stakeholders

In line with the concept of risk culture, the central assumption is that civil society and stakeholders have deep involvement, intended to reconnect crisis managers with civil society, but also reconnect societies with their territory and the risks and dangers that make it up. Based on the idea that a "co-constructed" project is a "co-supported" project, the challenge is to transform crisis managers and civil society into 'co-managers' of risks and crises, with their own skills and prerogatives, in order to work effectively together and deepen or create solidarity within and between territories.

This report is based on the idea that it is crucial to involve civil society and stakeholders in risk and crisis management, and that the emergency planning process is an effective medium for incorporating them. On the one hand, we see all the components of civil society and other institutional stakeholders behind these concepts of civil society and stakeholders. Our approach therefore calls for the involvement of "ordinary citizens", but also and above all of the various entities representing the public, who already play a societal role and have the capacity for action. On the other hand, our approach also calls for the involvement of private actors, as well as administrative bodies and political authorities. A participatory project cannot be robust and effective without the involvement of political and administrative authorities. The private sector also plays an essential role in the region's productive industry.

While stakeholder involvement remains a challenge in our "specialist" societies, which are still too much governed by a 'silo' mentality, the keys to initiating a cross-cutting mindset among institutional actors are fairly well known in the political-administrative worlds in Belgium. The challenge is of a different order when it comes to involving civil society. In our view, involving civil society should be based on four principles.

Firstly, the involvement of civil society can only be understood through a comprehenisve approach. Every step in the risk management process needs to be considered in terms of this involvement, and the process needs to be built as a continuum, taking into account the entire risk management cycle. In other words, the whole process needs to be built up and adapted to each stage, so that every citizen participation initiative is understood holistically, and so that they fit together.

Secondly, civil society needs to be involved in the emergency planning process against floods as early as possible. Involving civil society right at the end of the process, when the main principles have been laid down and there is little room for manoeuvre, is the same as unilaterally providing information and passing it off as 'participatory'. Taking this approach not only misses out on valuable input from civil society, it is also frustrating for the parties consulted and drives them away. In this respect, sub-standard participation can be worse than no participation at all. We therefore advocate setting up an inclusive framework for project, even if this means devoting a considerable amount of time to the process, in order to make the project more robust.

5 Law on fire protection, assistance and disaster control (BHKG): https://www.lexsoft.de/cgi-bin/lexsoft/justizportal_nrw.cgi?xid=7477744,1

6 Law on the Security Region: https://wetten.overheid.nl/BWBR0027466/2023-06-20

Thirdly, to involve civil society, it is easier to go through intermediary institutions that have the capacity to mobilise these users. In concrete terms, to set up an event involving the general public, it is easier to go via schools, libraries, nursing homes, centres for social action (such as PCSW in Belgium), non-profit associations and private companies, in order to create a leverage effect and mobilise the people attached to these institutions. Involving a wide range of institutions also makes it possible to reach the entire population, and avoid overlooking target groups. Our approach therefore diverges from the conventional vision of 'risk culture', which is aimed primarily at the average citizen as an individual. Our vision of involving civil society is necessarily collective and based on actors already playing a role in managing their region.

Thirdly, another approach is to organise initiatives in the districts that make up the region. Visiting people door to door helps limit the attrition rate that occurs since not everyone is mobile, and not everyone is willing to participate. Moreover, going to a particular neighbourhood makes it possible to address specific risks and vulnerabilities, as well as appropriate protection and prevention measures specific to the area. Finally, it is a good way of reconnecting crisis management authorities and the public by physically bringing them together in the same place. This approach tends to involve residents more effectively, who then feel more implicated.

Fourthly, this involvement must not be a substitute for the competent authorities. The aim is not to scale back the resources of the existing system by subcontracting the responsibility to a cheaper workforce, but rather to strengthen the system through in-depth collaboration between those in the front line of a crisis, and those who are able to resolve it. We strongly believe that certain tasks require psychological and operational preparation, which does not only have to be the prerogative of professionals. This is the case in particular for certain rescue tasks, which require experience, training, an established structure and specific mental preparation.

Developing a comprehensive strategy for involving civil society may seem utopian, for both reasons of value and pragmatism. However, this report is not intended to be irreproachable. Indeed, it considers the various methodological and practical challenges and obstacles this involvement entails. While the involvement of civil society has many advantages, it can also be detrimental in a number of ways. Both of our reports show that involving civil society is a highly complex but essential process, in the context of the Anthropocene and the larger context crises it is leading to. It is precisely for these reasons that all levels of crisis management, starting with the municipalities, need to make substantial investments in this process. Moreover, while this process is by its very nature time-consuming and costly in terms of personnel, it must necessarily be carried out with the support of external actors specialised in civil society participation. To do this, there is support and it is available. For example, there are a number of associations in the region involved in this kind of work. Furthermore, many academics and other specialists in the field both preach and practice citizen participation. What is more, other municipalities are already involved in this process, developing techniques and tools that can be shared and reproduced in other municipal contexts. There are networks for improving the sharing of best practices[7]. Moreover, investing in citizen participation represents an investment in the early stages, aimed precisely at improving crisis management by minimising the increase in crisis management professionals.

Finally, to make this successful, we believe it is crucial that the process of involving civil society is not totally outsourced without any involvement from the municipal administration, as this approach would contradict the very essence of the process, i.e. connecting administrations with the public.

7 The Regional Crisis Centre of the Walloon Region, for example, supports initiatives to involve civil society in risk and crisis management, and organises regular events bringing together actors to develop these projects (Walloon Region, 2023).

Emergency planning framework

Emergency planning is a particularly collective process. Indeed, the primary aim of emergency planning is to bring people together and build a common approach. The importance of emergency planning lies much more in the drafting process than in the plans themselves (Glesner, 2017). The actors involved in an emergency planning process (whether specific to flood risks or not) must necessarily constitute a network of stakeholders organised and involved in the emergency planning process. To achieve this, the roles, missions and working methods must be laid down in advance and accepted by all stakeholders. This report sets out a series of theoretical and practical considerations that offer the keys to establishing a process that must be adapted to the realities of municipalities in terms of human resources and stakeholders. Below are a number of concrete proposals for organising the emergency planning process.

First and foremost, the report advocates appointing an emergency planning manager from within the municipal administration. In Belgium, the planning coordinator seems ideally suited to this role. This person will be responsible for drafting the plan in its entirety. Depending on the size of the municipality, the person may draft the plan on their own, or coordinate the process and the input of other actors. This person will be responsible for ensuring that the planning process is participatory and that the plan takes all aspects into consideration, and for chairing and managing the work of the "planning working group" (see below) conduct planning meetings, draw up the plan, have it validated, and organise associated communication and training. Given the cross-cutting nature of this role, interpersonal skills, openness, curiosity and networking are essential in order to work with all stakeholders in flood management and identify the various chalenges (often difficult to highlight) linked to flood risk.

If the size and resources of the municipality allow, it is advisable to appoint a "planning working group" (PWG) respnosible for emergency planning against flood risks in the municipality. Coordinated by the emergency planning manager, the PWG is made up of a variety of actors with specific emergency planning responsibilities. Its members are primarily drawn from the municipal administration, but may also come from other departments or institutions, depending on local circumstances. In order to cover all the aspects included in the plan, and to be effective and united in view of the uncertainty, we recommend setting up a PWG that is both small and composed of complementary profiles (in terms of skills and vision). Specifically, the PWG must allocate tasks to these members to manage specific aspects of the planning. In particular, there may be a coordinator for recovery, continuity of activity, involvement of civil society or communications, who is responsible for preparing the planning tasks assigned to them. The PWG needs to set out the principles and methodologies underpinning the planning process. Drafting these principles, for example via a charter, makes it possible, firstly, to frame the objectives and working methods, and to adapt the process without straying from the original idea of the project. Drawing up a charter also makes it possible to communicate clearly on the scope of the actions and the roles of each of the stakeholders. Getting all stakeholders to sign the charter will not only prevent some from under-investing or going beyond their prerogatives in the process, but will also ensure that all actors are on board and united behind a clear, transparent project. In this regard, the sense of creating something holistic needed to accomplish such a task will be fostered. The process of drafting these fundamental principles and methodologies must also be done in a participatory way, involving stakeholders in the process as well as the political authorities, in order to increase the engagement of the decision-makers and thus maximise the robustness of the the emergency plan and its prospects of implementation.

Once these principles have been established, it is advisable for the PWG to meet at regular intervals to provide feedback on the progress of each member's work, and to ensure that the various tasks are properly coordinated. These meetings are also an opportunity to brainstorm in groups, in particular to reflect on the planning outside the frameworks, to enhance the knowledge and skills of the actors involved, ensure that the plan is adaptable to unforeseen circumstances, and make the planning process more robust.

In addition to the working group, it may be useful to set up a steering committee made up of experts in the respective fields, as well as political and administrative leaders, if the municipality's resources allow. This committee, which will have to sign the charter of fundamental principles and methodologies (and potentially take part in the drafting process), is responsible for monitoring the project (with varying degrees of intensity, depending on the municipal resources) to ensure that the project (1) stays on track, (2) takes into account the globality of the challenges to

be addressed and (3) can support or guide the work if necessary. This group is larger than the PWG (on the understanding that members of the PWG participate in it) and should meet on a recurring basis, but not too frequently.

The planning process is an opportunity to set up partner networks made up of actors who play a role or are involved in one or more stages of the risk management cycle, and who can offer their opinion, assistance or vision to the process. Like the PWG and the steering committee, we believe it is essential that the planning process has institutionalised bodies. Setting up such a group, backed by a charter signed by all stakeholders, will enhance its long-term prospects and the lasting commitment of all parties. These two elements (charter and institutionalised bodies) offer the necessary foundation to allow the framework and the project to fluctuate in line with contextual developments, without jeopardising its identity and corpus.

Having outlined the framework for our approach, the following sections, which form the main body of this report, set out to develop our reflections on flood risk management by addressing all aspects of the risk management cycle.

1. Pre-crisis

Once the emergency planning framework against floods has been established, the planning working group can start the emergency planning process against floods. To achieve this, the working group will need to plan for all stages of the risk management cycle, bearing in mind the cyclical nature and continuous improvement challenges underlying the cycle.

The risk management cycle is built around three main stages, which can be broken down into several sub-stages. Although the system is cyclical and has no beginning or end, for instructional purposes we propose starting the presentation of the flood risk management process with the 'pre-crisis' phase. This phase also corresponds to the actual emergency planning phase, and more specifically includes the risk identification and analysis phase, as well as the prevention and preparation phase.

This section offers a number of keys and reflections on pre-crisis planning. As mentioned above, the concepts put forward and reflections made should be seen as sources of rumination and inspiration, not as "must-haves" in the planning process.

1.1 Identification of flood risks

The first phase studied is risk identification. This phase is crucial for any municipality to understand its territory and the risks it faces. Indeed, risk identification and understanding are the main priorities of the Sendai Framework on Disaster Risk Reduction (United Nations, 2015). Furthermore, the Royal Decree on emergency planning of 2019 requires the various risk management authorities to draw up a risk analysis for its territory (Government of Belgium, 2019).

As presented in the research report (section 1), a risk must be understood as the result of a vulnerability, hazard, exposure and a response (Simpson et al., 2021). As regards flood risks, the process has been facilitated. However, the consequences of flooding in terms of subsidiary risks should not be overlooked. This stage involves an analysis of the territory of a municipality and its surroundings, taking into account the people who live there. This analysis cannot be performed without involving civil society in the process. Indeed, as well as being an important source of information and knowledge, when civil society is involved in the process, it is made aware of the emergency planning and has a collective stake in the risk and crisis management. In general, it is important to approach this process holistically, taking into consideration all the stages of risk identification and integrating them into a more comprehensive cycle of participatory events involving the public, rescue zones, police zones and private/public companies involved in all aspects of the emergency planning (pre-crisis, crisis management and post-crisis).

Nevertheless, it is important to work out the most suitable methods of participation and risk identification, taking a pragmatic approach. The idea behind risk identification is to develop a comprehensive repertoire of the challenges, i.e. one that is complete and accepted. As with all stages of the process, it is necessary to be open and transparent in the approach, while remaining aware of and communicating the necessary trade-offs.

The various Belgian provinces have developed different approaches to risk analysis. We can only recommend that municipalities adopt the approach advised by the region to which they belong. Nonetheless, in order to provide food for thought and tools for the planning working group, we propose a number of identification keys below.

1.1.1 Identifying hazards and vulnerabilities in the region

Hazard is an element of the concept of risk, representing an unforeseeable adverse event linked to a danger. In the context of flood risk, various different hazards can be identified: mudslides, runoff flooding, flooding caused by overflowing rivers, torrents, capillary flooding and tidal flooding. The risk assessment that a municipality needs to carry out must identify the various hazards possible within its territory.

This inventory is the first phase of the risk assessment, and can be carried out on the basis of available flood [8]hazard maps. Units in the various regions of the Euregio Meuse-Rhine, such as the GISER unit in Wallonia, have expertise in mudflow and runoff [9]risks. To finetune this research, it ts also important to draw on the knowledge of local residents and the history of the municipality, as well as on municipal archives. This source of information, which needs to be weighed against the other available resources, makes it possible, firstly, to identify hazards that are difficult to identify, and secondly to involve civil society in the emergency planning process. This approach is the first step in raising awareness and involving local civil society in risk management.

Different methods available for involving civil society in identifying flood risks	
Neighbourhood meetings with local residents	Makes it possible to visit different areas to gain understanding of the physical hazards present, but is also an opportunity for people who may not want to or cannot travel, to participate.
Focus Group	The focus group is therefore a type of brainstorming session in which several people take part at the same time. The aim of a focus group is to collect data on specific aspects of the interaction between the people who make up the group.
World café	At a World Café, participants analyse an issue by discussing it in small groups at tables, over several consecutive 20-30 minute sessions. Participants change tables after each session to 'cross-fertilize' their discussions with ideas from other tables.
Setting up a transdisciplinary working group of civil society representatives (including people from different sectors and associations).	Setting up transdisciplinary workgroups makes it possible to bring together different actors from civil society and get them to reflect, over the course of several meetings, on a given topic, in order to come up with innovative solutions.
Serious games	A serious game is an activity that combines a 'serious' intention - educational, informative or training - with playful elements. It allows top-down and bottom-up learning, as well as participant involvement.

1.1.2 Identifying vulnerabilities in the region

Analysing hazards makes it possible to list the various challenges in the region. On this basis, the territorial vulnerabilities can also be analysed. In our view, this part of the risk assessment is crucial. Indeed, focusing on hazards puts the accent on disparate elements that are inherent to the region, and over which the actors have few means of action. Moreover, as the limits of the planet are exceeded, hazards, their intensity and the exposure of territories to them are bound to vary over time in potentially sudden and unexpected ways (IPCC, 2022; Keys et al., 2019; Silva Corrêa & Magnelli, 2020). In this context, understanding and acting on our individual and collective vulnerabilities is the first step towards building robust communities.

8 https://geoportail.wallonie.be/walonmap#BBOX=190718.4692406946,200759.4268226098,110893.47035904766,114121.39348156056#SHARE=C3391174C7D33ADBE053D0AFA49D2E1C

9 https://www.giser.be/

To this end, a participatory process will therefore make it possible to determine the vulnerabilities associated with a given region, following on from the process of identifying hazards. This can be organised as an extension to the participatory process of identifying hazards.

The identification of vulnerabilities should focus on three types of elements. Firstly, it is necessary to identify vulnerable infrastructure in the region, with a hierarchy of criticality (SFG Brabant Wallon, 2022, p. 55; SFG Liège, 2023, p. 25). Critical infrastructure in Belgium is governed by a law of 2011 that defines critical infrastructure as infrastructure that is (freely translated)" crucial for our society, and the disruption or destruction of which would have a significant impact on our country and possibly neighbouring countries" (National Crisis Centre, 2023; Glesner, 2017). As regards floodings, it is important to identify water retention or channeling infrastructure (such as temporary immersion zones, embankments, dikes) which can both mitigate floods and exacerbate their impact.

Secondly, it is important to combine this analysis with the identification of inherently more vulnerable populations and areas. Such populations and areas are more at risk and will require special intervention in the event of floods. This is the case in particular in areas where there are people with physical and/or mental conditions (such as nursing homes, sheltered centres, hospitals, prisons, etc.).

Thirdly, the flood response and management infrastructure must be identified. Response infrastructure refers to fire stations, police stations, potential sites for command posts and coordination committees, and assembly and reception areas (SFG Namur, 2022). Identifying these locations will guide the emergency services, crisis managers and the general public on what to do and where to go in the event of floods.

1.1.3 Mapping the collateral or induced risks

The floods we are likely to experience can be characterised as a systemic risk (Hegger, 2020). Rising water levels in a given region entail various different risks in the short, medium and long term. It is essential to carry out a risk analysis in the context of the municipal emergency plan. Although these plans depend in part on the territorial context of the municipality, it is possible to identify generic risks induced by floods in any context. The following table provides a non-exhaustive list.

EXAMPLES OF INDUCED RISKS	
Waste management	Floods carry along huge quantities of waste, which accumulates on the land when the water recedes - (CEPRI, N.D.). This waste is a source of pollution, disease and injury, and slows down the restoration of public services and the life of a municipality. It is therefore essential to think in advance about how the waste will be removed, by whom and how, and where it will be transported (to which disposal sites) (see below).
Economic activity	Many businesses, as well as the infrastructure required for economic activity, such as roads, waterways, engineering structures (bridges, tunnels, traffic lights, etc.) and railways, are all found in flood-prone areas. If these are shut down, there are a range of risks for local residents, workers and the local and/or wider economy.
Water supply and consumption	Floods can hold up food deliveries and impact local agricultural production. They can also affect water quality and make it difficult to distribute water. Health risks linked to contaminated or unavailable food or water may arise. In addition, it is essential to work out in advance the various options for transporting food and drinking water.

Looting of goods	Floods create chaotic situations, by destroying buildings and furniture. This aspect needs to be taken into account in emergency planning and post-flood management, and methods of preventing looting and intercepting looters need to be worked out together with the police.
Traffic capacity	In the acute phase, evacuation routes must be ensured (see below). In the post-crisis phase, communication routes will have to be modified to provide access to all districts. It is therefore important to be able to manage mobility flows in the aftermath of a crisis, to give a hierarchy of access to districts (emergency services, disciplines, local residents, volunteers, volunteer activities, economic activity).
Psychosocial impacts	People may have psychological trauma, and the entire psychosocial care sector may be overwhelmed, with diminished capacity to provide services to the region. It is essential to consider how to provide short, medium and long-term social and psychological support for those affected. These challenges need to be prepared for in collaboration with actors including the AVIQ10, the Red Cross and SPW IAS 11for Wallonia.

The identification of collateral risks in the region must involve a participatory approach, involving stakeholders from within the municipality, the disciplines, other crisis management authorities, the private sector and civil society. Once again, a participatory approach must be put in place.

1.2 Preventing floods

Risk prevention can be defined as all the measures taken in a region to prevent, or if not mitigate, the occurrence and impact of a risk, by working on the various elements of the risk (hazard, vulnerability, exposure, response). Floods are a natural phenomenon for which hazard cannot entirely be eliminated. Nevertheless, humans have had a significant impact on this natural hazard. We can cite man-made landscapes, the intensification and industrialisation of forestry and agriculture, the increasing human habitation of valleys and the exceedance of the limits of the planet by humans. As a result, the present-day flood risk must be seen as a hybrid natural/anthropogenic risk.

