

Living on the Water

A Social Innovation Approach to Flood Adaptation Planning in
the River Basin Eferding/Austria

Tobias Gebetsberger

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Sustainability Studies



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Abstract

In the summer of 2013, devastating floods caused heavy damage along various streams in central Europe. In the river basin Eferding in Austria, the Danube River reached record water levels and flooded hundreds of homes in the low-lying areas over night. The response of the government to resettle people has been heavily criticized by a local citizen initiative, leading to protests in front of the regional parliament. The demand for alternative solutions and for answers to the many questions to the cause of the extraordinary impact of the flood have been growing.

The aim of this study is to analyze people's attitudes towards social innovation thinking in the context of flood planning and to discuss the benefits of the concept of social innovation in this particular case. In such situations, according to the concept of social innovation, solutions that meet unmet needs of society and create new capabilities and better use of resources can occur. In search for resilient ways to adapt to the risk of floods, through a participatory action research approach, I engage with the local citizens and other stakeholders by simulating the idea creation process of social innovation. In a short video distributed via social media, I introduce a new way of living in the flood area. Subsequently, using a survey I assess people's reaction towards the innovation presented in the video.

The results show a great potential for change: people are highly receptive to rethinking flood adaptation and their way of living in the flood zone. Compassion is strong far beyond the immediately affected citizens, which advocates for more active involvement of many more people in order to shape the innovation to meet all stakeholders' needs. However, as the topic splits the opinion of locals and the government, politics tends to impede the process.

The use of the video and social media has proven highly efficient in breaking down barriers of communication: the complexity of the subject could be presented in an easily understandable way; social media provided a perfect platform for discussion and involving people. The study shows that people perceive innovation thinking rather positively. I therefore advocate for a more active use of the concept in similar complex contexts.

Keywords: proactive flood-adaptation; social innovation; participatory action research; social media research; resilience; change.

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1 Introduction

In the summer of 2013, floods of the largest scale ever recorded (one in 300-years event) occurred along Central and Eastern European rivers. The floods cost many lives and caused an estimated total of 12 billion euros damage to the economies of the affected countries (Jongman et al., 2014). In the north of Austria, the Danube River enters the country through the German city of Passau and runs through the regions of Upper-Austria, Lower-Austria and the capital region Vienna before it leaves towards Slovakia. Although the floods in 2013 had an impact on many places along the river and smaller side rivers, it had the most devastating impact on the river basin Eferding, home to approximately 30,000 inhabitants (see figure 1).

In this area during the night from the 3rd to the 4th of June, a water power plant situated at the mouth of the River Basin had to open its locks as the water level reached critical levels. As a consequence, within a few hours, water masses filled up the low-lying hinterland and swamped the houses of hundreds of families (Pucher, Schober, & Samek, 2014). Some of the victims had already experienced a similar event in 2002, though the impact was smaller and the circumstances were different (Godina et al., 2004).

In response, a short time after the catastrophe, the political leaders of the regional government of Upper-Austria¹ developed a plan that entitles affected people to apply for financial compensation if they voluntarily decide to resettle. The former building area was re-dedicated into a flood risk zone. However, this act by the government left a vast majority of the affected citizens in distress since most of the people want to stay. The rededication of their land means a massive financial loss as their property in the new flood risk zone is worth only a fraction of the original value. It is not understandable for many why resettlement has been the only measure the government has taken up so far and also, why the government is so reluctant to cooperate with the affected people. The discontent has evoked the creation of a citizen initiative with the aim to investigate the exact incident, inform people as well as to find alternative flood adaptation solutions to the resettlement plan (Initiative Hochwasserschutz Eferdinger Becken, 2014b). As the government has continuously neglected to engage with the people, protests in front of the regional parliament on February 28th, 2015, hitherto marked the high point of the citizens' unrest.

In addition to the political discussions, there are considerations whether past and current flood adaptation and flood protection measures have been appropriate. Constructions such as dams, water power plants, and other regulations of rivers have interfered with the aquatic-ecosystem (Habersack & Piégay, 2007) and led to deterioration of the river basins' ability to cope with floods (De Vriend, Van Koningsveld, Aarninkhof, De Vries, & Baptist, 2014). The flood in 2013 showed that old dams and new high-tech protection measures barely withheld the water pressure. Especially in times of uncertainties (Sear,



Figure 1. River basin Eferding. Photos were taken from the same spot. The photo below shows the flood 2013. The water power station Wilhering-Ottensheim is visible on the photo above. In the foreground, the town of Ottensheim. The hills in the background mark the borders of the basin (Foto: Hagenauer)

¹ I will consequently refer to the regional government of Upper-Austria as the *government*.

Wheaton, & Darby, 2007) due to climate change and other challenges to our society, the question arises, whether the conventional way of dealing with floods in the Danube basin is still appropriate?

In recent years, more flexible solutions to proactive flood adaptation have emerged, as climate change and the increased occurrence of natural catastrophes have put risk-adaptation planning on the global political agenda (UNISDR, 2015a). In the Netherlands for example, which has been dealing with floods throughout the history of the country, the new paradigm is “learning to live with the floods” (Krysanova et al., 2008). The guiding principle in progressive Dutch water management is a system that can flexibly deal with unpredictable events and cope with any level of future floods (Krysanova et al., 2008). Human impact has put the ecosystem of the Danube under severe stress and research shows that rivers controlled by dams require significantly more management than free-flowing rivers (Palmer et al., 2008). There is thus an opportunity to introduce new paradigms to flood planning along the Danube.

After several devastating floods, the assumption can be made that planning how people can live side by side with nature in the river basin Eferding has failed. Thus, I want to investigate the possibilities for innovative ways for people to ‘live on the water’. As planning in Upper-Austria is mainly conducted top-down, meaning by the government only, I want to turn my focus to the bottom-up dynamics. As stated above, after being rejected several times, the citizens of the river basin have formed an initiative in order to mobilize against the government’s negligence to act. People are eager and willing to fight for a solution that allows them to stay in the area while being protected from floods in the future (derStandard.at, 2013). The concept of social innovation identifies precisely such situations, when needs of people are unmet, as breeding ground for social change (Mulgan, Tucker, Ali, & Sanders, 2007; Mulgan, 2007; Mumford, 2002; Tanimoto, 2012). The process of social innovation happens systematically (Mulgan et al., 2007) and this thesis engages with the first stages of social innovation for flood management in the river basin Eferding.

Driven bottom-up by the people in need for change, I assume that commitment and willingness to adapt to a new way of living is crucial for social innovation to happen. Currently, the dominant voice of the people is represented by the citizen initiative. The group is active in informing people through their webpage and public information events (Initiative Hochwasserschutz Eferdinger Becken, 2014b). Flood protection, however, concerns all the people in the region. The question is thus, how do they perceive the flood problem? Rethinking sustainable and resilient flood adaptation requires more than an outraged citizen initiative. The flood problem needs to be seen in a bigger perspective in order to combat the challenges not only of the local people, but many more stakeholders in the entire Danube River basin.

Thus, I argue that a systematic approach following the concept of social innovation can trigger change in the way people live in a flood risk area on the Danube. Based on best-case scenarios and expert knowledge, I created a concept for sustainable and resilient living in the flood prone river basin Eferding. I then presented the example in a speed-drawing video and tested peoples’ attitude towards social innovation in a survey in order to analyze the following problem formulation:

To what extent are people ‘open to/accepting of’ social innovation in flood adaptation planning in the river basin Eferding in peri-urban Austria?

1.1 Aim of the study and research questions

Social innovations have the potential to revolutionize our society (Mulgan et al., 2007): the concept of kindergarten, the internet, micro-finance, Wikipedia or Fair Trade are all examples of successful social innovations. The potential of social innovation to improve life has been discovered by various governmental and non-governmental organizations (European Commission, 2010; TEPSIE, 2015). Interested in how social innovation can help solving complex challenges, I aim to test the applicability of the concept in this study. Furthermore, in the perspective of sustainability science, I understand my work as, on the one hand, a contribution to knowledge creation within the paradigm, and, on the other hand, I intentionally aim to improve the current situation in flood planning thereby addressing environmental change. Sustainability

challenges are especially known for their complexity due to the multiplicity of dynamics, of involved stakeholders and of scales (Martens, 2006). To unwind the challenges in the research paradigm of sustainability science, I focus on mode 2 knowledge production, where knowledge is produced while it is applied (Nowotny, Scott, & Gibbons, 2003): with this work, I intentionally aim to contribute to resilient flood adaptation planning in the river basin Eferding while I test the applicability of the concept of social innovation in this particular case.

Previous studies about flood adaptation suggest that there is a need for changing the stationary paradigm of feeling safe behind embankments (Johannessen & Hahn, 2013) towards a new resilient paradigm of living with the water. According to the European Environmental Agency (EEA), floods between 1998 and 2009 were the most costly hazards in Europe resulting in losses of 52 billion euros and 1,126 fatalities (EEA, 2011). On top of that, the 2013 flood event has contributed to even higher losses. In this respect, I consider my topic relevant in relation to disaster risk reduction and linked to climate change adaptation. The thesis will be guided by the following research question:

To what extent are people open to social innovation in flood adaptation planning in the river basin Eferding in peri-urban Austria?

The research questions is divided into the following sub-questions:

1. What is the current situation in the Eferding river basin with respect to flood planning?
2. What could be an innovation scenario for resilient living in the flood prone river basin Eferding?
3. How can a social innovation arise through creative ways of stimulating the idea creation process?
4. How do people in the river basin Eferding think about social innovation?

2 Background to the Study

Sub-question 1: *What is the current situation in the Eferding river basin with respect to flood planning?*

In this chapter, I will explain what makes the case of the river basin Eferding controversial issue and thus a unique environment for research. I will introduce the reader to the river basin Eferding, the record flood 2013, the uncertainties about future flood development, the current measures by the government and how the citizen initiative is trying to fight for better solutions. In addition to extensive literature research for mapping out the background to the study, I interviewed the spokesman of the citizen initiative, Dr. Gerald Zincke on February 21, 2015. For further explanation about the methods used see chapter 5.

2.1 River basin Eferding

The river basin Eferding is situated in the region of Upper-Austria in the north of the federal republic of Austria.

