FLOOD RISK MANGAGEMENT:

European solidarity fund's contribution to flood risk prevention

Ing. R. Schuit
Master thesis Planning, Land and Real Estate Development
Nijmegen School of Management
Radboud University
June 2023

Colophon

Title:	Flood risk management: European solidarity fund's contribution to flood risk prevention
Place and Date:	Nijmegen, 21 June 2023
Size:	84 Pages (including annexes) 22.871 Words
Status:	Final
Annexes:	1

Author:	Rik Schuit
Student number:	s1087420
Email:	Rik.schuit@ru.nl

Thesis supervisor:	Dr. M. Kaufmann Radboud University Nijmegen Political Sciences
Second reader:	Dr. Ir. D.A.A. Samsura Radboud University Nijmegen Spatial Planning

Radboud University Nijmegen
Nijmegen School of Management
Master Planning, Land and Real Estate Development
Heyendaalseweg 141
6525 AJ Nijmegen
The Netherlands

Acknowledgement

This thesis is my final product of the Master program Planning, Land and Real Estate Development at the Radboud University in Nijmegen. The completion of this study could not have been possible without the expertise and help of Dr. Maria Kaufmann. Her guidance and advice carried me through all the stages of conducting my research. I would like to express my sincere gratitude and warmest thanks to her patience and feedback.

Besides my advisor a dept of gratitude is also owned to Dr. Ir. Ary Samsura, the second examiner of my thesis, thank you for taking the time to asses my thesis.

I would also like to my partner, Hayley Jones BSc., for her continuous and unconditional support and understanding when undertaking this study. Without her support, love and sacrifices to complete my academic journey I could not have completed this thesis.

A special thanks goes out to my family, missed birthdays and social interactions were part of the last two years, but your ongoing support helped me to focus on my studies and writing my thesis.

Finally I would like to thank my dear friend Maj. Ruud Thoolen BSc. Thank you for the lesson to never give up, the hardships we endured together gave me the mental strength to keep going through setbacks and challenging times.

Abstract

After extensive floodings in 2002 the European solidarity fund was formed with the goal to financially help Member States and candidate countries in case of disasters that exceeded the governments resources to cope. The European solidarity fund is considered a valuable instrument for sharing the risk among European countries and a potential model for financing loss and damages. Since its creation, it has been used for over 100 cases, covering a range of natural disasters like floods, forest fires, earthquakes, storms and drought. In total 28 European countries have been supported by the fund for an amount over 7 billion € of public money making it a subject of debate. This thesis researches if the European solidarity fund helps to prevent future floodings. By researching several cases in which the solidarity fund has been implemented, an attempt has been made to get a grasp on the spending of the fund. Instead of looking to the disaster relief and repair projects, this research will focus on the part of the funds that are implemented on preventive flood measures. Preventive measures should prevent further use of the fund making it a more effective investment for the future.

This thesis focused on the contribution of the *European Union Solidarity Fund* EUSF to the resilience of beneficiary nations. During this research the objective was to find out how the EUSF is providing financial aid for resilience projects or operations after the occurrence of a natural disaster within a Member State or an applicant state. The study was conducted through an evaluation and comparison between four case studies, Austria (2013), Bulgaria (2015), Romania (2014) and Serbia (2014). By doing so, the research question *"How does the European solidarity fund contribute in flood risk prevention in beneficiary countries?"* was answered.

In addition, two interviews were conducted with subject matter experts, and a correspondence letter was used to get a better insight in the process and the obstacles encountered during the different stages from the application up until the implementation of the funds. Based on the information of the experts and the data, it is showed that the fund is a welcome additional tool, but due to its regulation it fails to contribute on long lasting resilience measures.

Therefore it was recommended to alter the regulation which mandates beneficiary countries to build back at the previous capacity, but adopt a built back better policy to prevent future floodings or minimize future damages.

Key words

Flood Risk Management – EUSF – Solidarity Funds - European Union

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1 Introduction

1.1 Background

Floodings are not only the most frequently occurring natural disaster in Europe, but also the most expensive (European Environment Agency, 2023). The *European Environment Agency* (EEA) estimates the costs made due to flooding in Europe between 1980 and 2017 are over €170 billion (European Environment Agency, 2021). In the early 2000's Europe was faced with severe floodings in multiple countries. The UK, Italy, France and Switzerland were confronted with major floods (Kundzewicz, Pinskwar, & Brakenridge, 2013). August 2002 was an absolute record regarding of annual flood loss in Europe, when the material damage exceeded €20 billion in nominal value[1], and severely damaging historical cities like Prague and Dresden (Kundzewicz, Pinskwar, & Brakenridge, 2013).

River floods occur along small or big rivers when a river can no longer handle the increased amount of water. The increased amount of water are usually triggered by rainfall, sometimes in association with snowmelt (Boschl, et al., 2015). If a flooding occurs due to heavy rainfall, it also depends on non-climatic factors, such as land use, changes in flow areas and natural flow characteristics (changes of river beds, dams and the cover of the soil) and urban planning (European Environment Agency, 2021). Human influence on the increase of the likelihood of a flood due to changing rainfall patterns, is climate change (Groisman, et al., 1999). Long periods of intense rain fall lead to a higher river levels.

Most of the European rivers flow through several countries. This make the problem of flooding a cross-border problem. Addressing it requires good cooperation between the relevant countries of a river basin (Menzo, 2011). Due to several major floods that have occurred across Europe, the European Union (EU) recognizes the importance of a collaborative approach to address these floods or their consequences. In addition, the EU must ensure that problems are not passed on to other member states (Menzo, 2011).

After extensive flooding in 2002, the *European Union Solidarity Fund* (EUSF) was created with the purpose as an financing vehicle for EU member states and candidate countries in the case of disasters that exceed the government's resources to cope (Hochrainer-Stigler, Linnerooth-Bayer, & Lorant, 2017). The EUSF is considered as a valuable

[1] *"a nominal amount relates to prices or rates that are correct at the present time but do not show the effect of inflation"* (Cambridge dictionary, 2023)

instrument for vulnerable European countries which encounter financial losses due to an extensive flooding (Hochrainer-Stigler, Linnerooth-Bayer, & Lorant, 2017). But how does the fund contribute and what problems do the beneficiary countries encounter during the process, this is something this thesis tries to find answers to.

1.2 Aim and research questions

The purpose of this thesis is to examine how the EUSF is spend and how effective these funds are for the receiving countries. The research will focus on the allocation of funds in location and expenditure of these funds. From the moment a Member State makes the request for the fund, to the implementation of forementioned fund, several steps have to be taken. And after obtaining the fund, how is this implemented? Is it solely used for disaster relief or do Member States use the fund to prevent future flooding events? This will lead to the main research question in this thesis:

"How does the European Union Solidarity Fund contribute in flood risk prevention[2] in beneficiary countries?"

This thesis attempts to answer this question by answering a number of sub-questions that are related to the main question. First, it is important to know what the EUSF entails, who is eligible, how is if financed and who decides on allocation of the funds? This will be addressed in the first sub-question:

"What is the European Union Solidarity fund, what are the criteria, how is it financed and who decides on allocation of the funds?"

Even when a country would be eligible for receiving parts of the EUSF there are lots of obstacles to be taken before they could actually benefit from the program. Within the application a damage assessment have to be made, all damage assessments need to be structured and duplicates (the same damage can only be funded once) need to be avoided. The next two sub questions will give an insight on the organization of beneficiary nations and the method on how they approached their damage assessment needed to apply for the fund.

"How do beneficiary nations organize there governmental structure, to come to an structured application?"

[2] Preventive measures will be further discussed in chapter 2.1.3.

"Which methods did beneficiary nations use to came to an damage assessment?"

After the application, the EU needs to evaluate the application and decide whether the application is eligible for help out of the EUSF. They also need to determine the amount of funds the beneficiary nation could receive from the EUSF. The following sub-questions will address the process within the EU:

"What is the amount a beneficiary nation receives and how is this determined?"

"How long does it take for beneficiaries nations to receive parts of the European Union Solidarity fund?"

When a country is granted help from the EU and receives a part of the fund are they free to spend it at will? What obstacles are there to fund initiatives, do they improve their flood prevention methods or is the EU steering in the allocation of funds? This leads to the following sub-question, which will be addressed:

"How do the beneficiaries of the European Union Solidarity Fund spend it?"

"How do beneficiary nations organize there governmental structure, to implement the European Union Solidarity Fund?"

Once the answers to these sub-questions are known, it is possible to conclude how or if the European solidarity fund is actually contribution to flood risk prevention or whether it is just an "insurance" for countries with an underdeveloped flood prevention program.

1.3 Societal relevance

According to many scientists the climate on earth is changing (McKinney, Schoch, Yonavjak, & Mincy, 2003) (IPCC, 2001) etc. Changes in the atmosphere and increasing amounts of greenhouse gases alter the energy balance of the climate system (Change I. , 2007). Global warming due to an atmosphere with an increasingly higher concentration of greenhouse gases will affect temperature and rainfall, and ultimately river flows and water resources (Arnell & Reynard, 1996).

Events all over Europe have confronted us with the vulnerability to flooding and vulnerability from heavy precipitation and its serious consequences (Deltaprogramma, 2021). Public expenditure accounts for almost half of the annual wealth created in the EU

(Vandierendonck, 2014). Spending public money should have two objectives. Firstly, the funding needs to be relevant for a specific policy objective and secondly have to spend efficiently, optimizing the relationship between expenditure level and impact (Vandierendonck, 2014). Potential savings could be significant for public finances, a successful spending review could be an opportunity in restoring sound budgetary positions and will benefit EU member states in dealing with future financial setbacks due to environmental events (Vandierendonck, 2014).
The EUSF was created by the EU council to promote solidarity by the Member States to an disaster stricken country. Not only will beneficiary nations be able to reduce future costs, but they could also reduce future destruction of irreplaceable cultural heritage, loss of (wild) life and natural damages. As of January 2023, 107 EUSF interventions are made since 2002 with an total amount of M€6,915. Several Member States relied on the fund more than once, in fact, of the 24 unique Member States, five of them only where beneficiary of the fund once.

The societal relevance of this thesis will give an insight on the implementation of the solidarity fund and tries to identify the way beneficiary countries use the fund not only to repair flood damages, but also in prevention methods.

By investing in flood resilience, beneficiary countries optimize the impact of the fund and preventing further use of the solidarity fund and by doing so on the one hand they protect their inhabitants against floodings in the future, preventing further loss of life and material, on the other hand, save the European tax payer future spendings after another flood.

1.4 Scientific relevance

The EUSF was implemented in 2002 and was setup to respond to natural disasters and express European solidarity to disaster-stricken regions within Europe (European Commission, 2023). Even though we celebrated the 20th anniversary of the fund last year there is not much research being done to the effectiveness of the expenditure of the fund. In the recent years research about the evolution of the solidarity fund has been done, for example in *The European Union Solidarity Fund: an assessment of its recent reforms* (Hochrainer-Stigler, Linnerooth-Bayer, & Lorant, 2017) and in *Ex-post Evaluation of the EU Solidarity Fund 2002-2016* (Bachtler, Begg, Ferry, & Ogilvie, 2019). There is an abundancy of literature about the solidarity in Europe (Bernardi, Berranger, Mannella, Monni, & Realini, 2022; Pill, 2021; Ahman, Nilsson, & Olsson, 2009; Schmale, 2017) about the effectiveness of this solidarity during a crisis, but most of the literature refers to the financial crisis and how European citizens are willing to show solidarity with EU

Member States with comprehensive depts, but no papers are found on how the solidarity fund is spend by the beneficiary countries.

This research explores the contributions to resiliency in beneficiary nations by the EUSF. Increasing numbers of natural disasters have shown the importance of the protection of the environment and the citizens in the EU (Barredo, 2007). There is strong evidence of an increase in extreme precipitation events which implies that floodings will become more frequent in the near future (Christensen & Christensen, 2003; Kundzewicz & Schellnhuber, 2004). Discoveries during this research will show that there is still room for improvement and what needs to be changed in order to improve the EUSF. During this research four case studies will be examined on the application process, the approval phase and the implementation phase. Within these three steps of the process, the organizational structure, tools for damage assessment and the way of implementing the EUSF will be further examined. The scientific relevance of this research refers to the contribution of the organizational structure of governments and methods for damage assessments after a natural disaster occurs.

2 Literature review and theoretical framework

The first part of the chapter will describe the literature review, in the second part of the chapter the theoretical framework will be explained.

2.1 Critical review of academic literature and policy context

2.1.1 European solidarity funds

The EUSF was founded as a reaction after several severe floods in Central Europe in the summer and was intend as a respond to major natural disasters and to stipulate the European solidarity of the EU with regions in Europe confronted with a natural disaster (European Parlement, 2002). The EUSF is not incorporated within the regular EU budget, additional money needs to be raised by the member states. Each individual case is proposed to Member States and the European Parliament, at this moment up to €1 billion per year is allocated for the EUSF (European Commission, 2013).

Eligibility depends on the type of disaster, thresholds are set for regional and major disasters (European Commission, 2023). For mobilization of the EUSF, regional thresholds at a NUTS 2[3] level apply. The total damage must exceed 1,5% of the regional *Gross Domestic Product* (GDP). In case of a major disaster the total damage must exceed 0,6% of *Gross National Income* (GNI) or €3 billion in 2011 prices, where the lower amount is leading (European Parlement, 2002). EU Member States, or countries in negotiations of joining the EU, confronted with a natural disaster such as a flooding, earthquake or storm need to submit a request to the commission (Directorate-General for Regional and Urban Policy) within 12 weeks of the date of the first damage was caused by the disaster (Beremliysky, 2021). Received applications will be assessed by the commission and the amount of aid is proposed to the European Parliament and the council, the latter will decide whether to approve it or not (European Parlement, 2002). Once the council approves the application the commission adopts the decision and will award the aid to the affected Member State, which receives the funds directly in one single instalment (European Parlement, 2002).

Once the aid is paid in full, beneficiary nations appoint or assembles a responsible body for the management and control of the operations supported by the Fund (European Parlement, 2002). The appointed body shall take into account criteria on internal environment, control activities, information and communication, and monitoring.

[3] *"The NUTS classification (Nomenclature of territorial units for statistics) is a hierarchical system for dividing up the economic territory of the EU and the UK"* (Eurostat, 2023)

Additionally they report back to the commission during the whole of the implementation period (European Parlement, 2002).

Major natural and man-made disasters have struck Europe and other parts of the world in the last decade, the importance of solidarity has been accentuated among the Member States (Ahman, Nilsson, & Olsson, 2009). Efforts have been made to enhance cooperation at the EU-level in the areas of prevention, preparation, response and recovery, materialized by the creation of the EUSF (Ahman, Nilsson, & Olsson, 2009). The EUSF is an example of the EU's ambition to develop, improve and strengthen cooperation at EU-level regarding crisis management (Ahman, Nilsson, & Olsson, 2009). There are multiple ways to respond to challenges posed by large-scale natural disasters like governmental funds, budget reallocation, donor assistance, domestic and/or external credit etc. (Ioncica & Petrescu, 2016). The EUSF is an addition to forementioned financial methods to react to a natural disaster.

The EUSF interventions since the founding in 2002 helped countries to return to normal living conditions, prevent and mitigate disasters, reduce the pressure on budgets and stimulate follow up actions and measures for disaster risk management (Tijanic & Korent, 2019). The concept of resilience is been seen in the logic of intervention (Tijanic & Korent, 2019). Tijanic & Korent's evaluation confirms that the EUSF is effective as a response to a major disaster at a national level. The support of the funds is seen as useful, especially in countries whit budget constraints (Tijanic & Korent, 2019).

Over the last 20 years the EUSF have been reviewed and evaluated. In 2010 the legitimacy, viability and efficiency of the EUSF has been researched by Hochrainer, Linnerooth-Bayer and Mechler. They concluded that the EUSF didn't adequately fulfill forementioned objectives and they suggested possible alternatives (Hochrainer, Linnerooth-Bayer, & Mechler, 2010). Reforms of the funds were adopted in 2014, in which the European Commission has made steps to link the fund to proactive risk reduction (Hochrainer-Stigler, Linnerooth-Bayer, & Lorant, 2017). The conclusion Hochrainer-Stigler, Linnerooth-Bayer and Lorant make in their article is that the EUSF in its current form doesn't embed solidarity, in fact, lower-income "new" Member States have received disproportional lesser compensation in terms of eligible losses, but on average they have more financial aid than what they contributed to the fund (Hochrainer-Stigler, Linnerooth-Bayer, & Lorant, 2017).

2.1.2 Damage assessment

In the aftermath of a large-scale disaster such as a flooding, a rapid assessment of the situation is needed to identify the immediate humanitarian needs on the ground (Tandon, 2017). During this assessment, damages caused to vital infrastructure of the country such as roads, bridges, communication systems, electricity grids need to be taken into account (Tandon, 2017). A rapid damage mapping after a disaster is vital to detect affected areas and assess the grade and type of damage (Plank, 2014). Fast crisis response after a natural disaster is necessary to support evacuation, humanitarian aid and reconstruction operations in disaster stricken areas (Plank, 2014). By mapping affected areas, intact roads, railroads, airports and ports that are still available could be used for the crisis support, on the other hand, damaged areas are spotted within the same effort and alternative ways into the disaster area could be identified (Plank, 2014).