With this in mind, the Belgian public authorities and municipal authorities can play an important role in addressing exposure, vulnerability and the response to floods. One important element is the layout of the region. In order to tackle flood risk, the scientific literature details two approaches to flood risk management (Raadgever & Hegger, 2018): defences against flood risk by building infrastructure (dikes, embankments, dams, stormwater basins, etc.) and mitigating flood risk by soil desilting, reducing the intensity of land use and building water retention areas such as temporary immersion zones.

Although these two approaches are not mutually exclusive and can be combined, we advocate for the second one, mitigating flood risk, for several reasons. Firstly, it is more effective in limiting the risk of flooding, thereby combating global warming. Secondly, it brings about a paradigm shift that enables societies to better understand waterways and reconnect with the territory, thereby helping to improve risk culture (and hence preparedness in the face of flood risk). Thirdly, because it is a factor in social revitalisation. In effect, giving space to water often means giving space back to the commons, thereby revitalising the social dimension. Creating permeable spaces or natural water retention areas brings life back into communities and encourages social interaction. Fourth, opting for an approach to mitigating flood risk based on experience is an eminently more holistic approach that tackles the root of the risk, not just

10 Agence wallonne pour une vie de qualité (Walloon Agency for Quality of Life)
11 SPW Interior and Social Action

its manifestation (as opposed to the engineering-based approach to flood risk defences, which is limited to building infrastructure). Fifth, because defence infrastructure (favoured by the flood defence approach), in the context of the Anthropocene, are destined to become obsolete and ineffective due to the exponential evolution of environmental risks. Obsolete or outdated defence infrastructure is an additional risk factor, as its presence makes the downstream territory more vulnerable. This is known as the leverage effect.

At the municipal level, there are several ways in which the municipalities can invest in flood risk prevention. Firstly, it is important to raise awareness of flood risks at the municipal level, among the actors involved in territorial planning and urban development. To achieve this, it is important to encourage interaction and coordination between crisis management actors and territorial and urban planning actors, to ensure that the measures taken and the visions adopted reduce the risk of floods. Secondly, flood defence infrastructure (dams, dikes, embankments, stormwater basins, etc.) are risk prevention factors and potentially additional risks for the municipalities concerned. Municipal crisis managers and emergency planners therefore need to develop interaction and coordination procedures with the managers of this infrastructure. Thirdly, the region's private companies are also factors in flood risk and prevention. In effect, their activities, assets and properties may make the region more or less exposed and vulnerable. Here again, close contacts need to be established between these companies and the municipal emergency planners. Fourth, civil society and local residents have an important role to play more broadly. Indeed, they also play an important role in shaping the region. Investing in a risk culture by raising awareness among civil society of the best practices for increasing soil permeability and retaining water by counteracting runoff also plays a role.

In the wake of the floods in Wallonia in 2021, various interesting ideas have been conceived and put forward. Examples include the multidisciplinary strategic plan for the Vesdre river basin (Teller & Vigano, 2023) and the sustainable (re)development programmes in neighbourhoods (PDDQ in French) (Walloon Region, 2023b), which have been rolled out and seek the resilient redevelopment of the territory. These developments can be a source of inspiration for other regions.

1.3 Preparing for flood risks

By identifying and analysing risks, a municipality can put in place various mechanisms to prepare its response to floods, if they occur. It is important to emphasize that 'being ready' does not mean that a crisis will be averted, but rather that the necessary improvisation tools will be at hand to remain functional in a crisis situation. This phase usually includes the drafting of an emergency plan, which is the focus of this report.

However, beyond this, other mechanisms can be put in place to prepare municipalities and all the actors in the region for when a crisis does arrive. The aim of this section is to look at the preparatory measures that need to be put in place to make a region more robust. Please note that all the points raised in this section (as throughout the report) are not intended to be exhaustive.

1.3.1 Reconnecting crisis managers with the region, and with civil society

In order to enhance the region's preparedness in the event of floods, it is essential to reconnect the various actors impacted by this risk. Nevertheless, the research report (sections 2 and 3) clearly highlights the gulf that currently exists between professional crisis managers and actors from civil society. The former tend to see the latter as risk factors whose actions should be restricted to following up the measures imposed by the professionals.

However, as the research report makes clear, civil society has an abundance of skills, knowledge and capacity for innovation and action. It is crucial for the crisis management actors to make the most of this know-how on the part of civil society. For this to happen, professional risk management actors need to actively involve civil society, and regard them as genuine interlocutors who bring added value to risk management. Involving civil society is a reflex that crisis managers need to develop and act on in order to reconnect civil society to the world of crisis management, thereby transforming it into a fully-fledged player and thereby improving the risk culture in the region.

This reconnection can take the form of organising events in neighbourhoods

and within the region, throughout the flood risk management cycle. Such events are described in detail throughout this report.

1.3.2 Campaign to raise awareness among civil society

The other aspect of reconnecting crisis management professionals with civil society involves sharing and disseminating the know-how of local professionals with civil society, through awareness-raising campaigns. In practice, these two aspects are not necessarily separate. These campaigns have several objectives. Firstl they aim to provide civil society actors with the keys to preparing for and protecting themselves against the risk of flooding, by disseminating risk analysis and communicating on practical actions that citizens can take. Second, they aim to bring people together in communities to prepare for crisis management together and develop common tools and practices for mutual support. Thirdly, a publicity campaign helps to reconnect the local administration and crisis managers with civil society, thereby triggering a process of involvement in the risk management cycle.

These events/awareness and communication campaigns also need to to include physical events, together with communication via various media (free press, social networks) to reach as many people as possible and involve all people redundantly.

1.3.3 Emergency exercises

Emergency exercises are excellent tools for testing the procedures laid down in emergency plans, enhancing knowledge and collaboration between actors, and raising awareness of these risks among civil society. In this sense, exercises are part of the learning, preparation and planning phase.

However, for an exercise to achieve its objective, it is crucial that it is aligned effectively with the needs. There are a wide range of exercises with different objectives. As a general rule, the objectives should be put in place at least after a first version of the plan has been drawn up. They should also be seen as a continuation of the process of involving civil society.

There are various types of emergency exercises:

- Table top: these exercises are carried out in a meeting room using a support. The idea is for (freely translated) “all the partners who are part of a crisis unit to come together around a table. They discuss how they would intervene in a real-life situation.”(NCCN, n.d.a)

- ALEX: these exercises simulate the triggering of a crisis alert system. The aim is not crisis management as such, rather the entire upstream process of communication and alert.

- Command post exercises: These are exercises where “multiple crisis units test the same scenario at the same time, and need to work together with each other.”(NCCN, n.d.a)

- Exercises in the field: During these large-scale exercises, “an emergency situation is re-enacted. All resources and personnel are deployed.”(NCCN, n.d.a)

Organising an emergency exercise takes up time and human resources to varying degrees, depending on the type of exercise carried out. However, all types of exercise are complementary, and the idea is not to perform just one type of exercise, with the risk of having less opportunity to learn and practise the others. In Wallonia, there are various forms of assistance available to municipalities to help them implement these exercises. Certain departments (in Belgium, certain federal departments of the provincial governors) offer ready-made exercises for use by municipalities (eg: CLEX, SFG Liège, 2014 and COMEX, SFG Namur)[12].

Emergency exercises, particularly large-scale exercises and ALEXs, are an excellent way to involve and raise awareness among civil society.

12 The Belgian provinces are also devising table-top exercises intended for various actors. One example is the Province of Liège, which has developed a table top called Cris’Ex Inter.

Training and drills are one of the keys to successful crisis management. To ensure that training is optimal, all the actors implicated in a crisis must be involved. Nevertheless, during a crisis, the public is the first group affected, and the first group involved in civil protection. They therefore need to be involved in the emergency exercises, which must be designed to involve civil society in the most appropriate way possible. As mentioned above, a good way to involve civil society at local level is through existing public or civil society institutions and organisations, including schools, daycare centres, government departments, private companies, libraries, associations, etc.

Developing emergency exercises is a crucial issue that needs to be thought through and planned collectively right from the start of the process. Indeed, to set up an exercise, an "Emergency Exercise Working Group" needs to be put in place, tasked with working out the objectives of the exercise, the parties involved, the format of the exercise (see above), the roles of the various actors (observers, evaluators, director of the exercise (DIREX), any extras, etc. How an emergency planning action plan needs to be assessed and developed must be considered from the outset of the process, with particular attention to implementing hot and cold exercise debriefings, and drafting an action plan.

1.3.4 Serious games

With the aim of raising awareness and expertise in risk and crisis management, serious games are important tools for continuing the process of involving civil society via other media. Compared with emergency exercises, serious games offer a different, more playful approach, which also makes it possible to include other types of actors. As such, they are excellent tools for raising awareness among crisis management stakeholders, local authorities and citizens. They are also ideal for mixing different target groups at the same time, but also for allowing the participants to play different roles. These games enhance mutual knowledge and understanding, and encourage cooperative working. They are also an excellent way of involving civil society in crisis management.

1.3.5 Inventory of resources (material and human)

In order to identify the various challenges within a given region, and to anticipate the different infrastructure that will need to be brought back into service following a crisis, it is essential to have an updated list of actors who can intervene on the ground. This is the case in particular for actors and organisations involved in managing utilities (water, gas, electricity, internet), as well as the list of contact points and partners for various services (water suppliers, cleaning, telecoms, equipment, rehousing, vehicles, boats (SFG Brabant Wallon, 2022)). The inventory can also take into account the intervention resources (material and human resources) available to the municipality and other civil society actors in the region. Listing contacts and keeping the details updated is a participatory process that will become more robust as more people are involved. In this sense, the inventory of resources should also be seen as a tool for involving civil society in crisis management, and helping to improve the risk culture of the region.

A well-maintained inventory of resources is a valuable asset in the event of a crisis. Indeed, a comprehensive and well-maintained inventory will enable crisis managers to contact a range of actors who can provide different services or facilitate access to different resources. However, if incomplete, inaccurate or outdated, it could prove to be an additional source of vulnerability, and managers will lose time and capacity for action.

The process of creating and maintaining this inventory over time is therefore a time-consuming and complex undertaking, requiring a good network of actors to be put in place. To ensure that this inventory is as comprehensive as possible, it is important to establish contacts with the various actors in the region, and to broaden the scope to include the various departments of the municipality or province.

For the process to be sustainable, the system needs to be supported by a close-knit network of actors. It is therefore preferable to start with a relatively limited inventory, but with solid foundations to build on later. At the municipal level, it must be ensured that the expertise required to maintain the inventory is disseminated, so that situations where just one person is entrusted with this task are avoided.

Finally, it might be worth considering compiling the inventory at a supra-municipal level, in order to pool the human resources in setting up the project and benefiting from the more plentiful resources (human and material) in the inventory.

1.3.6 Developing an impact assessment and damage assessment model

An impact assessment and damage assessment model takes the form of a grid, which allows crisis managers to list and classify the various municipal functions and infrastructure impacted by the floods. It also allows crisis and post-crisis managers to understand all the functions performed by a given infrastructure, to estimate as quickly as possible the costs (in terms of time, money and personnel) involved in restoring it, and on this basis to make trade-offs in terms of protection and recovery.

This model therefore needs to be used in the crisis management phase and will be very useful in the post-crisis phase. It needs to be linked to the inventory of resources, with the two mutually providing information. Indeed, setting up such a model sometimes means that contractors and various experts need to be contacted, so they can draw up impact assessments and damage assessments for the infrastructure beforehand, or at the very least to be able to list the contractors and experts who could carry out these tasks in the event of a flood. Devising this model is part of the 'recovery' coordinator's role.

Among other things, the impact assessment model must include the various elements of the region and the emergency services that need to be involved, and where they are located.

By way of illustration, in Belgium, the federal services of the governors of the province of Namur have drawn up a list of elements to be taken into consideration, which can be used as a framework for all municipalities in the Euregio Meuse-Rhine.

- Assessment of the capacity to immediately set up food and water distribution in the disaster areas;
- Assessment of the number of people affected (residents whose homes have been partially or totally flooded and/or destroyed);
- Assessment of the number of people unable to return to their homes;
- Assessment of the number of places available in municipal PIPS reception centres and the catering available and/or required;
- Assessment of the damage to road, technical (communications, water, gas, electricity, drainage) and hydrological (waterways) infrastructure;
- Assessment of the resources (engineering) available and/or required to clean roads and remove logjams;
- Assessment of waste disposal and treatment capacities (cleaning of roads and homes);
- Assessment of the areas/inhabitations that need to be secured and/or cordoned off;
- etc. (SFG Namur, 2022)

Furthermore, the impact of the damage on the municipal functions for each element assessed must be traceable, along with the estimated cost of the damage and the estimated recovery time.

1.3.7 Activity continuity plan

In the context of crisis preparedness, in particular for floods, the Activity Continuity Plan (ACP) is (freely translated) "a crisis management tool that anticipates the damage caused by a flood to equipment or a service, in order to ensure it can still operate, even if impaired". (Etablissement Public Loire, 2018). Applied to floods, the purpose of an ACP is "to set out the strategy and all the measures planned to ensure that an organisation can recover and continue its activities following a disaster or event that seriously disrupts normal operations. (Government of the Grand Duchy of Luxembourg, 2020) Activity continuity planning aims to (freely translated) "define the essential services and actions to be carried out during a crisis [...] to ensure that the public and municipal staff are protected, and to

ensure the continued operation of the municipality's essential services during the crisis".(Government of the Grand Duchy of Luxembourg, 2020)

In this sense, the activity continuity plan is part of a general risk management framework. It therefore needs to be developed in parallel with the municipal emergency and intervention plan. The municipal ACP is essentially an overarching document that applies to different types of risk, depending on the risk assessments carried out by the municipality. Specific scenarios need to be devised for the risks identified as the most significant for the municipality. Flooding, a hazards that affects municipalities, is one of these risks.

In the context of flood preparedness, a municipality needs to be able to determine which essential activities need to be maintained, and which are likely to be affected. It (freely translated) "describes the continuity strategy adopted to deal, in order of priority, with the risks identified and prioritised according to their severity and likelihood of occuring. It sets out this strategy in terms of resources and documented procedures that will serve as references for responding to, restoring, resuming and recovering a predefined level of operation, when this has been interrupted following a major disruption."(Government of the Grand Duchy of Luxembourg, 2020)

Based on the guide for drafting an ACP published by the government of the Grand Duchy of Luxembourg, municipal services can be classified into three categories:

- Category A: Essential services, the continuity of these vital services and missions must be ensured;
- Category B: Important support functions, a short-term interruption or reduced service has no impact on the continuity of essential services;
- Category C: Services and missions deemed non-essential, the activity can be interrupted in the long term in the event of an impaired situation without having an impact on essential services. (Government of the Grand Duchy of Luxembourg, 2020)

Criteria can help determine the appropriate category of municipal services (maintaining public order; how the service is provided in normal times (frequency, etc.); the impact/consequences in the event of interruption of the respective service; interdependencies; human and technical resources required; safety of staff; legal obligations, etc.).

However, in general, two factors need to be taken into account when determining whether a service needs to be covered by the ACP:

- Its vulnerability to a hazard (in this case, floods)
- Whether or not the service is a priority

In addition, human resources management in crisis management requires the following evaluation criteria:

- Possibility of working from home (teleworking);
- Arrangements for getting around;
- Identifying the skills required for priority services and activities;
- Identifying people, their skills and different expertise (with a view to posting them somewhere else);
- The possibility of using external staff, retired officers or volunteers.

Categorising municipal services

Catégorie	Service
A	- Services industriels : Hygiène, Déchets, Energie, Eaux, - Etat civil - Transport public - Eclairage public - Bureau de la Population - Cimetières - Structures d'accueil (Crèches, Maisons relais) et écoles - Administration : o Secrétariat, recette, RH, Informatique, communication, service financier
B	- Véhicules et maintenance - Circulation - Services techniques : bâtiments, maintenance, voie publique - Services sociaux : logements, jeunesse, seniors
C	- Sports, urbanisme, Parcs, Biens, Forêts - Service culturels : théâtres, musées, conservatoire, bibliothèque, centres d'art, et autres - Enseignement musical - Archives

The activity continuity plan requires internal communication and awareness-raising, so that everyone is aware of the implications in the event of a crisis, and is ready to react in the interests of the municipality. It must be conceived as an integral part of the General emergency and intervention plan, and therefore integrated into the planning process and related publicity.

Keeping the plan up to date

Drawing up a municipal emergency plan (PGUI or PPUI in French) is not an end in itself, but the start of an organisation that needs to evolve with the municipality and the changes it will experience. In effect, emergency planning is more of a process than a plan. The final result is therefore only a snapshot, and is subject to change as the circumstances change. The emergency planning managers are therefore responsible for keeping the municipal plans operational, adapting them to take account of changes and new know-how (Wikipedia, n.d.). This adaptation must be preceded by a new participation process with the stakeholders concerned and, depending on the case, may require communication campaigns and/or the involvement of civil society.

However, it is also important not to modify the plans too often, as this could add to the workload unnecessarily and prevent a common foundation, known and tested by all actors, from emerging[13].

2. Crisis management

In theory, crisis management in the context of a flood is the phase that starts after a meteorological and hydrological warning, and ends with the end of the transition phase and the start of the recovery phase. Although all the stages in the risk management cycle are interwoven, we can identify a number of steps and actions that are essential to flood management. Although not exhaustive, this list covers various flood risk management actions.

2.1 Alert and warning

The alert phase marks the transition from the preparedness phase to the crisis management phase. Within the Euregio, the respective regional emergency planning and crisis management legislation classifies alerts and warnings, and sets out the methods of alert and the related consequences. A municipality wanting to draw up procedures for actions and reactions to alerts and warnings for flood risks therefore needs to consult the procedures developed in its region. In Wallonia, this is characterised by various communications and actions that are carried out according to specific procedures.

2.1.1 Rain warning

The rain warning is a weather warning issued by the Royal Meteorological Institute (RMI). Depending on the meteorological models used and the established precipitation thresholds (see below), the RMI determines the alert levels (green, yellow, orange, red) for forthcoming flooding events (rain, storms). Once the alert level has been set, the RMI communicates the alert to the National Crisis Centre (NCCN) and the Regional Crisis Centre, which then disseminate it. The NCCN will then transmit the alert to the Governors, as well as to the various disciplines (D1, D2, D3, PC, Defence, SPW) and to 112 by e-mail, while CRC-W will forward the information to the Governors of the Walloon provinces. (SFG Namur, 2022)

In the event of an orange or red alert by the RMI (storm and/or rain), an expert assessment unit (CELEX) (for the procedure, see below), convened by the CRC-W, will meet by videoconference. At the same time, the provincial governors may decide to launch the procedure for early warning of the public, municipalities and the CC-Prov in the event of orange and red alerts by the RMI (storm and/or rain).

2.1.2 Hydrological alert

At the same time, when a weather alert (yellow, orange, red) is issued by the RMI on the basis of various weather models, the Direction de la Gestion Hydrologique (Hydrological Management Department - DGH) analyses the expected rainfall and measures the potential impact on Wallonia's watercourses according to defined thresholds (water levels), to ascertain whether the prealert or flood alert thresholds will potentially be

13 Regarding the Belgian case, Article 5 of the Royal Decree of 22 May 2019 stipulates that the municipal general emergency plan must necessarily include information on how and when the plans will be updated (Government of Belgium, 2019).

reached in each of Wallonia's sub-basins[14].

Once the analysis has been carried out and the alert level established (flood pre-alert or flood alert), the DGH sends INFOCRUE messages to the CRCW for each sub-basin concerned by a (pre-)alert. The CRCW will then send the INFOCRUE messages to the municipal and provincial authorities concerned by the (pre-)alert by e-mail using the Be Alert service (SFG Liège, 2023; SFG Namur, 2022).