Approximately 10 kilometers downstream lies the regional capital city Linz with roughly 200,000 inhabitants. The region of Upper-Austria is divided into 41 different landscape zones (Cermak et al., 2007). Indicators, such as relief, hydrography, climate, geology, forest cover, primordial landscapes or land use, define these zones. The 13 municipalities cover the 118.5km² large basin with approximately 30,000 inhabitants (see table 1). Agricultural fields, smaller settlements, meadows and riparian forests as well as the large Danube River and smaller side rivers define the landscape. In the north, east and west the river basin borders on forested steeps, and in the south on a densely forested, hilly agricultural area. The Danube River primarily

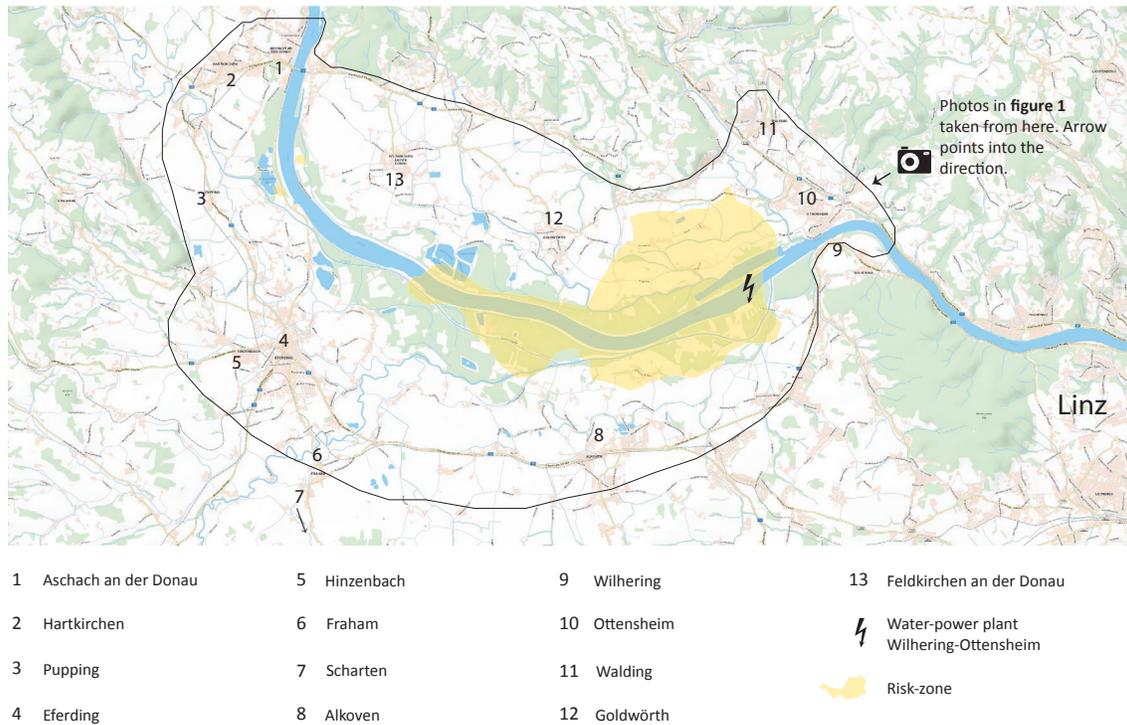


Figure 2. Map of the river basin Eferding (IRIS, 2015 and own interpretation)

serves as an international waterway for freight and passenger transportation, connecting the Black Sea with Rotterdam harbour in the Netherlands through the Rhine-Main-Danube channel. Additionally, electricity is generated through the water-power plant Wilhering-Ottensheim, constructed in 1974 and owned by the private corporate Verbund AG, in the east of the river basin. The municipalities are the responsible authorities for land-use planning. In Austria, most of the administrative competencies are divided between the 9 regional governments (in this case the government of Upper-Austria) and the federal government (see figure 3).

2.2 The record flood in 2013

As a low-lying area, the river basin has been flooded several times in history. Almost 200 years of annual peal flow recordings of the city of Linz indicate mayor flood events (>7,000 m³ per second) in the years 1862, 1899, 1954, 2002 and 2013. However, with more than 9,000 m³ per second, the flood in 2013 was the first at this scale and the only event so far in the return-category one in 300-years (HQ 300). A low-pressure area over central Europe caused constant heavy rain over seven days from May 28 until June 4, 2013 (Pucher et al., 2014). The highest precipitation volume measured was 350 mm per day/m². In contrast to the flood in 2002, where most of the damage was caused by side rivers transporting the water masses into the river basin

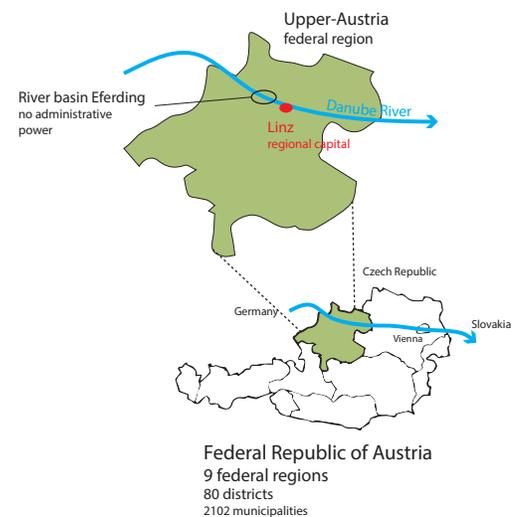


Figure 3. Political administration of Austria (own interpretation)

(Godina et al., 2004), this time the water masses came from the Danube River. Over night to the 4th of June the water power plant Wilhering-Ottensheim had to open its locks and overflow the area as the water level reached critical levels. The process of consciously flooding the river basin was in line with the dam regulation, which has been in place since the construction of the waterpower plant in 1974. The flood was therefore caused by both natural factors (i.e. heavy precipitation) and human factors (i.e. opening the locks), thus making it a socio-ecological system (Danubefuture.eu, n.d.). As a consequence, roughly 50 per cent of the area of the river basin was flooded causing millions of Euros in financial damage (Weingraber, 2013). Due to the lack of adequate early warning and evacuation procedures, the flood hit the people rather unprepared (derStandard.at, 2013). The procedure raised many questions, such as why people were not warned in time, and whether the dam-regulations of the water power plants along the Danube River still are up-to-date. The latter is an on-going debate about adjusting the regulations about water levels in the storage areas of the Danube water power plants in times of floods. Some argue, that the current dam-regulations are jeopardising the river basin Eferding in times of floods (Initiative Hochwasserschutz Eferdinger Becken, 2015).

Name of municipality	Size by population	% of municipality's area situated in the river basin Eferding	
Eferding	3,920	100	
Goldwörth	913	100	
Pupping	1,880	96	
Alkoven	5,523	68	
Fraham	2,296	55	
Feldkirchen an der Donau	5,250	52	
Ottensheim	4,469	46	
Walding	3,993	34	
Hartkirchen	4,061	27	
Aschach an der Donau	2,190	27	
Hinzenbach	1,973	25	
Wilhering	5,898	24	
Scharten	2,203	1	

Table 1. Municipalities of the river basin Eferding (Source: Government of Upper-Austria)

2.3 Uncertainty

In recent years, heavy floods have caused massive damage to vast areas along the Danube River and other mayor river catchments in Europe. The International Institute of Applied System Analysis (IIASA) in Austria has estimated the annual average flood costs in Europe between 2000 and 2009 to € 4.9 billion and predicts an increase to € 23.5 billion average annual spending in Europe by 2050 (IIASA, 2014). In the same article, the IIASA predicts an increase in frequency of flood occurrence from currently every 16 years to every 10 years by 2050 (IIASA, 2014; Lehner et al., 2006).

Of great importance for flood planning in the river basin is the question of whether climate change and further human modification of the rivers could increase the likelihood of floods. An increase in the likelihood of floods could support the resettlement policy of the government. The responsible politician, member of parliament (MP) Anschöber has stated in the media, that “(...) due to climate change, the volume of precipitation in extreme precipitation events will increase and hence the water levels of floods will rise” (BTV-EF, 2015). Although the link between increased precipitation due to climate change and the increased risk of floods has been scientifically confirmed for certain regions in Europe (Jongman et al., 2014; Kundzewicz et al., 2014; Lehner et al., 2006), there is no clear evidence for similar predictions for the Danube River catchment (Austrian Panel on Climate Change (APCC), 2014; Lehner et al., 2006). However, local changes in extreme precipitation patterns caused by increased evaporation through warmer temperatures are nevertheless a major threat for flood prone areas (Austrian Panel on Climate Change (APCC), 2014; Becker & Grünewald, 2003).

Local data collection shows that there are no clear signs as to whether climate change will have an impact on the flood situation in the river basin: although temperatures have increased in the north-eastern Alps region by approximately 2 degrees Celsius over the last 100 years (ZAMG, 2012a), data collection over the past 200 years neither showed significant effect on precipitation (ZAMG, 2012b) nor extreme-precipitation (ZAMG, 2012c). Similar results have been found for other bigger European rivers (Mudelsee et al., 2003). The statement by MP Anschöber that climate change will have an impact on floods can neither be confirmed nor denied (BTV-EF, 2015). However, it is likely that the human dynamics in the river basin will increase the risk of floods (ZAMG, 2012c).

Hence, while weather forecast does not provide a basis for flood planning, it can be recommended to acknowledge the high level uncertainty and plan for any scenario of unknown scale (Sear et al., 2007). Actively dealing with uncertainty can have considerable positive effect on resilience planning (Berkes, 2007).

2.4 The flood protection plans by the government and the citizen initiative

Considering its history with floods, the river basin Eferding is a rather large flood-threatened area along the Austrian Danube that is lacking comprehensive flood protection. After the last catastrophe, a budget of 250 million² euros was assigned to create a holistic protection plan (APA, 2013).

The first measure taken up by the government was to enable people to apply for public support for resettlement. The legal basis for granting public support is the rededication from the building land into a flood risk zone (Weingraber, 2013). The government defined a yellow zone that covers 24.35 km² with 612 buildings of which 138 are residential properties (see figure 2). Affected people within the yellow zone are able to apply for public support for resettlement. After individual evaluation, people are entitled to receive up to 80 per cent of the market value of their house and 80 per cent of the costs for removing the existing building³ (Weingraber, 2013). On the government’s recommendation, the municipalities as the responsible authorities have rededicated the land accordingly. According to a local newspaper, the mayor of the Goldwörth municipality stated that the municipalities were more or less forced to vote in favor of the flood zone (G. Zincke, personal communication, February 21, 2015). In addition, building-restrictions in the flood zone for the existing houses have been determined (Weingraber, 2013). For almost all houses, an offer has been issued which has to be confirmed by the end of 2015 (Anschöber, 2015). The resettlement is entirely voluntary for both sides, which means that the affected people don’t have to accept an offer and the government is not obliged to guarantee subsidies.

Although some people have shown interest in moving, a vast majority wants to stay in the river basin. There are several arguments of those against the resettlement policy (G. Zincke, personal communication, February 21, 2015): first, the resettlement plan is the only protection measure that has been decided by

² Subsidies come from: 50 per cent federal government, 30 per cent regional government of Upper-Austria, 20 per cent municipalities.

³ People have to remove their homes up to 1 meter below the ground (G. Zincke, personal communication, February 21, 2015).

the government until now. In fact, the governor's opinion still is that resettlement is the only solution for real flood protection (Hirsch, 2015). It may happen, that future flood protection is strong enough to resist a flood of any size. The resettling would in that case not make any sense. Second, since affected people cannot get any subsidies for their land, choosing to resettle would mean financial loss. With the subsidies, people will not be able to build up a similar living situation without investing considerably as the land in the flood zone has lost nearly all its value after the zoning process⁴.

Besides the resettlement plan, a general project should protect the river basin Eferding in 2020. A tender of the Austrian engineering company Werner Consult was accepted in March 2015 (Anschober, 2015). In a first phase, the company will collect data and inputs from the 13 municipalities in the river basin. The protection plan should be finished by June 2016.