Major disaster events are usually followed by multiple assessments, carried out by a large number of agencies and covering a broad range of sectors. These assessments are wide-ranging from rapid assessment of the immediate needs to the most elaborate assessment of long-term recovery and risk reduction requirements (UNDG, 2015). Natural disasters lead to challenging situations, where comprehensive and reliable information on the nature, extent, and the consequences of an event are required. Providing information on time, is difficult during sudden disasters. In those situations only partial, inaccurate or conflicting ground-based information is typically available (Kerle, Stekelenburg, van den Heuvel, & Gorte, 2005).

Community participation is becoming increasingly popular within the field of disaster management. International policies, frameworks and charters embrace the fact that communities could play an active role in identifying vulnerabilities and risks, and in the event of a disaster, that they could play an active role in response and recovery (Méheux, Lloyd, & Dominey-Howes, 2010). Interdisciplinary collaboration and community involvement are pivotal for significant and sustainable changes in under-developed communities (Pardasani, 2006). In more developed regions, social media could serve as a crowdsourcing platform for citizens' communication and information sharing during natural disasters and provide the timely data for identifying affected areas to support rapid damage assessments after or during a disaster (Yuan & Lui, 2018).

Whilst conducting the damage assessment by the community, large *Non-Governmental Organizations* (NGO's) and governmental agencies work alongside the community to fulfill their often complicated and technical disaster assessment methods (Bhatt, Mehul, & Murphy, 2005). NGO's like the Red Cross could provide humanitarian assistance (Bhatt, Mehul, & Murphy, 2005). Wherever possible, they provide relief aid, but also could advise

on relief actions, long-term development for the health care system, environmental concerns and evaluate the need for food, water, shelter and clothing.

Next to the community and NGO participation, governmental departments or ministries of relevant sectors play a big role in requiring pivotal damage assessments. It is recognized that the Government of an disaster stricken nation has a responsibility to provide emergency aid and take a leading role in the aftermath of a disaster (UNDG, 2015). National governments have their own governmental structure and responsible ministries for areas of expertise. Damage assessments of cross-cutting themes and specific characteristics needs to be addressed by the responsible ministries taking into account the priorities and needs of the affected population (UNDG, 2015).

One of the major challenges in undertaking rapid damage assessments of damaged infrastructure and amenities is the lack of available baseline data as well as systems to track, compile, analyze and visualize multiple forms of post-emergency data (Tandon, 2017). Post-disaster assessments generate a large volume of primary and secondary data which needs to be analyzed (UNDG, 2015). It is for the national government agencies to provide baseline data on all the sectors that would be assessed (UNDG, 2015). Government agencies should implement an organization or staff for the collection of primary data on damages and losses. Expert sectors, for example Department of Agriculture or transport are responsible for collecting the data on their area of expertise (affected crops or damaged infrastructure) (UNDG, 2015). Data concerning loss of employment and livelihoods in different affected areas should be collected by the agency responsible for employment (UNDG, 2015). To clarify inaccurate or conflicting information, responsible government agencies could undertake field visits to carry out assessments. During these field visits, additional or missing data could be collected and implemented in the damage assessment (UNDG, 2015).

2.1.3 Flood prevention measures

Flood prevention measures could roughly be divided in three classes: 'Protect', 'accommodate' and 'retreat' (Nicholls, 2007). 'Protect involves measures by which we do not adapt ourselves or the land, but by which we want to keep the water out or even gain land at the expense of the water (Nicholls, 2007). Examples of protective measures are the construction of levees, embankments and land reclamation. 'Accommodate' means a greater flexibility when it comes to dealing with water. This does not involve adapting or altering the water, but rather adapting our own habitat. Examples of this are flood-proof housing and floating agricultural systems (Nicholls, 2007). In 'retreat', water is left alone and people withdraw from high-risk areas. Retreat also includes mobile flood

defenses, flood prevention and awareness through risk maps and evacuation plans. Finally, it also includes sustainable solutions such as nature restoration and development (Nicholls, 2007).

It can be said that 'protective' measures are mainly focused at reducing the probability and that 'accommodate' and 'retreat' measures are mainly aimed at reducing the effect of a flood.

2.2 Theoretical framework

In this chapter the concepts that support the research will be discussed, it should help addressing questions on how the EUSF is used and received in beneficiary (potential) Member States and the hurdles Member States have to take in the process. After the occurrence of a natural disaster, the EUSF process could be divided into three steps. First the application has to send in by a potential beneficiary nation, second the Committee has to evaluate and propose the contribution of the EUSF to the EU council and third after accepting the proposal the implementation and closure look is taken at the beneficiary nations. During the research, documents regarding the three forementioned steps will be analyzed.

2.2.1 Applied theories

This thesis will be based on a grounded theory, this is a qualitative research design in which the inquirer generates a general explanation (a theory) of a process, an action or an interaction shaped by the views of participants who have experienced the process (Cresswel, 2003). Data about the process will be extracted from relevant documentation and official websites of beneficiary nations and the EU. New information will be gathered through interviews with subject matter experts. First, the structural management of the beneficiary states will be examined on structure, management and effectiveness. This approach is derived from the structural theory of Provan & Kenis (2007). This theory describes the governmental structure and level of network competencies (Provan & Kenis, 2008). Second, the response time after a disaster is taken into account, according to Comfort, Ko & Zagorecki (2004), there are three phases in disaster response operations, this will be further discussed in chapter 2.2.3, the disaster response intensity through the three stages will be compared to the goals of the EUSF and the time between the application and the moment the actual funds are made available for a beneficiary nation. Third and final, the resilience is measured according the findings of Alexander (2016), the protective measures done by beneficiary nations will be examined, to see if a beneficiary nation will be ready for future events.

2.2.2 Structural management

Multi-organizational governments are dependent on networks, the coordination of both public and private sectors are important to increase the capacity to plan for and address complex problems (Provan & Kenis, 2008). It emphasizes the importance of collaboration and coordination to counter problems (Daamen, 2016). Network functioning refers to the process by which certain conditions lead to various network-level outcomes (Provan & Kenis, 2008). There are three forms of governance, these forms of governance are listed below.

2.2.2.1 Shared governance

In public management, governance refers to the funding and oversight roles of government agencies, especially regarding the activities of private organizations that provide public services (Provan & Kenis, 2008). The role of governance in these sectors is to monitor and control the behavior of management, who are hired to oversee the day-to-day business. Network government forms can be categorized along two definitions. First, networks may be governed by the organizations that comprise the network (Provan & Kenis, 2008). Every organization would interact with every other organization within the network, resulting in a highly decentralized form. A second distinction can be made by focusing on whether the network is participant governed or externally governed. Participant-governed networks are governed either collectively by the members or a single network participant that takes on the role of a lead organization (Provan & Kenis, 2008).

2.2.2.2 Lead organizations

While shared and participant governance involve many network members, there are situations that may not be ideal for such decentralization. In some cases, network governance can occur through "lead organization". Organizational governance occurs through a vertical hierarchy, with bigger and influential organizations on top (Provan & Kenis, 2008). In lead organizations, all major network-level activities and decisions are coordinated by a single participating member.

2.2.2.3 Network Administrative organization

A third form of network governance is the *Network Administrative Organization* NAO model (Provan & Kenis, 2008). The basic idea is that an independent administrative body is set up to specifically to govern the network and its activities (Provan & Kenis, 2008). The NAO model is centralized, but the network members still interact with one another. The NAO is not another member organization, but plays a key role in coordinating and sustaining the network. The network is governed externally, unlike the lead organization

model, either through mandate or by the members themselves, for the exclusive purpose of network governance (Provan & Kenis, 2008).

An adoption of a particular form of governance (NAO), will only be successful if the network goals and the nature of the tasks are clear. The table below shows the network of governance forms.

Governance forms	No of participants	Goal consensus	Network level competencies
Shared governance	Few	High	Low
Lead organization	Moderate	Low	Moderate
NAO	Many	High	High

Table 1 Key predictors of effectiveness of network governance (Provan & Kenis, 2008)

The organizational structure of beneficiary nations during the application and the implementation of the EUSF will be researched during the case study analysis, based on table 1, their individual governance form will be discussed and evaluated on its efficiency.

2.2.3 Disaster response

In disaster response and recovery operations, demand for assistance varies over time. In the initial stages of a disaster, the first demands lay within actions to protect lives and provide assistance to injured people (Comfort, Ko, & Zagorecki, 2004). When a major disaster occurs, it not only threatens the destruction of technical infrastructure such as roads, communication and powerlines, but also the social, organizational and economic structures of communities or even regions (Comfort, Ko, & Zagorecki, 2004).

According to Comfort, Ko & Zagorecki (2004), response operations are divided in three, time critical phases.

Phase I, the first response phase. First response operations are mobilized by organizations or departments within the respective government, responsible for specific tasks, for example, police, fire, emergency medical services, military etc. In the model Comfort, Ko & Zagorecki (2004) made, they stated that it takes 39 days before the capacity of emergency services exceeds the demand (Comfort, Ko, & Zagorecki, 2004).

Phase II is the period between Phase I up to the threshold where new recourses enter the disaster operations from outside the area and other organizations join the emergency services (Comfort, Ko, & Zagorecki, 2004).

Phase III represents the actions of disaster recovery and the return to normal operations. An appropriate allocation of new and existing resources is the most important part of phase III (Comfort, Ko, & Zagorecki, 2004).

One of the goals of the EUSF is to provide an immediate assistance to disasters stricken regions or nations. It does so by helping to fund vital emergency and recovery operations in areas affected by a disaster (van Lierop, 2018). As the model of Comfort, Ko & Zagorecki (2004) shows, the first month after the occurrence of a disaster is critical. Therefore the period between the application and receiving the actual funds should be a small as possible.

2.2.4 Implementation

During the implementation stage, funds will be allocated to several projects. Each *Implementing Authority* (IA) has its own area of expertise and works on different aspects of the disaster response. This these will divide all the areas of expertise in two categories, the first is repair and/or disaster response, and the second will be the implementation of preventive measures.

For the research question at hand, the first part of the implementation is not really relevant. Even though its money well spend and it contributes to the core goal of the EUSF, the stipulation of solidarity of the EU with regions in Europe confronted with a natural disaster (European Parlement, 2002), there are no guarantees that the next flood will not have the same amount of damage as the previous one, starting the process all over again.

The second part of the implementation stage is of much more importance, the allocation of funds to preventive measure. What part of the EUSF is implemented by de beneficiary Member States to prevent future floods and the potential loss of environmental damage, undermining economic activities, displacement of people or worse the cause of fatalities (European Commission, 2013).

2.2.5 Resilience

To prevent floodings in the future and in that way reducing repeating costs for disaster response, this thesis looks at the part of the funds that are spend on resilience. By investing in protective measures, that have the capacity to resist, increase the capacity to absorb and recover and the capacity to adapt (Alexander, 2016), repeating cost could be diminished. In this thesis the assumption is made that all resilience measures, succeeded, the implemented measure can only be tested by an actual event. Making the

assumption money spend on resilience measures is 100% effective, the effectiveness of the expenditure is mostly based on the part spend on preventive measures in relation to the part of funds spend on the disaster response itself.

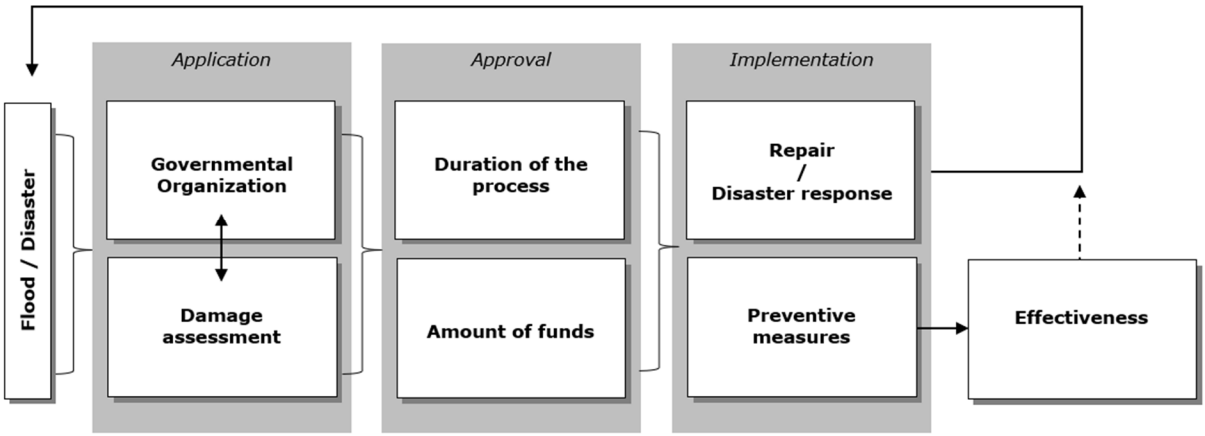

Figure 1 Operationalization of theoretical framework. Source: R. Schuit 2023

2.3 Operationalization of theoretical concepts

In this part of the thesis the transition from theory to the empirical research is described (van Thiel, 2014). An overall conceptual model of the EUSF process can be established, and consists of three crucial steps between the occurrence of a flood and the implementation of actual measures. The steps including the application for the fund and the damage assessment process, the approval phase, and implementation of before mentioned funds. This thesis therefore examines each step of the conceptual model, seeing how funds are obtained and how it is implemented.

During the first part of the process, the application phase, the process of the damage assessment and the governmental organization will be examined. Each case study will focus on how the different beneficiary nations organized the damage assessment and what methods they used to formulate their application. The governmental organization will be evaluated by the theoretical concept by Provan & Kenis (2007).

The approval phase, the second part of the process, focuses on the time period after the application was handed in by the beneficiary nation up until the fund is paid to forementioned beneficiary nation. According to the theory of Comfort, Ko & Zagorecki (2004), the first month(s) after the occurrence of a disaster, the need for temporary housing, health care and evacuation out of the disaster stricken area is the most crucial. One of the main objectives of the EUSF is to provide emergency support, as mentioned before the fund needs to be beneficial to improve or reconstruct public facilities to prevent further losses.

The final part is the implementation stage, the allocation of funds to preventive measure is of much importance. What part of the EUSF is implemented by de beneficiary Member States to prevent future floods and the potential loss of environmental damage, undermining economic activities, displacement of people or worse the cause of fatalities (European Commission, 2013). The focus will be on how the funds are implemented. In this part of the research the implementation of the funds will be divided in two separate groups. To be effective, spend funds need to prevent flood damages in the future. Finalized projects will be analyzed and identified as either a repair / disaster response project of a preventive measure project. In the end the preventive projects are the projects that are interesting for this thesis.

3 Methodology

3.1 Research strategy

The focus of this thesis will be on how the EUSF is used for the implementation of flood prevention measures by receiving countries, this will be examined through four case studies. A case study is "a research strategy in which one or several cases of the subject of study are examined in an everyday, real-life setting" and is generally associated with a holistic approach making use of qualitative methods (van Thiel, 2014). The selection of the cases could been done by a random selection or by information-oriented selection, in this particular case, the cases where selected as critical cases (part of the information-oriented selection) (Flyvbjerg, 2011). The (sub) research questions will be answered through case studies by explaining key elements and taking the context into account. Relevant quantitative data will be examined during the exploratory phase and qualitative methods will be used. The case study research will allow a comprehensive, holistic and in-depth investigation of the issue at hand (Harrison, Birks, Franklin, & Mills, 2017).

The theoretical model and scale of the case studies leads to certain expectations in terms of research question operationalization: the perceived obstacles in obtaining the funds and organizational structures in the implementation phase are expected to be crucial. Therefore there will be a focus on understanding how the different elements interact and react to certain processes and levels of different authorities. A constructivist research paradigm (Guba & Lincoln, 1994) is adopted in this thesis.

A deductive approach will be used because the situation examined through case studies is also examined through the lens of existing theories (Guba & Lincoln, 1994). This will allow for reflection on the theories themselves and on their relevance to this thesis.

3.2 Research methods, data collection and data analysis

The research will be sequential to allow for an initial exploratory research using qualitative and quantitative methods to better understand the situation and better design future research steps. This will involve examination of relevant public documentation, better understand the case studies and refine further methodology through more relevant interviewee selection and questioning. This is in effect a triangulation approach (van Thiel, 2014). This initial exploratory research will be mixed methods: it will also examine quantitative data, in this case, implementation reports of the beneficiary nations will be used, because even though such data will be limited, it is expected to reveal interesting information regarding the means and obstacles faced by Member states.

This thesis will focus on four case studies: one in Serbia *(flooding May 2014, EUSF M€60.2)*, one in Austria *(flooding May 2013, EUSF M€21.6)*, one in Romania *(flooding July 2014, EUSF M€4.3)* and one in Bulgaria *(flooding January 2015, EUSF M€6.4)*. These case studies seem representative because they show a trend of implementing the fund. They were chosen because they fit neatly into the research gap being examined, because the floodings happened several years ago, projects are finalized and can be analyzed. Because Serbia is not part of the EU yet, but since 2000 an potential candidate, they could establish or disprove difficulties in the requirement process. The shared characteristics of the case studies should improve their comparability. However the fact that the case studies are in different countries means that local contexts but also local public and private stakeholders could vary. This will allow for more varied data gathering and comparative analysis.