2.1.3 CELEX

Depending on hydrological conditions, the Wallonia Regional Crisis Centre (CRC-W) may call in a special flood expertise unit (CELEX).

Led by the CRC, this unit brings together various actors from the SPW (hydrology, dams and all watercourses), the RMI, emergency zones and provincial technical services. The objective of CELEX is to examine the forecasts of the RMI and INFOCRUE messages in a multidisciplinary approach, to work out the concrete impacts of the weather event on the territories, and to inform the responsible authorities.

The reports drawn up by CELEX are complementary to the RMI alerts and INFOCRUE messages. CRC-W sends these reports by e-mail to the authorities via the Be Alert service, for their information. (SFG Liège, 2023; SFG Namur, 2022)

CELEX meets by videoconference (TEAMS). The mandatory participants are:

- CRC-W;
- The Hydrological Management Department (DGH);
- Regional watercourse managers (SPW MI, SPW ARNE-DCENN);
- Direction des Barrages-Réservoirs (Directorate for Dams and Reservoirs);
- The RMI;

The following are also invited to take part in the evaluation:

- The emergency zone(s) concerned;
- The 2nd category watercourse manager (Provinces).

The CELEX is organised on the basis of an initial round-table discussion, with each participant sharing information based on their expertise.

- The meteorological situation (RMI) and hydrological situation (DGH);
- The situation of watercourse managers (regions and provinces);
- The situation of dams;
- The situation on the ground (emergency zone);
- Actions and recommendations to be included in the report ;
- Planning a new meeting if necessary;
- Sending of the report.

The CELEX report (see report template) is sent by e-mail from the CRC-W on-call service:

- To participants (mandatory and optional);
- To the emergency planning of the governors concerned;
- To the municipalities concerned when a specific risk is identified;

2.1.4 Resource websites

In addition to the alert procedures in force in Belgium, municipalities have direct access to hydrological and meteorological information via various websites:

Weather information	https://www.meteo.be/fr/belgique
Hydrological information	https://www.efas.eu/en https://hydrometrie.wallonie.be https://www.waterinfo.be/

14 Reference site: https://hydrometrie.wallonie.be

2.1.5 Reflection on the involvement of civil society in the alert

Flood detection systems have made great strides in recent decades, both in terms of geographical coverage and forecasting accuracy (both in the hydrographic and meteorological arena). However, a significant number of zones remain unmapped. Moreover, the forecasts remain uncertain in several respects.

It is therefore particularly useful to be able to rely on detection capabilities directly on the ground. In this respect, local residents can be a particularly important source of information, both in terms of anticipating events and monitoring them in real time. More involvement by people living along rivers or in areas subject to regular flooding would mean they were more able to take action and make decisions.

However, involving local communities requires preparation as well as adequate, long-term support. Involving civil society must be a step-by-step process, starting with informing, raising awareness, involving and empowering local residents. This obviously needs to be done on a voluntary basis.

For example, in the Netherlands, farmers have hydrological sensors on their plots, installed by the authorities, and they are required to take readings according to the meteorological hazards and pass on the information to crisis managers.

As one crisis manager explained: “Local residents could play a crucial role in the event of flooding. Indeed, we often have to manage a crisis blindly. We often don’t have a direct view of what’s happening on the ground. Residents could have rain gauges in their gardens. They would have to check them in the event of bad weather, and would be able to alert crisis managers. However, this means training the local residents in question, and building a trusting, long-term relationship with them.”

2.2 Operational coordination

Once the flood alert has been issued, the multidisciplinary response of the emergency services is organised and multidisciplinary coordination is set up. In Belgium, operational coordination is governed by the Royal Decree of 2019 (Government of Belgium, 2019).

The Royal Decree of 2019 defines operational coordination as (freely translated): “the multidisciplinary mission aimed at mitigating the consequences of an emergency situation by organising the various interventions on the ground.” (Government of Belgium, 2019).

The roles and actors involved in these roles are governed by Article 5 and Chapter 5 Section 1 of this Royal Decree, and must be set out in the local General Emergency and Response Plan (PGUI). In general, the operational management of a crisis is organised through the action of the crisis management disciplines[15] and these are coordinated within the operational command post (PC-Ops) (NCCN, n.d.b).

However, floods have a number of specific requirements in terms of operational management. These are listed and documented in various provincial emergency plans, which include specific crisis management organisations.

In particular, the PPUI for floods of the province of Liège stipulates a reorganisation of operational command posts by hydrographic sector. The PPUI for floods of the province of Namur stipulates a reorganisation of operational command posts by zones.

2.3 Strategic coordination

Alongside the multidisciplinary operational response, strategic coordination also needs to be put in place to manage the crisis with an integrated approach. Here again, different regions have developed

15 There are 5 disciplines in total in Belgium. Discipline 1: emergency operations. Discipline 2: medical, health and psychosocial emergencies. Discipline 3: the police in the location of the emergency situation. Discipline 4: logistical support. Discipline 5: information to the public.

different approaches, which are summarised below. In Belgium, the strategic coordination approaches are stipulated in the Royal Decree of 2019 (Government of Belgium, 2019).

As is the case for operational coordination, local strategic coordination is governed by the Royal Decree of 2019, in particular Article 5 and Chapter 5, Section 2.

Depending on the phase triggered (municipal or provincial), the coordination committee may be housed within the municipal crisis centre or the provincial crisis centre. The duties of the municipal crisis unit (known as the municipal coordination committee (CC-Com)) in the event of a municipal phase will be impacted.

These duties in the event of floods must be identified in advance, pursuant to the RD of 2019 and the municipal PGUI. They also need to be designed in close coordination with the provincial level. To this end, various provincial PPUIs set out the duties of the CC-Prov in the event of the provincial phase being triggered for a flood (SFG Brabant Wallon, 2022; SFG Liège, 2023, 2023).

2.3.1 Transition to the crisis management phase

Crisis management is divided into three phases in Belgium, corresponding to three levels of crisis management, each with its own administrative authority. The municipal phase (phase 1) is coordinated by the mayor, who is the administrative authority, the provincial phase is coordinated by the provincial governor, and the national phase is coordinated by the Minister of the Interior. Depending on the extent of the flood, the authority for crisis management may be transferred to other actors at a higher or lower geographical level.

In the event of a flood, multidisciplinary crisis management is often activated at the municipal level, and if the floods affect several municipalities in the same province, management is promoted to the provincial phase. This switch to a new phase means the municipal phase is over and the provincial phase is activated, and this needs to be prepared in advance so that all actors understand the various duties, responsibilities and transitional arrangements incumbent on them. As stated in the PPUI for floods of the province of Liège (freely translated), “If the provincial phase is triggered, the municipal phase is stopped. To ensure continuity of action, the municipal coordination committee is transformed into a municipal crisis unit, and receives the decisions taken by the provincial coordination committee for implementation.” (SFG Liège, 2023)

2.4 Communication between crisis managers

The crisis communication between managers is an important challenge that is often lacking in crisis management in general, meaning that the capacities to respond adequately are reduced. Specifically, as regards flood management, this represents a major challenge, as the communication has to go across a territory that is generally large and diffuse, thereby involving a large number of participants.

In crisis management, particularly in the event of flooding, the various managers communicate with each other via the various channels stipulated in the emergency plans, in particular through the Redundant Communication Plan (PACE in French).

The various communication channels are as follows:

- National safety portal
- Videoconferencing
- Telephone/SMS
- REGETEL network
- Email
- ASTRID Radios
- Instant messaging apps

The different channels are used according to what these systems can or cannot do, and depending on the urgency of the information to be transmitted.

2.5 Elements of direct crisis management

Floods entail very specific risks, which must be anticipated in the context of municipal and provincial PPUIs for floods (Government of Belgium, 2019) and addressed within the framework of single-discipline plans (in particular through PIPS) (FPS Public Health, 2017). Certain actions to protect civil society and property can be anticipated. The following are some of them:

- Sheltering (vertical evacuation)
- Evacuation (horizontal evacuation)
- Requisitioning
- Reception
- Other protection measures

2.5.1 Sheltering

Sheltering, also known as vertical evacuation, is a civil protection measure designed to direct residents to the upper floors of their homes. It can be an effective immediate protection measure when the assessment suggests that leaving the home is more dangerous. (SFG Liège, 2023). The four regions in our study have different regulations governing sheltering.

In Belgium, Art. 182, paragraph 2 of the law on civil security stipulates that (freely translated) “The Minister or his delegate may, in the event of dangerous circumstances, with a view to ensuring the protection of the public, oblige the latter to move away from particularly exposed, endangered or disaster-stricken places or regions, and assign a temporary place of residence to the persons affected by this measure; he may, for the same reason, prohibit any movement on the part of the public. The same power is granted to the mayor. The Royal Decree of 2019 also authorises mayors (in the municipal phase) and governors (in the provincial phase) to issue a vertical evacuation order.

As regards implementation, the PPUI for floods of the provinces of Liège and Namur explain in concrete terms how this decision is taken and the associated communication.

There are three possible scenarios:

1. Depending on the urgency of the situation, the officer in charge of operational coordination or the Dir-PC-Ops is responsible for strategic coordination, as the competent authorities have not yet informed that they have taken over at their level: the officer takes the decision and communicates it to the members of the PC-Ops. In this case, the authorities (mayor or governor) must be informed as soon as possible;

2. The governor or mayor has triggered a phase and is responsible for strategic coordination: after receiving the report from the Dir-PC-Ops, he consults with his coordination committee, then informs the Dir-PC-Ops of his decision, which is communicated to the members of the PC-Ops and, if necessary, to the Dir-Sectors and mayors of the municipalities concerned;

3. The governor relays the strategic decisions of the federal coordination committee during the federal phase: The federal coordination committee takes the decision and informs the Governor, who in turn informs the Dir-PC-Ops, who in turn informs the members of the PC-Ops and, where appropriate, the Dir-Sectors and mayors of the municipalities concerned.

The governor and/or mayor then issue police decrees.

Of course, communicating the measure is crucial in order for it to be successfully implemented. Various channels are used in this regard.

D5 will have a key role to play in communicating the advice. It will use the most effective and rapid communication tools (BE-Alert, social networks, press contact) as a complement the tools/actions of the intervention services (public address, megaphone, door-to-door, etc.).

The public must be informed immediately:

- of the reasons why they have to take shelter;
- of the practical procedures for implementing this measure;
- of additional instructions depending on the danger (vertical evacuation).

The following instructions can be communicated to the individuals concerned (essential):

- The reason for the measure: major flooding likely to affect the ground floor
- Please move to the upper floors of your building
- Take water, food and medicine with you
- Cut off the electricity and gas
- Keep a fully-charged telephone with you to alert the emergency services if you feel you are in danger or if the situation worsens.
- Keep watching the media (radio/television) if possible
- Take identity documents, valuable papers (property deeds, diplomas, notarial deeds; civil status certificates; photos), cash or other means of payment with you.
- Keep pets safe
- Possibly save assets deemed of value, without putting yourself at risk (SFG Namur, 2022)

2.5.2 Evacuation

Evacuation, also called horizontal evacuation, is a public protection measure designed to move people living in a specific area to another geographical zone. Evacuation is an exceptional measure that represents considerable danger both for the people to be evacuated and for the intervening parties. This measure must therefore be subject to a cost-benefit analysis, taking into account the risks involved in moving large numbers of people, and must be considered against other measures to protect the public, such as sheltering. Furthermore, various other aspects need to be taken into consideration.

If the municipal phase has started, in accordance with Article 26 of the Royal Decree of 22 May 2019 and Article 182 para. 2 of the law on civil security (see above), the mayor may issue an evacuation order if evacuating residents is necessary. The same applies to the Governor in the provincial phase.

The mayor can first order this measure orally (it will be enforceable) and then formalise it by issuing a decree.

If sheltering is inadvisable given the circumstances of the emergency, evacuation may be considered. It is then up to the officer in charge of operational coordination (Dir-PC-Ops or Dir-Secteur if sectors have been set up) or the authorities, depending on the assessments made by the experts (CELEX, etc.), to decide whether evacuation is necessary.

Following an on-site risk assessment and multi-disciplinary consultation, the relevant locations or zones are determined, along with the specific safety measures to be taken. (SFG Liège, 2023).

To implement horizontal evacuation, various elements need to be taken into consideration (Etablissement Public Loire, 2018). Firstly, the zones to be evacuated need to be split into sectors, identifying which sectors may be affected and require evacuation, with the municipality then divided into segments (hamlets, neighbourhoods, streets, etc.) and identifying the number of people concerned, as well as vulnerable or non-autonomous population groups. To implement the evacuation, a hierarchy must be defined: the sectors most at risk first, and those least at risk at the end.

Secondly, assembly points must be set up so that people in the sector in question know where to go as soon as they receive the order to evacuate. These assembly points need to be easily identifiable and accessible (including by public transport), so as to minimise any impact on mobility.

Thirdly, in order to be successful, it is crucial to draw up an evacuation route map for each sector, including intersections to be cordoned off, the direction of circulation of the evacuation, assembly points and reception areas. In connection with this, the public transport services need to be contacted in order to organise the evacuation. Moreover, despite the availability of assembly points and collective means of transport, many people naturally tend to organise their own evacuation. Before starting the evacuation, it is therefore essential to have properly marked out the route to be taken. The purpose of this marking is to direct motorists to the correct route, so that traffic flows more smoothly and the road network is not overloaded.

Fourth, an evacuation order (and if the speed of the flood allows, a message to prepare for evacuation) must be broadcast among the public by various means, depending on the possibilities and the actual crisis. These messages must specify the relevant practical details (who, what, why, how, where).

Fifth, the protection of evacuated homes must be organised to prevent any looting.

Finally, depending on the speed of the flood, it is advisable to identify the evacuees and draw up a summary list. This will make it easier to identify people later on. (Etablissement Public Loire, 2018).

Further technical information on evacuation procedures can be found in the provincial PPUI documents issued by the municipalities

2.5.3 Reception of people affected by the disaster

The reception of people affected by the disaster, or displaced individuals (in the case of preventive evacuation) involves assembling these people and setting up reception centres. Assembly and reception is organised by the municipalities, according to their own territorial proceduress (in Belgium, in their PGUI and PIPS).

There are various types of reception sites.

- Assembly points for victims/people affected by the disaster/displaced people: these are places where victims can be assembled in a safe place, so that a roll-call can be taken, and useful information and instructions communicated.
- Primary reception centres: these are the several main centres (such as community halls and sports halls) in your municipality. In accordance with the PIPS, a detailed data sheet must be completed and regularly updated. The number should be limited to make updating data easier. (SFG Liège, 2023).
- Secondary reception **c**entres: these are optional sites (such as a small events venue) that can be used as needed. A summary sheet is sufficient for these centres. (SFG Liège, 2023).
- Accommodation centres: these are centres where people affected by the disaster can be housed for a longer period of time, as a substitute for their damaged home before it is repaired, or before they are permanently rehoused.

The reception of people affected by the disaster requires organisation and logistics to be prepared in advance. In particular, it is crucial to work out in advance the most suitable locations for reception centres, taking into consideration the proximity to the evacuated areas (also to be worked out in advance, see above).

Material and human resources also need to be envisaged for the operation of the reception centres. The administrative dimension (computers, Internet access, action sheet for disaster victims, radio, telephone), the material dimension (chairs, blankets, floor mats, signposting etc.), the human dimension (technical staff from the municipality), the health and social assistance dimension (doctors, nurses, social workers, children's games, etc.), the psychological dimension (confidential or psychological areas, psychologists etc.). Clothing is also a crucial aspect that needs to be anticipated, by contacting with local associations. Grocery supplies are also essential, and it is important to envisage catering capacity, paying particular attention (as is the case with clothing) to young children.

Temporary accommodation in these reception centres is also essential. Disaster victims must be given the opportunity to sleep on camp beds, with as much privacy as possible.

For example, the PPUI of the province of Liège sets out a list of measures to be taken into consideration.

- Ensure an appropriate and reassuring welcome for those involved and their families;
- Conduct a basic registration (including at least the surname, first name, date of birth and nationality, to be supplemented if possible with contact details and home address) of the people present at the reception centre and draw up an attendance list to be completed, if useful, with information on where people are going to if they leave the reception centre - see Annex P5.2.3)
- Inform the people involved and their families;
- Respond to individual/collective needs and requirements and ensure follow-up;
- Provide emotional support;
- Ask for back-up (mo***re manpower) if necessary.*** (SFG Liège, 2023).

2.5.4 Disaster action sheet

In order to meet the needs of the disaster victims, develop a comprehensive approach and respond to requests from non-affected citizens, it is essential for the municipality to keep a register of disaster victims arriving at the reception centre. This will facilitate and organise the support and assistance that can be provided to them, and enable them to keep records so that they can assess the scale of the crisis.

To this end, an action sheet can be drawn up in advance and distributed to disaster victims when they arrive at the reception centre. Among other things, it could include a questionnaire to identify victims and evacuees, key contacts and any special needs.

2.5.5 Requisitioning

Requisitioning is a crisis management tool regularly used in flood situations when the needs exceed the intervention resources, or when available resources are insufficient or not set up to mitigate the crisis. The public authorities in the regions studied have enacted legislation that allows them, under certain conditions, to impose obligations on natural or legal persons, or to allocate to themselves the use or ownership of movable property or the use of immovable property, without the consent of these persons or the holders of this property being required.

Requisitioning is governed by article 181 of the law on civil security (LAW OF 15 MAY 2007 ON CIVIL SECURITY, 2007), under which (freely translated) “the public authority imposes services on natural or legal persons, or allocates to itself the use or ownership of movable property or the use of immovable property, without the consent of such persons or of the holders of such property being required”. (FPS Interior, 2023).

As stipulated in the PPUI for floods of for the province of Liège (SFG Liège, 2023), (freely translated) “requisitioning is a measure carried out without the consent of the persons subject to it, who are obliged to accept under penalty of sanctions. The intervention of a person on a voluntary basis or in the performance of a contract or status does not therefore constitute requisitioning.

The requisitioning mechanism is an important aspect of emergency planning and crisis management, but at the same time it represents a serious infringement of fundamental rights, which therefore requires that the following essential principles are duly observed, applicable to all types of requisitioning.

- By virtue of the principle of legality, the requisitioning must always be authorised by law.
- In accordance with the principle of subsidiarity, the requisitioning must take place in the following order:
  1. Use of public resources (excluding the armed forces): public services (civil protection, fire services, municipal services, specialised public services) and/or specialised private companies with whom public contracts have been signed;
  2. Requisitioning of the armed forces;
  3. Requisitioning of private resources. (SFG Liège, 2023) .

At the provincial and local level, the requisitioning mechanism can be activated by provincial governors (during provincial phases), mayors (within their municipality) and zone commanders (in the emergency zone).

In practical terms, three documents need to be drawn up for the requisitioning:

- The requisition order
- The acknowledgement of receipt of the requisition order
- The receipts for services

More detailed information on the activation of the requisitioning mechanism can be found in various documents referenced here (SFG Brabant Wallon, 2022; SFG Liège, 2023; SFG Namur, 2022; FPS Interior, 2023).

2.5.6 Protection of evacuated zones

Floods can devastate entire neighbourhoods, making them uninhabitable and therefore uninhabited. Nevertheless, many goods and assets remain in situ. These zones are therefore at a higher risk of anti-social behaviour such as looting. It is therefore essential that, as soon as the water recedes, the neighbourhoods are made secure. This must be done in collaboration with and by the police, and must be anticipated during the drafting of the emergency and intervention plan, as well as the mono-disciplinary plan of the police.