As a response to the one-way proceeding of the government, affected citizens started to collect data and information about the flood and investigated other possible solutions to protect the river basin (G. Zincke, personal communication, February 21, 2015). On 29th, June 2014, the citizen initiative Hochwasserschutz für das Eferdinger Becken (flood protection for the river basin Eferding) was founded with the aim to investigate the causes for the flood, informing the affected citizens of the government's process in flood protection planning via the online platform hochwasser2013.at, and what could be done alternatively to the resettlement policy. In a comprehensive master plan, a group of volunteers and many supporters described 16 measurements to reduce flood frequency, avoid flood damage and mitigate flood impact (Initiative Hochwasserschutz Eferdinger Becken, 2014a). The master plan was presented to representatives of the regional and federal government but has so far been overlooked (G. Zincke, personal communication, February 21, 2015).

2.5 Status-quo

The river basin Eferding currently meets severe challenges regarding flood adaptation planning: 250 million euros have been assigned to establish flood protection; resettlement as the government's first measure has been highly disputed; a citizen initiative is fighting for fairer and better solutions; uncertainty about future floods is making the planning difficult; the Danube's ecosystem is suffering from human impact and needs more attention. The next chapter will present innovative ideas that could evolve to a solution for the complex challenges.

3 Way Forward in Flood Adaptation Planning

Sub-question 2: *What could be an innovation scenario for resilient living in the flood prone river basin Eferding?*

The flood in 2013 has shown that existing dams and other local flood protection measures in the river basin do not suffice to fully protect the citizens. The planning process for a new system has already started with the government's resettlement policy and an engineering company has been commissioned to start planning additional protection measures. It is questionable which challenges these measures will tackle. Will the system only provide protection for the local citizens in the river basin or will it tackle the flood problem more holistically? In this chapter, I will introduce to proactive flood adaptation measures and international best practice cases.

⁴ E.g. the costs per square-meter of building land in the municipality of Walding for resettlement victims was stated with 95 euros. In many cases, the building land of current houses amounts to over 800 square-meters, which would result in approximately 80,000 euros additional costs for new construction land (Dr. G. Zincke, personal communication, February 21, 2015).

3.1 Planning innovatively: from reactive to proactive flood adaptation

In the river basin, dams are the predominating flood protection measure. As an example, in the municipality Ottensheim a system of earth walls was built in the 1970s to protect low-lying settlement areas of the town (K. Hagenauer, personal communication, April 22, 2015). As a more current example for flood protection in Upper-Austria, in the Machland, a river basin further downstream of the river basin Eferding, a flood protection plan for the entire basin was finished in 2012. The system consists of dams, dykes, mobile floodwalls, a compensation embankment, resettlement policy and special building code for new constructions, emergency generators, power transformers, pumping stations and valve boxes ("Machlanddamm," n.d.).



Figure 4. Flood dam in Ottensheim needed heavy adjustments during the flood 2013 as it almost broke after it started to leak at several spots along the dam (Foto: Hagenauer)

However, during the 2013 flood, the dam in Ottensheim had to be weighted with rocks as it was close to breaking (see figure 4). In addition, the mobile floodwalls in the Machland could barely hold back the mass of water from streaming into the city of Grein (see figure 5). Such protection measures, which shield specific buildings or areas from floods are defined as *reactive* measures (Palmer et al., 2008). The disadvantage of reactive flood protection is that it is designed for certain flood levels. Furthermore, as Palmer et al. (2008) conclude, embanked rivers require more management to protect people and ecosystems than naturally, free-flowing rivers. Settlement along rivers, the drainage of wetlands in favor for agricultural land, the straightening of the riverside or the construction of water power plants are just a few examples of human interference that have an impact on the aquatic ecosystem (De Vriend et al., 2014; Habersack & Piégay, 2007).



Figure 5. Mobile flood walls in the city of Grein, further downstream of the river basin Eferding. Only a couple of centimeters between the top of the flood walls and the water level (Source: Ariva.de)

In contrast, *proactive* flood adaptation targets on increasing the river system's natural capability to absorb floods (Palmer et al., 2008). As an example for proactive flood adaptation, ecosystem-based adaptation measures, such as wetlands, have been implemented in several riparian areas to mitigate floods (De Vriend & Van Koningsveld, 2012; Heeb, 2012; Mitsch & Gossilink, 2000; Palmer et al., 2008; wetlands.org, 2015). The main problem with floods is often the peak flow. Wetlands on strategically important spots can serve as buffers for floods as they are able to retain water before it joins big streams that swell to a critical size (Mitsch & Gossilink, 2000).

Other functions of wetlands are: habitat for animals and plants increasing biodiversity; aquifer recharge; nutrient sinks.

3.2 Living on the water best practice

In addition to considering how the nature can be adapted to improve flood resilience, the flood in 2013 has shown the weaknesses of how people currently live in the river basin: many houses are vulnerable to floods as expensive heating systems and other electrical gear is often placed in basements and living areas often start below safe flood heights (G. Zincke, personal communication, February 21, 2015). The Dutch architecture studio Waterstudio.NL⁵ has specialized in finding solutions to use water as living space. With floating boats, the studio tackles several issues at once (figure 6 and 7): first, in flood risk areas, resilient living can only be provided if houses are safe regardless of the magnitude of the flood. Floating homes fulfill this criterion. Secondly, flexibility, including the way of living, is becoming more important to people. For example, the demand for space of a family can change as children grow up and move out. Floating homes can be adjusted more easily than traditional houses. This form of living with the floods has been practiced for many years along rivers with periodic floods, such as the Mekong in Cambodia, where people either move to higher altitudes whenever the basin is flooded or live in houses on stilts or floats (Berkes, 2007). However, in areas where this form of living has not been part of history, flood resilient houses on floats or stilts demonstrate innovation.

Proactive flood planning and rethinking the way of living in the flood could both improve flood resilience in the river basin Eferding. Incorporating a new paradigm of resilient living in the flood area (Johannessen & Hahn, 2013) can be brought to the region through getting people involved in social innovation thinking. The concept will be explained in the next chapter.

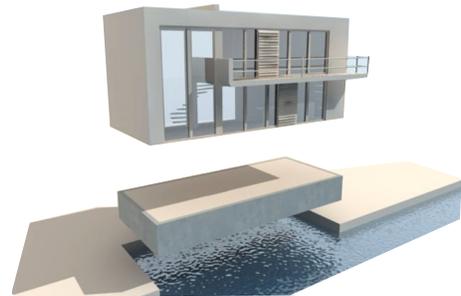


Figure 6. Floating house concept by Waterstudio.NL (Source: Waterstudio.NL)



Figure 7. Watervilla in IJburg, the Netherlands (Foto: Waterstudio.NL)

4 Theory

Sub-question 3: *How can a social innovation arise through creative ways of stimulating the idea creation process?*

The concept of social innovation is at the core of this study. In order to find clever solutions to how people could potentially live in a more flood-resilient way, I make use of the concepts' four process steps. In this study on flood adaptation in the river basin Eferding, I will in particular focus on the first step. In this chapter, I will introduce to the concept of social innovation.

⁵ Link to the webpage of the architecture studio: <http://waterstudio.nl>.

4.1 The concept of Social Innovation

Many prominent, ground breaking changes to our society have the principles of social innovation in common (Mulgan et al., 2007). Fairtrade, the Grameen Bank, Amnesty International, Oxfam, The Open University, Women's Institute, Linux Software, NHS Direct, Participatory budgeting models, Wikipedia, the concept of kindergarten, and many other innovations have emerged from within society in order to tackle challenges to our society. These innovations have a broad impact and convince through their durability (Westley, 2008).

There are a variety of definitions that describe social innovation. The bottom-line is made out of two characteristics that define human beings (Westley, 2008): on the one hand, humans have an endeavour to explore, improve and invent new things and processes. On the other hand, inventions are often driven by the desire to strengthen social bonds and make life easier and fulfilling. The following definition presents the ideas of this concept in a straightforward way:

Social innovations are new solutions (products, services, models, markets, processes etc.) that simultaneously meet a social need (more effectively than existing solutions) and lead to new or improved capabilities and relationships and better use of assets and resources. In other words, social innovations are both good for society and enhance society's capacity to act. (The Young Foundation, 2012, p. 18)

This definition is the contribution of The Young Foundation, a UK research institution, to the TEPSIE consortium, a research collaboration of six European institutes with the aim of understanding the theoretical, empirical and policy foundations for developing the field of social innovation in Europe (TEPSIE). The project is funded by the European Union under the seventh framework programme (TEPSIE, 2015). Among others, it is the target of the research collaboration to aim at describing barriers to innovation.

To foster social innovation, many governments, NGOs, private companies and for profit and non-for profit actors have established networks and platforms for innovators to get support, exchange knowledge and conduct research (Mulgan et al., 2007). Examples include the Skoll Center for Social Entrepreneurship at the Said Business School at Oxford University, UK, the Austrian Center for Social Innovation, The Young Foundation, UK, and a multitude of incubators, such as the Ideon Innovation Incubator at Lunds University, Sweden, that help ideas to become reality. These European examples should by no means hide the fact that the trend to support social innovation is global (Mulgan et al., 2007; Tanimoto, 2012).

4.2 Why do social innovations emerge?

A look at recent history of western society shows the development towards an ever higher living standard: from a society plagued with numerous wars, diseases, unstable food supply, inequality, heavy discrimination and the lack of a social welfare system towards a safer society, where hunger and diseases can be fought rather easily, and kindergarten and pension systems are in place. Many of these developments emerged when our society, driven by the feelings of exclusion, discontent, passion and devotion, is in need to change certain conditions (Mulgan, 2006; Mumford, 2002).

Although society has improved in many ways, new challenges constantly arise: dilemmas, such as the financial crisis that put a lot of people out of the labour market, food, natural resource and energy shortage, the change of our climate, security and migration, health and the change in life expectancy, inequality and even the definition of happiness demand our society to do things differently in order to achieve improvement to the quality of life (Edwards-Schachter, Matti, & Alcántara, 2012; Mulgan et al., 2007). As a response to tackle these dilemmas in current policy, the potential of social innovations to create change has been fostered by various national and international policy and research institutions, not only in terms of business, products and services, but also in social processes in order to increase the future standard of living (European Commission, 2008, 2010).

4.3 Social innovation in history

Throughout history, philosophers, economists and politicians have written about the concept of social innovation: in the 18th century, Benjamin Franklin stimulated social innovation by, among other innovative initiatives, forming a club of intellectuals (Junto), where improvements to the societal organization were discussed (Mumford, 2002). At the turn of the 19th century, Emile Durkheim highlighted that technical changes only matter when they serve social order, continued by Max Weber's studies of the relationship of social order and innovation between individuals and groups as opposed to innovation in technology in the beginning of the 20th century (MacCallum, Moulaert, Hillier, & Haddock, 2009; Nussbaumer & Moulaert, 2004). The Austrian economist Joseph Schumpeter, particularly in his later works in the mid-20th century, recognized that the concept of innovation in the dynamic form of capitalism led by mathematical models will lead to monopolistic structures and ultimately collapse (Śledzik, 2013). Hence, novelty, i.e. social innovation, needs the influence of sociologies beyond economics (MacCallum et al., 2009). The holistic understanding of the concept of social innovation as presented in this thesis emerged in the 1970s in France in a debate on the organization and transformation of society (MacCallum et al., 2009). Central to this debate was the link between crisis, in which society expresses their unsatisfied needs, and social innovation that can lead to satisfying those needs. In this evolutionary step of the concept, the emphasis on the satisfaction of the individual needs through collective initiative, which is not state intervention, is important for today's discussion on the topic. Moreover, the state can be seen as curtailing and provoking social innovation (MacCallum et al., 2009).