During the case studies the interrelationships between the four cases will be studied for similarities and patterns. The results may or may not fit to all Member States, but it should establish an "average" of the process. A comparison across the cases will be made, showing the common variables and will give a simplistic representation of the organizational structure of the governments that received the EUSF in the past.

The three steps in the process will be determined by researching several official documents. The applications will be evaluated and researched to determine how beneficiary nations organized their governmental structure and how they conducted their damage assessment in the aftermath of the disaster occurrence. For the approval phase, minutes of EU council meetings will be examined and also the EU proposal for implementation of the fund will be researched to determine the amount beneficiary nations received from the fund, but also the time it took for the EU council to come to a decision. Finally the implementation reports of the beneficiary nations will be examined on the expenditure of the fund, and how these expenditures will contribute to additional resilience of these beneficiary nations.

Examination of the case studies will begin with an initial exploratory phase. In this phase documents and reports will be examined to identify the governmental structures of beneficiary nations. This phase will facilitate identification of key stakeholders for future interviews. Next, a desk study of available economic data will be conducted, to see how funds are used in the implementation phase. After the desk study, a phase of interviews will be conducted to collect further data and to proof or disproof findings. Interviewees will be selected using information from desk study.

Interviewee selection will be focused on individuals involved in the process, even though the selected case studies where finalized several years ago, an attempt will be made to contact stakeholders from the beneficiary Member States as well as the EU. Preferably, interviewees should be in roughly equivalent posts in each case study to keep improving comparability, but as mentioned before, it might be hard to find potential interviewees. Table 2 will give an indication on the type of organization that could provide an interviewee. The analysis of these interviews will occur in several stages. First, there will be a thematic analysis. Atlas.ti will be used to code the interviews and facilitate thematic cross-referencing. Initial coding will focus on identifying the characteristics of each case study. Then, a second coding phase will allow for a better typification of stakeholders to study their networks and their impact upon implementation in each case study. It will also allow for identification of obstacles faced in the requirement phase.

3.3 Validity and reliability of the research

Reliability refers to "replication and consistency" (Saunders, Lewis, & Thornhill, 2015), which is guaranteed not only by the non-invasive nature of the interviews, but also by the reoccurring floodings in the EU. This makes it possible to select other floodings or disasters being analyzed in the context of the EUSF and replicate the process there. Internal validity of the research design is upheld by the chosen methodology, and by the number of case studies (4) a small number of units of study, could endanger the reliability of case study research (van Thiel, 2014), with four cases studies a cross reference of facts could be facilitated and allows the interviewee's personal opinion to be verified (van Thiel, 2014). Furthermore, the triangulation of the research should increase research validity by decreasing the relative importance of any one's personal perspective (van Thiel, 2014).

The external validity of the research is met by the replication of the results of the case study analysis, if the study of the cases shows the same results the findings should be considered as more robust (Kohn, 1997).

Nation	Region	Organization	Role
Austria	National	Ministry for interior	Dept. crisis management
Austria	Salzburg	Salzburg state government	Water management
Austria	Styria	Styrian state government	Water management
Austria	Tyrol	Tyrol state government	Water management
Bulgaria	National	Ministry of regional development and public works	National coordinator
Bulgaria	National	Ministry of regional development and public works	Coordinating authority
Bulgaria	Burgas	Municipality Burgas	Executive body

Serbia	National	Public Investment Office	National coordinator
Serbia	Belgrade	Municipality of Obrenovac	Executive body
Serbia	Pomoravlje	Municipality of Svilajnac	Executive body
Serbia	Kolubare	Municipality of Valjevo	Executive body
Romania	National	Ministry for Environment and Water Management	Water management
Romania	National	National Administration "Apale Romane"	Executive body
Romania	Regional	Dolj state government	Executive body
Romania	Regional	Gorj state government	Executive body
EU	International	EUSF	Executive body

Table 2 List of potential organizations for interviewees

4 Case studies

4.1 Context

The EUSF was set up to show solidarity by Member States during major disasters within Europe. After the creation of the fund in 2002 it has been used for 100 natural disasters covering a range of different events like earthquakes, forest fires, floods, storms and droughts. In total 24 countries have been supported by the fund and a total of 7 billion € in aid have been paid to beneficiaries (European Commission, 2023).

In 2014 the EUSF saw its first reform, intended to be a sign of solidarity in practice lower-income "new" member states received disproportionately less compensation in terms of eligible losses (Hochrainer-Stigler, Linnerooth-Bayer, & Lorant, 2017). Although lower-income states have received more disaster aid than they paid in contribution to the fund, rules for disbursing aid needed to be changed (Hochrainer-Stigler, Linnerooth-Bayer, & Lorant, 2017). The main aim for the reform was to facilitate a faster and simpler use of the fund, but it also intended to encourage Member States to implement prevention methods (European Commission, 2014).

The revised Solidarity Fund Regulation encourages Member States to implement management strategies to prevent or mitigate risk during a risk. If a Member State infringes its obligation to implement the management strategies, the Commission may consider reducing the aid to the beneficiary country (European Commission, 2014). At the other hand, the reform also built in some flexibility to carry over any surplus or to draw in advance from the following year (Bachtler, Begg, Ferry, & Ogilvie, 2019).

The Danube rivers is the largest river basin (figure 2) within the EU[4], covering 801,403 km^2 and crosses 18 nations, including the four nations selected as the case studies (Schmedtje, 2004). With the span of 2778 km and a mean annual discharge of 5630 m^3/s into the Black Sea, the Danube River serves as a vital commercial transportation from Germany in the west to the Black Sea at the east (Gan, Zunic, Kuo, & Strobl, 2012).

Based on its gradients, the Danube River Basin can be divided into three regions: the Upper, Middle and Lower Basins (ICPDR, 2009). The Upper part of the basin starts at the source of the Danube in Germany and reaches to Slovakia, the Middle and largest part of the basin contains the area between Slovakia and the Iron Gate Gorge on the border

[4] The Volga is the largest river in Europe, but it doesn't cross any EU Member State (Hartley, 2021).

between Serbia and Romania. The lowlands, plateaus and mountains of Romania and Bulgaria form the Lower Basin (ICPDR, 2009).

Figure 2 Danube River basin (ICDPR, 2013)

Over the last nine centuries there have been 78 significant floods along the Danube of those 78 floods, 23 occurred took place before extensive flood protection works where implemented in the 18th century (ICPDR, 2009). Since then significant areas of floodplains have been lost due to drainage for agriculture, city development and flood protection dykes all over the river basin (ICPDR, 2009). With major flood evens in 2002, 2005, 2006, 2009, 2010, 2013 and 2014 (ICPDR, 2023) a steep curve of flood frequency and high water marks is noticeable (ICPDR, 2009). Neglected levies along with unusually heavy snow and rain contributed to the floodings. Multi-annual averages for precipitation have been exceeded by 1.5 to 2.0 times in recent history (ICPDR, 2009).

The increasing regularity of dangerous floodings is a cause of concern. According to the EEA the estimated losses between 1980 and 2020 due to weather and climate-related extremes accounted for around 80% of the total economic losses caused by natural hazards in EEA Member States (European Environment Agency, 2022).

In 2007 the *European Flood Directive* (EFD) was implemented and Member States had to develop management plans for river flow areas and make contributions to reduce the negative consequences of flooding on human health, economic activities, the environment and cultural heritage (European Environment Agency, 2023). This directive gives all member states three concrete obligations (European Parlement, 2007):

- An early risk assessment should be done so that it is known where actions are required to reduce flood risks.
- Risk maps should be created of river basins or sub-catchments at potential risk of flooding. This contributes to risk communication and risk awareness.
- Flood management plans should be developed at the level of river basins or sub-basins to identify the need for protection measures and to develop a sustainable strategy against flood risks.

Reports on the progress of the guideline are due every six years, the first six-year cycle has passed in 2015 and the second six-year cycle has passed in 2021 (Stowa, 2023). Even though the process just pasts its first cycle the effects where already noticeable when the cold weather in 2017 caused ice to drift, causing ice jams all along the entire length of the Danube. Contingency measures prevented casualties and damage and disruption were kept to a minimum (ICPDR, 2023).

Of the 100 interventions mentioned earlier, this thesis researches 4 individual cases along the Danube River, for each section of the river (upper, middle or lower) one or two cases were selected. First of all they share the Danube River Basin, but all but one are Member States of the EU, because the EUSF is also intended for countries involved in negotiations for joining the EU, Serbia was selected to see if this had any influence on the submission process. Within all the case studies there are common institutional arrangements for the EUSF intervention. Four layers of governance where identified, ranging from an international to a local perspective, within the four layers different roles could be assigned.

4.1.1 International level

Evidently the EU has a big part in the application and submission phase of the process. Beneficiary countries need to send in their application within 12 weeks of the date of the first damage (European Commission, 2023), and if the application is accepted, it has to approve the amount of aid. The EUSF is not a rapid response instrument for dealing with the effects of a natural disaster, so financial aid could only be granted to an applying state following an application and obligatory budgetary process which can take several months (European Commission, 2023).

4.1.2 National level

At a national level we can distinguish three types of entities involved in different stages of the process. First there is the *National Coordinating Body* (NCB), the role of the NCB is to prepare the submission of the application and to coordinate the implementation of the

EUSF. Secondly there is the *Independent Audit Body* (IAB) tasked with the audits required to draw up the statement of validity. And third, there are the National-level Beneficiaries. Their role is two sided, first they have a role in the contribution of the application by collecting and combining all the information of the lower governmental levels (regional and local), and second they are tasked with the implementation of the EUSF on projects delegated to a ministry, for example; ministries of transport, Health, Environment, etc., National public utility companies and emergency services.

4.1.3 Regional

The role for the regional-level beneficiaries can be differentiated in three categories, their first role is to contribute to the application by collecting damage reports from the region and combining all the information of the local-level governments (municipalities), second they have an implementing role on regional size projects like regional sized road repair, regional programs and assist regional government departments. The final task for regional-level authorities is to support local-level authorities with the implementation of the EUSF.

4.1.4 Local

Municipalities are tasked with first hand damage assessments, these assessments are send to a regional-level government, these assessments are combined and ultimately formed to the an application form to be send to the EU Commission. They also play a big part in the implementation of the EUSF for local level initiatives.

4.1.5 Other stakeholders

Non-Governmental Organizations (NGO's like the Red Cross, humanitarian organizations and Volunteers not only cover support in assistance for the affected population, but they also can play a pivotal role in providing complementary support in gathering data in the field on local needs for recovery to be passed on to local governments.

This section presents the four case studies examined for this thesis. The aim of the case studies is to analyze the procedure for obtaining the EUSF, how the governmental structure is organized in the process for the application and the implementation of the fund, and to see how the funds are spend. For each case a brief context will be given of the region where and when the flood occurred. Figure 3 shows the location of the selected case study within the European context. The case studies will be described in alphabetical order, starting with Austria and ending with Serbia, each chapter will follow more or less the same steps.

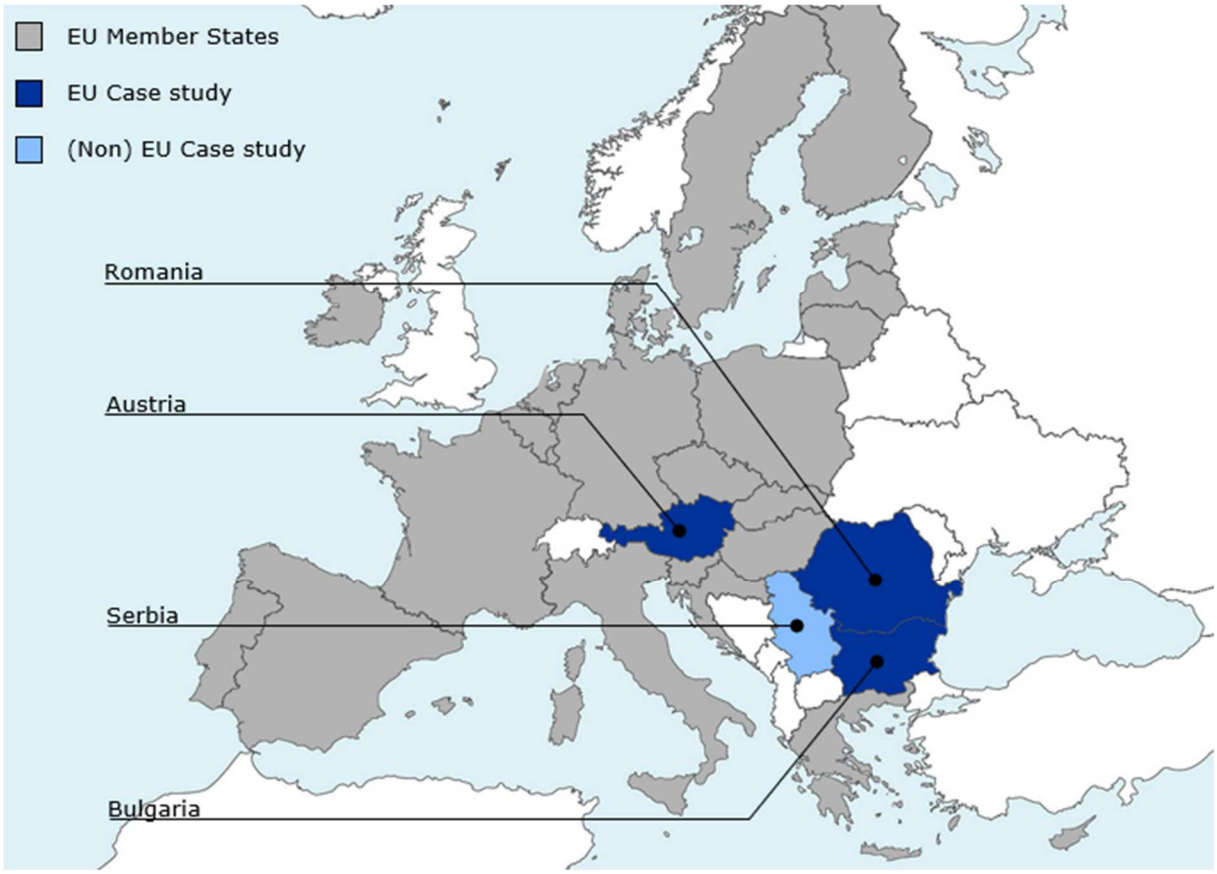

Figure 3 Overview of Case Study countries. Source: R. Schuit 2023

4.2 Case study Austrian Floods May and June 2013

4.2.1 Context

After the extreme floods in 2002 and 2005, another extreme flood occurred in 2013 on the upper and lower Danube. The Danube river basin is the second largest river basin of Europe with a total area of 801,453 km^2 and with flowing through 19 countries it is the most international river in the world (ICPDR, 2023). In a span of 11 years, two 100-years flood event had occurred.

The months leading up to the flooding disaster were characterized by high precipitation, the above-average wet May even came close to a record due to the heavy precipitation at the end of the month (ZAMG, 2013). May 2013 measured almost twice the precipitation in whole of Austria related to the multi-year average. During six days of constant precipitation along the Northern Alps in the first week of June, more than 400 mm of precipitation had been measured (ICPDR, 2014). Even though the individual daily precipitation sums were not extremely high, the accumulation over the four days from the 30th of May to the 2nd of June ultimately resulted in extreme flooding (ICPDR, 2014).

The wet conditions of the end of May and the start of June caused the saturation of the soil that led to a rapid runoff and ended in an extreme flooding within the Austrian

Danube and its tributaries. The coincidence of peak flows from the Saalach-, Salzach-, Inn- and the Danube river led to the highest records ever measured (ICPDR, 2014). Regions situated alongside the Alps saw the most severe rainfall, whereas Eastern and Southern Austria were affected to a lesser degree, Figure 4 shows the areas most affected by the floodings in 2013 (ICPDR, 2014).