Communication and support for civil society

In any type of crisis, civil society is the primary concern of the emergency interventions, but they are also the primary actors in civil protection. It is therefore essential that secure, two-way communication is set up and maintained. Indeed, communication between the crisis management authorities and civil society must be in place throughout the risk management cycle. The aim of the communication must be to ensure a comprehensive process of cooperation and construction. It is intended to connect the crisis managers with the reality on the ground experienced by civil society, to persuade or encourage civil society to take certain actions, and to feed back information and requests from civil society. It is therefore essential to prepare this communication and avoid making it unilateral.

Through this approach, this guidance report calls for an overhaul of the way in which information is communicated to civil society, as set out in the Belgian framework. Our vision calls for setting up a new relationship between civil society and crisis managers, highlighting the fact that civil society is not a grouping of undisciplined actors who simply need to follow instructions, but rather a resource with the ability to detect, alert and take decisive action, that is potentially much more effective than the capacities of the crisis management authorities. Civil society also has the capacity for organisation, mutual aid and innovation that goes far beyond the functioning of crisis management services that are paralysed by red tape. Resourcefulness comes into play at various moments in the crisis management process, and civil society has a big advantage in this respect.

In the event of a flood, the communication begins with the alert phase. This is triggered via institutional channels (see Point 5.1) or from on the ground (via civil society itself). Once the alert has been raised, it must be communicated to all actors in the affected region. This can go through various channels:

- Large-scale alert system (e.g.: Be-Alert
- SMS Alert
- Social media
- Public media
- Sirens
- Door-to-door

These different channels are used depending on the urgency and nature of the flood.

3. Post-flood

As regards floods, the post-crisis phase is critical. Indeed, every flood highlights the inherent vulnerabilities of a region and its relationship with society. In particular, land use, urbanisation, regional planning and mobility, as well as being affected by flooding, can also be a source of flooding, and therefore need to be re-examined when the waters recede. Moreover, “Enhancing disaster preparedness for effective response and to “Build Back Better” in recovery, rehabilitation and reconstruction” , is the 4th priority of the Sendai framework for disaster risk reduction (United Nations, 2015)

By their very nature, floods call into question the ‘normal’ modus operandi of societies up until now. The example of the floods in 2021 revealed the major sources of vulnerability caused by intensive urbanisation of valley floors and plateaus in the Vesdre river basin. In this sense, the post-flood phase represents an opportunity to rethink and redevelop a region stricken by disaster, in order to make it less vulnerable in the event of a new crisis. Moreover, the post-crisis phase calls for a comprehensive approach to various major issues and challenges (energy consumption, ecological responsibility, sustainability, appropriation, uses, etc.). Risk is only one component of the approach. Indeed, the reflection must not be limited to protection alone, we need to integrate various economic and development issues, taking into account the various risks inherent in the region. In other word, adopt a systemic approach to the apparent contradiction of certain issues.

The post-flood phase is also crucial for rebuilding the affected societies. Victims will have been dispossessed of many of their assets, and sometimes even their homes. They will have also experienced trauma, that requires a great deal of psychological treatment in order to recover.

However, although particularly important, this phase is under-invested in the emergency planning legislation of the Euregio Meuse-Rhine. The concepts addressed are not always defined and do not necessarily correspond with each other. For example, even within Belgium, this phase

is called “recovery” and nazorg in Dutch, which can be translated as “post-care” (Government of Belgium, 2019). Moreover, the individual stages containing these phases are not clearly characterised.

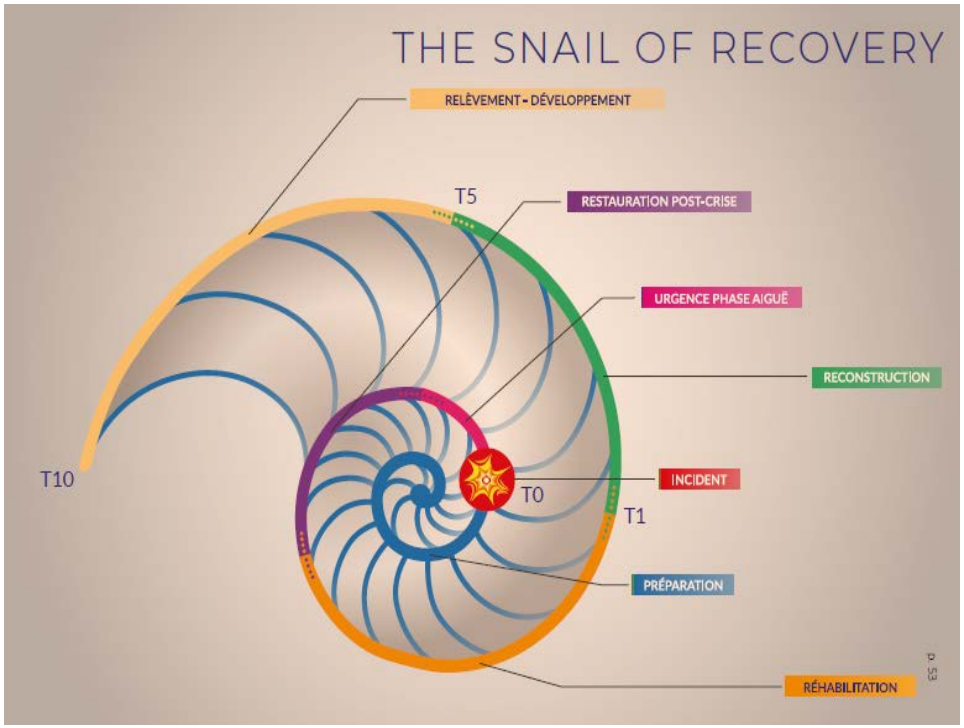
Nevertheless, the post-flood phase implies a collective effort to redefine and rebuild a new normal. This project must be conceived as a democratic process involving all stakeholders (victims, those affected or actors involved in psychosocial and infrastructure reconstruction). The approach must therefore be overarching and comprehensive. The challenge is to redefine the regions and societies that inhabit them by tackling the hazard and the root causes of vulnerabilities, in order to reduce the risks that cause disasters, without amplifying or generating other risks (Moatty et al., 2018).

However (freely translated), “various obstacles systematically stand in the way of the desire of the actors to rebuild differently: 1) the “limited window of opportunity” which in the first months following disaster calls for rapid arbitration and action in a context of uncertainties, 2) the inadequacy of existing procedures that mean that this need for rapidity cannot be managed, nor the need to inscribe the strategies designed during reconstruction in the long time-frame of planning and prevention policies.” (Moatty et al., 2018)[16]

With a view to helping the emergency planning actors clarify their understanding of the phase and the various stages that make it up, this report develops a set of reflections on the post-flood phase[17]. Bear in mind that the breakdown below is merely a proposal to be used as a basis for further reflection on the post-flood phase. It should be approached neither as an exhaustive list nor as gospel, but as a basis for critical reflection on this phase.

In concrete terms, based on the white paper, the report proposes approaching these stages using the “Snail of recovery” model (see Image below). The stages of the Snail of recovery are as follows:

- The emergency,
- The post-crisis restoration,
- The remediation,
- The reconstruction and
- The recovery/development



(Schmitz et al., 2023)

16 In Belgium, on the other hand, this vast and complex task has not been given much attention by the legislator, who, through article 40 of the Royal Decree of 2019, is vague on the matter, leading to various difficulties. In concrete terms, as summarised in the white paper on flooding by the group of experts in 2021 (Schmitz et al., 2023) (freely translated): “The floods of July 2021 highlighted in particular the importance and difficulty of implementing the so-called recovery period. The public has significant expectations in this regard. The difficulty is mainly in the fact that the authorities in charge of crisis management are often not the same as those who have the legal and financial levers to implement the policies needed for recovery.” (p.53).

17 Moreover, in this report, we have opted for the concept of post-flooding, which in our view covers all the events and actions involved in crisis management.

This depiction emphasizes the time-frame of the various successive phases, with the first phases, with more limited duration, still characterised by decisions and actions taken in haste, evolving into phases that span several weeks, months or even years.

3.1 The “recovery coordination”

In the event of a flood, the post-crisis phase will likely be coordinated at a supra-local level. In all cases, however, the municipality will continue to play a crucial role in this aspect. It is therefore essential that the municipalities anticipate and prepare for this phase.

Inspired by the proposal of the white paper, we suggest appointing a ‘recovery’ coordinator in each municipality, who is responsible for preparing and coordinating the recovery.

In the event of a collective emergency and during the acute phase, this person advises the authority on how to anticipate, and helps implement the reflex actions linked to recovery. They will have the possibility of setting up a ‘recovery’ unit (see measure 2) to avoid any discontinuity in decisions during the transition period. (Schmitz et al., 2023, p. 55)

The white paper proposes assigning various tasks to the ‘recovery’ coordinator.

Their main duties are as follows (freely translated):

- “Know the recovery strategy and the action plan to be implemented, inside out;
- Know the methodology and support tools inside out;
- Help local authorities to incorporate recovery into their PGUI [and PPUI];
- Initiate and establish collaboration agreements with previously identified recovery actors and framework contracts to facilitate the implementation of recovery actions, to support the authorities involved;
- Set up the ‘recovery’ unit;
- Coordinate the recovery period within the recovery management committee;
- Work with the ‘recovery’ coordinators in other provinces to provide mutual assistance in times of need, and share lessons and experiences;
- [Carry out impact assessments
- Coordinate the management and sorting of donations
- Manage and coordinate the one-stop shop
- Help draft the Activity Continuity Plan (ACP)
- Coordinate of post-crisis debriefings].
- Help assess the *recovery.”* (Schmitz et al., 2023, p. 56)

The ‘recovery’ coordinator should anticipate the recovery period by setting up a ‘recovery’ unit during the acute phase, in coordination with the administrative and operational authorities, thereby avoiding the risk of discontinuity. In the event of a minor flood, the municipal level may have to take on the role of coordinating the recovery. In this context, the recovery unit can play the role of coordinating all the tasks to be carried out. In the event of larger-scale flooding, coordination will be the responsibility of a higher administrative authority. The recovery coordinator will therefore act as an adviser and facilitator, enabling measures established at a higher level to be implemented at the local level.

Below, we outline a series of tasks that need to be implemented following a flood, whether minor or major. Responsibility for implementation is worked out on a case-by-case basis, but it is crucial that the municipalities are prepared to take part in implementing each of them. These tasks are divided into four main stages, representing the different phases of the post-crisis period, using the “snail recovery” approach (see Supra). Nevertheless, it is important to note that this division is artificial and solely for informative purposes. A clear chronological and thematic separation would be impossible in practice.

3.2 Triggering the post-flood phase

Ascertaining when the post-flood phase starts is a challenge in its own right. At first glance, the Belgian legal framework seems clear in that it establishes the start of the recovery management phase when (freely translated) “the direct or indirect consequences of the emergency situation no longer require multidisciplinary management” (art.35) and the crisis management phase therefore comes to an end (Government of Belgium,

2019). However, this apparent clarity is already vaguer in the context of certain PPUIs. In particular, the PPUI for nuclear risk lays down a transition phase to mark the transition between the acute crisis management phase and the actual reconstruction phase. As regards floods, too, it is tricky to pinpoint the end of the acute flood management phase. Indeed, it is likely that the flooding occurs at different times, depending on the type of flood (slow-onset vs. rapid-onset flood) and the region (enclosed, landlocked). What is more, during the same event, it is likely that the recovery phase is not activated at the same time, depending on the geographical situation, sometimes even within the same municipality. The floods of 2021 highlighted the fact that the phases were launched and ended at different times in different provinces. While some households were draining and cleaning their homes in Wavre, others were still under water in Pepinster. And even within the same municipality, some of the more isolated districts remained inaccessible to emergency services for several days due to the collapse of bridges, as was the case in Trooz for example.

3.3 The Post-flood restoration

Restoration is the first stage in the post-flooding process. Although not defined in the white paper (Schmitz et al., 2023), we understand restoration as all actions aimed at halting the destruction caused by a flood, conserving various damaged elements of the territory, with a view to restoring and directly restoring them. It can be seen as the “reflex phase” of the post-flood period. This phase is always an emergency phase, in which various essential functions can be restored as quickly as possible. The focus is on crucial infrastructure.

3.3.1 Impact assessment, damage assessment and compensation claims

As soon as the water recedes, it is important to evaluate the damage, while prioritising assistance to those stricken by the disaster. This evaluation must be based on an impact assessment (see (SFG Namur, 2022) The impact assessment involves identifying and categorising the damage since the onset of the disaster.

The assessment of the situation on the ground must include (freely translated):

- Assessment of the capacity to immediately set up food and water distribution in the disaster areas;
- Assessment of the number of people affected (residents whose homes have been partially or totally flooded and/or destroyed);
- Assessment of the number of people unable to return to their homes;
- Assessment of the number of places available in municipal PIPS reception centres and the catering available and/or required;
- Assessment of the damage to road, technical (communications, water, gas, electricity, drainage) and hydrological (waterways) infrastructure;
- Assessment of the resources (engineering) available and/or required to clean roads and remove logjams;
- Assessment of waste disposal and treatment capacities (cleaning of roads and homes);
- Assessment of the areas/inhabitations that need to be secured and/or cordoned off;
- etc.” (SFG Namur, 2022)

This initial assessment of the post-crisis situation is forwarded to the CC-Prov by the PC-Ops and the municipal crisis units still in place. The recovery coordinator could fulfil this role within the municipality, with the help of stakeholders, i.e. actors with expertise in these areas. This impact assessment must be carried out on the basis of a pre-established model, which must be validated internally by the municipality prior to the crisis. The stakeholders must also be listed and involved beforehand in drafting the impact assessment document.

The impact assessment framework must be linked to a damage analysis that objectifies the damage caused by flooding. If possible, an estimate of the cost and recovery time should be made. To this end, it is important to be establish contacts with contractors who can carry out various repairs, in advance of the crisis, during the preparation phase (see above). Flood preparedness/impact assessment phase).

In the event of a major crisis, the coordination can take place at the regional level. The post-crisis phase of the floods in Wallonia in 2021 was handled by the regional administrations and coordinated by the Commissariat Spécial à la Reconstruction (Special Commissariat for Reconstruction),

an ad hoc, cross-cutting body that centralises and matches requests to and offers from the service (Commissariat spécial à la Reconstruction, 2022).

3.3.2 The impact assessment and recognition of public disasters in the Walloon region

The impact assessment also helps to characterise the event that has just occurred and, if necessary, request acknowledgement of a public disaster by the Walloon Region. This acknowledgement is granted by the Service Régional des Calamités (Regional Disaster Service - SRC) of the Walloon Region, which is responsible for requests for acknowledgemen submitted by the municipalities, for filing requests to the Walloon Government requesting acknowledgement, and for compensating the victims. Based on Article 3 of the Walloon government decree of 21 July 2016 (Walloon Region, 2016), the Regional Crisis Centre (CRC-W) is responsible, on behalf of the SRC, for producing a detailed technical report on the natural phenomenon observed.

Compensation procedures and the required documents are available at: https://www.wallonie.be/fr/demarches/demander-une-indemnisation-pour-les-personnes-physiques-et-les-personnes-morales-dans-le-cadre-dune-calamite-naturelle-publique

Specifically, each municipality has 21 working days from the day after the event to submit a request to the Administration (in this case, the SRC). The request must be submitted by the local mayor, and must include a full range of information (date(s), location(s), type(s) of event(s), estimated number of victims, etc.).

Once the deadline has passed, the SRC informs the CRC-W of the number of municipalities requesting acknowledgement, and we start collecting information (opinions of the RMI, DGH and DCENN, and the number of interventions by the emergency services concerned).

Once the technical report has been drafted by CRC-W, it is presented and sent to SRC for discussion. If the acknowledgement criteria are met, the SRC submits a note to the Walloon Government (NGW), which then adopts a Walloon Government Decree (AGW) on acknowledgement that finally paves the way for victims of the disaster to receive compensation.

3.3.3 Restoring essential functions and critical infrastructure in the region

The impact assessment and damage assessment should provide an overall picture of the damage caused by the floods. Based on this, the essential functions and critical infrastructure required for the stricken municipality to function properly should be the priority of the intervention. This work also needs to be subject to a trade-off, to determine which critical infrastructure and essential functions are most urgently in need of restoration.

As such, it is necessary to determine which functions and infrastructure are the exclusive or partial responsibility of the municipality, and which not at all, and to develop appropriate strategies. For functions that do not fall within the remit of the municipality, a request for information and follow-up with the actors in charge will have to be made. In the case of functions that are partly the responsibility of the municipality, the latter must act as a stakeholders and co-manage the reconstruction. Depending on the case, the municipality will either be responsible for the coordination or will act as a stakeholder. As regards the functions that are the exclusive responsibility of the municipality, the recovery coordinator will be responsible for overall management and coordination. To this end, a working group comprising the various actors within and outside the municipality will have to be set up.

Based on a list drawn up by the National Crisis Centre (NCCN), critical infrastructure and operators of essential services can be found in the following sectors:

- “Energy: infrastructure for the large-scale production, transport and distribution of energy (electricity and gas). For example, gas pipelines or high-voltage masts.
- Transport: vital hubs for rail, air and water transport.
- Finance: critical links in electronic payments.
- Drinking water: suppliers and distributors of drinking water.
- Digital infrastructure: Internet exchange points and DNS service providers.
- Healthcare: healthcare facilities.

- Electronic communication: national electronic communication links. Within this sector, only critical infrastructure can be identified.
- Space: for the space navigation sector, a European regulation obliges member states to provide appropriate protection and security." (National Crisis Centre, 2023)
- Nuclear.[18]

The status of essential functions and critical infrastructure must be communicated to local civil society and other stakeholders. This communication must be repeated over time at regular intervals, to keep civil society informed of progress on the projects. As such, the groups and individuals in charge of crisis communication need to be kept informed of the progress of the various projects.

3.3.4 Waste management

Waste management is largely absent from Belgium's emergency planning and crisis management legislation.

Waste created by floods represents a risk to the health of people and wildlife in the area, as well as to the functioning of societies (cultural heritage, social relations, economic activities, etc.). Waste management is therefore a major challenge to "protect lives and safety, but also to ensure the economic recovery of the affected community" (Environmental Protection Agency, 2008).

"Flooding carries along very large volumes of a specific kind of waste[19]. In addition to the sheer quantity of waste produced, it is the speed it is generated and the variety of waste that make managing it extremely complex. First of all, the fact that all the waste produced by floods is created in just a few days or even a few hours makes the question of collection, transport and storage particularly complex. Moreover, the enormous variety of waste makes sorting and processing it even more complex. Indeed, in addition to the variety of household waste soiled by water, there is sludge and other natural elements such as branches, cadavers and destroyed infrastructure (for further information, see Tableau de catégories de déchets (CEPRI, N.D., pp.16-17).

This complexity means that "treating it cannot, in general, be carried out in the facilities available within the community. The problem must be envisaged before it arises. For this, consultation procedures must be carried out upstream, in order to plan for these waste streams." (CEPRI, N.D., p. 7)

This phenomenon is exacerbated by the disruption to services and infrastructure caused by the floods themselves. Moreover, the waste itself (by obstructing traffic routes or contaminating intervention sites, for example) is a disruptive factor for rescue and recovery operations.

Faced with this situation, it is essential to work with civil society and the public and private sectors to develop the right responses to reduce the generation of waste during floods. This requires good communication and understanding of the risk and the measures to be taken in the event of an alert. Waste prevention can take place at three levels.