To many current challenges of society, the concept of social innovation offers an alternative, where ideas of solidarity, new ways of organizing interpersonal activities and social relations, aim to achieve common social well-being (MacCallum et al., 2009; Mumford, 2002). This will especially become important in the 21st century, where social and health care sectors will grow to an estimated 20-30% of GDP (Mulgan et al., 2007).

4.4 The process of social innovation

Most of the existing research on innovation has been conducted on business innovation cases. However, the process of how innovations arise may be similar regardless of a stronger or weaker business or social focus (Mulgan, 2006; Tanimoto, 2012). In some cases, social innovation and business innovation are even interlinked: according to Tanimoto (2012), social entrepreneurship applies economic tools to achieve social innovation. Looking at it from another perspective, social innovation, business and economic growth are interlinked in the way that new business ideas need social acceptance in order to become mainstream. In order to become mainstream, social innovation runs through a four-step process (see figure 8) (Mulgan et al., 2007).

The process of social innovation explains the different stages that are necessary for change to happen. In this thesis, I will focus on the first step, where ideas are being created.

4.4.1. Idea creation

"All truth passes through three stages. First, it is ridiculed. Second, it is violently opposed. Third, it is accepted as being self-evident." (Arthur Schopenhauer, German philosopher)

As a first step, innovators, who can be a single person or a group of people, feel the need to change something for their own sake or, out of empathy, want to change a situation of a suffering friend or family member. Needs can be detected in a random conversation on the street, or while observing people. Innovators, competent of finding solutions for their own challenges, try out new things that are conceived impossible

(Mulgan et al., 2007). Once a need is detected, possibilities of how to satisfy these needs lead to the creation of an idea. Hardly any idea emerges fully developed. They are shaped through trial and error, and many ideas are not entirely pristine but rather improvements of circumstances, connected parts of existing thoughts or derivatives of other concepts (Tanimoto, 2012). Many institutions are specialized in supporting the creation of innovations, such as innovation incubators or innovation labs as private, public or NGO-led. These facilitators help ideas to reach maturity and separate the good from the bad ones.

Barriers to change

Why do (most of the time) things stay the same? To the surprise of innovators, even the most appealing innovative ideas often meet many more barriers than expected. As an explanation for our society’s reluctance to change, Mulgan et al. (2007, p. 18) name four barriers, which have been described by philosophers such as Joseph Schumpeter, Clayton Christensen and Thomas Kuhn:

First, from the perspective of the society, which has optimized a system of practices over a long time, innovations face an efficiency challenge. Radical new ideas often need some time to unfold their potentials, a phase that requires patience which many people are not ready to show. Innovation is perceived as disturbing to an optimized system. Second, the interest in change is often not as big as it might appear in the first place. People fear that investing in something new is too high of a risk compared to practicing things the way they are. Additionally, if those in power fear that change leads to a weakening of their current position, the interest in the innovation to happen will be low. Third, for change to happen it is important to get into the minds of the people who should implement the innovation. With the absence of people’s positive norms and assumptions about the innovation, it is difficult for change to happen. Fourth and finally, personal relationships that manifest in favours and debts can tie a system so strongly, that it can become extremely difficult for change to gain ground.

Breaking the barriers to change

Why do things change (some of the time)? Change happens when barriers start to fall apart (Mulgan et al., 2007, p. 19). This can happen in the following way: a good example for the efficiency barriers to break is the current financial crisis. Under such circumstances, when the optimized system is weak, companies and governments cry out for innovation. This can be an ideal breeding ground for change. Subsequently, more people, and in particular marginalized ones, are interested in taking risks since business as usual is not profitable anymore. At the same times, the minds of people changed as the old norms and values have failed and new ones are needed for a better future. This euphoric mood about change will also break ties of relationship, as some will go with the change and others will stick to the old scheme.

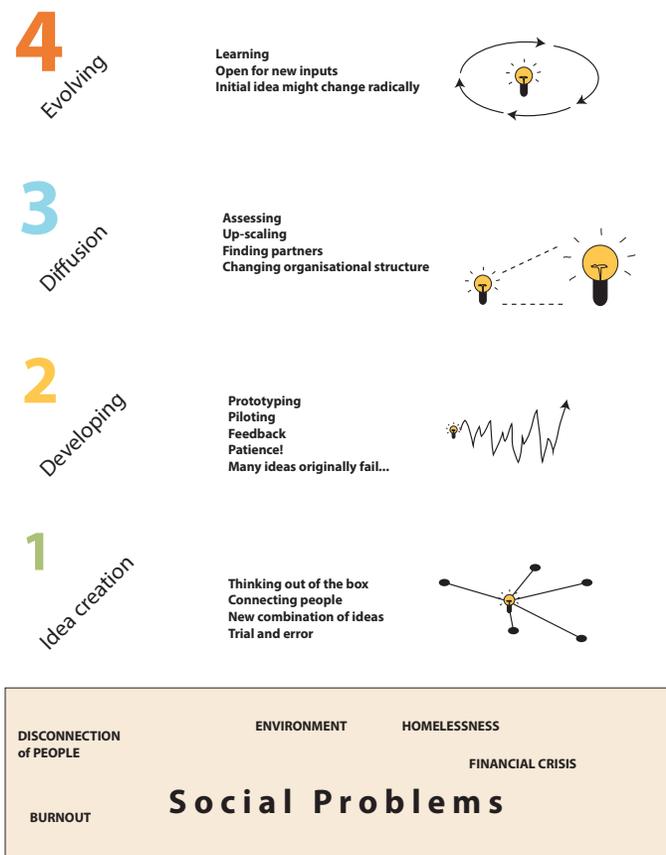


Figure 8. Process of social innovation (based on Mulgan et al., 2007)

4.4.2. Developing, prototyping, piloting

“Ever tried. Ever failed. No matter. Try again. Fail again. Fail better.” (Samuel Beckett, Irish novelist)

The next step demands courage and patience, as social innovations will encounter a lot of feedback during the test phase, both positive and negative. Mulgan (2006) points out, that many great ideas originally failed (e.g. Wikipedia). But it is important to learn from the mistakes and keep improving. The development of innovation incubators of various kinds (i.e. business and social), private and public foundations, and technology such as 3D-printers and the internet are important to support social innovations to overcome this phase of uncertainty (Mulgan et al., 2007).

4.4.3. Assessing, up-scaling and diffusing

Once an innovation has passed the test-phase, the next step is to scale it up. On the one hand, it is important to find the right partners with the necessary resources to scale-up the innovation. As Mulgan et al. (2007, p. 3) puts it metaphorically: the bustling bees (innovators, entrepreneurs) need trees (bigger organizations with resources) that can help ideas grow. These could be both private companies but also the government, which has the power to pass laws and direct public spending to support the innovation. Here, Mulgan (2006) points out that certain methods, such as calculating the social return on investment are important to convince a partner. Furthermore, the innovation needs to be communicated in the right way through a fitting name and branding. The barriers to scale-up innovations have become increasingly easy to overcome especially through innovations like the Internet, which decreases entry costs considerably. On the flip side, as the Internet offers unlimited ideas, it can make ideas disappear as quickly as they came up as others trump them. Furthermore, Mulgan (2006) names two important ingredients for innovations to grow: the right environment and organizational capacity. The former means that it can be a time consuming process for social innovations to get the public and other users on board in order to create demand. The latter means that it is important for social innovations to make the right organizational choices, which often results in changing management positions as different steps in the process require different skills.

4.4.4. Learning and evolving

Ideas start off as possibilities that are only incompletely understood by their inventors. (Mulgan et al., 2007, p. 25)

Although at this stage innovations are fully functional and practiced in real life, the process of learning and evolving through constant feedback continues. Many unexpected reactions might add on functions to the innovation to such a degree that there is not much left of the initial idea. The principle behind this is that the innovator can't know it all. Mulgan (2006) notes that changes to and evolvement of the innovation might occur in a non-linear way as feedback loops at any stage might change direction unexpectedly. Further, sometimes action and trial offers an entirely new exploration of possibilities (Mulgan et al., 2007).

4.5 Who is an innovator?

Every social innovation started in the mind of an innovator. Mulgan et al. (2007) name three different origins for social innovations: strong individuals, whole movements, and organizations. In the examples earlier mentioned, individuals, such as Muhammad Yunus with his idea of microfinance, Benjamin Franklin as an initiator for various innovations or Michael Young as founder of the Young Foundation and other activities in the 20th century (Mulgan et al., 2007; Mumford, 2002) have detected a need of society,

pursued it with passion, and convinced the broader society of its success. However, Tanimoto (2012) describes by using the example of a community-based wind-power electricity business in Japan in 2001, how social innovations emerge out of local multi-stakeholder relations. Hence, social innovations arise as the endeavor of a single innovator or as a collaboration of many different stakeholders. Another view is that all humans are innovators since we carry strong senses for justice or equality inside ourselves (Mulgan et al., 2007). In some cases, strong currents of discontent among many people may grow to big movements that bring about social innovation, such as feminism. Furthermore, Mulgan et al. (2007) name organizations as possible innovators, as in the case of childcare in Denmark that was revolutionized from within existing public institutions.

4.6 Further remarks on social innovation

The conditions for social innovations can differ greatly. While criteria such as public access to funding, open media and a supportive legal framework foster social innovation, monopolized power, controlled media and the lack of public funding possibilities pose barriers to social innovation (Mulgan, 2006). There are, however strong existing networks, such as the worldwide social innovation exchange⁶ (SIX), which are operating on local, regional and global levels in the public, private and NGO-sphere, to stimulate social innovation by connecting innovators to peers. Although the focus on social innovation is increasing (Mulgan, 2006; Phillis, Deiglmeier, & Miller, 2008; Tanimoto, 2012; The Young Foundation, 2012), public subsidies and private investment for business innovations are much higher than for social innovations (Castellacci et al., 2005; Mulgan, 2006). Since innovation involves failures, politicians are reluctant to invest in entirely new social innovations and prefer building on existing structures. Since in some sectors failures can be fatal (e.g. in the traffic sector, when an alternative to traffic lights could potentially lead to accidents), it is difficult to politically justify social innovations (Mulgan, 2006). Compared to the business sector, social innovations often lack the force of a competitive market that pulls out one idea after the other.

There are three criteria that differentiates social innovation from other innovations (Mulgan et al., 2007). First, social innovations are often a combination of existing ideas rather than ground-breaking new inventions, as in the case of technological innovations. Second, in order to become mainstream, social innovation requires the involvement of actors across various disciplines. Third, social innovations result in closing social bonds in society with the goal to satisfy unmet needs.

4.7 Social innovation for flood planning

I see the potential of social innovation, which is to bring about change to complex situations of different political opinions, highly relevant for flood adaptation planning in the river basin Eferding. In this particular context, without a new way of thinking, it is rather unlikely that the flood problem will be tackled holistically, i.e. as a problem for the entire Danube River basin, its aquatic ecosystem and its various stakeholders. Social innovation offers a process to initiate new ways of thinking about flood planning.