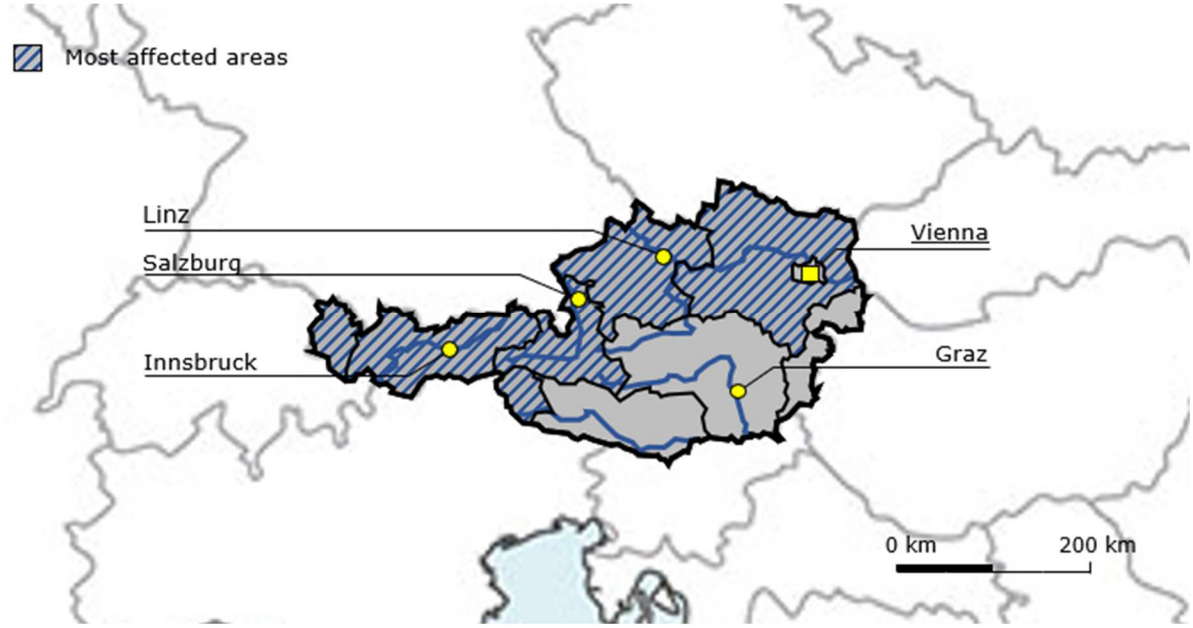

Figure 4 Affected areas 2013 flooding Austria. Source: R. Schuit 2023

In Austria 5 casualties have been directly related to the flood event, but the floodings and landslides also caused high levels of destruction to properties both public and private and had serious implications for the economy (ICPDR, 2014). The total monetary losses are estimated at M€ 870 of which M€ 235 where insured.

4.2.2 Application phase

During the May floodings, Germany was effected by the same event and submitted an application for the EUSF on July 24th 2013 under the "major disaster" criteria (Bundesministerium fur Inneres, 2013). According to Art. 2[5] a Member State could ask for assistance form the EUSF when serious repercussions on living conditions, human health, the natural environment or the economy occur as a consequence of a major or regional disaster has taken place on the territory of the same or a neighboring eligible state (European Parliament, 2002). Due to the massive flood damage, the Republic of Austria submitted an application for aid from the EUSF on August 6th 2013, based on that an application had also been submitted by Germany (Bundesministerium fur Inneres, 2013).

[5] Council Regulation (EC) No 2012/2002 of 11 November 2002 establishing the European Union Solidarity Fund (European Parliament, 2002).

In accordance to Art 4[6] Austria included an accurate estimate of the direct damages caused by the flooding. Estimates were executed by the affected local, regional and national public administrations as well as private entities (Bundesministerium fur Inneres, 2013). The Austrian Federal Ministry of the Interior requested relevant Austrian Ministries (Ministry for Sustainability and Tourism, Ministry for Transport, Innovation and Technology, Ministry of Defense and the Ministry for Education, Science and Research) to assist in the determination of the severity of the damages (Bundesministerium fur Inneres, 2013).

After a natural disaster, the Austrian system of financial assistance involves 'municipal damage commissions' whom are tasked with the damage evaluations and collecting data (OIR GmbH, 2018). The commissions consist of local councilors, experts and administrative staff. During visits to the affected sites, they wrote (local) damage reports and forwarded the reports to the Federal or State Governments (OIR GmbH, 2018). The majority of the damages estimates in the EUSF application were based on local assessments (OIR GmbH, 2018). On a national level damages were evaluated by experts of the Torrent and Avalanche Control Department, the Federal Water Authority and the local waterway administration (OIR GmbH, 2018).

In the aftermath of the 2013 flood, depending on the available data, one of the next three methods of damage assessment were used (OIR GmbH, 2018):

- damage evaluation and assessment based on known costs;
- if this was not possible, an indication of the costs was made based on experience and averages in combination with the known extent of the damage; and/or
- if the previous steps were not possible, a plausible estimate was made by using the best available information.

The estimated total of direct damages were estimated by the Austrian authorities at M€ 866,5, representing 48% of the "major disaster" threshold of M€ 1,800 (0,6% of Austria's GNI). Therefore the disaster did not qualify as a "major disaster" (Art 2.2[7]) under the terms of Council Regulation (European Commission, 2013). Because the floods in Germany and Austria have the same underlying cause, the Austrian application under the "neighboring country" criteria was deemed valid by the commission (European Commission, 2013).

[6] Council Regulation (EC) No 2012/2002 of 11 November 2002 establishing the European Union Solidarity Fund (European Parliament, 2002).
[7] Council Regulation (EC) No 2012/2002 of 11 November 2002 establishing the European Union Solidarity Fund (European Parliament, 2002).

On August 6th 2013, Austria submitted its application for the EUSF. Based on previous experience with the application for the EUSF[8], the Austrian Federal Ministry of Interior went through the submission phase without and big problems or challenges (OIR GmbH, 2018).

4.2.3 Approval phase

The May floodings affected Germany, Austria and the Czech Republic. Subsequently, Germany submitted an application for financial assistance from the EUSF under the "major disaster" criteria, the applications from Austria and the Czech Republic were based on the so-called "neighboring country criterion".

The application for financial contribution of the EUSF was submitted to the commission on August 6th 2013, this was within the 10-week deadline of the first damage was recorded on May 30th 2013 (EU monitor, 2015).

In October 2013, the Commission formulated a proposal to the Parliament and the Council on three applications (Germany, Austria and the Czech Republic) for financial contribution from the EUSF (European Commission, 2013). The proposal included a description of the damages and a statement that the application meets the criteria set out in the regulation for mobilizing the EUSF, confirming that Austria had submitted their application in a timely manner (European Commission, 2013).

After examining the application and considering the maximum possible grant from the EUSF as well as the scope, the Commission have proposed to mobilize the EUSF for a total amount of € 21,661,550.- (sum of the 2.5% of the direct damage up to the threshold and the 6% damage above the damage threshold, see table 3). The direct damage didn't exceeded the threshold and the disaster was qualified as a disaster in a "neighboring country" (European Commission, 2013).

On 20th of November 2013, the proposed budget was adopted by the Council and the European parliament, but the major part of the necessary appropriations would only be available in 2014 (EU monitor, 2015).

[8] Floods in 2002, 2005 and 2012 (European Commission, 2023)

Direct damage (M€)	Major disaster threshold (M€)	Total cost of eligible operations (M€)	2.5% of direct damage up to threshold (€)	6% of direct damage above threshold (€)	Total amount of aid proposed (€)
866,462	1,789.112	350.334	21,661,550	-	**21,661,550**

Table 3 Damage evaluation EC (European Commission, 2013)

The financial contribution amounting to € 21,661,550.- was paid out on February 14th 2014 (EU monitor, 2015), 260 days after the disaster took place.

4.2.4 Implementation

For the implementation, the Federal Ministry of the Interior was assigned as the responsible body for financial assistance and coordinating the funds. In accordance with the rules of the federal disaster funds[9] the Federal Ministry of the Interior and the Federal Ministry of Finance agreed to divide the Funds. Two-thirds would be allocated for the federal government, and one-third would be assigned to the seven federal states (Bundesministerium fur Inneres, 2013).

Federal share: € 14,441,033.33
Share states: € 7,220,516.67

This division is based on the principles of cost sharing for damages due to natural disasters between the federal government and the states. Expenditures by the public sector, the aid of private individuals and the damage to the governments assets are covered by the fund (Bundesministerium fur Inneres, 2013).

A breakdown of the financial division between the seven regional districts in relation to the total losses is shown in table 4.

	% share of total losses	**Proportionate aid**
Lower Austria	23.91	€ 1,726,775.19
Upper Austria	40.46	€ 2,921,469.11
Salzburg	9.79	€ 707,041.34
Styria	0.88	€ 63,640.31
Tyrol	23.21	€ 1,676,202.47

[9] Paragraph 3 of the Disaster Fund Act 1996 (RIS, 2023)

Vorarlberg	1.19	€ 85,735.82
Vienna	0.55	€ 39,625.43
Total	*100*	**€ 7,220,516.67**

Table 4 Breakdown funds regional (Bundesministerium fur Inneres, 2013)

To maximize transparency of expenditures, an organizational and legal framework was created for processing and coordinating of the financial assistance. With this framework, the Federal Ministry of the Interior and the provinces Lower & Upper Austria, Salzburg, Styria, Tyrol, Vorarlberg and Vienna used an identical administrative system and the same distribution of rights and obligations (Bundesministerium fur Inneres, 2013).

In line with the EUSF regulation, the fund was mainly used for the immediate rebuilding of protective infrastructure and measures for the immediate protection of the cultural heritage (OIR GmbH, 2018). In coordination with the strategic levels of the departments, regional authorities of the Torrent and Avalanche Control and the Federal Water Engineering Administration projects where selected (OIR GmbH, 2018). Carried out operations were all measures for the immediate securing, rehabilitation and reconstruction of riverbank protections structures and the associated infrastructure, including the additional work and accompanying measures required for this purpose, such as dredging, sludge removal etc. (Bundesministerium fur Inneres, 2013).

The floods in 2013 not only caused extensive damage to public infrastructure, but also damaged and destroyed the necessary protection facilities along watercourses. The rapid securing and short-term restoration of the protective facilities, destroyed by the flood was therefore a critical part of the implementation of the fund (Bundesministerium fur Inneres, 2013).

The implementation of the financial control by the beneficiary state is specified in Art. 6.4[10] of the Agreement and was carried out as follows;

The federal Ministry of the Interior was responsible for managing the control of the funds and acted as the audit authority for the EUSF (Bundesministerium fur Inneres, 2013). The audits were based on the relevant EU legislation on the EUSF and national regulations (Bundesministerium fur Inneres, 2013). Identified deficiencies were either corrected during the on-site audit or handled in a satisfactory way with the involvement

[10] Council Regulation (EC) No 2012/2002 of 11 November 2002 establishing the European Union Solidarity Fund (European Parliament, 2002).

of the responsible authorities and did not have any on the paid out funds (OIR GmbH, 2018).

The EU Civil Protection Mechanism[11] aims at a higher level of protection and resilience to disasters by preventing and mitigating the effects of disasters and develop a culture of prevention, taking the effects of climate change and the need for adequate adaption into account (Bundesministerium fur Inneres, 2013). The strategic orientation of flood protection in Austria is based on decades of experience, but also draws on lessons from recent flood disasters. Flood protection consists of several components (Bundesministerium fur Inneres, 2013):

- Preventive flood protection including measures that lead to a reduction of runoff peaks and runoff velocities
- Technical flood protection including protective structures in or along the channel and in the flood zone

Flood prevention focuses on measures to reduce the damage potential through area, construction, behavior and risk prevention (Bundesministerium fur Inneres, 2013).

As a result of 45 subprojects, recommendations were derived on how to improve flood management in Austria for the future. The flood protection strategy for Austria is based on the following elements (Bundesministerium fur Inneres, 2013):

- Show limits of the current protection infrastructure and responsibility of the parties involved
- Promote hazard knowledge and awareness
- Ensure appropriate use through spatial planning
- Identify negative developments relevant to flooding
- Coordinate public sector planning
- Protective measures where necessary
- Expand emergency planning and disaster response
- Ensure financial provision
- Improve warning systems

One of the funds available for financing measures to prevent future disasters and to repair damage directly related to a natural disaster is the EUSF, during the May and June floodings in 2013, three quarters of the fund was earmarked for protection against natural hazards (Bundesministerium fur Inneres, 2013).

[11] The EU civil protection mechanism helps EU and non-EU countries respond to emergencies such as natural disasters, health crisis or conflicts. Countries can request assistance through the mechanism when an emergency overwhelms their response capabilities. (European Council, 2023)

4.3 Case study Bulgarian Floods January and February 2015

4.3.1 Context

Due to heavy precipitation, varying between 160 and 200 mm in three days equaling to a normal month ratio, in combination with hurricane force winds, led to severe floodings and causing major damage to public and private infrastructure in Bulgaria (Government Bulgaria, 2023). High water-levels damaged bridges, and destroyed vital infrastructure like roads, railways, drains, culverts and preventive flood measures. Excessive levels of groundwater led to the flooding of public and private owned buildings (Georgieva & Spiridonova, 2018).

The most affected by the flooding was the region in the south-east of Bulgaria, Figure 5 shows the areas most affected by the floodings in 2015. The Burgas municipality suffered major damages by the flood, over 300 buildings were flooded, the public transport and water infrastructure were badly damaged and one of the main water pipelines became ineffective and needed to be repaired immediately (Georgieva & Spiridonova, 2018). The population affected in the Burgas district reached over 400,000 inhabitants, almost 17% of the total population (Worldbank, 2023).

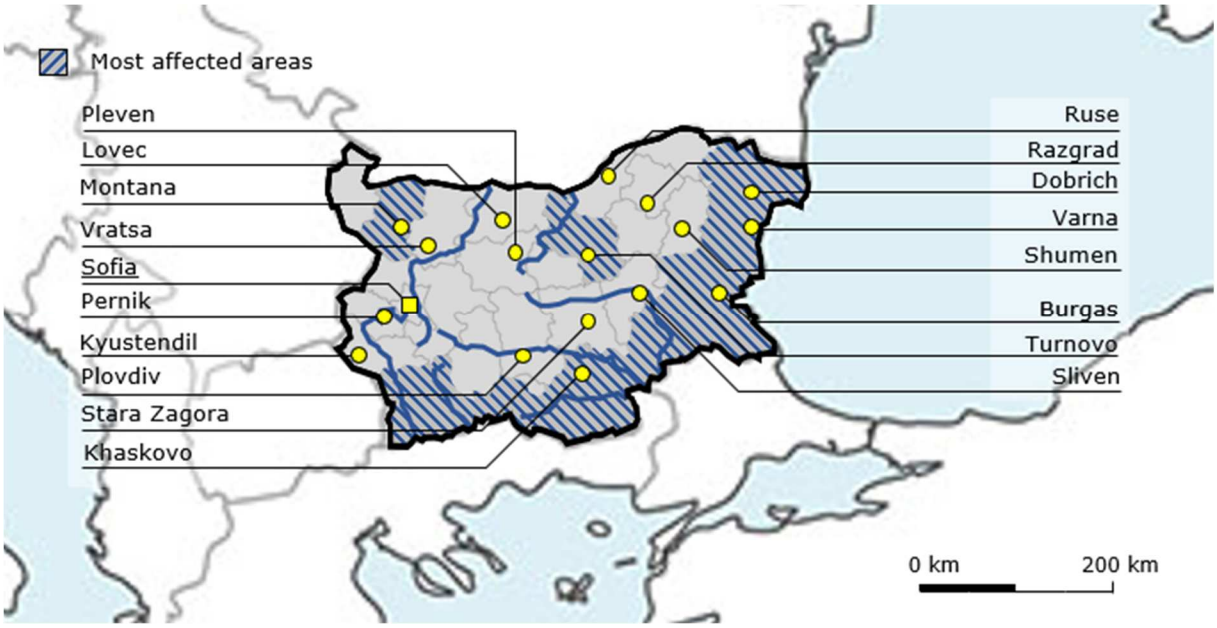

Figure 5 Affected areas 2015 flooding Bulgaria. Source: R. Schuit 2023

On the night of 30th and 31st of January 2015, hurricane force winds hit the North-West part of the country, causing power failures, affected over 40 km of road infrastructure and caused more than 10 landslides in the Montana district (Georgieva & Spiridonova, 2018). In Bulgaria 5 casualties have been directly related to the flood events of January 2015 (Davies, 2015), the total monetary losses are estimated at M€ 234 (Georgieva & Spiridonova, 2018).

4.3.2 Application phase

The severe winter conditions affected almost the whole territory of Bulgaria. Landslides destroyed important infrastructure, dykes broke, many rivers burst their banks, pine forests were destroyed causing power failures and roads were blocked by fallen trees (European Commission, 2015).

On April 24th 2015, Bulgaria submitted its application for the EUSF, within the deadline of 12 weeks after the first damages were reported on January 30th 2015 (European Commission, 2016). The damages directly caused by the disaster where estimated by the Bulgarian authorities at M€ 234,3, which represented 0,622% of Bulgaria's GNI (European Commission, 2016). This exceeded the disaster threshold, qualifying it as a "major natural disaster" (European Commission, 2016).

During the submission of their application, Bulgaria requested an advanced payment of the anticipated contribution from the EUSF. After a preliminary assessment of the application the Commission concluded that the circumstances Bulgaria faced where within the criteria to grand an advance and 10% of the anticipated financial contribution was paid out on July 15th 2015 (European Commission, 2016).

Before an application could be submitted, a damage evaluation needed to be conducted. Damage estimates had to be collected and summarized from 18 municipalities in 12 districts (Georgieva & Spiridonova, 2018). Due to the short period of time, the separate commissions formed in these 18 municipalities made an inventory of mostly public property. Private damages were not included in the application because there was inadequate time to make a proper assessment of the damages caused by the flooding (Georgieva & Spiridonova, 2018).

Essential emergency operations, eligible under Article 3.2[12], have been estimated by the Bulgarian authorities at M€ 239 (European Commission, 2015). This amount represents over 98% of the total damages. This disproportionately high share was explained by the Bulgarian government as the inability of local authorities to assess the private damages properly within the deadline, therefore private damages are for a large extent excluded from the application (European Commission, 2015). The biggest part of the emergency operations (M€ 97) went to securing preventive infrastructure, over M€ 46 was designated for the restoration of transport infrastructure.