- Prevent waste generation in existing areas, i.e. reduce the amount of waste potentially produced by the territory in its current state of development,
- Limit the development of potential new sources of waste in flood-prone areas or flood impact zones,
- Limit the risk of certain types of generated waste that are particularly problematic, not on account of the quantity, but the hazardous nature. For example, protecting the stocks of hazardous products of a company in a flood-prone area. On the other hand, in terms of the risk to human health and the environment, as well as the appropriate management to be implemented, the expected benefit of preventing this waste from being generated can be substantial. (CEPRI, N.D.)

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18 Nuclear infrastructure and means of transport, or the handling of radioactive elements, can also be considered as critical infrastructure, although it is not included in the legislation on critical infrastructure.

19 In 2002, 270,000 tonnes of waste were generated in Prague, and it took 11 months to dispose of. In Dresden, the waste generated was the equivalent of three years' ordinary waste collection5. During Storm Xynthia in 2010, the waste generated in some municipalities was the equivalent of 12 'normal' years. Estimates for the Val d'Orléans are based on a cumulative total of 6 normal years of work by the Directorate for waste management of the agglomeration of Orléans6. Following the floods of 15 June 2010, the Communauté d'agglomération dracénoise and its service provider managed more than 28,000 tonnes of miscellaneous waste (sludge, "bulky" waste), equivalent to the average tonnage collected in 5 years for this category of waste. (CEPRI, N.D., p. 7)

Following up these different phases is particularly crucial and represents an important challenge, as it makes it possible:

- To accurately ascertain the quantity and nature of the waste to be treated;
- to limit/avoid the mixing of waste categories that should be kept separate;
- to check that all waste is discharged at the right sites and comes from the right geographical area;
- to better control of health and environmental risks;
- to obtain the data needed to carry out an assessment and provide feedback with a view to improving knowledge and practices.

It is therefore essential to determine which actors are responsible for post-flood waste management, and with what tools.

In the case of smaller floods, it is conceivable that the municipality will remain in charge of waste management. This must therefore be envisaged ahead of the crisis by the recovery coordinator and the recovery unit. Getting all actors involved in waste management following a flood to work together to prepare for the management of this waste remains an important challenge (CEPRI, N.D.). As mentioned above, this preparatory work means bringing a large number of actors into a network (from different levels of government, but also from civil society and other private actors) in order to set out a clear vision of the means of collection, sorting and storage available, the actors in charge of these different functions, and how they will intervene.

3.3.5 Organising assistance to the public

In the aftermath of floods, the people affected are confronted with various issues and problems (insurance, housing, clothing, groceries, psychological aspect, etc.). To help them overcome these issues, the municipal administration (in partnership with the other actors in charge of post-flood management, depending on the scale of the disaster) need to organise integrated support for the public.

In terms of post-flood management, we recommend setting up a single point of contact, a one-stop shop, where disaster victims can go to receive the right support for their situation.

This one-stop shop must be seen as an actor at the crossroads of the various actors involved in post-flood support. Using the “Disaster action sheet” (see above) will prove to be very useful in this regard, and will need to be thought through in a coordinated approach.

This support for the public must be put in place as soon as the municipal phase ends, and will evolve throughout the post-flood phases by adapting these tasks and the services provided. To accomplish these tasks, the one-stop shop needs to be cross-cutting and adaptable. The stronger the network, the more efficient the support provided to the disaster victims. The human resources allocated will need to bring together these adaptability and cross-cutting skills, and these skills will need to be maintained over time. To this end, the sharing of files by officers will be crucial.

Here again, setting up the one-stop shop, its operations and the human and material resources allocated to it must be worked out upstream by the recovery unit, and will have to be the subject of a decision in the context of the activity continuity plan.

Ensure grocery supplies for volunteers, intervention actors and disaster victims

During the flood management phase, the supply of groceries to intervention actors and victims is a major challenge. And this challenge does not simply disappear when the water recedes. Indeed, disaster victims often find themselves destitute, unable to cook for themselves due to lack of access to water, electricity and/or gas cuts, or destroyed kitchens. Moreover, the work of the intervention actors sometimes continues weeks or even months after the event. As well as the professionals involved, the floods are also tackled to a large extent by civil society, which mobilises to help those affected and restore the region. Previously sparsely populated villages can find themselves ‘invaded’ by hordes of people.

Providing supplies to these people is crucial, and requires a pre-established organisation, as well as flexibly adapting to the needs of the moment. For example, during the floods in Wallonia in 2021, supplies were delivered to the stricken municipalities in three ways:

- Supplies provided and organised by the municipality through contracts with companies

- Supplies provided by the Ministry of Defence on the basis of an express request from the crisis management authorities.
- Supplies provided by volunteers without any specific request from the crisis management authorities20.

While these various methods are essential to fulfilling this role as effectively as possible, it also requires a capacity for coordination to ensure that meals are correctly distributed and cover all needs.

Another challenge is transporting food for the actors involved in providing supplies, as well as for disaster victims who still have resources and kitchen furniture, but are finding it difficult to source food. These supplies must be provisioned in contact with logistical actors and in collaboration with the actors in charge of providing supplies.

To this end, it is advisable to set up a supply platform built upstream by the recovery unit and managed by the latter in the event of a crisis.

Managing and sorting donations

Once transformed into waste, the movable property and other assets of disaster victims are sorely needed. Solidarity between people, through sent donations, makes it possible to cover different needs, to some extent.

For example, the floods in Wallonia in 2021 generated several thousand tonnes of waste, as well as many tonnes of lost possessions and other furnishings. Managing and sorting donations is a major challenge. It represents an additional workload for administrations that are already under strain. At the same time, it can be a source of frustration for donors and disaster victims alike, if donation are not properly sorted and distributed.

It is therefore essential to prepare for the management and sorting of donations in advance of the crisis. This task also falls to the recovery coordinator and the recovery unit. Donations must be managed in collaboration and via the one-stop-shop, so that requests and offers can be centralised in one place.

Different advice is offered for developing a policy for managing donations. It must be carried out in collaboration with actors from outside the municipality (or taken on by a higher level in the event of a disaster which straddles several municipalities). The collection and sorting of donations. It should encourage monetised donations, as these allow disaster victims to spend the money on what they need. Volunteers can play an important role in managing and sorting donations, given the critical mass effect they can have. Here again, this collaboration must be seen in the context of the work of the coordination and recovery unit. In addition, donations must be conditional on the needs expressed by the disaster victims themselves, or by logistical and psychosocial staff, depending on the situation. Here again, this management needs to be prepared upstream by the recovery coordination team and the recovery unit, bringing together a range of actors to prepare for the coordination and fulfilment of the various roles. Of course, there needs to be room for the network to adapt, so they can deal with situations that are by their very nature unforeseen.

Within the municipality, there are various issues that need to be taken into account and prepared for. Firstly, the method of contact between donors and donation managers (via the one-stop shop) based on a telephone number, website or physical site. Secondly, the means of contact between disaster victims and donation managers, always via the one-stop shop and also on the basis of different mechanisms offering the most suitable model for managing these aspects. It should be noted that for both of these issues, the means of contacting and transferring donations needs to be determined which best correspond to the respective expectations of donors and disaster victims, in order to avoid frustration, creating a sense of shame or the use of this service falling away. Thirdly, the places where donations are collected and sorted must be worked out, to ensure the streams are managed efficiently. This depends on the territory and its mobility network. Fourth, the donation flows must be stricly acocunted for, in order to match supply and demand as efficiently as possible. Fifth, as mentioned above, it is important to connect all these services with the

20 It is worth noting that most of the supplies provided to victims were initially provided by volunteers, demonstrating the capacity of civil society to help each other and react quickly.

one-stop-shop, to centralise and simplify procedures for all actors. This one-stop shop serves as a point of contact and networking for the various actors involved. Finally, human resources are an important consideration. Indeed, in order to manage this entire system, it is crucial to consider all the actors involved in all these tasks, and ensure that there are no human resource 'gaps' that prevent the management and sorting of donations, and to ensure the transfer of the knowledge and skills needed to keep this 'machine' running. To achieve this, sorting and donation management must be developed in collaboration with the activity continuity plan.

Continuity of activities

To ensure that the municipality maintains its activities as effectively as possible, it is important to draw up a activity continuity plan (ACP) and, more generally, work out how to allocate (finite) municipal resources to the reconstruction. The plan must be triggered as soon as a flood occurs, in the crisis management phase, and adapted to changing needs in the post-flood phase.

This activity continuity plan should make it possible to manage the municipal human resources over the long term, and determine which resources need to be allocated to activities deemed essential for reconstruction and performing essential municipal functions. The activity continuity plan will have to take into account developments linked in particular to the one-stop shop and the management and sorting of donations.

This plan therefore needs to be monitored by the general directorate of the municipality, the recovery coordination and the recovery unit.

3.4 The remediation

3.4.1 Support for disaster victims[21]

As regards support for disaster victims in the context of remediation, it is important to set up an integrated one-stop-shop system to help and support disaster victims in their procedures for insurance claims and rehousing. This one-stop shop system can also serve as an entry point for requests and needs from civil society, in particular concerning the management and sorting of donations (see above). It also acts as a platform for the various different actors working in psychosocial support, to meet and coordinate. The challenge is to provide integrated, centralised psychosocial support to disaster victims through continuous, priority contact. As such, good preparation via the recovery coordinator and the recovery unit is essential.

In terms of psychosocial support, various broad themes need to be addressed in order to anticipate flood-related issues with stakeholders. This is the case in particular for the insurance policies of the properties of disaster victims. Indeed, these kinds of crises can be expected to give rise to various insurance-related problems, requiring coordination to facilitate insurance claims and responses. This problem could be addressed by the municipal level, but is also likely to be taken on by higher authorities. It remains essential, however, for the municipalities to continue to play an active role in facilitating insurance procedures for their residents.

Rehousing is another challenge. Many disaster victims may have to move out of their homes for a short or long time. This large-scale and sudden demand for rehousing will put a strain on social services. It is therefore essential to involve these social services, along with the recovery unit and recovery coordinator, and stakeholders (hospitality sector, estate agents, etc.). Solutions will be found at the time, but will have to be reviewed as the context evolves.

21 The legal framework for emergency planning and crisis management in Belgium provides for support in crisis management to disaster victims by Discipline 2, and more specifically by teams coordinated by a psychosocial manager (provincial level) and PIPS manager (municipal level) (art. 10 RD of 2019) (Government of Belgium, 2019). However, once the crisis management phase is over, the role of the PIPS coordination as manager for psychosocial matters will be adapted. Other actors will take on coordinating roles and manage different aspects of psychosocial support.

Psychosocial support for civil society

As mentioned above, psychosocial support is provided for in the respective legislation of the Euregio Meuse-Rhine (in particular, for Belgium, it is governed by the Royal Decree of 2019 (Government of Belgium, 2019)). This support takes various forms. Firstly, it includes basic assistance, through the provision of food, drink, medicine and medical care (apart from emergency care) and accommodation. Secondly, it includes information and follow-up on actions taken during the post-flood period to deal with the situation, things that may have happened to loved ones, and any stress reactions. Thirdly, it provides emotional and social support through listening and acknowledgement processes, with a view to psychological stability. Fourthly, it provides practical help with household management, legal advice, financial assistance and administrative follow-up. Finally, it is also involved in healthcare in the event of any health problems, through prevention, reporting, diagnosis and treatment.

Psychosocial support is organised through the drafting and activation of a Psychosocial Intervention Plan (PIPS) (Royal Decree 2019, art. 10§3) at municipal (but also provincial and federal) level. The Psychosocial Intervention Plan (PIPS) governs the organisation of psychosocial support which is implemented during collective emergencies (FPS Public Health, 2017). It includes basic assistance, information and follow-up on the actions taken post-flood, emotional and social support, practical help, and care for health problems. At local level, the Local Psychosocial Coordinator (PIPS coordinator) is responsible for the local PIPS staff and is the direct link between the municipality and the PIPS. This PIPS coordinator must be based in a local PIPS network, enabling him/her to perform these functions, and collaborate within discipline 2 (medical emergencies) and crisis management.

To implement psychosocial assistance measures at municipal level, the Local Psychosocial Coordinator (PIPS coordinator) is responsible for the local PIPS staff and is the direct link between the municipality and PIPS. This PIPS coordinator must be based in a local PIPS network, enabling him/her to perform these functions, and collaborate within discipline 2 (medical emergencies) and crisis management. The priority actors of the PIPS coordinator will be public authorities such as the AVIQ or SPW IAS, and civil society actors such as the Red Cross, which may be assigned public authority functions. In addition, non-institutionalised civil society, in the form of volunteers, offers excellent potential for psychosocial support. Indeed, the large-scale intervention of volunteers observed in every post-flood situation means that a critical mass of manpower is available to carry out the monumental tasks involved, in particular in terms of psychosocial support. Moreover, support from civil society is, in itself, a comforting factor for disaster victims. The solidarity demonstrated by people helps those who have lost everything to recover both materially and psychologically. It is crucial to capitalise on, promote and support the initiatives emanating directly from civil society, and to see them as invaluable resources.

In this respect, the PIPS coordinator will have a crucial role to play in coordinating institutional actions, and those of civil society, promoting assistance wherever it comes from, and valorising out-of-the-box initiatives, while striving to maintain a comprehensive approach and a common focus for all actors. To achieve this, it is essential to raise awareness among and prepare crisis managers and institutional psychosocial support providers to work collaboratively and adaptively with volunteers, seeing them as assets rather than risk factors.

Long-term guidance and support for volunteers

The work of volunteers is both essential and desirable. The floods of 2021 showed just how important a role solidarity can play. The action of volunteers has a multiplier effect on the reconstruction effort, enabling tasks to be carried out that would otherwise be impossible and time-consuming. Outside the institutional frameworks that are often cumbersome and rarely adapted to chaotic or emergency situations, volunteering also represents a capacity for adaptation and innovation, thereby making it possible to find out-of-the-box solutions to unprecedented problems. Volunteering is also a concrete expression of solidarity within civil society. As such, it is a factor in recovery and reconstruction. The initiatives to help neighbors generate positive feelings and comfort within civil society.

Nevertheless, the post-crisis reconstruction also requires a well-established organisation with well-defined tasks and tried-and-tested collaborations. The actors on the ground highlight the need to set up a highly-structured, military approach to reconstruction, so that reconstruction tasks can be carried out in a coordinated and efficient way.

But these two aspects appear to be partially at odds with each other. Indeed, how can volunteering be organised militarily, whhen by its very nature it is spontaneous and unregulated? To overcome this potential inconsistency, we promote a flexible, integrative approach to volunteering. To achieve this objective, we believe it is necessary to create a network of actors upstream of the crisis, and to establish the various responsibilities and tasks to be carried out post-flood, as well as the guiding principles for post-flood coordination. This will require setting up a network of actors in charge of the post-flood phase, coordinated by the recovery coordinator and the recovery unit.

The institutional actors in the psychosocial field must be involved (see above), as well as the actors involved in discipline 4, logistics (civil protection, emergency zones, Defence, etc.)[22]. It is also essential to involve civil society in discussions about its role in the post-flood period. While these issues need to be addressed at a supra-municipal level, it is also crucial for municipalities to take up the challenge and develop a participative approach to post-flood management, rather than confining the work to institutional actors. In concrete terms, the private companies that could play a role in reconstruction, as well as citizens' associations and other stakeholders identified on a case-by-case basis, will have to be involved in the process, not just as the recipients of the decisions taken, but as actors with the power to make proposals and a role in the process. This process also has the advantage of mobilising civil society upstream, reconnecting it with the territory and its risks, as well as with institutional actors, thereby reducing the distance (or even suspicion) often observed between crisis management actors and civil society. If implemented properly, this will increase volunteer involvement in crisis management. To this end, there are various citizen participation methods, and these can be mobilised.

From the outset, citizen action can take many forms in the post-flood phase. These include psychological and social assistance, reconstruction work, environmental restoration, remediation of public and private sites, catering, management, sorting and dispatch of donations, and communication. All these measures were successfully implemented during the floods of July 2021.

However, even if our guidance report advocates strong public involvement throughout risk and crisis management, it is essential to highlight the fact that most people are not psychologically prepared to deal with emergency situations where stress and terror can be in evidence. Scientific studies have shown that post-crisis volunteers suffer more trauma than professional workers [23] (Steward et al., 2004). It is therefore necessary, firstly, to work upstream with civil society to familiarise them with the challenges of crises, so that they can better understand the consequences of disasters. Furthermore, it is advisable to consider in advance with the intervention actors which roles civil society is best placed to handle, in order to provide the most effective help while avoiding traumatising whole groups of volunteers.

Psychological repair phase for actors

Floods are always traumatic events in many ways. Moreover, flood management requires everyone involved (intervention actors and victims) to put their heart and soul into rescue, recovery and/or restoration. During this phase, people may experience a state of shock, combined with overwork. The negative effects of these phenomema are not always felt once the water recedes, but can become apparent once the first necessary interventions have been made.

In addition to psychosocial support, it is important to set up ad hoc venting measures with the various actors involved. These can take the form of emotional venting debriefings for the intervention actors of the emergency services, volunteers, members of municipal administrations and other levels, and civil society and other stakeholders (Glesner et al., 2018). The aim of these meetings is to give a voice to the various actors, without seeking to draw lessons, or identify causes or culprits. Debriefings are an interpersonal process during which the actors share their feelings and perspectives on the crisis (freely translated): "debriefings are more a gathering of intervention actors who share their experiences and feelings a posteriori about how the crisis unfolded."; (Interview with a crisis actor from the province of Liège). Contrary to feedback on their experiences

22 At the municipal level in Belgium, the key actors in this network must be the PIPS coordinator, the head of the works department and the general directorate of the municipality.

23 For example, one study showed that 46% of the volunteers who responded to the crash involving Swissair Flight 111 in 1998 developed post-traumatic symptoms.

(see below) and although debriefings are intended, among other things, to improve intervention within small units, they are not intended as a means of vertical [24]learning or something to commit to memory.

In post-crisis management, at least two types of debriefing can be envisaged. Mono-disciplinary and multi-disciplinary debriefings. Mono-disciplinary debriefings take place within a department or organisation, and bring together colleagues who have been involved in crisis management together, fulfilling related functions and/or working under the same management (e.g. debriefings between firefighters from the same fire brigade, or between civil servants from a municipal administration). In contrast, multi-disciplinary debriefings bring together people from different disciplines or departments who have been involved in the multi-disciplinary management of the same crisis[25].

The municipalities are priority actors when it comes to organising mono-disciplinary and multi-disciplinary debriefings. Despite the continuing urgency of post-flood management, it is crucial that the municipalities give their civil servants the opportunity to perform a mono-disciplinary debriefing internally. To improve coordination, smooth out potential tensions and allow actors to create an overview of crisis management, it is also important to organise multi-disciplinary debriefings with actors from other disciplines who have managed the crisis. The municipality, via its mayor, is in fact the director of the municipal crisis unit, which justifies his or her ability to organise these debriefings. The organisation of these debriefings can be coordinated by the recovery coordinator.

To avoid any tension, misunderstanding or too much stress, these debriefings should be organised as soon as possible after the crisis is over. Working out the timing of the debriefing is particularly complex in the case of floods, as the end of the crisis is rather vague in terms of time, and can vary depending on the actors involved. The debriefings will take various forms depending on the target group, and should be moderated by neutral, external actors.

For all these reasons, the municipality needs to devise a framework for debriefings in the context of the work of the recovery unit. This framework needs to be developed with a trans-disciplinary approach with intervention services involved in other disciplines, to bring on board all the actors involved, but also to receive support in organising them when necessary.