5 Methodology

As mentioned in the theory chapter, a social innovation process includes several steps. In order to evaluate how people think about social innovation in the particular case of the river basin Eferding, I created a social innovation scenario in three steps. The first two steps relate to how I engaged with the idea creation process in innovative flood planning, the third analyses people's reaction to the idea: first, I developed

⁶ Link to the webpage of the organisation social innovation exchange: <http://www.socialinnovationexchange.org/home>.

an idea for innovative flood protection in the river basin Eferding. The concept was based on literature research and expert knowledge with a local architect. Second, I created a video in order to present the idea and explain the context of the current situation of flood planning. I then published the video on YouTube and distributed the link through various channels. Third, I evaluated people's attitude towards social innovation through a survey, which I linked to the video.

5.1 Action research

Throughout the thesis progress, I had considerations whether I would move too far away from conventional research, so that my project no longer can be perceived as academic work. I justify my active role in the process by borrowing principles from participatory action research (PAR) (Baum, MacDougall, & Smith, 2006; Bradbury-Huang, 2010; Greenwood, Foote Whyte, & Harkavy, 1993). According to these principles, through communication, participation and reflection between researcher and the people under study, I aim to increase the relevance of my work for the broader society. However, this study merely shows my participation in the initiation of a social innovation process. In the further process of flood adaptation planning in the region, I may not play a participatory role at all. Thus, I see participation as a process developing throughout the project (Greenwood et al., 1993). I acknowledge that my work is driven by values. These values, however, result from respectfully making use of people's knowledge and their understanding of needs (Brydon-Miller, Greenwood, & Maguire, 2003). Thus, while working towards a value-driven goal, the project should contribute to better understanding the concept of social innovation.

5.2 Epistemological and ontological considerations

I want to explain my epistemological and ontological standpoint by stating what actually impels me to conduct this study: as I grew up in the river basin Eferding, flood planning personally matters to me. I believe that people can be motivated to re-think the way in which they live in the flood risk area, and that - through a joint effort - a solution for resilient flood adaptation can be found. In order to find new, smarter ways of living, I engage actively in an experiment using the process of social innovation, mixing qualitative and quantitative methods (Johnson, Onwuegbuzie, & Turner, 2007). Although most of my study design follows the rational of the ontology of positivism (i.e. quantitative analysis of people's attitudes in a survey), I equally value the position of interpretivism, focusing on how society is constructed by people's interactions (Morgan, 2007). Hence, my solution oriented, interactive research approach is in line with the pragmatist view, that what counts for flood adaptation planning in this case is what I observe as the way forward through engaging with the environment and the people (Shalin, 1986).

5.3 Step 1: Idea creation

According to Mulgan (2006), when ideas emerge, they are rarely complete thoughts that master the problem right from the start. Also, ideas that lead to social innovation might not be entirely new, but rather a collection of other thoughts and best-case scenarios. Initial thoughts are shaped by the feedback of people who have an interest in the idea to happen or not to happen. As the first step of the social innovation process, I created an idea in an iterative process (see figure 9).

Before I investigated the current situation in flood planning in the river basin, I drew inspiration from an exhibition and an event in the Danish Architecture Center in Copenhagen on urban flood adaptation planning (DAC, 2014). In addition, I conducted a semi-structured interview with the spokesperson of the citizen initiative, Dr. Gerald Zincke on February 21, 2015. With inspiring ideas on how to handle flood waters from the DAC and a first thorough explanation of the situation in the river basin Eferding from the interview in my mind, I studied the proposal for flood protection measures of the citizen initiative in the river basin

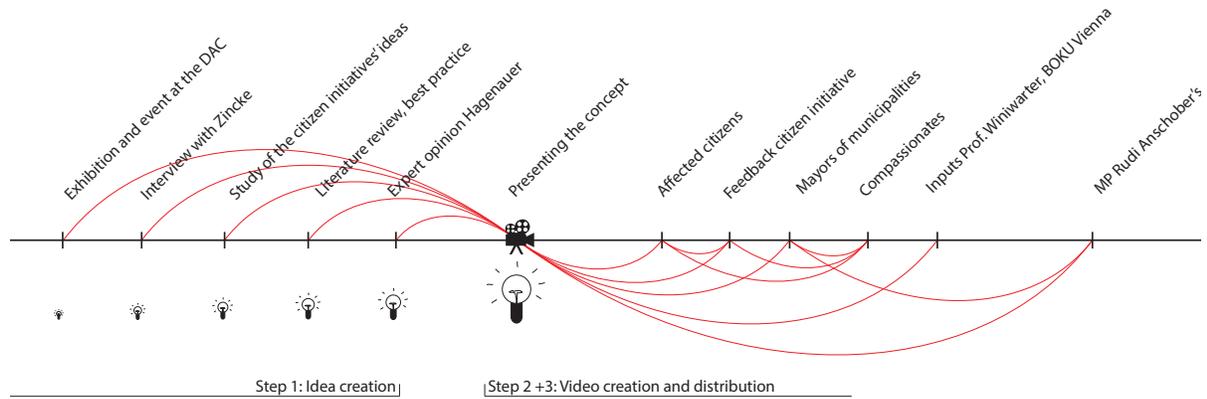


Figure 9. Timeline of idea creation process (own interpretation)

(Initiative Hochwasserschutz Eferdinger Becken, 2014a). The measures described in this proposal, so called master plan, are based on hydrology expert opinions and personal observations. In order to build on the ideas from the river basin, I conducted a literature research on current examples for flood resilient living. I then discussed the idea with engineer Klaus Hagenauer, a local architect and landscape planner from Ottensheim in the river basin. Hagenauer was excited about my thoughts and added his suggestions and comments on the feasibility of the concept. The concept presented was built on five thoughts (see figure 10): flood protection, protection of biodiversity, providing living space, recreational function of the river basin, and inclusion of all stakeholders. Having collected thoughts about how living in a flood area could be done differently, I presented this innovative idea through a video, which I explain in step 2.

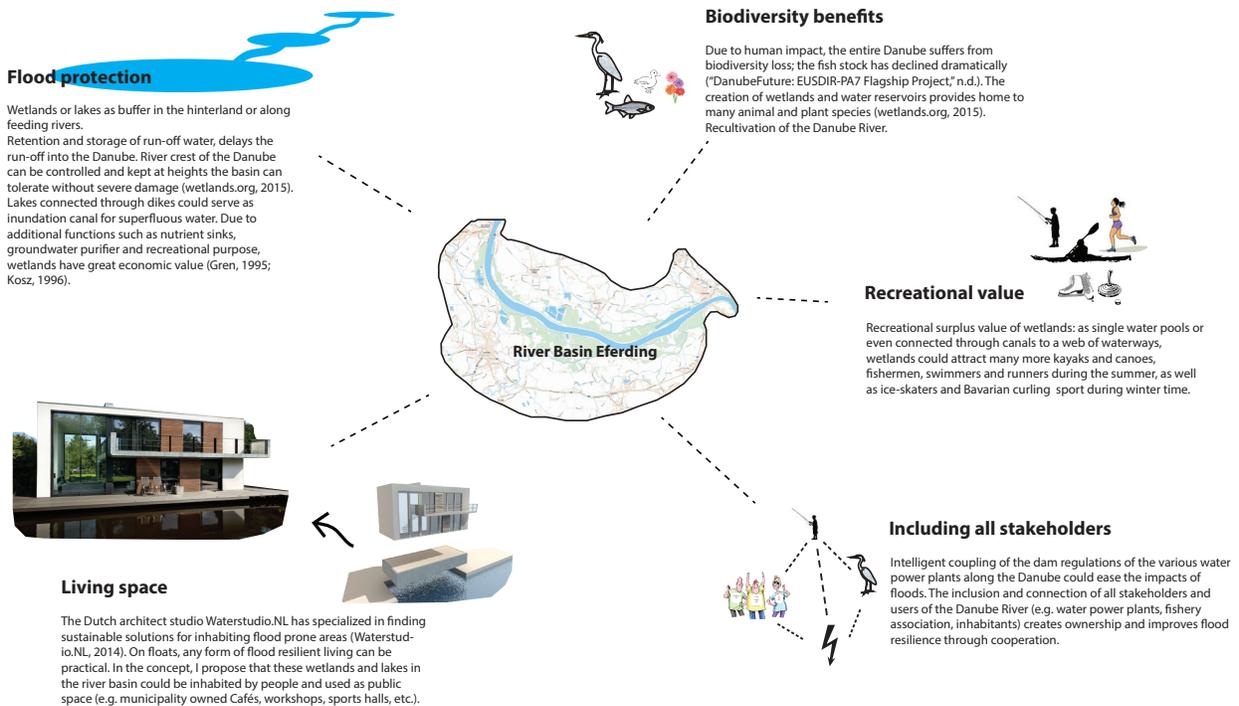


Figure 10. Concept of living in the flood area (own interpretation)

5.4 Step 2: Idea communication

In order to communicate the idea to the people in the river basin, I made a short video (approximately 6 minutes), which I uploaded on YouTube⁷. For analyzing the viewer-behavior, YouTube provides all the data to the video online and ready to export as csv-files to Microsoft Excel.



For the video, I used speed-drawing technique combined with pre-drawn elements. This format is particularly useful as complex content can be explained in a simple and straightforward way. The use of concept-videos in social science research has not been well documented. A rather old literature survey describes the use of videos mainly in the field of psychology and psychiatry (Rosenstein, 2002). Here, situational assessment feedback videos are applied to provide a basis for discussion and further understanding of a situation. In the case of the river basin, using the video in order to spread and present an idea to a wider audience was resource efficient. As an alternative, to visit the region and to present the idea on workshops requires much more willingness to participate than watching the video online and answering the questionnaire. The video is also easily accessible and communicates scientific ideas in a simple manner whilst bringing the systems thinking to the social innovation.

The video was put online in the evening of April 17, 2015. Between that date and May 01, 2015 the video was viewed 936 times, 796 times from Austria. Figure 11 shows the traffic sources over time, which peaked in the beginning and faded out after one week. Most views came from external websites (e.g. primarily Facebook), unknown mobile or direct (e.g. e-mails) and unknown embedded players (e.g. www.ottensheim.at, the unofficial webpage of the municipality Ottensheim).

Besides the efficient outreach, explaining the concept with speed-drawing method in the video is an effective way to present a complex matter in a simple way. Since the flood in 2013, various actors have investigated the causes that led to the extraordinary damage, which makes the content more complicated to understand. Many people commented on how easy it became to understand the context:

“Innovative thinking - refreshingly explained and understandable for everyone! 560 views after only 4 days on YouTube!” (Citizen initiative, comment on the video on Facebook)

“Very professional way of processing this complex matter!” (Johann⁸, 50 from Ottensheim, personal e-mail)

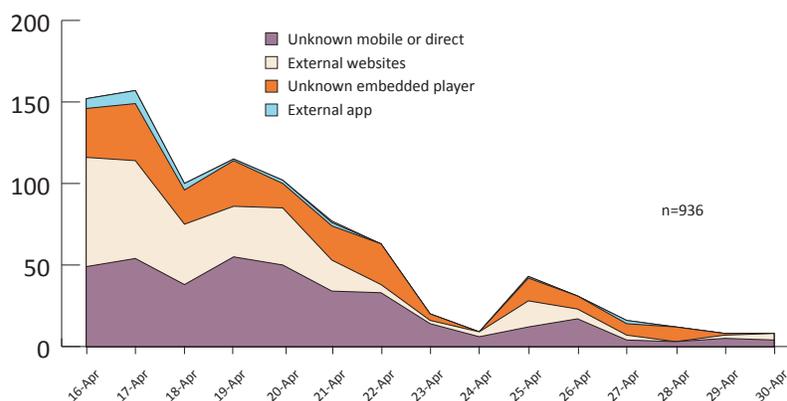


Figure 11. Views per day through different traffic sources over time (Source: YouTube analytics)

⁷ Link to the original (German) version of the video: <https://www.youtube.com/watch?v=4ZvHtMNn-mQ>. Link to the English version: <https://www.youtube.com/watch?v=Ai717NteLoM>.