[12] Council Regulation (EC) No 2012/2002 of 11 November 2002 establishing the European Union Solidarity Fund (European Parliament, 2002).

4.3.3 Approval phase

The application for financial contribution of the EUSF was submitted to the commission on April 24th 2015, this was within the 12-week deadline of the first damage was recorded on January 30th 2015 (European Commission, 2016).

In July 2015, the Commission formulated a proposal to the Parliament and the Council on two applications (Bulgaria and Greece) for financial contribution from the EUSF (European Commission, 2015). The proposal included a description of the damages and a statement that the application meets the criteria set out in the Regulation for mobilizing the EUSF, confirming the Bulgaria had submitted their application in a timely manner (European Commission, 2015). After examining the application and considering the maximum possible grant from the EUSF as well as the scope, the Commission have proposed to mobilize the EUSF for a total amount of € 6,377,815.- (sum of the 2.5% of the direct damage up to the threshold and the 6% damage above the damage threshold, see table 5 below). The Bulgarian authorities estimated the total direct damages, caused by the disaster at M€ 234,305.-, this represents 0.622% of Bulgaria's GNI or 103.6% of the "major disaster" threshold (European Commission, 2015).

Direct damage (M€)	Major disaster threshold (M€)	Total cost of eligible operations (M€)	2.5% of direct damage up to threshold (€)	6% of direct damage above threshold (€)	Total amount of aid proposed (€)
243.305	234.871	239.225	5,871,775	506,040	**6,377,815**

Table 5 Damage evaluation EC (European Commission, 2015)

When submitting its application, Bulgaria put in a formal request for an advanced payment on the anticipated contribution of the EUSF. After a preliminary assessment of the application the Commission concluded that the conditions for an advanced payment were met. 10% of the anticipated financial contribution was awarded and € 637,782.- was paid out on July 15th 2015.

On 6th of October 2015, Decision EU 2015/1872 on the mobilization of the EUSF was published by the Council (EUR-Lex, 2015). The financial contribution amounting to € 5,740,033.- (total mobilized amount minus 10% which was paid out on July 15th 2015) was paid out on December 1st 2015 (European Commission, 2015), 305 days after the disaster took place.

4.3.4 Implementation

For the implementation of the EUSF intervention, the Bulgarian government set up an organizational structure, with designated institutions and obligations for those institutions (Georgieva & Spiridonova, 2018). The top-down approach consisted of a national coordinator, a coordinating authority, executive bodies and an audit authority.

The institutional arrangements showed two important features that affected the speed and efficiency of the implementation of the funds in a positive way (Georgieva & Spiridonova, 2018).

The national coordinator was tasked to prepare a list of prioritized projects. For the implementation of the fund, the national coordinator set up three priorities for the executive bodies to organize the immediate efforts after the disaster (Georgieva & Spiridonova, 2018):

- Support affected population by (temporary) accommodation and rescue services;
- Immediate restoration of basic infrastructure; and
- Evaluate damages

The coordinating authority was formed by the *General Directorate for Fire Safety and Protection of the Population* (GDFSPP) and the *General Directorate Strategic Planning and Programs for Regional Development* (GDSPPRD) (Georgieva & Spiridonova, 2018). Because of the well-trained and organized structure the GDFSPP, was tasked to provide immediate assistance to the population in emergency situations (Georgieva & Spiridonova, 2018).

Together with District Governors and local authorities the GDFSPP collected information at a municipality level and afterwards at district level, this information was used by the national coordinator for the application and implementation of the EUSF (Georgieva & Spiridonova, 2018).

A leading role was given to the GDSPPRD for the implementation and the execution of the prioritized projects setup by the national coordinator. The GDSPPRD was the managing authority because of their experiences with commission services, local authorities and other public bodies as beneficiaries of the EUSF (Georgieva & Spiridonova, 2018). Experts in the managing authority verified request for payments according the designated procedures, guaranteeing a level of control on the disbursement of the funds and an understanding of the needs of the beneficiaries (Georgieva & Spiridonova, 2018).

The executive bodies consisted of beneficiaries like municipalities, responsible units, civil servants and the Road Infrastructure Agency. Their task was to prioritize projects eligible for the EUSF. A total of 21 projects were submitted by the executive bodies and 19 of them were approved (Georgieva & Spiridonova, 2018). Of the two projects who were considered as ineligible, the first one was covered by insurance and for the second project the executive body failed to provide additional information.
The EUSF aid was divided among the affected districts and other public authorities. The total granted amount was € 6,377,815.- and divided among the executive bodies as shown in table 6.

Beneficiary	**EUSF awarded**
Bulgarian districts (12)	€ 2,955,726.-
Road Infrastructure Agency	€ 3,238,775.-
Public bodies	€ 171.136.-
Total	***€ 6,377,815,-***

Table 6 Division of EUSF in Bulgaria (Georgieva & Spiridonova, 2018)

Because the public procurement procedures could take a long time (9-12 months including appeals) the Bulgarian authorities prioritized ongoing projects. This resulted in a nearly full absorption of the funds and the completion of 19 projects, which included 111 operations, 56 of them were completed within six months after the disaster occurred (Georgieva & Spiridonova, 2018). Within 12 months after the disaster, 83% of all projects and operations were completed (Georgieva & Spiridonova, 2018).

During the implementation of the fund, most of the financial support was used for the restoration of infrastructure (82.6%), 15.6% was used for preventive infrastructure and restoring cultural heritage. Even though the EUSF aim is to show solidarity in the aftermath of a disaster, the restoration of water networks or cleaning up river beds also have an effect on the resilience against future floodings (Georgieva & Spiridonova, 2018).

The qualitative achievements of the EUSF implementation in Bulgaria is summed up below (Georgieva & Spiridonova, 2018):

- 10,254 m^1 river cleansing and drain channel restoration;
- 29,233 m^3 sediment, rock and ground removal;
- 25 preventive infrastructure restoration projects;
- 57 roads were reopened;
- 57,911 m^2 pavement (asphalt and sidewalk) was restored.

On September 24th 2015, the Commission carried out a monitoring visit to Varna. During this visit the Commission concluded that the relevant authorities were carrying out the implementation and controls in a transparent correct manner and in respect of the rules imposed by the EUSF Regulation (European Commission, 2016).

4.4 Case study Romanian Floods July and August 2014

4.4.1 Context

Romania is a country with one of the highest flood risk in Europe (Zaharia & Loana-Toroimac, 2018). Climate change has led to new temperature records and an significant increase in precipitation between 2000 and 2017 compared to the previous century (1900-1990) (Marinica, Constatin, Marinica, & Grigore, 2019).

In the summer of 2014, Romania experienced torrential rain that led to a major flooding (Roman & Lucaciu, 2018). The heavy precipitation and subsequential flooding began at July 28th and continued up until mid-August, resulting in significant damage to infrastructure, businesses, public and private buildings, and agriculture (Roman & Lucaciu, 2018). River basins, unable to cope with the volume of water, exceeded their capacity with large scale floodings as a result (Roman & Lucaciu, 2018). Figure 6 shows the areas most affected by the floodings in 2014.

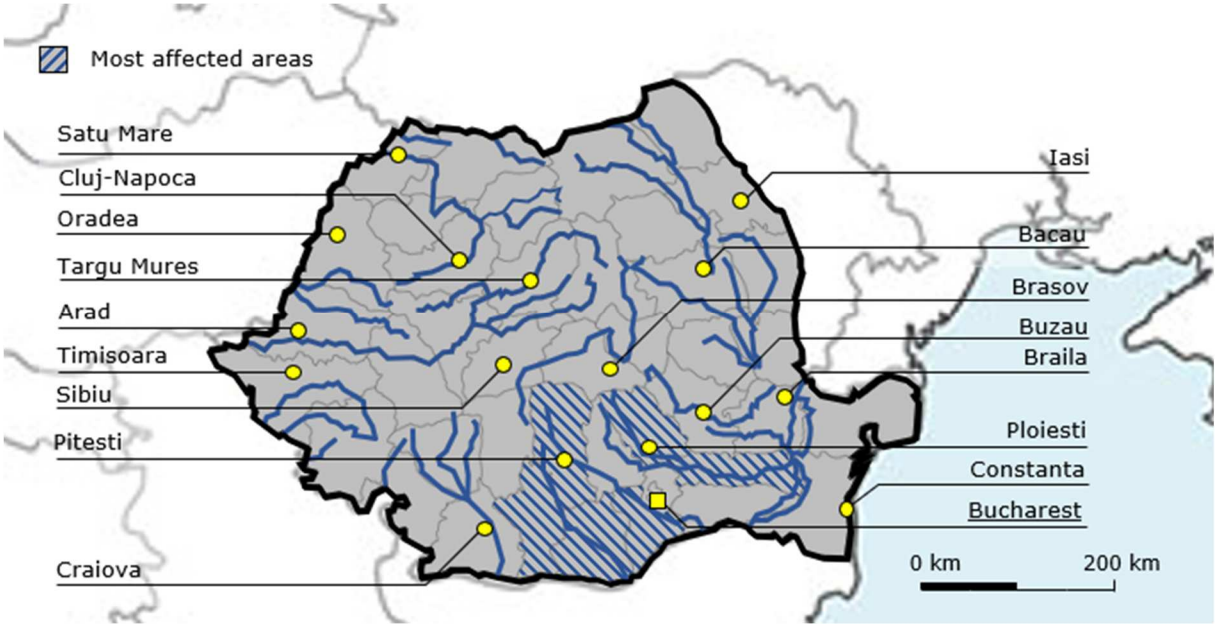

Figure 6 Affected areas 2014 flooding Romania. Source: R. Schuit 2023

Damages included partial or complete devastation of more than 2,300 homes and around 125,000 people were directly affected by the floodings (Roman & Lucaciu, 2018). With approximately 40,000 hectares of crops ruined, and 700 livestock animals drowned, the agricultural sector was hit particularly hard (Roman & Lucaciu, 2018). With damages to schools, kindergartens, churches, healthcare centers and other cultural buildings the

2014 flood had a lasting impact on the living conditions of the population (Romanescu & Stoleriu, 2013).

In Romania 1 casualty have been directly related to the flood event, three others were missing after the flood (Reuters, 2014). Large numbers of people had to be evacuated and have been given temporary shelter in nearby schools and police stations (Reuters, 2014). The total monetary losses are estimated at M€ 172 (Roman & Lucaciu, 2018).

4.4.2 Application phase

As a result of adverse weather and water conditions in the summer of 2014, units under the supervision, coordination or authority of the Ministry of Agriculture The Ministry of Water and Forests report on the damage recorded, according to the specific activity (Ionescu, 2023).

In the legal acts issued in Romania for the regulation and access to EUSF applications, national 'bodies' are involved in the implementation and application of the EUSF. In Romania the national 'bodies' are:

- The General Secretariat of the Government, through the Policy and Priorities Coordination Directorate, is the Coordinating and Managing Authority of the EUSF;
- The Ministry of Environment, Water and Forests is the IA, being one of the bodies responsible for the execution of the financial contribution;
- The Audit Authority of the Court of Auditors of Romania is the independent audit body responsible for establishing the opinion on whether the expenditure made from the Solidarity Fund's financial contribution and presented in the implementation report is legal and regular and whether the management and control system put in place functioned properly;
- Final beneficiaries may be any of the public entities using/administering public funds and/or public assets and operating under the subordination/coordination or, as the case may be, within/under the authority of the implementing authorities (Ionescu, 2023).

The situations received were analyzed/evaluated from the following points of view:

- administrative: documents identifying the disaster-affected objective or areas (name, location, technical elements affected, link with the disaster), type of document and issuing institution, summary reports with the endorsement of the State Inspectorate for Emergency Situations, any other equivalent documents, signed by the members of the verification commission and findings endorsed by

the Prefect as chairman of the Committee for Emergency Situations, related to the objective for which the EUSF settlement is requested;

- technical-economic. For this it was followed:
    - real value estimation of the affected objectives and/or hydrotechnical elements. This estimate represents the value required to restore or bring it back into service. The restoration to original condition of the affected areas should be expressed in current prices, not as an inventory value. This has been done as followed:
        - affected areas have been identified,
        - in order to estimate the value, the database was searched for new works executed, similar in terms of morphology, technique, location, etc.,
- identify ways of connecting the new, reconstructed elements to the existing elements in such a way as to preserve the functionality of the infrastructure or facility (Ionescu, 2023).

The centralized damage statement was sent to the Secretariat-General of the Government the Policy and Priorities Coordination Directorate. By the EUSF Coordination and Management Authority, grouped by counties. These damage assessments mentioned the periods in which the disaster occurred. At the same time, the institutions under the subordination, coordination and authority that will be involved in the implementation, as Final Beneficiary, would assess for each of the operations declared if they were eligible, in accordance with Article 3[13].

Romania submitted a second application for EUSF assistance for damage caused by the heavy precipitation and subsequent floods and landslides in south-western Romania during the period from late July to mid-August 2014. The disaster caused damage to public and private infrastructure, to businesses and the agricultural sector, as well as to cultural heritage and private homes (European Commission, 2016).

4.4.3 Approval phase

The application for financial contribution of the EUSF was submitted to the commission on October 3rd 2014, this was within the 12-week deadline of the first damage was recorded on July 28th 2014 (European Commission, 2016). Upon request from the Commission, on

[13] Council Regulation (EC) No 2012/2002 of 11 November 2002 establishing the European Union Solidarity Fund (European Parliament, 2002).

January 13th 2015 additional information including a revised damage estimation was provided (European Commission, 2016).

The flooding related to one singe NUTS 2 region, "Sud-Vest Oltenia". Romanian authorities estimated the total direct damage caused by the disaster at M€ 171,911.- representing 0.13% of Romania's GNI and thus remaining below the threshold for a "major disaster" (European Commission, 2016).

In April 2015, the Commission formulated a proposal to the Parliament and the Council on four applications (Bulgaria, Romania (spring floods/summer floods and Italy) for financial contribution from the EUSF (European Commission, 2015). The proposal included a description of the damages and a statement that the application meets the criteria set out in the Regulation for mobilizing the EUSF, confirming the Romania had submitted their application in a timely manner (European Commission, 2015).

After examining the application and considering the maximum possible grant from the EUSF as well as the scope, the Commission have proposed to mobilize the EUSF for a total amount of € 4,297,775.- (sum of the 2.5% of the direct damage up to the threshold and the 6% damage above the damage threshold, see table 7 below).

Because the total damages did not meet the disaster threshold for activating the EUSF, the application was examined on the basis of the criteria for "regional disasters". For this the damages needed to exceed the threshold of 1.5% of the GDP of the region at NUTS level 2 (European Commission, 2015). With a direct damage of M€ 171,911.- it represents 1.64% of the regional GDP, exceeding the 1.5% threshold, and therefore eligible for a contribution of the EUSF (European Commission, 2015).

Direct damage (M€)	Major disaster threshold (M€)	Total cost of eligible operations (M€)	2.5% of direct damage up to threshold (€)	6% of direct damage above threshold (€)	Total amount of aid proposed (€)
171.911	232.502	93.955	4,297,775	-	**4,297,775**

Table 7 Damage evaluation EC (European Commission, 2015)

On 9th of April 2015, the proposed budget was adopted by the Council and the European parliament (European Commission, 2015). The financial contribution amounting to € 4,297,775.- was paid out on August 21st 2015 (European Commission, 2015), 389 days

after the disaster took place. During the interview, the interviewee stated that the time between the application and the approval was long and the process was slow. Projects were mostly pre-financed by the Romanian government and later reimbursed by the EUSF (Randasu, 2023).

4.4.4 Implementation

The implementation phase started on 23 August 2015 and ended after 18 months with the last installment on 23 February 2017 (Roman & Lucaciu, 2018). Before the implementation phase could start, a need for a legal framework was necessary. On 30 December 2015, the Romanian government approved an organizational structure for the management for the granted EU assistance (Roman & Lucaciu, 2018). The organizational structure prioritized eligible public expenditures within the emergency operations conducted to repair the damages caused by the floods. For the IA's without previous experience the provided support by setting up an operational framework and procedures, these entailed a job description, procedures, checklist forms and rules of the forementioned procedures (Roman & Lucaciu, 2018).

After setting up the operational framework, the IA's where tasked to identify eligible beneficiaries and operations, by evaluating collected applications and establish their eligibility for EUSF support (Roman & Lucaciu, 2018). The EUSF support was granted for the following types of operations (Roman & Lucaciu, 2018):

- Emergency operations consisting of:
    - Debris removal caused by the damage, search and rescue missions, air interventions, special transport, and the extraction and rescue of persons. Conducted by the Ministry of National Defense, General Aviation Inspectorate, Romanian Gendarmerie and the *General Inspectorate for Emergency Cases* (IGSU);
    - Distribution of primary need products;
    - Pumping and draining operations performed by *National Land Improvement Agency* (ANIF);
    - Electricity for disaster-stricken people

- Restoration of damaged infrastructure:
    - Reconstruction of the bridge over the Gilort River;
    - Restoration of the water supply system in the Vaideeni area;
    - Reinforcement of embankments;
    - Restoration of a footbridge in the village of Rosia;
    - Damage repair on roads;

- Restoration on flood defense infrastructure damaged by the flooding;
- Recovery of the defense line on the Teslui River.