3.5 Reconstruction

3.5.1 3.5.1 Support for rehousing

Floods have a potentially significant and long-term impact on the homes of the people affected, sometimes preventing them from returning to their homes for months, years or even at all. Moreover, emergency housing is not a permanent solution for these people, who need to find temporary or permanent housing as quickly as possible. The municipal authorities are also called upon to find solutions for all disaster victims living in the municipality. Obviously, the municipalities are not alone in this and will find support from regional and federal authorities. It is important for the recovery coordination and the recovery unit to establish prior contact with the public planning and urban development authorities, to identify solutions to be taken in the event of floods.

During the floods of 2021, the municipalities took steps to provide conventional housing and build light accommodation. To achieve this, many of them had set up special rehousing units (Commissariat spécial à la Reconstruction, 2022). Once again, it is important that disaster victims' requests for rehousing should initially go through the one-stop-shop, so there is a clear, integrated approach to these requests and offers of housing.

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24 Vertical learning is defined in contrast to horizontal learning. The Larousse dictionary defines learning in various ways: as (freely translated) "*initiation by experience into an activity, a reality*"; and as "*all the processes of memorisation used by animals or humans to develop or modify specific behavioural patterns under the influence of their environment and experience*". From these definitions, at least two learning modes can be inferred. The first refers to learning through experience and how a situation is perceived. This includes both personal and shared experience. We will refer to this as horizontal learning. The second definition, while including horizontal learning, opens the field to learning via a process or document. This allows a more comprehensive learning process involving a larger number of actors. This learning will be referred to as vertical learning (Glesner et al., 2018).

25 In Wallonia, psychological support for intervention actors (members of disciplines) can be provided by the "Appui Psychologique aux intervenants" (Psychological support for Intervention actors - API) network set up by the Province of Liège in the context of its mission to support and develop the training of security and emergency service agents. The network, which is mainly active in the fire departments and police zones of the province, aims to train resource staff who will be responsible for providing psychological support to safety and emergency personnel during crisis events.

3.5.2 Restoring visibility on timing and direction

As the post-flood intervention measures evolve over time, it is important to redefine the objectives and issues to be taken into consideration. Indeed, new elements will emerge that will prompt a re-examination of the missions, objectives and strategies. This is a complicated exercise to undertake, given the urgency of the situation and the fact that many actors are hard at work.

Nevertheless, it is important to set up a strategic unit with a comprehensive vision of the present and future challenges. The recovery unit can play this role. In order to adapt the post-flood strategies to the context, it is important to set up a comprehensive approach, by pooling and coordinating the actors involved. Involving post-flood stakeholders in this process, through regular meetings, for example, helps to clarify the issues at stake and to determine, in a collegial and coordinated way, the strategies to be adopted, as well as the division of tasks and related communication. In effect, restoring visibility on timing and direction is important. If actors are left in the dark, they will not be on board, and will oppose any changes or measures taken.

3.5.3 Restoring infrastructure and functions

The post-crisis restoration phase directly following the acute crisis management phase includes measures to restore essential functions and critical infrastructure. However, these measures are only taken with the aim of getting the functions needed to get life in society up and running as quickly as possible. These reconstructions are sometimes temporary, and are not intended to call into question the fundamentals on which these functions and infrastructures are based. In addition, they are carried out on the basis of impact assessment and prioritisation according to their importance. This means that various critical infrastructure and essential functions will remain out of action for some time to come.

The challenge of this phase is to get the community, the region and its society back on track. It therefore represents an opportunity to redefine the foundations on which society is based. Indeed, when a crisis occurs, it highlights various vulnerabilities that add to the danger for these municipalities. Crises therefore represent an opportunity to redefine society in order to reduce its vulnerabilities, but also to develop positive practices to retransform it. In particular, flooding is an opportunity to reflect on the municipality's relationship with its waterways, its mobility, social life, public spaces and so on.

The process of restoring infrastructure and functions is therefore particularly important. It must be developed with a comprehensive, integrated vision that makes it possible to grasp the interwoven relationships that these societies form. It is therefore important that these policies are taken carefully, to ensure that reconstruction is not organised haphazardly. However, it is also important not to waste time and leave infrastructure and functions as they are without any action being taken.

As such, it is important that the process of redefining municipal normality, which underpins the remediation of infrastructure and functions, is both organised (and therefore prepared) and participatory. Indeed, given that these functions and infrastructure impact and serve the community, it is important that the latter is involved. In addition to being participatory, the process of redefining normality must be clarified. In other words, it must take into account the systems and the overarching nature of the challenges. The process of involving civil society, as advocated by this report, also makes it possible to develop the participatory framework within which this collective redefinition of a new normal can take place.

3.6 Recovery/development

3.6.1 Learning

Although they have things in common, every flood is a unique event that brings its own challenges, and therefore represents a potential learning curve for making a system more robust. Managing such an event inevitably brings to light various sore points, unforeseen elements and shortcomings that need to be taken into consideration as lessons to improve future crisis preparation and prevention. Risk management is cyclical in that one event is always the source of learning for future events.

Currently, however, it is all too often the case that there is no record of previous crises, and no lessons to be learned from them. The analyses of crises remains too anecdotal, limited to the actors directly involved. The

crisis actors in the province of Liège readily point to this shortcoming. Moreover, the little that is documented is neither filed nor stored, and so gets lost: “the problem is that everything is spoken, we discuss things, but don’t write much down. Crisis actors don’t write much down”. (Interview with a crisis actor from the province of Liège). This lack of lessons learned is explained by a lack of learning culture. A learning culture can be characterised as (freely translated) “the set of values, interpretations, experiences and behaviors shared and learned within one or more groups of actors oriented towards learning and questioning”. There are several reasons for this lack of learning culture. The first is a reluctance to disclose information, engendered by the fear of legal repercussions based on information collected in crisis analysis documents. The same applies to disciplinary and political sanctions.” (Glesner et al., 2018).

Feedback methods (RETEX) enable us to learn from experience and share it with other actors, while avoiding the search for culpability. RETEX is one of a number of crisis learning techniques, including judicial inquiries, parliamentary investigations and external studies. However, they offer the dual advantage of involving stakeholders and giving them a voice, while avoiding the ‘witch-hunts’ resulting from the judicialisation of risk management. We will therefore take a closer look at this method.

RETEX can be defined as an overarching didactic process mobilising various methods and tools (potentially debriefings) as resources. The aim is to draw lessons from previous crises in order to promote learning and thereby improve preparedness for future crises, and therefore has a dual “a posteriori” and “a priori” nature. Indeed, analysis of previous crises is, in their view, always future-oriented, with the aim of changing behaviour. According to this vision, debriefings are complementary and integrated into feedback processes: I would say that feedback can be seen as a book, and debriefings as one of its chapters. (Interview with a crisis actor from the province of Liège).

Unlike a survey or evaluation, RETEXs do not aim to pass judgment on operations and actions, but focus on the lessons learned and best practices to be drawn from them.

In practical terms, feedback should be seen as a process that brings together all the actors involved, as well as a written document for educational purposes. Secondly, the scope, nature and objectives of the feedback process must be adapted to the scale and learning potential of the crisis being examined. In addition, bringing together the factual elements based on raw and primary information must be prioritised. This element reflects the idea, implicit or explicit, that bringing together different actors with different missions and cultures who have participated in crisis management in different places (hierarchical and spatial), necessarily produces a wide variety of visions and interpretations.

Recorded radio networks and log books are used. Thanks to this, we can have a slightly lighter assessment, since we’re no longer basing ourselves on observations that people have written or said with their own perceptions. (Interview with a crisis actor from the province of Liège).

Producing a common RETEX that brings together crisis actors around a common story must be based on the most common factual basis possible.

In the context of a flood, an event which by its very nature involves a wide variety of non-institutional actors, in particular from civil society, it is crucial to involve them in the process in the same way as the other actors. Giving a voice to the local population, disaster victims, volunteers and other civil society actors is necessary for at least three reasons. Firstly, it makes it possible to highlight information that is potentially unknown to the intervention actors. Secondly, it gives a voice to the people who have made a major contribution to crisis management, and in so doing correctly valorises their contribution. Thirdly, it brings civil society into the risk management cycle, thereby improving the risk culture.

Drafting a RETEX report is a time-consuming process, requiring expertise and an outsider’s view of the events studied. It is therefore advisable to assign the task of drafting a RETEX to a group of specialists at the request of the municipality, or in the context of a wider process depending on the scale of the crisis. In this context, the municipality and the actors who managed the crisis are merely partners in the process, who are solicited by the RETEX team. A detailed framework for action is proposed in (Glesner et al., 2018).

3.6.2 Translating the lessons learned

On the basis of the various learning reports produced in the wake of the events, and on the basis of the more contextual learning developed in a mono-disciplinary or multi-disciplinary way, a set of lessons emerges that can be used by the actors concerned to improve the identification, prevention and preparation for future risks.

The next step is to produce lessons learned and translate them into the emergency planning process. The municipalities, through their planning coordinators, will be responsible for adapting the plans through an integrative planning process. Indeed, it seems crucial to establish a process that involves all risk and crisis management stakeholders, including the public, to re-identify the hazards, exposures and vulnerabilities of the region, to adapt the prevention to new risks and to review preparedness measures for new risks.

Integrating the different stakeholders is essential for several reasons. Firstly, it raises awareness of the new risks facing the region. Secondly, it makes it possible to construct a collegial planning process and make the territory more robust. Involving civil society and other stakeholders (including the general public) leads to solutions that are known and accepted by all. Thirdly, it makes it possible to forge relationships with partners and to divide up the tasks of identification, prevention, preparation and planning, thereby developing an integrated approach with all stakeholders and reducing the burden on the local planning coordinator.

Involving stakeholders and citizen participation in the risk management cycle represents a major challenge. Throughout this guidance report for emergency planning, we have emphasised the need to take a participatory approach. This approach demands considerable preparation and methodological tools. It is therefore necessary for the whole municipality to develop such an approach.

3.6.3 Commemoration of events

The commemoration of events takes place in the context of collective recovery and development. These events provide an opportunity to pay tribute to potential victims, and in any case to those affected by the disaster. They are an opportunity to bring together a large number of people from all walks of life to reflect and share in a significant event.

Commemorations represent a pause in the grueling post-flood management process, during which all stakeholders can come together, take time out, and take stock of the events and their interventions over the preceding weeks.

They also provide an opportunity for the collective committing to memory of the events, thereby contributing to the learning and development of a risk culture among all the actors involved.

They can be associated with the inauguration of memorials (works by others, steles or flood markers) which help both to pay tribute to the victims and to raise awareness among civil society of the risks.

In any case, the commemorations must be carried out in collaboration with, and in the presence of, the people affected by the floods. Limiting the commemorations to events attended by political and administrative authorities prevents people from rebuilding their lives, and can create a feeling of resentment.

The timing of the commemorations is also critical. Indeed, while they help people remember the dramatic events of a region, they also have the effect of turning the page on events and orienting the stricken region towards the future. Nevertheless, while the wounds and traumas of the public are always alive during commemorations, these can lead to the traumas of entire populations being forgotten and repressed, aggravating these wounds and excluding the people already marginalised by the events. A commemoration must therefore be prepared with and for the victims.

4. Civil society: an actor in flood risk and crisis management

Through this report, we have made the involvement of civil society throughout the flood risk management cycle a cornerstone. The aim is to integrate the local population as civil protection actors with their own roles, participating in planning and having actual power to propose, decide and implement. The challenge is to create structures that allow coordination and collaboration with professional crisis management actors.

In the final analysis, the approach promoted amounts to establishing civil society as a fully-fledged player in crisis management, both institutionally and in practice. The underlying assumption can be broken down into two elements: firstly, the public is the beneficiary of crisis management, ras they are the first actors to be safeguarded in the event of a crisis, and secondly, they are the first to be present on site in the event of a crisis. Secondly, the fact that the limits of the planet are being exceeded increases the intensity and frequency of disasters beyond the capacities of specialised services. Involving civil society is therefore both desirable and necessary.

Another way of reducing exposure and vulnerability to flood risks is to prepare people at household level for flood risk management. In parallel to their involvement in the overall flood risk management process, the public can participate in the risk management cycle by protecting themselves, preparing for and reacting to floods at their own level.

To this end, this section sets out a series of tools that can be made available to the public, to support them in their actions in the face of flood risks.

4.1 What risks am I exposed to?

As with the overall planning process, the first challenge for residents will be to determine the risks to which they are exposed. To this end, a range of websites and other resources can be used. The following is one example:

- https://inondations.wallonie.be/home/urbanisme/cartes-inondations/carte-alea-inondation.html

- Municipal PGUI and PPUI

When it comes to flood risk, it is important to find out what the likely flood risk is in your region. Depending on the location and type of flooding, plan your evacuation, sheltering or relocation to higher ground nearby.

4.2 Prevention

On the basis of this risk identification, residents may need to implement risk protection measures. When is comes to flooding, measures to reduce exposure and vulnerability can be envisaged.

If you live in a flood hazard zone, reducing exposure to flood risk is obviously more complex, since you have little control over the hazard itself. However, for new constructions (if you are allowed to build in a flood hazard zone), you can situate your house away from the water by building your second floor above the reference level shown on the flood hazard maps or in your local PGUI.

In addition to reducing exposure, reducing vulnerability must meet three objectives (freely translated):

- “Protecting people, i.e. guaranteeing safety in the dwelling while making evacuation possible.
- Make sure rapid resumption of daily activities is possible, while ensuring the security of systems and health safety.
- Protect property and limit damage to minimise restoration work and reduce the generation of waste.” (GEIDE, 2013)

It is possible to carry out a diagnosis of the vulnerability of your home to flooding. Some municipalities offer free diagnostics. It is also possible to carry out a self-assessment based on guides (for example: www.ecologie.gouv.fr/sites/default/files/livret%20auto%20evaluation%202021-3.pdf) (Préfet de la zone de défense et de sécurité sud & Cyprès, 2019)

In general, various sources of information list different measures for reducing vulnerabilities:

- secure the electrical circuit, by isolating the network in rooms subject to flooding from that in other rooms, by placing electrical equipment above the floodable level, and by favouring high sockets wherever possible;
- store pollutants at height, to prevent them dispersing in a flood (oil,

petrol, etc.);
- install a system to temporarily block lower vents in the event of an alarm, to prevent water infiltration. These vents should be reopened after a flood, to refresh the air and dry things out;
- create an elevated shelter area, accessible from the inside and with an escape hatch (through a skylight, balcony, etc.) when the rescue services arrive. Place the 72H emergency kit here;
- mark out swimming pools or basins so that they can be seen even during flooding, when the water is cloudy (to prevent rescue workers from drowning, sufficiently high markers at the 4 corners of the pool);
- install cofferdams (panels or removable structures) on doors to limit the entry of water and mud into the house (max. height 80 cm to avoid excessive pressure on the dwelling);
- install a submersible pump in basement (or, if not submersible, above flood level), connected to a secure power source, to pump out water more quickly after the flood;
- install non-return valves on the wastewater network, to prevent wastewater from flowing back into the home (if the sewage system is saturated, water can flow back up to the WC and sink);
- secure tanks (gas or fuel oil) and seal them to prevent them from being swept away or polluting the environment;
- replace floor coverings and woodwork with materials that are less sensitive to water (tiles or stone, not parquet or carpet; PVC doors, not wood);
- Install heating systems at height (e.g. heat pumps, boilers) or install them in a non-floodable room, to ensure they remain operational during and after flooding. (Géorisques. n.d.).

In addition, you are strongly recommended to take out an insurance policy that provides optimum coverage against flooding.

4.3 Putting in place a family emergency plan against floods

As well as protecting themselves against flooding, it is essential that residents of flood-prone areas are able to prepare for and cope with any floods. To this end, there are various websites to help individuals draft an emergency plan for themselves and the other residents of their home. In an emergency situation, you are likely to have to react and take various measures to ensure your safety and that of the people in your home.

We recommend that you think through a few possible flood risk situations in advance with everyone living under your roof. This will save you time if there is actually a flood.

The first step is to identify the various people to be protected, and mak a hierarchy of priority. To do this, you will need to collect all your family's contact details and add them to the communication plan. A telephone chat group with all members can also be a good way to share flood risk information.

Also include contact details for other important people or organisations, such as hospitals, doctors, schools or service providers.

Assets and pets to be protected must be identified in parallel with the identification of the vulnerabilities of your home that are still there once the protective measures have been implemented. The various challenges in terms of sheltering or rescuing them must be worked out in advance.

Based on this identification, you will need to prepare, together, the various measures and steps to be taken according to the risk you are exposed to, based on the hierarchy of priorities. There are several websites to help you with this:
- https://www.monplandurgence.be/fr-BE/
- https://www.ready.gov/collection/are-you-ready

These sites set out the measures to be taken in the event of a flood alert or flood. In particular, emergency accommodation must be worked out in advance. In addition, if applicable to you, solidarity within vertical communal housing must be established.
- Check that the oil tank is secured
- Check that your home insurance policy includes a "multi-risk property" clause covering damage caused by natural disasters, as well as the conditions for making a claim.
- Emergency accommodation to be arranged in advance
- Solidarity for vertical communal housing
- Pets, etc.
  - Envisage pet collars
  - Leashes
  - Pay attention to rescue
  - Beware of the law regulating adoptions

In connection with this emergency planning, a number of points need to be highlighted. These will be explained below.

4.3.1 What to do in the event of rising water levels

In the event of rising water levels, a few tips can help. First, when you encounter flooded roads: Turn around, don't risk drowning. 15 cm of moving water can be enough to knock you over. 30 cm of moving water is enough to lift a small vehicle. Secondly, if you are requested to do so, and even if you are not currently aware of the risk of flooding, evacuate immediately.

4.3.2 Flood survival kit

As a resident of a home located in a flood hazard zone, you will be advised to prepare a "flood survival" kit. This should allow you to live autonomously for 3 days. Once a year, for example at the start of periods of warm weather, it is a good idea to check the contents of the kit, especially the expiry date of medicines and foodstuffs. It must contain:

- A battery-operated radio with spare batteries so you can follow the instructions of the authorities;
- Flashlights with spare batteries, candles, lighters or matches in waterproof packaging;
- Basic tools (multi-purpose knife, can opener, etc.) in waterproof packaging
- Non-perishable food that does not need to be cooked, for three days;
- Drinking water (6 litres per person);
- Medication and first-aid kit (disinfectant, bandages, compresses, etc.);
- Spectacles (spare pair);
- Warm clothing and survival blanket;
- Duplicate house keys and car keys;
- Copy of essential documents in a watertight pouch (ID card, prescriptions, etc.);
- Cash (cash machines may not work);
- Cell phone charger and, if possible, recharging battery;
- Card or board games to pass the time.
- Toiletries
- Sleeping bag or survival blanket for each person
- Whistle to alert yourself or a hazard
- Wrench or pliers to turn off water, gas and electricity
- 1:25,000 IGN map of the region.

(GEIDE, 2013; French Government, 2023)

4.3.3 Weatherproofing kit to prevent your home from becoming a waste receptacle

When a flood alert is issued, it is important to put in place various measures to reduce the vulnerability of your home before the waters rise. This phase should only be carried out if the safety of all residents of your home is assured.

This kit enables you to methodically protect your assets and furnishings from water, as well as your home from flooding. There must be a special focus on securing toxic products, to prevent them from spreading and polluting the environment.

To facilitate the evacuation of assets and furnishings, it is advisable to keep a number of items on hand:

- Breeze blocks
- Watertight cases
- Ropes, turnbuckles
- Trolley

4.3.4 Kit for returning to the home

Following a flood that has affected your home, the immediate availability of day-to-day accessories is invaluable. You will need:

- Thick gloves
- Rubber boots
- N 95* protective masks
- Protective suit
- Flashlight

- Mops, buckets, brooms, waste bags
- Shovels and squeegees
- Multi-surface detergent
- Sponges, rags

4.3.5 Alert: get informed and inform others accurately

It is important for the public to find out about the warning messages broadcast by the authorities and emergency services, in particular via warning messages, local radio stations and official websites (RMI, hydrométrie.be).