⁸ Names, age and residence of people cited in this thesis are changed.

5.4.1. Technical details

For filming, I used a Canon Eos 600d reflex camera. I built a small film-studio around my office desk (figure), equipped with a customized camera rack, a Joby tripod to place the camera centered over the desk, four energy-saving bulbs, flip-over paper as background and drawing canvas, and different painting material, colored paper and carton. Besides drawing some of the motives myself, the vast majority were drawn with Adobe Illustrator software, printed and painted afterwards. Most of the live-recorded drawings I thinly painted on the flip-over paper with pencil, so the camera could not catch them. I then drew carefully on these lines and recorded it several times faster. The effect makes faultless paintings and an easy to follow flow of the concept.



Figure 12. Film set at my office table

5.5 Step 3: Measuring people's attitudes – Survey

Sub-question 4: *How do people in the river basin Eferding think about social innovation?*

In order to analyze the applicability of the social innovation concept in this case, I tried to evaluate what people think about the idea presented in the video and how they feel about social innovation.

5.5.1. Creating the survey

To test the target group's attitude towards social innovation in the case of the river basin Eferding, I created a self-completion questionnaire, using a 5-trin Likert scale (Bryman, 2012). The answer possibilities range from "strongly agree" to "strongly disagree", with an additional answer possibility "I don't have an opinion about this statement". I chose the self-completion questionnaire due to two reasons: self-completion questionnaires are a resource-effective way to detect trends about a sensitive political topic concerning a big target group (Bryman, 2012). As Zincke stated in the interview and the phone-calls with mayors and staff from certain municipalities showed, the topic is quite political and some people do not want to either get involved or state their opinion in the public. Since the respondents answered anonymously, the self-completion questionnaire offers a great opportunity to overcome this barrier. In contrast to personal interviews, there is no risk of bias from the interviewer in self-completion questionnaires (Bryman, 2012).

Within ten days, I collected 143 responses. The survey questions were divided into four chapters: demographic background, statements about the flood problem in the river basin Eferding, flood protection, and change. The survey questions can be found in the appendix 1.

With the survey I targeted the population of the 13 municipalities situated in the river basin. Although not the entire target population is situated in the river basin (table 1), decisions made and money spent by municipalities represent the opinion of all inhabitants. The most recently published population census from 2011 by the regional government of Upper-Austria results in 44,569 inhabitants in the 13 municipalities situated in the river basin.

5.5.2. Distribution of the survey

For the distribution of the video and the survey, I used social media as well as e-mails, homepages of the target municipalities, and word-of-mouth. The survey was published for participation on Friday evening, April 17th.

Social media

As the primary channel for distributing the video, I created a post on my private Facebook account, which I shared with my network. In Austria, Facebook counts roughly 3.4 million users (Statista, 2015). To reach people in all 13 municipalities, I searched for the most popular Facebook groups. These included groups such as local voluntary fire brigades - popular in rural and peri-urban towns in Austria and related to the topic since the voluntary fire brigades were among the most active helpers during and after the flood - local sports and leisure clubs, and other popular cultural interest groups. I also created a post on my LinkedIn profile. However, since my profile is rather new and includes primarily contacts in Denmark, the outreach was limited.

Municipalities' homepages

As the primary target group, I contacted the 13 municipalities' offices of the river basin Eferding and asked to post the link to the video on their official municipality homepage. These homepages are used frequently by citizens of the municipalities and are updated on a regular basis. After first sending out e-mails, none of the municipalities responded. When I called the offices of the municipalities four days later and talked to mayors or staff in person, nine responded that they would post the link on their homepages. Five municipalities posted the link on the same day, three the day after. However, the phone calls showed that some of the municipalities were reluctant to help due to political reasons. I will further discuss this issue in the analysis and discussion.

E-mail

In order to broaden the reach, my family, residents in Ottensheim, sent out e-mails to every contact with connections to the river basin.

Word-of-mouth

Ultimately, advertising the video and survey through word-of-mouth is, particularly in small towns, a reliable channel of distribution. The topic of flood planning is actual and, at the time of the distribution of the video, politically discussed. According to personal feedback, a fruitful debate about the video and the concept presented emerged at various events in Ottensheim and Goldwörth, which motivated people to participate in the study.

5.6 Limitations

Flood adaptation involves many stakeholders in the river basin Eferding. It is difficult to directly address all of them, in order to get a variety of opinions on the concept and flood planning. I did not, for example, directly send an e-mail to the energy company Verbund AG, nor did I directly contact the organization responsible for the Danube as a waterway, Viadonau. The IT reliance of my methodology is also a limitation, as it excludes people without Internet access. As the survey and the video was conducted in German, the study was limited to people who could understand the language.

6 Analysis

Research question: *To what extent are people open to social innovation in flood adaptation planning in the river basin Eferding in peri-urban Austria?*

In this chapter, I will present a descriptive statistical analysis of the findings from the survey. The aim of the survey was to analyse people's attitude towards social innovation in the case of flood adaptation planning in the river basin Eferding. As target group, I primarily focus on people from the 13 municipalities in the river basin. However, social innovations are often driven by people who are not personally affected but engage in the process out of compassion and conviction (Mulgan et al., 2007). As stated earlier, flood protection in the river basin not only has a local impact. Areas up- and downstream can also be affected by the planning. Additionally, many other stakeholders without residence in the river basin can play a crucial part in the social innovation process. Since the survey was mainly targeted on stakeholders connected to the river basin Eferding where close to 100 per cent speak German, the video and the survey were spoken and written in German language. Hence, responses were only possible for German speaking people. The constellation of linking the survey to the video explaining the concept for the river basin Eferding favours responses from people passionate about the topic. Hence, I consider all 143 responses for the analysis of the survey.

6.1 Who are the participants?

Women (43 per cent) and men (57 per cent) are fairly equally represented. In order to find out whether people of different age have different views on the topic, I divided the population in five age groups (see figure 13). When compared to the current Facebook user statistics for Austria (see figure 14), it is surprising that the older groups in my survey (36 to 50 years and 51 to 65 years) are so strongly represented. On the contrary, the younger group with people between 29 and 35 is underrepresented; teenagers (18 and younger) did not participate at all. As expected according to figure 14, people over 65 years represent a small group. However, it needs to be stated that although I mostly used Facebook for distributing the link and survey, other means of communication (e.g. e-mails, municipality homepages) were used as well. Still, since watching the video and participating in the survey required access to electronic communication, the outreach was limited.

In order to analyse people's attitudes towards new ways of thinking, I asked about their opinion towards change and tradition. 80 per cent of the respondents indicated that change is important for them, whereas tradition is important for half of them. However, since one third is not sure about their opinion towards tradition, the question can be interpreted as rather broad.

The picturesque landscape of the river basin with small towns and primarily single houses is the typical way of living in this peri-urban region. Living close to nature is an important factor for nearly all respondents (96 per cent). To own a house is an important goal to almost two third of the respondents, however this tendency

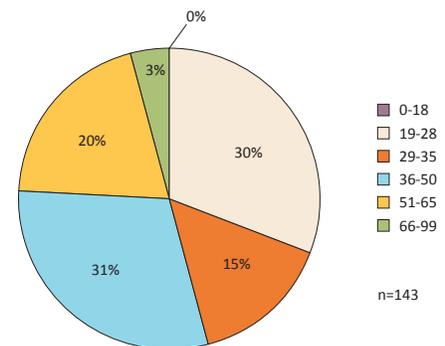


Figure 13. Age distribution of participants

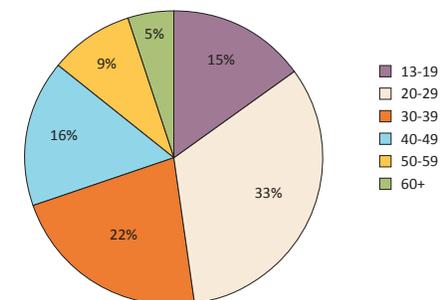


Figure 14. Facebook users in Austria by age (Source: Statista, 2015)

decreases with age. The majority of the participants own a house (46 per cent), followed by apartment renters (22 per cent), apartment owners (11 per cent), people who live with their parents (11 per cent) and house renters (3 per cent). The final six per cent enjoy other forms of living. Roughly one fourth of all respondents are members⁹ of the citizen initiative, 12 per cent did not want to disclose their identity in regards to the citizen initiative.

6.2 Where do the participants come from?

The results show that the vast majority of respondents have close connections to the river basin: 71 per cent have lived in the area at one point, of which 89 per cent currently live there. 23 per cent of the people currently living in the river basin live in the newly dedicated risk-zone. A small group of 3 per cent actually does not know whether they live in the risk-zone, which is rather surprising as the rezoning has considerable consequences for property owners situated within the area (see figure 2). Since the last flood in 2013 was only two years ago, nearly every respondent had experienced this event as a resident of the river basin. More than 75 per cent of the current residents have been living in the area for more than 20 years (see figure 15) and thus also experienced the big flood in 2002. Noticeably, none of the participants has been living in the area for a medium short period between six and ten years. Only 13 per cent have been living in the region between 11 and 20 years, ten per cent shorter than six years.

As my biggest network is among people from my home municipality, 45 per cent of all respondents have lived or currently live in Ottensheim (see figure 16). Similarly as the argument why I consider all respondents as important for my study, the strong representation of people from my hometown is not biasing the results in respect to social innovation. As I take an active role within my network, it is natural that more active participation emerges from my hometown. However, as the focus of this study is targeted towards flood resilient planning in the river basin through social innovation, I argue that it is of minor importance where the most active participation comes from. Besides, as I consider most of the people in the 13 municipalities fairly homogenous, the place of residence in the river basin does probably not affect the opinion of the people: As Zincke stated in the interview, people in the river basin are rather conscious about nature (G. Zincke, personal communication, February 21, 2015). Most of them settled to live their dream in a single house with a garden, still in close distance to the city of Linz, where the majority of the people work. The argument that activity emerges around committed actors explains well the rather

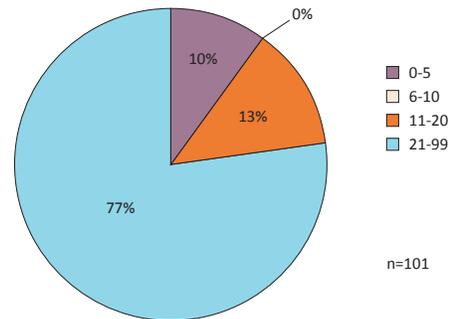


Figure 15. Years of participant's residence in the flood area

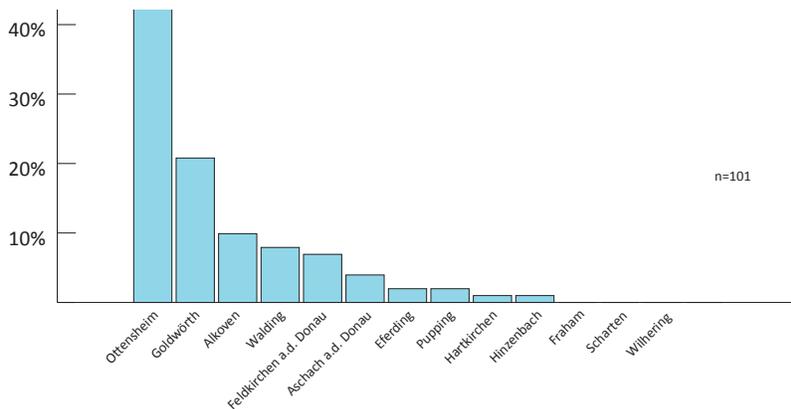


Figure 16. Geographic distribution of participants

⁹ There are no formal requirements to become a member of the citizen initiative. Thus, members in this context are to be understood as supporters.

strong representation of the small town Goldwörth with 21 per cent, as the core of the citizen initiative comes from this town. Additionally, with 100% of town-area being within the river basin Eferding, Goldwörth was among the towns most severely affected by the flood in 2013. Another seven towns are represented in the study; three towns are not represented at all. Besides Ottensheim and Goldwörth, I do not have a particular strong social-network in any of the other municipalities. In this respect, the distribution over the chosen channel had an equal effect in most towns.