The total amount of € 8,495,950,- was allocated by the European Commission and divided accordingly to the eligible expenses. The settlement of costs will be done after all the work on the damaged infrastructure is completed by 15th of January 2017 (Romanian Government, 2015).

According to the Romanian Government, the total amount of the EUSF allocated to Romania was distributed by the Romanian Government to the following agencies (Romanian Government, 2015):

Institution	**Amount**
Ministry of Regional Development and Public Administration	€ 5,429,953.-
Ministry of Environment, Waters and Forests	€ 2,039,447.-
Interior Ministry	€ 579,353.-
Ministry of Health	€ 64,559.-
Ministry of Defense	€ 17,141.-
Ministry of Agriculture and Rural Development	€ 91,765.-
Ministry of Transport	€ 216,706.-
Ministry of Economy	€ 56,953.-
Total	***€8,495,950,-[14]***

Table 8 Implementation of EUSF by the Romanian Government (Romanian Government, 2015).

The above mentioned ministries are the IA's of the EUSF, with the authority to establish criteria for the selection and prioritization of contracts. Payments where approved by the Prime Minister Chancellery, based on the operational frame work established by the Romanian Government (Romanian Government, 2015).

Following the audit mission carried out by the Audit Authority of the Romanian Court of Auditors, the independent audit body responsible for establishing the opinion on whether the expenditure made from the Solidarity Fund financial contribution and presented in the implementation report is legal and regular, a financial impact of the equivalent in RON of € 259,283,70 was established (Ionescu, 2023).

[14] Romania suffered more than one incident that particular year, they received funding from the EUSF twice that year.

4.5 Case study Serbian Floods May 2014

4.5.1 Context

During the third week of May 2014, Serbia faced the worst rainfall in 120 years of recorded measurements (Andelkovic, et al., 2018). Following a pressure cyclone system ('Yvette'), the Republic of Serbia was struck by a severe flood. As rivers rose several meters above their banks entire cities were evacuated (Brkanovic, Regiogro, & Pesic, 2018). Road damages and the disrupted infrastructure caused several towns in western Serbia to be inaccessible for days (Brkanovic, Regiogro, & Pesic, 2018).

The combination of heavy precipitation, high soil saturation and the unstable soil in hilly areas caused the a sequence of landslides (Serbia National Government, 2014). These landslides caused major damages in both inhabited and uninhabited areas and resulted in the destruction of houses, roads, bridges and other infrastructural works (Serbia National Government, 2014). In addition to the direct effects of the flooding and landslides, it also brought additional problems to the living and environmental conditions (Serbia National Government, 2014). Due to the flooding, several health facilities and schools were damaged and had to be closed. Figure 7 shows the areas most affected by the floodings in 2014.

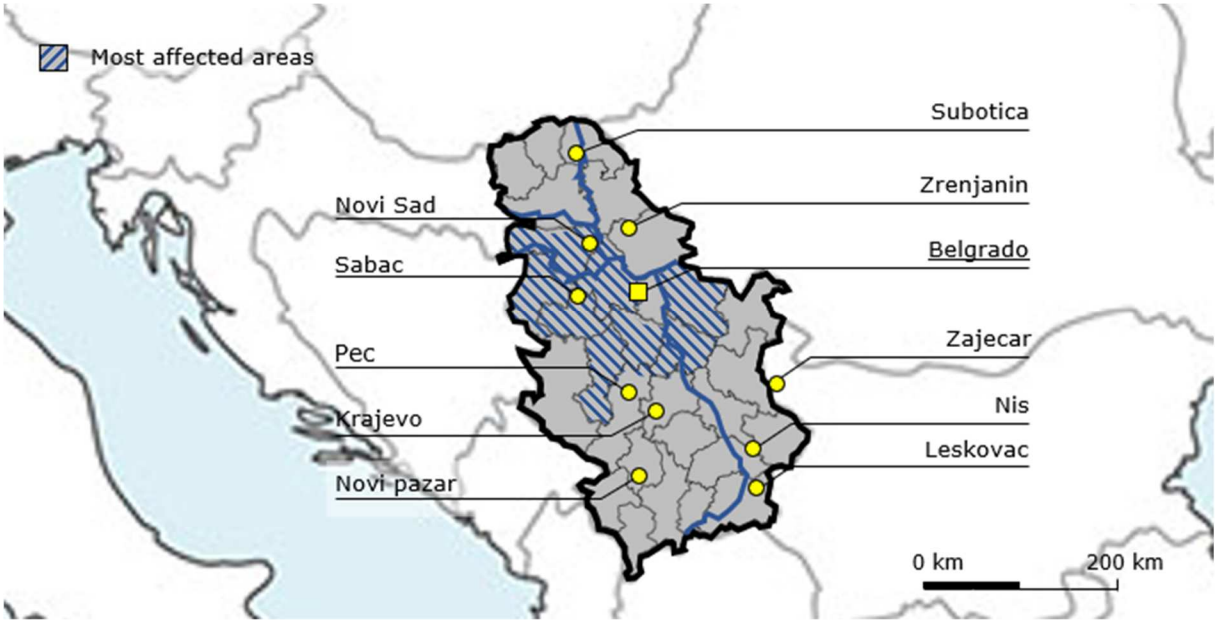

Figure 7 Affected areas 2014 flooding Serbia. Source: R. Schuit 2023

Because of the flooding, 32,000 people were evacuated from their homes. Most of the evacuees found refuge among relatives, but 5,000 needed to be placed in shelters provided by the Red Cross and the Serbian government (Serbia National Government, 2014).

The disaster resulted in 51 casualties, of which 23 were due to drowning (Serbia National Government, 2014). The total monetary losses are estimated at M€ 1.105 in damages. In total 485 houses were completely destroyed, and 16,200 houses were damaged. Coal plants which provide fuel for Serbia's power supply were disrupted, also impacting households that were not harmed by the floods (Brkanovic, Regiogro, & Pesic, 2018).

The economic impact of the direct damages caused by the flooding was assessed at 2.7% of the GDP (Brkanovic, Regiogro, & Pesic, 2018). An additional two percent of economic loss was anticipated by the damages done in the energy, mining and agricultural sector, which could potentially push the already weak economy into another recession (Brkanovic, Regiogro, & Pesic, 2018).

4.5.2 Application phase

To be eligible for the EUSF a Member State, or a nation involved in accession negotiations with the EU, need to submit an application as soon as possible but no later than 12 weeks after the first occurrence of damage as a consequence of a natural disaster (European Union, 2002).

At the Thessaloniki European Council summit in 2003, Serbia was identified as a potential candidate for EU membership (European Commision, 2023). Several steps were taken and in March 2012 Serbia was granted EU candidate status (European Commision, 2023). As a result of the candidate status, the EU is supporting the socioeconomic development and reforms in the enlargement of the region with financial aid and technical assistance through the *Instrument for Pre-accession Assistance* (IPA) (European Commision, 2023). This instrument provided the Serbian government of good knowledge about EU processes and implementation and submissions for structural funds (Nedeljkovic, 2023). Unfortunately, the Serbian government had no prior experiences with the application of the EUSF, so they reached out to other Member States like Croatia and Italy, but this didn't turned out to be successful (Nedeljkovic, 2023).

At a national level rules and procedures for the implementation of the EUSF were formulated, and an intersectoral working group was formed. This working group consisted of all ministries and the first task to formulate a *Post-Disaster Needs Assessment* (PDNA) (Nedeljkovic, 2023). With help of the international community (EU, UN, and the World Bank), external experts and the methodology, an assessment was made on the damages and losses. Not only did they asses the damages and losses, but they also assessed the need to recover. Not all that is damaged needed to be recovered (Nedeljkovic, 2023).

On 3 June the Government of Serbia presented an official request for assistance to the EU, the UN, and the World Bank for the purpose of conducting an assessment of disaster effects and impacts and of recovery and reconstruction needs, to be used to develop a national plan for recovery and reconstruction after the disaster (Brkanovic, Regiogro, & Pesic, 2018). The three Partners immediately responded to this request by deploying required expertise and assigning financing required for conducting a post-disaster recovery needs assessment (Brkanovic, Regiogro, & Pesic, 2018).

The purpose of the PDNA was to analyze the effects, impacts and needs following the disaster. Estimations were made on the socio-economic impact, the costs of damages on infrastructure, amenities, public/private services and to establish the costs of the identified needs in all economic and social activity sectors (Brkanovic, Regiogro, & Pesic, 2018). To establish this, the intersectoral working group, collected all the damage estimates, and assessed them all and formulated a report with the total damage assessment. The report was adopted during a government session with consensus all through the government (Nedeljkovic, 2023).

With help from municipalities, external consultants, experts and NGO's, the PDNA process was completed in four weeks (Nedeljkovic, 2023), on the 23th of June 2014, Director of the Government Office for Reconstruction and Flood Relief (Marko Blagojevic) announced that the final assessment of the flood induced damage, would be completed on July 9th (Ministry for Public Investment, 2014). The application for the EUSF funding was submitted by the Serbian authorities 11 weeks after the occurrence of the disaster, one week before the deadline of 12 weeks passed (Brkanovic, Regiogro, & Pesic, 2018). The estimated direct damage was estimated by the authorities at M€ 1.105, with a major disaster threshold calculated for the Republic of Serbia of M€ 175, the application was assessed as a major disaster (Brkanovic, Regiogro, & Pesic, 2018).

During a donor conference under the motto "Rebuilding Together" held in Brussels at the initiative of the European Commission, France and Slovenia on July 16th 2014, the Director of the Government Office for Reconstruction and Flood Relief pleaded the Serbian recovery needs to delegations of more than 60 countries and 23 international organizations. During the conference, a great global solidarity was shown by mobilizing pledges of donating nations to help Serbia to face the financial needs (Serbian National Governement, 2014).

4.5.3 Approval phase

The application for financial contribution of the EUSF was submitted to the commission on July 30th 2014, this was within the 12-week deadline of the first damage was recorded on May 14th 2014 (EU Monitor, 2015). Updated information on the application was provided on August 18th 2014 (EU Monitor, 2015).

In October 2014, the Commission formulated a proposal to the Parliament and the Council on three applications (Serbia, Croatia and Bulgaria) for financial contribution from the EUSF (European Commission, 2014). The proposal included a description of the damages and a statement that the application meets the criteria set out in the Regulation for mobilizing the EUSF, confirming that Serbia had submitted their application in a timely manner (European Commission, 2014). After examining the application and considering the maximum possible grant from the EUSF as well as the scope, the Commission have proposed to mobilize the EUSF for a total amount of € 60,244,605.- (sum of the 2.5% of the direct damage up to the threshold and the 6% damage above the damage threshold, see table 9 below). The direct damage exceeded the threshold and the disaster was qualified as a "major natural disaster" (EU Monitor, 2015).

Direct damage (M€)	Major disaster threshold (M€)	Total cost of eligible operations (M€)	2.5% of direct damage up to threshold (€)	6% of direct damage above threshold (€)	Total amount of aid proposed (€)
1,105.622	174.649	381.967	4,366,255	55,858,380	**60,244,605**

Table 9 Damage evaluation EC (European Commission, 2014)

On 17th of December 2014, Decision EU 2015/437 on the mobilization of the EUSF was published by the Council (EU Monitor, 2014), it took up until March 23rd 2015 before the implementing decision was published (European Commission, 2015).

The financial contribution amounting to € 60,244,605.- was paid out on April 14th 2015 (EU Monitor, 2015), 335 days after the disaster took place. During the interview, the interviewee stated that the time between the application and the approval was long and the process was slow. By re-directing IPA funds, Serbia managed to start recovery and reconstruction projects, but if the country was reliable on the EUSF it would be problematic (Nedeljkovic, 2023).

4.5.4 Implementation

The responsible body for the implementation was the Government Office for Reconstruction and Flood Relief. The responsibilities for the managing of the financial contributions where delegated to the following entities: Public Enterprise 'Roads of Serbia'; Railways of Serbia; Public Water Management Company 'Beogradvode'; and the Government Commission for assessment of Damage Resulting from Natural Disasters (Brkanovic, Regiogro, & Pesic, 2018). On four governmental levels from national, provincial, regional to local, emergency headquarters where established by the national government in 2009 to respond in cases of emergencies. During the 2014 flooding the National Emergency Headquarters consisted of a Commander, the Operations Chief and 28 members (Brkanovic, Regiogro, & Pesic, 2018). These additional members are representatives of all ministries, the armed forces, public agencies, utility companies, (national) media and the Serbian Red Cross (Brkanovic, Regiogro, & Pesic, 2018).

A total of 119 *Local Self Governments* (LSG[15]) also declared, through their regional headquarters, a state of emergency. Most LSG's had already formed emergency headquarters, but some (like Obrenovac) formed them during the flooding (Brkanovic, Regiogro, & Pesic, 2018).

To coordinate the government response, the Serbian Government established the Office for Reconstruction and Flood Relief. They were charged with the coordination, monitoring and reporting of the division of humanitarian aid received by the government for persons affected by the floods. Standards, criteria and procedures for aid allocation were established (Brkanovic, Regiogro, & Pesic, 2018). In 2015, all responsibilities and obligations of the Office for Reconstruction and Flood Relief, would be taken over by the *Public Investment Management Office* (PIMO) (Brkanovic, Regiogro, & Pesic, 2018).

In total 72 LSG's benefited from the EUSF, the funds were used for (Brkanovic, Regiogro, & Pesic, 2018):

- Building and restoring infrastructure including 73 bridges, and 8 road restoration projects;
- Recovery and improvement of sewage systems;
- Sanitation of 29 landslides;
- Recovery of 14 riverbanks;
- Recovery and restoration of 59 public buildings (education and health objects);

[15] *The Serbian state recognizes three levels of governance: central, provincial and local. 23 cities (grad) and 150 municipalities (opstina) are listed as LSG's, they have a form of autonomy and powers but are regulated by the national government* (European Committee of the Regions, 2023).

- 202 projects were conducted on preventive infrastructure in which public utilities for water management were rebuilt or improved.

According to Brkanovic, Regiogro & Pesic (2018), the EUSF were allocated on four damage categories (see table 10).

Categories of damage	**EUSF awarded**
Infrastructure restoration	€ 25,000,000.-
Temporary accommodation	€ 7,000,000.-
Preventative infrastructure	€ 25,000,000.-
Clean-up of disaster	€ 3,200,000.-
Total	***€ 60,200,00,-***

Table 10 EUSF granted in EUR millions (rounded figures). Source (Brkanovic, Regiogro, & Pesic, 2018)

The disaster caused by the floods and landslides made the Serbian government aware of their vulnerability and that they should carefully reconsider their current (2014) regulations for physical planning, land zoning and the definition of construction standards (Serbia National Government, 2014). To reduce the risk for a disaster they should also improve flood control measures and works. Absence or noncompliance of these (new) requirements could result in further negative impact on the overall socio-economic development (Serbia National Government, 2014).

The Serbian government and the private sector seized the opportunity to build resilience in their processes, infrastructure and livelihoods. These processes are captured into a "build-back-better" strategy, based on the Sendai Framework (Asian Disaster Reduction Center, 2015), that involves a quality improvement and modernization of physical assets and productive processes. Due to these measures the country and its society may reduce the risk to more manageable levels and maybe better prepared to face similar events that may occur in the future (Serbia National Government, 2014).

On October 1st 2015, the Commission carried out a monitoring visit to Belgrade. During this visit the Commission concluded that the relevant authorities were carrying out the implementation and controls in a transparent correct manner and in respect of the rules imposed by the EUSF Regulation (European Commission, 2016).

5 Cross-Case Analysis

All four case studies showed multiple similarities in the different stages of the process, in fact even though the case study countries are very different in culture, wealth, organizational structure, the approach and implementation of the EUSF was almost identical. In this cross-case analysis, the three different aspects discussed in the case studies chapters will be compared and summarized.

5.1 Application

Within 10 or 12 weeks (depending of the year of the occurrence) after the first damages of a natural disaster are recorded, the application have to be received by the European Council. In all four cases this was the case, and wasn't seen as a critical obstacle for receiving the funds.

5.1.1 Damage assessment

The first step for the application was damage assessment, it was interesting to see that all four case study states used a different methods to approach a rough estimate of the occurred damages, but were almost identical in organizational structure (see 5.1.2). Approaches variated from evaluation on known costs to best possible guess on the available information (Austria), creating a cost database (Romania) to a more elaborate PDNA system (Serbia).

In all cases the damage estimations were made bottom up. Damage estimates were conducted on several governmental levels simultaneously, but most of the information was provided in a bottom-up process. Municipalities, with help from external consultants and NGO's assessed the damage at a local level, mostly involving the cost of damages to infrastructure, amenities and public and/or private services. At a regional level, estimates were made on public property, infrastructure and waterworks. On a national level, damages were evaluated by experts and responsible ministries within their respected area of expertise. In case there was not already a national coordinator in place (Bulgaria and Serbia), independent central committees were formed. These central Coordination Authorities were tasked with the evaluation of the assessments made on a local, regional or national level and in all cases a total damage estimate report was drafted as part of the EUSF application.