In the event of a flood, other protective measures are recommended:

- Keep track of all your journeys on foot or by car.
- Keep your children safe at school
- Do not take your car
- Do not go down into basements or underground car parks
- Cut off gas, electricity and heating networks, if possible and without endangering yourself.
- Stay away from watercourses, banks and bridges
- If there is no evacuation order, take shelter upstairs
- Contact vulnerable and isolated people by SMS
- If you don't already have one, prepare an emergency kit and keep it in an easily accessible place.

(GEIDE, 2013; French Government, 2023)

4.3.6 Post-flood

Once the end of alert signal has been given, normal conditions can return. However, the receding water does not mean there are no more risks. After a flood, avoid wading in floodwater, which can contain dangerous debris and be contaminated. Underground or downed power lines can also electrify water. Do not enter flooded buildings until an authority tells you it is safe. Use protective clothing such as safety goggles, work gloves, hard hats and waterproof clothing, work gloves and boots when cleaning up after a flood. Only use a generator or other gas-powered machine outdoors, away from windows. Be aware of the risk of electric shock. Do not touch electrical equipment if it is wet or if you are in the water (FEMA, 2020).

When you return to your home after a disaster, it is important to take stock of the situation, starting with an assessment of external damage (serious structural damage, gas smell, hazardous materials spill). The next step is to analyse the damage and safety of the interior of the house by switching off the power (if the circuit breaker is dry) and carefully handling objects. Check whether the water is potable, and if in doubt, do not drink it.

Before starting the clean-up, it is important to take stock of what needs to be done. Taking photos of the general condition and damage will help you organise the work and answer any questions your insurance company may have. Another essential step is to remove stagnant water and mud by following a few simple instructions (see (GEIDE, 2013)).

As soon as you return to your home, start drying the building, starting with aeration. Drying can take several weeks or even months, depending on the season, and must continue throughout the clean-up phase. There are several points to bear in mind in this regard:

- In good weather, open doors and windows. Turn on heaters on a low setting: too high a temperature can cause certain materials, such as veneers, to delaminate and warp.
- Keep objects and furniture away from the walls.
- Remove plugs, taking every precaution to allow ventilation between the wall and the partition.
- Strip wallpaper.
- Use fans to expel damp air to the outside, or use dehumidifiers.
- Drill 2 to 3 cm diameter holes at the top and bottom of the double partitions. If these are metal-framed partitions, dismantle them. This work should be left to experienced handymen and women. Otherwise, call in a professional. (GEIDE, 2013)).

The disposal of waste must also be methodical. It is a good idea to pay close attention to the instructions issued by public authorities regarding the way in which waste must be disposed of and sorted. As a general rule, it is best to start by clearing out what cannot be recovered: the contents of refrigerators and freezers damaged by water, soft objects

(mattresses, underlays, upholstered furniture, stuffed toys, pillows, etc.), as well as insulating materials, fibrous materials or panels that have lost their properties and may be mouldy. You will then need to sort through the remaining waste and determine which items are salvageable.

Finally, once all stagnant water, damaged goods and waste have been removed, the restoration can begin. To do this (freely translated), "surfaces must first be sprayed with clean water and then with detergent." (GEIDE, 2013)

To take things a step further, there are many guides available for restoring normality, intended for civil society. Here are a few references.

Conclusions

This report falls within the broader context of an 18-month project (MARHETAK), financed by INTERREG funds. The Crisis Centre of the Walloon Region, a partner in the consortium[26], led a work package aimed at improving the preparedness of municipalities in the area of flood risk. To this end, the Regional Crisis Centre entered into a collaboration with the SPIRAL Research Centre at the University of Liège to conduct research and produce two reports.

The first report analysed the emergency planning systems of the four regions of the Euregio Meuse-Rhine, with a specific focus on inter-regional relations, the extent of civil society participation in risk management, and the respective and shared challenges and opportunities of these different systems.

The second, which is the present report, aimed to translate the general reflections of the first report into a guidance report, with the objective of offering food for thought for emergency planning against flood risk at the local level, by addressing all phases of the risk management cycle. It is not intended as an emergency planning guide, but as a guidance report that offers various theoretical and practical frameworks and proposals for use by different municipal emergency planning and flood risk management stakeholders, or by Belgian and more specifically Walloon crisis management services. Moreover, this report does not aim to be either exhaustive or neutral, but puts forward an innovative and robust approach, drawing on various hypotheses from a research project covering the Euregio Meuse-Rhine (MARHETAK project). This report focuses more specifically on the Walloon Region, although it does touch on a number of cross-cutting issues. As such, it is intended to be the first step in the process of drafting an emergency planning guide for the municipalities of the Euregio Meuse-Rhine.

Taking a cross-cutting approach, the report highlights the importance of involving civil society throughout the risk management cycle, proposing, at each stage, theoretical reflections and concrete emergency planning

26 The other partners are the EMRIC network (Lead partner), the Belgian National Crisis Centre (NCCN) and Waterschap Limburg (NL).

tools and techniques. In particular, it highlights how civil society, with its skills, know-how, resources and capacity for innovation, can be involved as a genuine actor throughout the risk management cycle. To this end, the report advocates implementing a process of co-construction for flood risk and crisis management, with all stakeholders in civil society. Upstream, individuals need to play a role in identifying, preventing and preparing for flood risks. In the event of a flood, they need to play a role in alerting and security, as well as in direct intervention through psychosocial and logistical support. Downstream, civil society, with its knowledge of the region, its capacity for innovation and its mobilising strength, has a crucial role to play in restoring the functions of a municipality, providing psychosocial and logistical support to disaster victims and reconstruction services, and recreating a new 'social normality', by drawing together the lessons learned from the crisis.

The report also takes into account the existential challenges posed by the exceedance of the planet's limits and the transition of our societies into the Anthropocene era. Convinced that the era we are entering entails a higher frequency and scale of unprecedented disasters, as well as high levels of uncertainty, it is vital to make our societies more robust, by fostering holistic emergency planning and a culture of risk.

Far from painting a glossy picture, this guidance report discusses the challenges and obstacles linked to involving people in risk and crisis management. It concludes by asserting that it is precisely because the involvement of the public is a highly complex but indispensable process - in the context of the Anthropocene and the unprecedented crises it leads to - that all levels of crisis management, starting with municipalities, must make large-scale investments in this process.

Annex I: Benchmark of emergency planning guides against flood risk

This section summarises the state of the art in the various emergency planning guides against floods. It is designed to be a summary of the guides analysed, and synthesises the various themes covered in them. Specifically, each element addressed in the guides studied is reprised, analysed and compared. Through this exercise, this section aims to highlight recurring elements and different approaches, but also to point out inconsistencies and contradictions, and to emphasise missing elements in the various guides.

This document is therefore not only a review of the literature, but also a critical analysis of these guides as a basis for drafting an emergency planning guide for floods. Each element taken from the different guides is summarised and analysed in order to put it into perspective with other elements.

Following a brief note on the methodology used to collect and analyse the guides, the main body of this document will develop around the various chapters present within the guides analysed.

Methodology

In order to develop this analysis, the present work has been built around a pre-defined methodology. As regards which data to analyse, we opted for an approach combining searches on Google and Google Scholars using keywords, applying an intensity sampling approach and the 'snowball' method (Harsh, 2011). The keywords entered into the search engines were "guidelines", "guides", "handbook", "manual" coupled with the terms "planification d'urgence", "emergency planning" and "floods", "flooding", "inondations", "crues". Due to limited time, this summary of the state of the art was never intended to be a systematic review of the literature. The study focused exclusively on guides for municipalities within a specific region, generic and international guides for municipalities, and guides for private companies. The underlying idea was to select guides which incorporated an operational planning aspect. Scientific studies on emergency planning against floods, and more technical manuals on technical measures for flood prevention and protection were therefore not taken into consideration. This approach meant that we were able to

collect 30 emergency planning guides, ultimately analysing 25 of them.

To analyse these emergency planning guides against floods, we drew on the reflexive thematic analysis developed by Braun and Clarcke (Braun & Clarke, 2006, 2019) without relying on the three-step coding method. The aim of this critical analysis of the state of the art (Grant, 2009) is to identify the most significant items in the field of research, and to compare them, in order to highlight the most significant contributions, as well as to devise new approaches. To this end, we focused our reflections on two aspects:

How can we take into account the international and interregional aspects inherent in flooding?

How, when and under what conditions should civil society be involved throughout the flood management cycle?

In concrete terms, the analysis of the planning guides is developed by listing the various points addressed and explaining how they are mentioned in the guides, with the reference(s) of the guide(s) that addressed the subject most comprehensively.

Analysis of emergency planning guides

1. Preface/Preamble/Editorial

Every emergency planning guide starts by setting the context and highlighting the importance of flood-related risks, and the need to prepare for them. Prefaces and preambles are ideal for making readers aware of the need to get involved in the emergency planning process against floods. These sections can cover a variety of topics, which are summarised below.

First of all, a number of guides reiterate the fact there are risks and potential crises in the region. The aim is to make readers aware of the importance of risk in the organisation of our societies. They underline the need to live with and prepare for risks, but also, to a certain extent, to build a society around them. (Direction de la Défense et de la Sécurité Civiles, n.d.). They may also describe, in a few figures, the number of floods and their ecological, environmental, economic and social impacts. The editorials also explain the purpose and raison d'être of these guides. They highlight how these guides provide bearings for local authorities, so that they can prepare for floods. (CEPRI, 2019)

Moreover, certain documents highlight citizens' expectations of receiving assistance in the event of a crisis. The underlying theme of this section is the evolution of our societies, with the state taking ever more responsibility for civil protection, and increasingly delegation of this responsibility on the part of citizens. (Direction de la Défense et de la Sécurité Civiles, n.d.).

Other passages emphasise the importance of preparing for crises. In general, our societies function in normal mode, but this is punctuated by crises that turn this functioning upside down. Consequently, a municipality needs to be prepared in normal times for crises (DGSCSC & Zone de défense et de sécurité sud, 2018). Indeed, preparation and planning represent real added value to crisis management. Several guides demonstrate their usefulness in that they help organise responses and anticipate the challenges and tasks ahead. (Direction de la Défense et de la Sécurité Civiles, n.d.).

In addition, several guides provide support for this aspect, reiterating that emergency planning against floods is part of an existing legal framework that obliges local authorities in particular to be part of a prevention and emergency planning process against floods. (Direction de la Défense et de la Sécurité Civiles, n.d.).

Finally, various guides conclude with a reminder of the purpose and objectives of such a guide. In particular, the guide aims to help local authorities in their emergency planning process, and highlights the necessarily pragmatic nature of an emergency plan. The guides are therefore intended to allow local authorities to draw up plans that are as pragmatic and usable as possible. (Direction de la Défense et de la Sécurité Civiles, n. d.; DGSCSC & Zone de défense et de sécurité sud, 2018; London Borough of Richmond Upon Thames, 2011). This section also mentions what the document does not cover. What objectives are not included in the plan? In this sense, this section defines the scope of the guide. (CEPRI, 2015)

2. Introduction

In a large proportion of cases, the guides start with an introduction to the terms and concepts used or underlying them. This section also present the guide's target audiences and the legislative context under which it falls. The scope of the document and the methodology used are also discussed.

With regard to the definitions listed, some guides characterise flood management, and one in particular provides a concrete definition. (The associated programme on flood management & World meteorological Organization, 2011). The same guide also promotes an integrated vision of flooding, taking into account not only the entire risk management cycle, but also rainfall extremes. Floods should not be considered in isolation, but as a whole, over the course of a cycle. (The associated programme on flood management & World meteorological Organization, 2011).

Surprisingly few guides provide a clear definition of flood risk. Nevertheless, some of the guides characterise them. Generally speaking, each guide aims to make flooding easy to understand. (The associated programme on flood management & World meteorological Organization, 2011).

Other guides focus on characterising what a plan actually is, although in general, only one offers a clear definition of an emergency plan. (Major Emergency Management Project Team, 2006). In the same vein, several guides deal with the objectives of a plan, but only one clearly defines its missions. (Major Emergency Management Project Team, 2006).

Some guides claim to be general in nature, but in general they are often aimed at a specific geographic target. One guide in particular clearly defines which municipalities are covered by the guide and which are less so, even within the geographical area of application. (DGSCSC & Zone de défense et de sécurité sud, 2018). Other guides focus more on the type of actors the guide is targeting. (Major Emergency Management Project Team, 2006).

In addition, several guides address legislation on emergency planning for floods in greater depth than is covered in the preamble. (Major Emergency Management Project Team, 2006). Within this section, several guides also mention the importance of preparing against flooding. One in particular explains the reasons why municipalities should be prepared, detailing the cost of flooding and the impact of good preparation. (DGSCSC & Zone de défense et de sécurité sud, 2018). In addition, various guides clearly establish the scope and objectives of the document, mentioning what it does and does not cover. (Bath & North East Somerset Council, 2012; Major Emergency Management Project Team, 2006; The associated programme on flood management & World meteorological Organization, 2011). These elements should be understood as further elaborations of the preambles.

Although all the guides address the issue of flooding throughout the risk management cycle, only one clearly mentions the cycle in the introduction. (The associated programme on flood management & World meteorological Organization, 2011). However, we feel it is essential to highlight the comprehensive and cyclical nature of flood risk management.

Just one guide also explains the methodology used to create and write the guide. (Major Emergency Management Project Team, 2006). In our view, this stage should also be made explicit, as it enables readers to understand the issues at stake, and the reflections and approach underlying the drafting of such a guide.

And finally, the introductions generally conclude by setting out the various stages that make up the guide, but one in particular deals specifically with the structure of the document (Major Emergency Management Project Team, 2006). This step must be taken in conjunction with the flood management cycle, to demonstrate the logic of the proposed sequence of steps.

3. Managing flood risk

The introduction is sometimes followed by more specific information on flood risk. The aim of this section is to describe what flooding is, the different types, the likelihood and impacts. (Major Emergency Management Project Team, 2006; New South Wales government, 2007; (Major Emergency Management Project Team, 2006). In particular, in order to illustrate the variety of impacts a flood may have, one guide presents a selection of impacts and notable events that can occur during a flood. (Major Emergency Management Project Team, 2006).

This section is also used by the guides to present critical infrastructure

potentially impacted by floods, including water treatment plants, dams, dikes and sewage systems. Some guides also address the infrastructure that needs to be maintained in the event of floods. (Major Emergency Management Project Team, 2006). For this reason, all buildings housing crisis intervention actors and managers (barracks, police headquarters, hospitals, crisis centres, etc.) must be located in non-flood-prone, accessible areas. Furthermore, energy generation infrastructure must be maintained to the extent possible (CEPRI, 2015).

It is important to note that only a minority of guides mention the impact of global warming directly and the environmental destruction it causes (Major Emergency Management Project Team, 2006). In our view, an emergency planning guide against floods needs to frame the phenomenon by characterising the hazard, vulnerabilities and impacts in question, as well as placing them in the context of the age of disasters and the uncertainty we have entered into as a result of exceeding the limits of the planet. This context is critical, to enable readers to grasp the challenges of floods and the scale of the phenomena facing our regions.

Setting up a flood risk management and emergency planning process

A number of guides take a practical look at the process of setting up flood risk plans. They highlight the steps involved in drafting the plan. Among other things, this section addresses the concrete elements to be put in place and the foundations for getting the project off the ground. This section therefore deals with the human resources aspects, and working out the roles and objectives of the actors involved.

Setting up a working group to draft the plan

According to several guides, the emergency planning process against floods starts with setting up a working group. This group is responsible for making the drafting of a plan operational. Some guides cover the practical aspects of organisation. (Major Emergency Management Project Team, 2006). This working group will start by appointing a project manager who will be responsible for coordinating all planning activities. (Direction de la Défense et de la Sécurité Civiles, n.d.; FM Insurance Company, 2017). As municipalities can vary significantly in terms of size and resources, the working group, its size and the investment that participants can make in the process will also vary according to the means available.

One of the working group's first tasks will be to identify the human resources needed to draw up the plan. (Direction de la Défense et de la Sécurité Civiles, n.d.). In this regard, a list of tasks to be carried out must be drawn up and linked to a workload. This list can then be supplemented and refined, to produce the action plan.

Setting up a local flood management committee

If human resources allow, the process should be monitored by a group of actors (or on actor) external to the working group. Several guides suggest setting up a steering committee to monitor and control the process, without being directly in charge. (Direction de la Défense et de la Sécurité Civiles, n.d.; The associated programme on flood management & World meteorological Organization, 2011). In addition to the steering committee, it is important to involve interested partners, whether from other levels of government, civil society associations or academia. (Direction de la Défense et de la Sécurité Civiles, n.d.). Creating such a network enables the various stakeholders involved to get to know the plan, to get to know each other, and to raise their awareness of the issues involved in flood risk management.

Interestingly, one guide warns against the temptation to outsource the drafting of an emergency plan. This is seen as potentially negative, as it hinders the learning and networking process that is the planning phase (the most essential phase) (Direction de la Défense et de la Sécurité Civiles, n.d.). We would agree, recalling that in emergency planning, it is not so much the final plan that is important as the planning process.

Tools for identifying flood-related risks

Various guides deal with the analysis of risks and vulnerabilities to be put in place for the region. The identification and analysis of risks is the first phase in the process of drafting emergency plans. It is based on different methods, or flood control options, which are explained to varying degrees in the different guides.

The scientific literature establishes 5 flood governance strategies (Flood defence, risk prevention, Flood mitigation, Flood preparation, flood recovery etc.) (Raadgever & Hegger, 2018). They represent the different strategies put in place by public authorities to manage flood risks. Some of

these strategies are reprised in certain guides. (FM Insurance Company, 2017; Major Emergency Management Project Team, 2006). Identifying the strategies used by the public authorities in the region helps us to understand the local flood management context. It also makes it possible to draw up an inventory of the resources and requirements needed to prevent, guard against and rebuild after a flood. (Direction de la Défense et de la Sécurité Civiles, n.d.). This is a crucial step in emergency planning, which goes hand in hand with an analysis of the types of flooding that can occur in the territory (FM Insurance Company, 2017; New South Wales government, 2007).

Furthermore, some guides emphasize the need to assess the different levels of flood risk and classify them using a flood risk classification code. (Bath & North East Somerset Council, 2012; London Borough of Richmond Upon Thames, 2011). Some guides support the idea of translating risks into scenarios. This is the basis of emergency planning, which is based on graduated crisis scenarios. (DGSCSC & Zone de défense et de sécurité sud, 2018).

Identifying vulnerable actors in the region. The approach by vulnerabilities is crucial, as it is the combination of hazard and vulnerability that will determine whether or not a flood will be a disaster (Bath & North East Somerset Council, 2012; DGSCSC & Zone de défense et de sécurité sud, 2018; Environment Agency, 2012; FM Insurance Company, 2017; The associated programme on flood management & Wolrd meteorological Organization, 2011;Zurich Insurance Group, 2022).

Maps are essential, and all guides emphasize the need to keep them up-to-date and to be able to display hazards on the ground (Bath & North East Somerset Council, 2012; DGSCSC & Zone de défense et de sécurité sud, 2018; Direction de la Défense et de la Sécurité Civiles, n.d.; Environment Agency, 2012; Major Emergency Management Project Team, 2006; The associated programme on flood management & Wolrd meteorological Organization, 2011;Zurich Insurance Group, 2022).