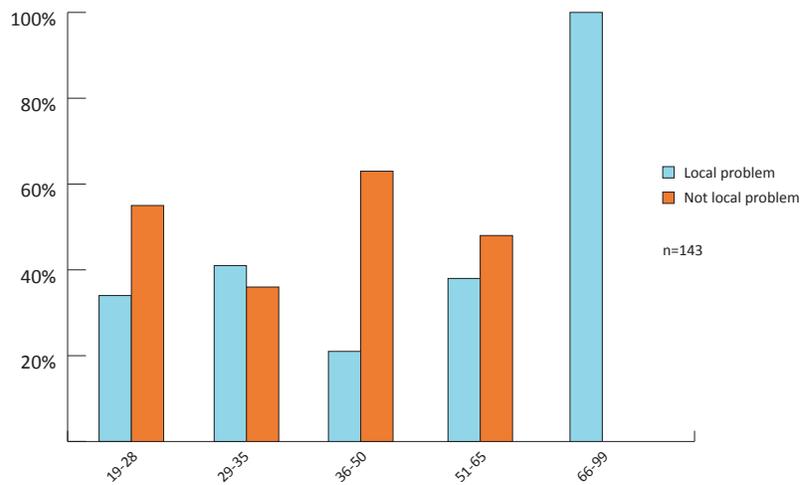


Figure 17. Perception of flood as a local problem per age group

6.3 Perception of floods

The flood problem in the river basin is rather complex. Many stakeholders are involved and the problem affects people along the Danube. Knowledge about the complexity of the situation is important to push on social innovation. Considering the strong voice against the government's way of conducting flood adaptation, when asking people about their opinion about the current flood protection in the river basin, I expected an overwhelming discontent. Nevertheless, 9 per cent are actually satisfied with the current flood protection, 22 per cent are neither satisfied nor unsatisfied. Respondents' perception of the problem differs: while 20 per cent strongly agree that the floods in the river basin are a local problem, 29 per cent strongly disagree. Whereas residence in the river basin does not affect these results, age seems to influence people's opinions (see figure 17): all respondents above 66 years understand the flood problem as local, also a slight majority of people between 29 and 35 think floods are a local problem. The other three groups think differently, although the strongest opinion that the problem is not local is among the 36 to 50-years. This could indicate different perceptions of the world, where younger people are used to think about problems in more globalized inter-connected ways compared to older people.

Two third agree that it is the human way of living in the flood area that constitutes the problem and not the water per se. Although the video explained, based on meteorological data, that climate change has no influence on the flood situation in the river basin, the opinion among the study group is almost evenly split (see figure 18).

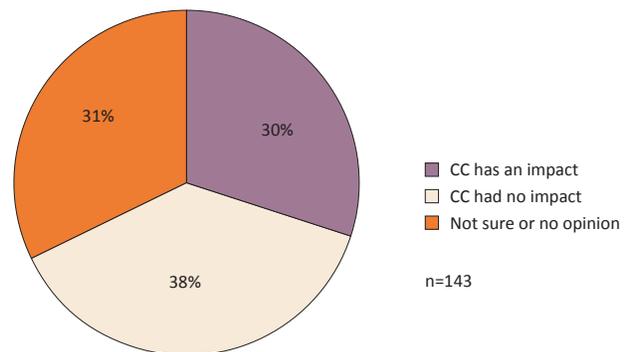


Figure 18. Perception of climate change impact on local flood situation flood

6.4 Participation in flood planning

Social innovation is per definition a bottom-up process that needs acceptance among the public (Mulgan et al., 2007). However, it can very well be that ideas get rejected many times before they develop into the final product. In the river basin, due to the citizen initiative, a tendency towards openness for innovation is provided. A demonstration in the end of February 2015 showed that many are dissatisfied with the current situation (nachrichten.at, 2015): affected citizens are disappointed, that, on the one hand, the government has been acting slowly

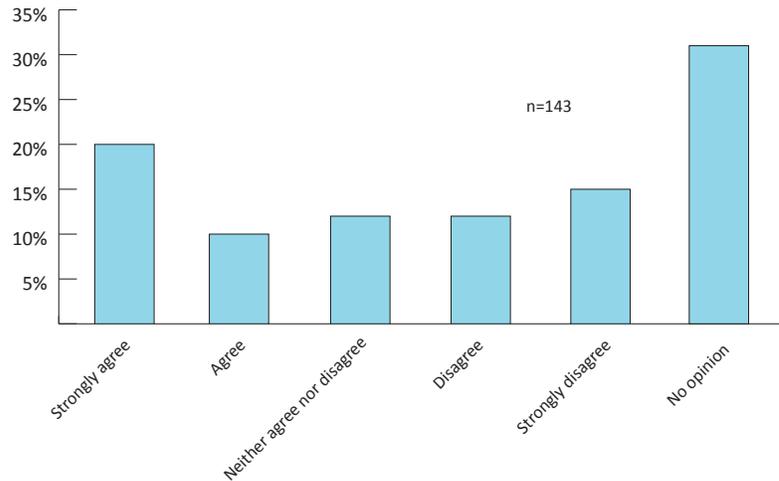


Figure 19. Willingness to actively participate in flood planning

and, on the other hand, that their suggestions for better flood planning (i.e. masterplan) are still not fully considered. Knowing about the willingness to contribute can be crucial for a social innovation to gain momentum. A clear tendency towards participation can be seen in different questions: more than 95 per cent think that flood planning should include all stakeholders. More than 70 per cent advocate for a right for participation for everyone who wishes to contribute to the planning process. 83 per cent either strongly disagree or disagree with the statement, that the government alone should solve the flood problem. More than 90 per cent state that they would support the idea of an alternative flood protection plan. However, when it comes to actively participating in the planning process, opinions are evenly distributed among the pro and contra side. More than a third does not have an opinion on this statement (see figure 19). It is likely that people do not know what an active role entails, as the video does not explain that. Similarly, 45 per cent either don't have an opinion or are undecided when it comes to taking the first chance to contribute to the implementation of the concept explained in the video.

6.5 Showing colours?!

Is there a difference in the attitude among directly affected people and those who only feel compassion for the issue? An overwhelming majority of more than 90 per cent of the respondents are concerned about flood protection and think it is an acute issue in the river basin Eferding.

Throughout the project process, I recognized that the topic was highly political. Some mayors stated that they wanted to refrain from the discussions, thus they were not willing to put the link to the video on their municipality's homepage. As Zincke stated (G. Zincke, personal communication, February 21, 2015), many people do not feel comfortable to speak up in the public. One of the reasons Zincke names for this is the political landscape of Austria. According to Zincke, with many people working in public administration, speaking against the government is perceived as speaking against their employer. 9 per cent of people living in the risk-zone do not want to disclose their membership in the citizen initiative. Surprisingly, 14 per cent of people who do not live in the risk zone and are not directly affected by the governments' resettlement do not want to disclose their membership either. On the contrary, 23 per cent of the people not living in the risk-zone and 70 per cent of the people who live in the risk-zone are members of the citizen initiative. This shows that not only affected people are committed; the interest in the work of the initiative is rather high among compassionate, not directly affected people.

6.6 Innovation

Of main interest is the question what people think about the innovative idea presented in the video. During the social innovations process, ideas get improved, challenged, transformed or even entirely discarded through feedback loops at different stages (Mulgan et al., 2007). In order to bring social change about, it is important to get people to talk about the challenges and solutions. The question is do people believe in traditional flood protection (i.e. dams) or are they open for new ideas?

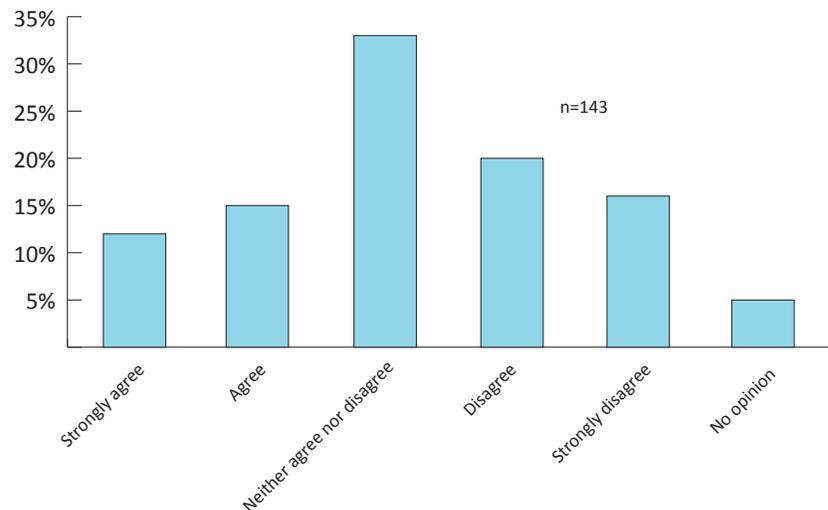


Figure 20. Perception of safety on a houseboat in the flood zone

Generally speaking, people are rather sceptical about traditional flood protection and are open for alternatives. 82 per cent do not trust high dams more than other flood protection measures; two third are against a vast embankment of the river basin. Additionally, a strong majority is against human interference with nature: 74 per cent do not think that humans have the right to control nature as they wish. 15 per cent are in doubt. A more precise question about whether humans should be allowed to control the river as much as they wish in order to assure flood protection for the people was answered very similarly: 74 per cent strongly disagree or disagree with this statement, 17 per cent are in doubt.

In direct response to the innovation presented in the video, people reacted quite positively: More than 90 per cent would support the idea of an alternative flood protection system. 87 per cent agree, that the presented idea would benefit people, nature and the region in general. However, people answer considerably more conservative, when it comes to the feasibility of the proposed solution (23 per cent are in doubt, 64 per cent think it could be feasible). While 64 per cent believe that a new way of thinking is necessary to solve the problem, 28 per cent are in doubt. As a final question, I asked whether people would feel safe living in a floating house in the flood zone, people answered quite different (see figure 20).

6.7 Summary main findings

Overall, the respondents showed high interest in the survey; hardly any questions were left out and many left their personal comments.