Within the aim of the Fund, all beneficiary nations reported eligible projects concerning restoration of infrastructure (preventive, but also transport, water and waste water, telecommunications etc.), amenities (directly related to the needs of the population

concerned) temporary accommodation, clean-up activities, medical assistance and damaged private properties.

During the application phase Bulgaria was an outlier on two different aspects, first their application missed a damage assessment for private damages, and was therefore not included in the application. This resulted in a disproportionate high share (98%) of public damage, mostly concerning the securing of preventive infrastructure and restoration of transport infrastructure. The second anomaly in their application was that they, in contrary to Serbia, didn't want to reallocate funding from the *European Structural and Investment Funds* (ESI)[16] for the Bulgarian recovery measures. Instead they applied for an advance on the funds amounting 10% of the anticipated financial contribution from the fund.

5.1.2 Structure

As mentioned in chapter 5.1.1, all four case studies showed an almost identical organizational structure. In each case a national coordinator was appointed as a centralized entity, these coordinating entities were responsible for collecting and reporting all damage statements made on the different governmental layers. Applications drafted by the beneficiary countries were primarily written under supervision of the national coordinator. In all cases an accurate estimate of the direct damages caused by the floodings were included, these estimates were an accumulation of all estimates made on the different governmental layers.

Next to the national coordinator, several ministries were involved in several roles in the wake of the flooding. In the immediate aftermath of the disaster, ministries of Defense, transportation, water works and Healthcare were involved in first response tasks, evacuation and emergency repair tasks on damaged flood protection infrastructure. For example, in 2005, Romania had some severe damages on their flood protection dikes, and a month after the flooding another incident occurred in the same area (Randasu, 2023). So speed is of the essence if it comes to (partially) restoring flood defenses, to prevent further major damages and losses. For damage estimations, several responsible ministries were tasked to make an overview of damages sustained on the respective area of expertise. In all the cases these ministries involved the Ministry of Infrastructure, Ministry of Water or Waterworks and the Ministry of the Interior, the names may differ between beneficiary nations, but there area of expertise is more or less the same.

[16] *"The purpose of these funds is to invest in job creation and a sustainable and healthy European economy and environment."* (European Commission, 2023)

In all four cases, as demanded by the EUSF legislation, an independent audit authority was formed, often part of the Ministry of Finance. These audit authorities were mostly active during the implementation phase of the funds, their responsibilities were to register the expenditure of the funds and in coordination with the national coordinator, draft the implementation report.

On a regional level damage assessments were made on local overarching facilities, amenities and infrastructure. Counties, Provinces or Regions made damage inventories on regional sized infrastructure, waterways, amenities and flood protection facilities that are not already part of the estimates done by the responsible ministries. In many cases damaged vital facilities and amenities directly had an impact on the population, environment, cultural heritage or the economy and therefore needed immediate attention. Regional coordinators were assisted by NGO's like the Red Cross, but in some cases (Serbia), external experts were consulted to assess the damages directly related to the natural disaster. All damage reports and assessments were send to the national coordinator the be examined on completeness and eventually added to the application.

In the wake of the floodings, local authorities, emergency services, in some cases the military and NGO's were involved in evacuation activities and arranging temporary housing accommodation for the population effected by the flooding (Nedeljkovic, 2023). NGO's like the Red Cross provided field hospitals for the first medical assistance, the military was involved in the evacuation of citizens, immediate damage repair and in some cases placing temporary infrastructure like bridges (Randasu, 2023). Estimations made on a local level were, in the Serbian case, the baseline for the decision making process, because municipalities with assistance of NGO's and experts have the situational awareness needed on the ground. Local damage estimations, not already included in the national or regional estimations, were send to the national coordinator to be examined on completeness and eventually added to the application.

Eventually in all four case studies the damage assessments were included in the application and were handed in within the set deadline. The interviewees reacted positively to the application deadline, they even mentioned that they finalized their damage assessment well in time, Romania had done it in 30 days (Randasu, 2023) and Serbia competed the damage assessments in four weeks (Nedeljkovic, 2023), both the applications from Romania and Serbia were received one week before the end of the deadline, so there must be an additional administrative burden somewhere in the process. Bulgaria was the only case in which the applicant couldn't finish all the damage

assessments in time and therefore focused only on public infrastructure, facilities and amenities.

The layered governmental structure seemed to have worked in all four cases, figure 8 shows a simplistic overview of the organizational structure for the application part of the process, derived from the four case studies.

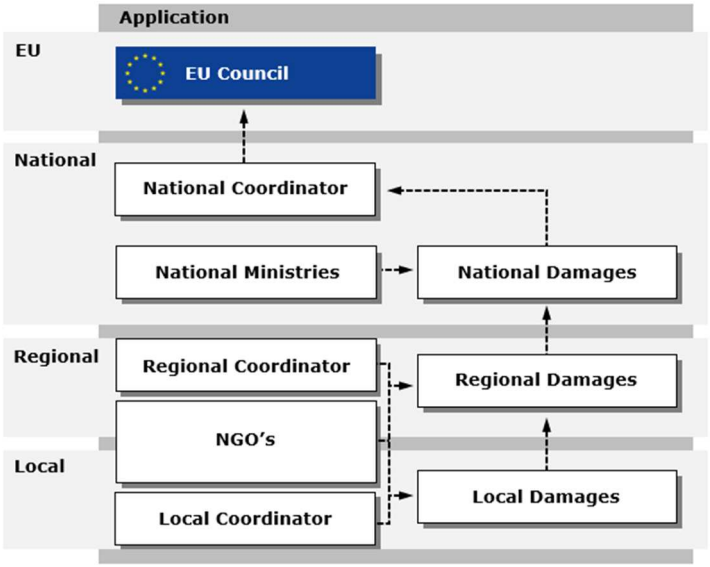

Figure 8 Application process EUSF. Source: R. Schuit 2023

5.2 Approval

After the application is received, the commission shall assess whether the conditions for mobilization of the Fund are met and shall propose an amount of possible financial contribution to the European Parliament and the Council. After an agreement by the European Parliament, the Council and the Commission on budgetary discipline will draft the decision and include the financial management and budgetary matters.

5.2.1 Duration

On average it took all beneficiary nations 75 days to submit their application, the deadline for participation in the EUSF is 84 days (12 weeks x 7 days). Within this period of time applicants needed to make a full damage assessment, as mentioned before, and also undertake clean-up activities, conduct priority damage repair, evacuations, built temporary housing and other facilities.

Applications sent in by beneficiary nations have to be assessed by the commission in order to establish whether the conditions for mobilization of the EUSF are met. During

this assessment, the council will review the application on the magnitude of the occurred damages. Article 2[17] describes:

> *"The EUSF may be mobilized when serious repercussions on living conditions human health, the natural environment or the economy occur in one or more regions of that eligible state[18] as a consequence of: a **major** or **regional** disaster have taken place on the territory of an eligible state or a **neighboring** state"* (European Parliament, 2002).

The floodings in Bulgaria and Serbia were classified as a major disaster, while the summer flood in Romania was seen as a regional disaster. In the Austrian case, the application was based on the neighboring state criteria, meaning they sent in their application based on the damages occurred by the same incident in Germany and it would therefore be eligible for the EUSF, because the direct damages in Austria fell below the EUSF mobilization threshold.

It took an average of 177 days for the commission to come to a decision on the respective cases. Austria went through the process within 123 days, but for Romania it took 278 days to get an approval from the commission. After the European Parliament and the Council decision on the mobilization of the fund and amending the budget in their respective financial year, it took an average of 72 days for the beneficiary nations to receive the funds. For Romania it took 46 days, but in the Serbian case it took another 118 days before the funds were transferred. Table 11 shows the different process steps and the duration between the date of the disaster and date of the payment from the EUSF.

Beneficiary nation	Date of disaster	Date of application	Date of decision	Date of payment	Days between disaster and payment
Austria	30-05-2013	08-08-2013	09-12-2013	14-02-2014	260
Bulgaria	30-01-2015	24-04-2015	06-10-2015	01-12-2015	305
Romania	28-07-2014	03-10-2014	08-07-2015	23-08-2015	391
Serbia	14-05-2014	30-07-2014	17-12-2014	14-04-2015	335

Table 11 Duration of the decision making process. Source: R. Schuit 2023

[17] Council Regulation (EC) No 2012/2002 of 11 November 2002 establishing the European Union Solidarity Fund (European Parliament, 2002).
[18] A Member State or of a country involved in accession negotiations with the Union. (European Parliament, 2002)

In the Romanian case the total time between the disaster and actually receiving the funds took over more than a year. With 391 days between the two major milestones. The Austrian case, not even considered a "major" or "regional" type of incident 'only' took 260 days.

The EUSF was founded with 17 goals in mind, goal 8 states;

> *"This instrument should allow a **rapid decision** to be taken to commit specific financial resources and **mobilize them as quickly as possible**."* (European Parliament, 2002)

Off course quickly as possible is a relative vague concept, but for a Fund with a sole purpose of showing solidarity with an intention to a rapid return to normal living conditions, an average time span of 323 days seems a bit long. This was also mentioned during the interviews. Without the redirection of other EU funds or prefinancing projects out of national funds, they wouldn't be able to use the funds for its primary purpose (Nedeljkovic, 2023; Randasu, 2023).

5.2.2 Amount

Depending on the magnitude of the occurred natural disaster a financial contribution of the EUSF is determined by the Commission. To be classified as a "**major natural disaster**" the direct damages need to be estimated at or over M€ 3.000 in 2011 prices, or has to be more than 0,6% of the beneficiary nations GNI (European Parliament, 2002). An incident could also be classified as an "**regional natural disaster**" when the disaster took place in a NUTS 2 region of an eligible state, and have a direct damage estimation in excess of 1,5% of that region's GDP (European Parliament, 2002). In case the natural disaster affected several NUTS 2 regions, the threshold is determined by the average GDP of these regions weighted by the share of the total damage in each region (European Parliament, 2002). An exception is made for outermost regions, but those regions are not applicable for this research (European Parliament, 2002). To be eligible as a "**neighboring**" state, the effected neighboring state need to meet the major natural disaster threshold and the applicant (in this case Austria) need to be affected by the same disaster (European Council, 2002).

When the threshold for a major or regional disaster are determined, the receivable EUSF contribution is dived in two parts. The first part of contains of 2,5% of the direct damages up to the threshold, the second part is 6% of the direct damages above the threshold, resulting in the formula as shown below;

TH x 2,5% + (DD – TH) x 0,6%) = Total amount of Aid

Whereas;

TH = Threshold

DD = Direct Damage

Nation	**DD** (M€)	**TH** (major) (M€)	**2,5%** (€)	**6%** (€)	**Total Aid**
Austria	866.462	1,789.112	21,661,550	-	**21,661,550**
Bulgaria	243.305	234.871	5,871,775	506,040	**6,377,815**
Romania	171.911	232.502	4,297,775	-	**4,297,775**
Serbia	1,105.622	174.649	4,366,255	55,858,380	**60,244,605**

Table 12 Overview of relevant figures. Source: R. Schuit 2023

Table 12 shows an overview of how the total aid amount for each beneficiary nation is calculated. Because Austria didn't met the threshold for a major disaster, there is no amount listed in the 6% column, Romania also didn't reach the major threshold, but was listed as a regional disaster. In both cases the complete estimated direct damages were multiplied by 2,5% resulting in the total aid.

On average, the total aid provided to the case study nations by the EUSF is only 3,27% of the direct damages related to floodings in the beneficiary countries. As explained before, Austria and Romania obviously only received 2,5%, but both Bulgaria and Serbia reached the threshold and received 2,62% and 5,45% respectively.

5.3 Implementation

The implementation process was, instead of the bottom up approach during the application phase, a top down approach with the same governmental bodies as during the application phase. After receiving the EUSF, the National Coordinator distribute the Funds among the National Ministries, Regional and Local Governments. In accordance with article 8.3[19] all case study nations designated an independent audit body for the implementation report of the financial contribution of the received funding. These audit bodies used internationally accepted audit standards, to establish the expenditure of the funds was legal and in line with EU regulations.

[19] Council Regulation (EC) No 2012/2002 of 11 November 2002 establishing the European Union Solidarity Fund (European Parliament, 2002).

All four cases showed a similar organizational structure, figure 9 shows a simplified overview of the organizational structure for the implementation part of the process, derived from the four case studies.

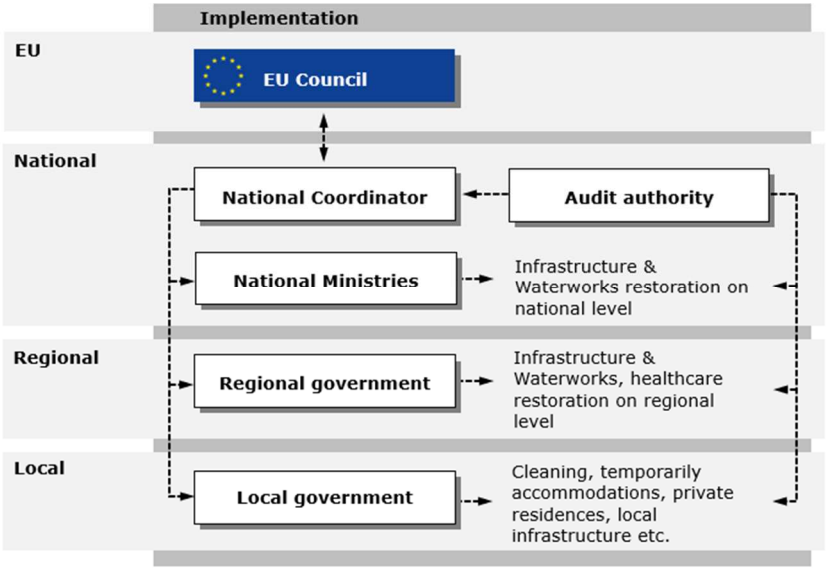

Figure 9 Organizational structure implementation phase. Source: R. Schuit 2023

5.3.1 Projects

In Article 3[20] the aim of the expenditure of the EUSF is formulated. Eligible expenditures, depending on the type of the disaster or emergency, are as follows (European Parliament, 2002);

- restoration to working order of infrastructure in the fields of energy, water and waste water, telecommunications, transport, health and education;
- providing temporary accommodation to meet the needs of the population;
- funding rescue services;
- securing preventive infrastructure and protecting of cultural heritage;
- clean up of disaster-stricken areas, including natural zones;
- measures aimed at the immediate assistance to the population including medical assistance.

In all four cases, projects were selected based on the criteria above. Large sums of the fund went to the restoration of damaged infrastructure and preventive flood defense infrastructure. They also showed a similar division of the fund, the national coordinator in each beneficiary state, divided the fund among the different governmental levels. In Austria this was based on the percentage of damage compared to the total loss (see

[20] Council Regulation (EC) No 2012/2002 of 11 November 2002 establishing the European Union Solidarity Fund (European Parliament, 2002).

table 4 Breakdown funds regional page 38). In Bulgaria a similar division is seen, they funded the damages occurred in 12 districts, but also to the Ministry responsible for the nations road infrastructure. Romania took a slightly different approach by dividing the EUSF between the responsible ministries. Serbia, implemented the fund in the same way as Austria and Bulgaria, local and regional projects were financed by the funds to restore public facilities and the restauration of damaged infrastructure.

In all cases authorities mainly prioritized ongoing projects, based on maturity of the project. For Bulgaria the main obstacle were the public procurement procedures, these procurement procedures could take up 9 to 12 months depending on appeals made to the procedures. Austria and Romania primarily focused on the prevention of future disaster by restoring vital preventive infrastructure. In Austria, three quarters of the fund was earmarked for this goal. In Romania 80% was spend on the restoration of infrastructure. Serbia also used the funds for the restorations of vital infrastructure, but also amenities like health care centers, but prioritized on the maturity of their projects. To avoid dragging tender procedures, projects already or near the completion of the tender process, were financed by the EUSF. This was done to complete the projects within the timeframe of 18 months (*"Funds shall be used within eighteen months from the date on which the Commission has disbursed the full amount of the assistance")* (European Parliament, 2002)*.)* set in article 8[21].

5.3.2 Pre-financing

With an exception of Bulgaria, all other cases used a form of pre-financing for their projects. Bulgaria, as mentioned in chapter 5.1.1, requested an advance of 10% of the anticipated financial contribution of the EUSF. They received the initial 10% after 167 days after the occurrence of the disaster, that's almost 6 months later. Adding the tender process to this, one might understand the difficulties beneficiary countries encounter during the implementation phase.

The other three cases took a different approach. Romania immediately started with emergency operations, damage repair and restoring vital amenities like for example their power supply. These operations were funded by the national government and when they finally received their part of the EUSF, reimbursed from the aforementioned fund.
Serbia, in the process of becoming a member state, were eligible for IPA funding. These funds could be used by a nation applying for the EU membership to implement the

[21] Council Regulation (EC) No 2012/2002 of 11 November 2002 establishing the European Union Solidarity Fund (European Parliament, 2002).

necessary political and economic reforms to prepare them for their membership (European Commision, 2023). The EU redirected IPA funds from the region to Serbia, these funds were used to finance the recovery process in the first month after the disaster (Nedeljkovic, 2023). To promote their membership application, the Serbian government used a part of the fund to reconstruct educational, health care centers and day-care facilities showing the importance of the role the EU (Nedeljkovic, 2023). An additional loan was provided by the world bank to finance operations for damaged areas.