Flood preparedness

This phase is addressed by a number of guides and deals with prevention, mitigation and preparedness in the face of flood risks. This phase is not, strictly speaking, directly linked to the drafting of emergency plans but, in an integrated approach, must form part of a logical whole. (The associated programme on flood management & World meteorological Organization, 2011). In particular, it includes the mapping of investment decisions in flood control infrastructure (Bath & North East Somerset Council, 2012; Environment Agency, 2012; Zurich Insurance Group, 2022).

Some guides highlight the importance of emergency exercises. They explain the purpose of the exercises and even include graphics on how the exercises work. (Bath & North East Somerset Council, 2012; Direction de la Défense et de la Sécurité Civiles, s. d.; Environment Agency, 2012; FM Insurance Company, 2017; The associated programme on flood management & Wolrd meteorological Organization, 2011).

In the preparation and prevention phase, emphasis is placed on the need to verify that infrastructure and equipment are operational. This must be a recurring process. (Zurich Insurance Group, 2022).

Floods generate a large amount of residual risks, which need to be listed and taken into account in the risk analysis. (The associated programme on flood management & Wolrd meteorological Organization, 2011;Zurich Insurance Group, 2022).

Organisation and emergency planning tools against floods

This part represents the concrete phase of the substance of emergency plans. Within each guide, it details the various elements that a plan needs to contain, as well as the different issues that emergency planners need to take into consideration: who are the actors involved in drafting the plan? What resources are available in the region? How can the plan be adapted and maintained over time?

This part also raises broader issues to be taken into consideration at local policy level, such as. Do we need to set up a citizens' reserve? If so, how?

Several guides suggest starting the emergency plan with a reminder of the legislation applicable in the region, together with a reminder of the objectives of emergency planning. (CEPRI, 2019)(DGSCSC & Zone de défense et de sécurité sud, 2018).

It is within this stage that the guides reiterate the structure of the emergency

planning stages (DGSCSC & Zone de défense et de sécurité sud, 2018). Also within this stage are explanations of the content of the emergency planning tools; the actors to be involved in the process; the emergency planning process; the objectives to be met in emergency planning; the obligations of the local elected official in emergency planning (CEPRI, 2019; DGSCSC & Zone de défense et de sécurité sud, 2018).

The various emergency planning stages described in the different guides can be summarised as follows:

- Assess the level of preparation. This stage involves analysing the risks, hazards and vulnerabilities of the region.

- Identify the actors in the region and their roles. The conventional crisis management actors (fire brigade, police, rescue services, etc.) need to be identified in this regard. But other actors also need to be listed. In particular, several guides mention the need to draw up contact lists and keep them up to date. (e-mails and telephone numbers). (DGSCSC & Zone de défense et de sécurité sud, 2018; Ontario region, n.d.). This applies not only to private resources, but also to civil society and the general public, who play a crucial role throughout the flood management cycle. Two guides address the issue of citizen involvement, highlighting the fact it is essential. However, none of them addresses the issue in any specific way. (Environment Agency, 2012; The associated programme on flood management & World meteorological Organization, 2011).

- Identify the region. First of all, it is essential to identify the critical infrastructures present in the region. This involves identifying evacuation routes and shelter areas, as well as potential locations for crisis centres. In addition, potential waste storage areas (DGSCSC & Zone de défense et de sécurité sud, 2018).

Once the territory has been identified, a phase of organisation and preparation of the region must be put in place. This involves a phase of organisation within the municipality, focusing on evacuation routes, waste storage areas and places where crisis centres can be set up. It is crucial to work out how to make these places accessible, the logistics involved and the roles to be played by the various actors involved. It is in this phase that the responsibilities and tasks of the various actors and levels of authority are determined, as well as the missions assigned to infrastructure or equipment (The associated programme on flood management & World meteorological Organization, 2011). This organisational phase must necessarily take the continuity of activities into consideration (FM Insurance Company, 2017). Indeed, a large proportion of the crises experienced by a municipality do not involve the shutdown of all the services it provides. According to several guides, it is therefore necessary to identify a person responsible for the continuity of activities.

The organisation and preparation phases must necessarily be followed by phases of communication of these aspects to and with civil society and the actors involved. This communication must necessarily be associated with drawing up fact sheets and informative documents that concisely explain the roles of each party (The associated programme on flood management & World meteorological Organization, 2011). This communication must be structured around integrated communication campaigns (DGSCSC & Zone de défense et de sécurité sud, 2018; Environment Agency, 2012). Several guides highlight the importance of using cartographic and IT tools to visualise risks and crises (Direction de la Défense et de la Sécurité Civiles, n.d.).

To complete these stages, the municipalities can adopt different modus operandi. The emergency planning guides analysed do not recommend any specific methods. In general, they do not address the issue of integrating civil society and stakeholders into these phases of drafting plans. However, in our view, the planning process must necessarily include phases of openness and joint development with these stakeholders. Indeed, civil society and stakeholders are the first affected by floods, the first to be involved in civil protection, but also partners who can bring to light issues overlooked by conventional crisis management actors.

The process of integrating civil society and stakeholders is, in our view, overlooked in emergency planning guides, for two reasons. Firstly, there is a form of mutual suspicion between public authorities and civil society when it comes to risk and crisis management. Indeed, the floods of 2021 demonstrated a certain distrust on the part of citizens regarding the actions taken and recommendations made by crisis managers. But on the other hand, the public authorities tend to see citizens as disorganised and incapable of acting in a civic manner, thereby creating additional risks and adding to crises. Nevertheless, a great deal of research, and the

experience of the floods in 2021, have highlighted civil society's ability to organise and act civic-mindedly, to mitigate the harmful impacts of crises. Secondly, the involvement of civil society alarms some owing to the time-consuming nature of the process and the significant investment of time required. There is also a fear on the part of some elected representatives that this process will highlight the region's weaknesses, vulnerabilities and risks, which may not necessarily help their chances of re-election. Moreover, the experience of many has shown that citizen participation does not attract large numbers of people, but only a small cohort.

While these elements seem to us to be partly well-founded, it is nonetheless crucial to overcome this phenomenon of mutual distrust and reluctance ot have citizen involvement, by involving civil society in all stages of flood risk management. This is not just a matter of communication campaigns, but rather of specific integration throughout the entire process. Various techniques developed by the social sciences (focus groups, workshops, consensus conferences, door-to-door canvassing, etc.) have proved their worth. Generally speaking, this analysis leads to the conclusion that this process can only be conceived in the context of a more overarching process of paradigmatic transformation of the way democracy works at local level.

The planning process must also include a phase of regular updating of the plan as well as evaluation of the operational character of the device over time (DGSCSC & Zone de défense et de sécurité sud, 2018; (DGSCSC & Zone de défense et de sécurité sud, 2018; Direction de la Défense et de la Sécurité Civiles, n.d.). In this respect, emergency exercises are invaluable for evaluating the process, bringing together the actors and updating the plans. The involvement of civil society and the actors involved in construction and the exercises themselves are also overlooked in the guides analysed, and we feel that it is crucial to raise awareness and involve civil society before a crisis occurs. In addition, exercises must be coupled with recurrent training for crisis managers and the actors involved, and even, on certain aspects, for the public as a whole.

4. Managing flood risk

Anticipation and alert tools

In the context of the flood emergency planning process, the guides generally place special emphasis on the alert and vigilance phases. Indeed, floods are unique in that they are forecast (more or less accurately) within a certain timeframe. This is a plus-point to be taken into account in crisis management. In some states, legislation has developed a specific typography for the pre-crisis phase. Belgium refers to pre-alert, or alert, while France distinguishes between vigilance and alert phases (CEPRI, 2019). In some cases, the guides devote a more specific section to forecasting methods and resources, alert schemes and different alert (and vigilance) thresholds and levels, mapping of alert impact resources at local level, etc. (DGSCSC & Zone de défense et de sécurité sud, 2018) (Bath & North East Somerset Council, 2012.

Specifically, various guides present, in the form of graphs or diagrams, the anticipation and warning tools available to local authorities and explanations of the objectives of these respective programmes (CEPRI, 2019) (Major Emergency Management Project Team, 2006).

In addition, emphasis is placed on the need for well-functioning and trusted alert systems. In this respect, it is important for local authorities to understand how the tree of actors involved in flood management is characterised. One guide explains the roles of hydrological and meteorological monitoring agencies. (The associated programme on flood management & Wolrd meteorological Organization, 2011 ;Bath & North East Somerset Council, 2012). Several guides address the issue of ascertaining and mapping the resources available to a municipality to ensure the alert is raised (Direction de la Défense et de la Sécurité Civiles, n. d.) (CEPRI, 2019) (London Borough of Richmond Upon Thames, 2011) (Bath & North East Somerset Council, 2012). These are accompanied by graphs showing the scaling up of projects (Major Emergency Management Project Team, 2006).

Flood response guide

Within the emergency planning phase, the various guides analyse in detail the crisis response phase, highlighting the various elements to be taken into consideration when a flood occurs.

Various guides start by explaining the different intervention actors in crisis management, as well as the crisis management authorities at local level (CEPRI, 2019). Despite the different crisis management systems, we see that several actors are common to the different countries. This is the case in particular for the fire service, which plays a key role in crisis management,

as well as the police and rescue services. Local elected representatives are also mentioned as key actors in emergency planning. By setting out the missions of each of the local actors involved in crisis management, the guides establish the local context and lay the foundations for the interactions of the various actors in crisis management.

Based on these elements, the guides cover the bodies to be set up for crisis management. They detail their missions and composition, referring to the actors previously introduced. They also explain the specific objectives pursued by the various bodies and how these interact (CEPRI, 2019).

These elements are often associated with graphic representations that allow readers to visualise the compositions and interactions between organs (CEPRI, 2019). Reference is also made to the warning and public information systems available to municipalities.

In addition, one guide in particular summarises the various measures that a municipality can/should take to support its population (CEPRI, 2019). According to this guide, a municipality must ensure that the following elements are in place during crisis management. As such, a municipality needs to prepare all these points in advance through the emergency planning process.

In the context of the emergency planning process, a municipality needs to study the methods to be used in terms of crisis communication with the public, so that it can explain the substance of the crisis communication to the public. It is essential to identify who is responsible for communication in each municipality, and to train them in a standard communication method. The communication needs to be managed both internally (within departments) and externally. The means of communication must be inventoried.

In addition, the municipality must prepare the elements for direct crisis management in connection with the flood. In particular, shelter locations, evacuation routes and waste management sites must be worked out in advance (The associated programme on flood management & World meteorological Organization, 2011).

The emergncy planning also involves planning for personnel management, to ensure both crisis management and the continuity of activities. In particular, it is important for municipalities to think about the rotation of staff and the organisation of the handover, so that this does not take place (freely translated) “at the peak of the crisis and doesn’t involve all the actors simultaneously, in order to ensure continuity” (CEPRI, 2019, p. 19).

An activity continuity plan must be drawn up, listing the various functions that a municipality must be able to maintain, prioritising the municipal missions and specifying how they are to be fulfilled. An analysis of the region’s critical infrastructure must also be carried out (The associated programme on flood management & World meteorological Organization, 2011). Associated with this, a damage assessment system needs to be studied in advance, so that the missions and infrastructure impacted, and the work to be carried out, can be identified as quickly as possible. Procurement procedures also need to be worked out in advance, so that the work can be performed as quickly as possible. In the same vein, municipalities need to be prepared and trained in advance for the claims procedures they may be required to organise (Bath & North East Somerset Council, 2012).

Long-term support for the public also needs to be considered during emergency planning. Questions of psychosocial support, housing, drinking water and healthy food must be studied in advance (Direction de la Défense et de la Sécurité Civiles, n.d.).

Finally, in addition to supporting the public, municipalities can also consider involving civil society in crisis management. This point is absolutely crucial to our argument. Indeed, the age of disasters we are now entering requires us to move beyond specialised crisis management methods. People therefore have a crucial role to play in preventing, responding to and rebuilding after a crisis. It is therefore critical that municipalities embrace citizen participation in the crisis management cycle, and work with the population to build community involvement. This process is extremely complex, and is not covered in depth in emergency planning guides. In our view, involving communities in this way requires a paradigm shift not only in risk and crisis management, but also in the way we live together. This involves rethinking the way localities operate, and the democracies that are applied there.

5. Post-flood management

Guide to managing the post-crisis period and rebuilding ‘normality’.

Also mentioned in all the guides, this phase seems crucial for a majority. The guides reiterate how big this phase can be, and point out that it is essential to prepare for it in advance. The emphasis is on rebuilding and restoring, as well as learning from experience. However, none of the guides go into detail on the methodology of feedback. Furthermore, these guides do not sufficiently address the issue of volunteer involvement and supervision. Finally, they do not address the need to question the underlying societal foundations and values that underpinned the disaster. Indeed, floods are a disaster when the infrastructure and societal system are not adapted or no longer adapted to it. It is therefore necessary to question this aspect.

In general speaking, this phase is characterised by a form of adapting to the unknown. Although planning must be carried out in advance, several guides highlight the unprecedented consequences of each crisis. This phase is therefore crucial, but very difficult to anticipate. It is therefore necessary to prepare for the unexpected, to remain as adaptive as possible (CEPRI, 2019). Preparing for this phase therefore specifically involves focusing on a number of important points. Firstly, as mentioned above, maintaining and restoring critical infrastructure is one of the most urgent aspects to consider following a disaster (The associated programme on flood management & World meteorological Organization, 2011). Another aspect concerns direct support measures for the public. This takes into account psychosocial issues, food and water supplies, housing issues, and the challenge of rapidly clearing up buildings and the territory (Bath & North East Somerset Council, 2012). This is followed by an impact assessment, damage assessment and compensation claims Some guides also recommend setting up Local Committees for Victim Support (CLAV) (CEPRI, 2019). Without specifying how these committees would be made up, this point touches on, but does not really address, the issues of involving citizens in post-crisis management and formalising the participation of volunteers.

The post-crisis period also starts with damage assessment and claims for compensation and financial support (CEPRI, 2019; FM Insurance Company, 2017). This stage involves delegating various municipal staff, as well as close collaboration with the bodies responsible for compensation, and even with external actors who can calculate the costs of reconstruction and the necessary financial resources to be put in place (Ontario region, n.d.).

As regards reconstruction and restoration, as mentioned above, it is in the interest of municipalities to keep a list of reliable actors who can intervene following a crisis (Ontario region, n.d.).

The post-crisis phase is also a learning phase, allowing actors to to draw lessons in preparation for future crises and thereby completing the Deming loop. This learning process involves an evaluation phase, based on Feedback from Experience (RETEX in French). This phase is made up of various debriefings, interviews with actors on the ground and analysis of daily reports in order to build a picture of the events and understand the decisions, to learn from them and summarise the roles to be carried out in the post-emergency phase (Direction de la Défense et de la Sécurité Civiles, n.d.). This RETEX phase also needs to be part of the sharing of knowledge on crisis management. (CEPRI, 2019; DGSCSC & Zone de défense et de sécurité sud, 2018; Direction de la Défense et de la Sécurité Civiles, s. d.; The associated programme on flood management & Wolrd meteorological Organization, 2011). Furthermore, various guides mention the importance of not pointing the finger of blame, as this could undo the learning process and prompt the actors and services to turn inwards.

Once the lessons have been learned, they must be followed by a process of prevention and preparation. They should therefore be the first step in implementing a policy to reduce vulnerability and raise awareness of crisis management among all stakeholders (The associated programme on flood management & World meteorological Organization, 2011).

6. Conclusions

The conclusions of the emergency planning guides against floods which were studied are often an opportunity to summarise certain crucial, cross-cutting aspects mentioned in the guide, but also to highlight certain salient elements. (CEPRI, 2019; The associated programme on flood management & World meteorological Organization, 2011).

Some guides, for example, emphasize the need to integrate flood management into a comprehensive approach that includes land and river planning, water retention issues and coordination between crisis management actors and the general public.

In connection with this last point, one guide highlights the importance of raising public awareness of flood management (CEPRI, 2019). Without going as far as involving the population throughout the risk cycle, this guide does mention that a population that is familiar with the risks can consistently follow the instructions given by crisis management authorities and become a partner in civil protection.

Finally, other guides recall various references and legal bases relating to crisis management in their conclusions.

7. Practical sheets and glossary

Interestingly, many guides produce practical sheets to help with and standardise the emergency planning work. In particular, an information sheet covering the challenges of alerts and how to make sense of them has been developed in a guide (Direction de la Défense et de la Sécurité Civiles, n.d.). It includes advice on how to improve the reception and understanding of alerts, and make it more likely that people will act on them. Another guide, in the form of a practical sheet, covers the role of the municipal flood coordinator (Ontario region, n.d.). It describes the role, missions and attributes required to play this role, which is necessary for any municipality involved in a flood planning process.

These practical sheets are interesting because they highlight, in a pragmatic and implementable way, various issues linked to emergency planning against floods. It makes it possible to give the people in charge of this process tools, as well as practical guidelines.

Finally, some guides end with a glossary of acronyms and synonyms. The general idea is to make the guide as pragmatic and usable as possible for emergency planning (CEPRI, 2019; Major Emergency Management Project Team, 2006).

Cross-cutting comments and points for attention

Based on our analysis of the guides, we were able to highlight a number of cross-cutting points which we feel are important to take into consideration when producing our guide. The first element concerns the informative choice used by a guide in prioritising the measures to be taken in emergency planning for a municipality and distinguishing the measures to be taken according to different levels of obligations (Bath & North East Somerset Council, 2012). According to its nomenclature, some measures are “necessary”, others “interesting” and still others “possible”. The aim of this distinction is to provide emergency planners with the best possible tools and guidance on the essential aspects and procedures of emergency planning against floods. This technique also makes it possible to address municipalities of different sizes, with different resources, facing different hazards and with different vulnerabilities. It could serve as a basis for the development of our own guide.

The other element relates to the importance of flood alerts. Unlike other hazards, alerts are possible in the context of flood risks (droughts also). Although weather forecasts are not exact, the regions of the Euregio Meuse-Rhine all rely on weather forecasts and associate them with different levels of risk. Compared to other risks, this specificity represents a major asset, but also a challenge that crisis managers need to use adeptly. Other risks, such as industrial accidents or malicious attacks, are difficult or impossible to predict. They cannot therefore be the subject of an alert when they occur. In the case of floods, these can be anticipated several days in advance, and are therefore the subject of preventive measures to shelter the public, preparation and damage mitigation.

However, the uncertainties inherent in forecasts in terms of where rain will fall and its intensity have the effect of potentially resulting in an over- or underestimate of the coming crisis. If the crisis is underestimated, preparedness and shelter measures will be inadequate and fall short, thereby increasing the actual vulnerability of the regions and the damage caused. Indeed, believing that they are well-protected, communities and crisis managers may find themselves in an even worse situation in the event of a larger-than-expected flood. On the other hand, an overestimated flood will mean that the public have less trust in the crisis management partners. Like the boy who cried wolf, a false alarm will impair confidence and compliance with protective measures for future alerts.

This asset, alerts, must therefore be handled with the utmost caution. They must be the subject of concerted decisions between actors who

know and trust each other beforehand, and must be communicated to a public that is already aware of the hazards. All the actors involved in flood management (political and administrative authorities, crisis managers and civil society) need to be aware of what an alert implies, what it allows and what it does not allow. Ultimately, for an alert to work, it must be part of a well-structured flood preparedness and prevention process, based on a well-developed culture of risk and collaboration. Alerts must therefore be part of an integrated, cyclical approach to flood risk management, with structured public involvement throughout the risk management cycle.

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GUIDANCE FOR LOCAL ACTORS
DECEMBER 2023

978-2-8056-0578-9
D/2024/11802/18

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