“Thank you a lot for your professional work! I hope the planners will take your ideas into consideration! We witness that politics is conducted in favor for big companies, not for us affected people. But we will fight for our beloved living area – until all questions are answered!” (Monica, 38 from Goldwörth)

The response of the 143 participants showed strong tendencies, which can be summarized in these 5 main results:

Compassion is high – potential for strong public voice

Many people showed compassion with the directly affected people. The potential for a strong bottom-up movement could be used to foster social innovation.

Showing colors is delicate

As the topic is rather political, many people feel uncomfortable to speak publicly about their opinion. Some people are therefore reluctant to speak up.

“Our municipality homepage should not be used as a platform for distributing political information, regardless whether the content is good or bad. We do not want to engage in this debate.” (Karl G., mayor, personal communication, April 21, 2015)

Human impact creates the problem

A great majority strongly agrees with all the statements that want to give the nature, the rivers space. People see themselves as the problem; the way of living needs to be adjusted to the flood circumstances.

“Of course, we need to give the nature and the rivers their space back and stop sealing the entire surface with concrete! A general re-thinking is necessary, not only in flood risk areas!” (Josef, 52 from Ottensheim)

Desire for change prevalent

To a vast majority of the participants, the situation is need for change. People need to rethink and most of them indicate, that they are ready for innovation.

“We need to think flood planning more holistically, and not only for this river basin!” (Franz, 57, Puppung)

Doubts about the concept – people hesitate

Although the desire for change is prevailing, people have doubts whether the concept can be implemented. When it comes to taking an active role in the planning process, people show hesitation. They are in doubt or possibly don't know, what change really entails.

“The idea with swimming houses is very appealing! The problem is, I can't put my current house on a float, can I?” (Ralf, 44, Feldkirchen)

7 Discussion

The study using social innovation as a concept for rethinking flood adaptation in the river basin has brought up several interesting aspects. Although there are many positive findings, there are limits and other considerations, which I will discuss in this chapter.

7.1 Social innovation – a new fresh angle

As stated before, the topic of flood planning has become rather political and seems to split the opinions: on one political side, the citizen initiative has demonstrated the discontent of many affected people in front of the regional parliament and the government; on the other side, the government continues to focus on the resettlement policy and tends to ignore some of the initiative's claims. Showing an entirely new solution seemed to make people forget for a while about the political tensions and brainstorm more freely about the idea I brought up: affected citizens commented on the idea although their houses are situated within the flood risk zone; likewise, I got positive feedback on the video from the office of MP Rudi Anschober, who is responsible for the flood adaptation planning. As a result, bringing in an innovative idea as a first step of the social innovation process facilitates positive discussions. On Facebook, the video was commented on from various people and was shared in different groups (e.g. citizen initiative's group).

Although I tried to explain the situation from an objective and neutral standpoint, some might argue that the message presented supports the side of the citizen initiative more than the side of the government. Creating a new solution is value-driven, since the main message is an argument for better, creative, resilient flood adaptation planning. However, the idea is on advances in innovative flood planning and not on my personal preferences. For similar studies, I recommend to communicate the idea from a neutral standpoint. On the one hand, a strong political message could provoke a radical change, on the other hand, presenting an idea, which is against the government's opinion makes it difficult to win political stakeholders as supporters for the idea. According to Mulgan et al. (2007), especially for scaling-up an idea, working with powerful stakeholders is crucial. Furthermore, as the social innovation process favours collaboration of different stakeholders in new ways (Mulgan et al., 2007), the concept has great potential to facilitate solution-oriented communication detached from political party thinking. This would be beneficial for those people who indicate their concern raising the voice in this politically debated matter. A major limitation is, as one of the participants in the study pointed out, that the video does not focus on how to protect existing individual houses, as it is not an option to move them on floats. However, social innovation is about change and not maintaining the status quo therefore some ideas will be radically different in the concept (Mulgan et al., 2007).

7.2 Flood adaptation – is change going to happen?

A great majority of the population in the survey agreed to the anthropogenic cause of floods. They also admitted that rethinking is inevitable and a new way of living required in order to bring about change. Nevertheless, to the questions whether people would be willing to actively contribute to change and adapt their life-style, a tendency towards hesitation is noticeable. These results do not indicate whether change will actually happen. In addition, it needs to be taken into account that the video might have a rather immediate positive effect on people's attitudes towards change. It can be argued that the video biased people towards answering positively. However, feedback from experts showed that the idea was feasible and many thoughts of it favourable, though they also stated their concerns and suggested improvements.

7.3 Social media

The focus on social media was an especially good fit for this politically highly debated topic as there was already active communication about it on Facebook and different homepages: especially the citizen initiative's online platform and the homepage of MP Rudi Anschober provides material on the topic, the citizen initiative's Facebook group provides an interactive platform for discussion. Mulgan (2006) points out that the Internet helps overcome the barriers to scaling-up innovations. I would argue that social media can assist not only in the scale-up process phase, but also in the idea creation phase: the ideas and prototypes can be liked and shared, spreading them to a broad audience and hence opens up the possibility for many people around the world to give their inputs and share their thoughts. However, English language for international discussion would be required. I got positive feedback from non-German speaking people with knowledge on the topic, but since both the video and the communication on Facebook was in German, people could not participate in the discussion. The use of social media also has limitations, as it excludes people without profiles, Internet access, or necessary IT-skills. Especially elderly citizens - many of them have witnessed several floods and are therefore great assets for flood planning – do not use social media.

7.4 Methodology

The presentation of an innovative idea to flood adaptation planning in the river basin Eferding through a video opens the possibility of explaining a complex situation and solution in a simple way. People's feedback showed that they very well understood the current challenges to flood adaptation in the region and the idea to rethinking the way of living in the flood area. Additionally, people's engagement through posts and comments via social media and personal feedback showed that the chosen methodology was rather effective in facilitating a discussion. However, a six minutes video has its limits: there are a great number of considerations about feasibility, other solutions and ideas that were not presented. Hence, the bias towards my idea is obvious and the quality of the presented concept was heavily dependent on the scrutiny of my research. However, I do not argue that the presented idea is the best solution. I merely aim to start a fruitful discussion about rethinking living in the flood area and alternative solutions.

Nevertheless, the chosen methodology can be highly recommended due to its efficiency in outreach and the communicative power of the video, which makes it easy to approach and motivate people to be part of the study.

8 Conclusion

With the study, I aim to answer the following research question: *To what extent are people open to social innovation in flood adaptation planning in the river basin Eferding in peri-urban Austria?* Presenting a new, innovative way of living in the flood area and engaging with different stakeholders in the idea creation phase has brought a new angle to the topic. The results show the tendency that people are open for change and acknowledge their need to rethink the current situation. In addition, the current situation in flood adaptation planning is unsatisfying for an overwhelming majority. People favour a solution that gives nature and the rivers space; they do not believe that dams can solve the problem of floods; neither do they feel that traditional flood protection works. In this respect, the question can be answered with *yes, people are open to social innovation in flood adaptation planning in the river basin Eferding*. The high number of participants in the survey and the numerous comments and feedback on the concept show people's interest in the topic. The current situation in the river basin can thus be interpreted as a breeding ground for social innovation.

Furthermore, the choice of methods to initiate the idea creation process was highly successful in communicating the message: through the distribution via social media, more than 1,000 people have viewed the video within less than three weeks.

However, as the study did not show how people could engage in social innovation, it seems unclear to many how to proceed. The success of social innovation will depend on the next steps. As people got curious about the new way of living, continuing with the process of the concept of social innovation can be recommended. Next steps could include engagement with planning specialists, such as architects, landscape planners and potential investors in order to build a test area, where alternative housing concepts (i.e. floating homes) could be implemented.

In the idea creation process, some powerful stakeholders were reluctant to help due to their political considerations. In order to get more stakeholders involved in the social innovation process, it could be recommended to focus on common goals outside the politically discussed topics. As an example, with the support of the government, the 13 municipalities in the river basin Eferding could aim to become a UNISDR role model region (UNISDR, 2015b), a certificate for regions or cities with clever solutions for disaster risk reduction. In case of the river basin, some measures proposed by the citizen initiative, such as a preventive trans-regional disaster relief force, could be implemented (Initiative Hochwasserschutz

Eferdinger Becken, 2014a). A UNISDR model region certification could help improve the image of the region and create a more collaborative relation among the different stakeholders.

In regards to disaster risks and other challenges that affect the well being of people, society is forced to rethink and adapt. Creative thinking has the potential to reshape society. However, facilitation is needed in order to bring about desired change (Johannesen & Hahn, 2013). Thus, I hope for increasing engagement in social innovation practice as well as further research and case studies in order to make this concept a powerful tool for change making. The collaboration of all stakeholders - policy makers, civil society and researchers make sustainability solutions possible.

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10 Appendix 1: Survey

1 Demographic background

Please state your gender:
Female
Male
Other

Please state your age:

Have you ever lived in the river basin Eferding?
 Yes
 No

In which municipality? Please only state the last one, if you have lived in more than municipality in the river basin Eferding:

Do you currently live in the river basin Eferding?
 Yes
 No

For how many years have you been living in the river basin Eferding?

Do you live in the newly dedicated flood zone?
 Yes
 No
 I don't know

Are you a member of the citizen initiative?
 Yes
 No
 I don't want to disclose that

What is your current way of living?
House owner
Apartment owner
House renter
Apartment renter
I live with my parents
Other

2 Flood problem

I concern about flood protection.
 Flood is an urgent problem for the people in the river basin Eferding.
 Floods along the Danube river and its side rivers are local problems.
 Global warming has an influence on floods in the river basin.
 The actual problem is the way people live, not the water per se.
 Humans have the right to control nature as much as they need.

3 Flood protection

Flood protection should include all stakeholder connected to the river basin Eferding (e.g. Verbund corporation for water power, fishermen, inhabitants of the river basin, etc).
 Humans should control rivers and build high dams in order to ensure flood protection.
 I am satisfied with the current flood protection in the river basin Eferding.
 I trust high dams more than any other flood protection measure.
 The solution for flood protection is a vast embankment of the river basin Eferding.
 The government should solve the flood problem on their own - that's what they are here for.
 Everybody should have the possibility to contribute to the planning for the flood protection.
 I would like to have an active role in flood protection planning.
 It is important, that affected people are included in the planning process of the flood protection.
 I would support the idea of alternative flood protection in the river basin Eferding.
 People, nature and the region would profit from the alternative flood protection concept presented in teh video.
 I believe that the flood protection concept presented in the video could be implemented.

4 Change

Change is important for me.
 Tradition is important for me.
 I believe that people in the river basin Eferding are ready to adapt to the flood situation.
 I am convinced that an entire new way of thinking can solve the flood problem.
 I would be willing to take the first chance to contribute to the implementation of the innovation presented in the video.
 I value new ideas, which improve my life.
 I like living close to nature.
 To become homeowner is an important goal in my life.
 The challenges to our society today (e.g. climate change) force us more than ever to adapt and to rethink.
 The only way of living I consider as 'home' is a traditional house with a garden.
 I would feel safe living on a house on the water in the flood-risk zone.

For the groups 2, 3, and 4, people were asked to rate their attitude in a 5-trin Likert scale:
 Strongly agree
 Agree
 Neither agree nor disagree
 Disagree
 Strongly Disagree
 I don't have an opinion on that statement.