In Austria the allocation of the EUSF is based on national legislation. Reconstruction costs of damages are based on principles of cost sharing the damages between the national government and states/regions, both for expenditures by the public sector for aid for private individuals and for damages public infrastructure. Regions will be compensated by the central government up to 50% of the damages and up to 60% for aid provided. Damage to federal properties remains solely with the National government. Damages in Austria were pre-financed either by the National government, or by the region in which the damages occurred, afterwards, these damages were compensated by the EUSF, a total of 89% of the paid damages were compensated for the National government and the regions were compensated for 70% of the damages they prefinanced.

5.4 Cross case findings

5.4.1 Application findings

The governmental structures in the four cases showed many similarities. The organizational structures within the respective beneficiary nations are structured between many expert participants. Table 14 gives an insight into how the different beneficiary nations formed their governance. In all four cases the number of participants where high, involved ministries on a national level where used on their respective field of expertise and the consensus on the goal and how to achieve it was high. Each beneficiary nation used a NAO (as described in chapter 2.2.2.3) governance form, which seems to be effective for the application phase. All beneficiary nations completed their damage assessment within the set deadline of 12 weeks, only Bulgaria could not complete their complete damage assessment on time, even though their damage report was eligible for the EUSF, they could have add private damages into their damage assessment. This could have raised the amount of support from the EUSF.

5.4.2 Approval findings

In none of the four cases the funding was received within the first phase of the disaster response phases (see chapter 2.2.3) determined by Comfort, Ko & Zagorecki (2004). Bulgaria requested an advance of 10% of the anticipated financial contribution of the

EUSF, this was received after 167 days after the occurrence of the disaster. All other cases showed a timeline from occurrence to finally receiving the funds between 260 days (Austria) and 391 days (Romania). According to the timeline set by Comfort, Ko & Zagorecki (2004), this would set beneficiary nations beyond phase III.

5.4.3 Implementation findings

During the implementation phase, the organizational structure is identical to the application phase. In all for cases, beneficiary nations choose the NAO structure. By adding an audit authority, the national coordinator was checked on the legitimacy of the implementation of the EUSF. The implementation of the fund by the beneficiary nations, did differ from one nation to another. Some nations overcome the restraints made by the EUSF regulation, by rebuilding the health care facilities, communication and or power infrastructure and used other funds to adopt a "build back better" approach for their existing flood prevention systems. Other countries used the fund, often under time pressure, for the restauration of their flood defenses.

All four cases were confronted with the vulnerability of their flood defense systems and where more or less forced to rethink their current strategy. In all cases this was included in their implementation report. Even though this is a mandatory step, it should add to the resilience of disaster stricken nations.

	Austria	**Bulgaria**	**Romania**	**Serbia**
Organizational structure	NAO	NAO	NAO	NAO
Damage assessment	Best estimate	Individual cases	Historical data	PDNA
Eligible damage	M€ 866.462	M€ 243.305	M€ 171.911	M€ 1,105.622
Days to application	70	84	67	77
Days to decision*	123	165	278	140
Days to pay out**	260	305	391	335
Received fund	€ 21,661,550	€ 6,377,815	€ 4,297,775	€ 60,244,605
Effectiveness	Low; Focused on build back in the previous condition	Low; Focused on build back in the previous condition	Low; Focused on build back in the previous condition	Medium; BBB implemented as much as possible
* Days between the occurrence of the disaster and the decision of the EU				
** Days between the occurrence of the disaster and requiring of the funds				

Table 13 Cross case findings. Source: R. Schuit 2023

6 Conclusions and recommendations

6.1 Conclusions

This thesis examined four case studies in which a natural disaster occurred in the Danube river basin. During this study, the application process, the approval process and the implementation was examined.

During the case studies it came apparent that all cases used the more or less the same organizational structure to finalize their application. The organizational structure could best be described as a NAO organization (as described in chapter 2.2.2.3), were many participants try to achieve the same goal. If not already established, beneficiary nations formed an independent administrative body to coordinate the network. Within the network, governmental ministries, regional and local authorities and NGO´s interact with each other with a clear and collective goal in mind. Within the different cases a clear goal was noticeable, each case showed a high cooperation within the different levels of their respective government. By delegating specific tasks to subject matter expert ministries a high level of competence on the specific tasks was reached. The organizational structure was used throughout the process from application to implementation, with one minor difference during the implementation stage. Next to the independent administrative body, an additional audit authority was appointed, in cooperation with the national coordinator, the implementation report was drafted and sent to the EU council for a final evaluation on the expenditure of the EUSF.

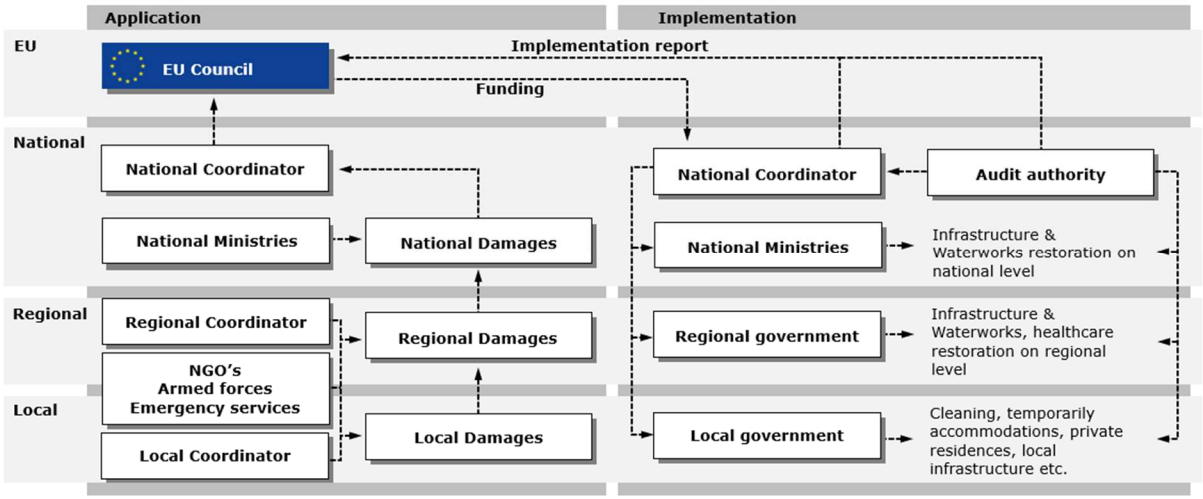

Figure 10 Governmental structure. Source: R. Schuit 2023

The four case studies showed that beneficiary nations used different tools for their damage assessments and/or tried to find a way to make a uniform approach within several regional districts to expediate the declaration of the fund and make it more

comparable through the several regions and therefore improving the transparency of the EUSF.

After the application is received, the commission shall assess whether the conditions for mobilization of the Fund are met and shall propose an amount of possible financial contribution to the European Parliament and the Council. According to the theory of Comfort, Ko & Zagorecki (2004) (as explained in chapter 2.2.3), disaster response takes place in three stages, in which the first stage of immediate emergency response ends within 39 days. After these 39 days, additional external resources enter the area and join the emergency services at the location.

One of the goals is to contribute to the cleaning of the disaster stricken areas and the costs of rescue services and temporary accommodation, the formal text of the legislation is quoted below.

> *"The Fund should contribute to the restoration of infrastructure to working order, to the **cleaning up of disaster stricken areas** and to the **costs of rescue services** and **temporary accommodation** for the population concerned during the whole implementation period."* (European Council, 2002)

With an average duration of 323 days between the first occurrence of the damages and receiving the funds it seems that the EUSF is failing to meet its own goals. This conclusion is supported by the interviewees. Even though the funds were perceived as helpful in the long run, without the help, or the use of either prefinancing projects by the central government, by using other EU funds or additional loans, beneficiary nations could not accommodate the intentions of the EUSF.

As for the implementation of the EUSF, beneficiary nations mostly based their priorities on first come – first serve principle. Maturity and the importance of projects seemed to be decisive in the prioritization of the projects, mainly driven by the deadline for the implementation report (18 months after receiving the funds). Restoration of flood prevention infrastructure was deemed as necessary and had to be restored any way, these operations were primarily pre-financed by the national government. Other countries prioritized the projects on immediate and future needs, by restoring their health care facilities, educational facilities and other pivotal infrastructure like power supply, communication systems and the fresh water supply.

After analyzing the several steps of the process and how beneficiary nations act on how the EU and beneficiary nations react to the several steps of the process, we could now answer the main research question;

"How does the European Union Solidarity Fund contribute in flood risk prevention in beneficiary countries?"

Regarding the frequency and intensity of natural disasters, it is necessary to mitigate the risks, strengthen the capacities to adapt and recover from the consequences. It is estimated by the EU that for every 1 Euro spent on prevention, 4 Euro or more will be saved on response (Tijanic & Korent, 2019). This estimation seems to be a good advocate for investing in flood resilience. Unfortunately, the EUSF own legislation prohibiting a pathway to resilience in beneficiary nations. One of the rules of the legislation states that infrastructure needs to be restored to the condition prior to the occurrence of the natural disaster, below the description of the foremention rule is quoted;

> *"The aim of the Fund is to complement the efforts of the States concerned and to cover part of their public expenditure in order to help the eligible State to carry out, depending on the type of natural disaster, the following essential emergency and recovery operations:*
> *(a)* ***restoring the working*** *order of infrastructure and plant in the fields of energy, water and waste water, telecommunications, transport, health and education"*
> *…*
> *"For the purposes of point (a)[22] of the first subparagraph, '****restoring the working order****' means restoring infrastructure and plant to their* ***condition prior to the occurrence*** *of the natural disaster. Where it is not legally possible or economically justified to restore the condition prior to the occurrence of the natural disaster, or* ***where the beneficiary State decides to relocate or improve the functionality of the infrastructure or plant affected in order to improve its capacity to withstand future natural disasters****, the Fund may contribute to the cost of restoration only up to the estimated cost of returning to its status quo ante."* (European Council, 2002)

[22] Art. 2.a of the Council Regulation (EC) No 2012/2002 of 11 November 2002 establishing the European Union Solidarity Fund (European Parliament, 2002).

Resilience is not only the ability to prevent floods through engineered solutions, but also entails the capacity to adapt, absorb and recover (Alexander, 2016). The case studies have shown that it is near impossible to resist to extreme perspirations and "once in a lifetime" flood events. Resilience strategies focus on minimizing the impact of a flooding and facilitate recovery and to the capacity to adapt (Alexander, 2016). Strategies based on the spatial domain could integrate and facilitate areas purposely designed to overflow in case of a flooding event. A combination of awareness, "lessons learned" and a diversity of measures should add to the resilience of flood defenses.

Beneficiary nations with the intent to "build back better" are being hampered by the legislation itself. Current preventive measures are proven to be flawed or less adequate, the application for the fund is an indirect result of that, restoring it to its former capacity, feels counterproductive and with the increasing frequency and magnitude of extreme weather events, the risk of a recurring natural disaster seems likely.

There still is a possibility to improve the functionality of infrastructure, but that has to be financed by the beneficiary nation itself. After implementing the EUSF, beneficiary nations need to present a report that not only justifies the expenditure, but also details the preventive measures proposed by the beneficiary nations to prevent a recurrence of a similar disaster, the implementation of disaster risk and prevention management legislation and a proposal to ensure environmental protection and resilience in relation to climate change and natural disasters (European Council, 2002).

In a direct way the EUSF does not contribute to flood risk prevention in beneficiary nations, the fund needs to be spend on restoring the infrastructure to their previous capacities. In an indirect way the EUSF contributes not only by adding the awareness of resilience by demanding a vision on how to prevent future recurrence of a similar disaster, but also by contributing to the restoration of public infrastructure needed to be restored anyway, making those funds available for preventive measures.

6.2 Recommendations

In light of the conclusions, a number of recommendations could be made on the current policy and legislation. Several recommendations for the improvement of the EUSF could be made, these recommendations will be discussed in this chapter and are listed below.

1. As mentioned by one of the interviewees, it was hard to find information and collaboration whit other nations organized the application process. With the

increasing chance of future floodings, it might be prudent to create a centralized organization to effectively support affected countries.

2. During the case studies it came apparent that most of the countries where working on a system, either to come to an efficient damage estimate or to find a way to structure their declaration process, these lessons learned could be centralized by the centralized organization suggested in point 1.
3. On average, beneficiary nations received only 3.1% (a total listed damage of M€ 163.240 and a total of M€ 6.194 was paid (European Commission, 2023)) in fund of their total damages. This number seems a bit low, especially for Member States with budget restraints, it could be recommended that a. the fund will be increased and b. for nations with budget restraints, additional funds would be made available.
4. The decision process after the application for the fund takes too long. The EU process should be shortened. The *European Council* EC stated that the translation of applications into working languages of the EC institutions needs to be reduced (European Commission, 2016). The centralized organization mentioned in point 1, could draft formats to expediate the application and reduce the administrative needs to shorten the time to assess the received applications.
5. More guidance could be given by the EU in long-term goals for reconstruction and recovery after a natural disaster.
6. The funds have to be fully used within 18 months after receiving the fund, this should make it ideal for emergency operations and short-term reconstruction projects, but for long-term reconstruction it is less useful. This could be resolved by budgeting long-term projects in the implementation report. Budgeted projects could be audited on their progress by the central organization mentioned in point 1 of the recommendations.
7. The legislation needs to make room to adopt policies to improve the resilience of beneficiary nations. "Built back better" policies should be adoptable by beneficiary nations to improve their current flood defenses or adopt a new policy which make them more resilient to future floodings, without the danger of having to repay parts of the funds.

These recommendations should improve the fund in a great manner, not only will the focus be on the solidarity of the fund, but it also will contribute to a safer living environment, especially for people who live in an area prone to floodings. Using the lessons of nations which already applied for the fund and distribute it to nations whit less experience on the subject will not only expediate the process, but also would make it

easier for the potential beneficiary countries to apply and for the EU to assess the damage reports and application forms.

6.3 Further research

This research focuses on how beneficiary nations managed their damage assessments, and structured their governments after the occurrence of a flooding in their respective nation. The EUSF is broader than a fund for flooding, other natural disasters and since recently health emergencies are added as a potential intervention of the fund.

Further research would be needed to see if these findings are applicable for other natural disasters like forest fires, draughts, earthquakes and health emergencies. Are there similar damage assessments tools, or are there better tools or means to assess a situation? Does every natural disaster need a similar governmental structure to organize information flow and disperse funds to disaster stricken areas?

Additionally, future research could focus on the how these structures are applicable for other situations inside and outside of the EU. Are there lessons to be learned of, for example the Tsunami's in Asia and or post conflict reconstructions in war torn area's in the middle east or Afrika? With additional information and research a more detailed framework on how to act in case of a natural or even a man-made disaster could be made.

6.4 Reflection

For some aspects in the research process a critical reflection could be made. Although the objective of this research has been researched some constraints have been experienced during the research process.

A big limitation was the accessibility to interviewees, numerous invitations were sent but the reply was severely limited. With only two interviews and one correspondence letter, the number of interactions with stakeholders and/or subject matter experts was very limited, constraining the external validity of the research. With more interviews or surveys a more general view of the processes and underlying problems could be identified and addressed. The interviewees and correspondence added relevant additional scientific information about the research topic and even though a lack of quantity, the provided information received from different beneficiary nations showed several overlapping topics and provided similar information on the multiple necessary steps in the process. Interviewees also indicated it is hard to find actors involved in the process of requiring the fund, in fact, one of the interviewees tried to contact other beneficiary

nations in name of their nation, but also didn't manage to get in contact with the subject matter experts of other Member States. The EU was asked for an interview as well, to establish or nuance my findings, but unfortunately they replied that there was insufficient time for them to have an interview or fill out a questionnaire. Despite the limited numbers in respondents, enough scientific insight is obtained to identify obstacles, limitations, governance and allocation of the EUSF. This in-depth information did contribute to the internal validity of this research.

An other limitation were the case-studies themself, they were relatively old, but for the research it was important to use incidents that completed the whole cycle (from disaster occurrence, application, approval, implementation and closure). Governmental processes take a tremendous amount of time, and because the EUSF is not part of the regular EU budget, donating nations need to agree to the additional costs individually. Not only does a beneficiary nation need to undergo this process, tenders need to be conducted according EU legislation which is a time consuming process on its own. Because of the age of the case studies it was hard to find the relevant information, both from beneficiary nation governmental sites as well as from the official European Union channels. By following traces from countless different official documents with references to legislation, implement rapports, European Council Propositions and decisions a proper research could be conducted about the topic. The use of all these different documents made it possible to answer the sub questions and main research question of this thesis.

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Annex 1: Interviewees

No	Nation	Region	Organization	Role	Name
1	Serbia	National	Public Investment Office	National coordinator	Sandra Nedeljkovic
2	Romania	National	Ministry for Environment and Water Management	Water management	Sorin Randasu
3	Romania	National	Ministry for Environment, Waters and Forests	Executive body	Speranța-Geor eta Ionescu

Table 14 List of interviews and or correspondence. Source: R. Schuit 2023