

Task E

Participatory Mechanisms report for the Dutch case study in IJtteren and Borgharen

Planning, implementation, and evaluation of pilot actions

FINAL REPORT

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Executive summary (English)

The EU project CAPFLO develops tools for building social capacity for flood risk mitigation through participatory processes in flood-prone communities. Social capacity comprises the resources (knowledge, motivation, network, finance, and participation) available at various levels (individuals, communities, organisations) that can be used to anticipate, respond to, cope with, recover from and adapt to external stressors, in this case fluvial floods.

To this purpose, participatory pilot actions have been implemented in five case studies across Europe. One of these case studies, conducted by the Vrije Universiteit Amsterdam, focused on Itteren and Borgharen, two (formerly) flood-prone parishes in the municipality of Maastricht. The initial capacity assessment revealed that overall social capacities (e.g. flood risk knowledge among rooted communities, participation to flood mitigation decisions) are fairly well developed. However, it was also found that, due to the new flood infrastructure and the absence of major floods over the past twenty years, citizens generally feel safe and are currently not motivated to mitigate flood risk. Moreover, the experience-based knowledge acquired by many inhabitants during the major 1990s floods is partially outdated. This is due to the new flood protection infrastructure (essentially dikes and river widening and deepening) changing flood dynamics from a slow rise of water to a rapid rise and slow withdrawal ('bathtub effect').

The participatory pilot actions implemented in the Dutch case study in early May 2017 therefore focused on sharing knowledge and increasing motivation in the communities. The first pilot action targeted the general population of Itteren and Borgharen; the second targeted students of the local elementary school.

The first pilot action took place on Sunday May 7 and included two participatory activities. One activity comprised a walk through Borgharen during which local inhabitants shared stories about their experience with past floods and representatives of local organizations (the water board and the Consortium Grensmaas) illustrated implemented flood protection measures. The second activity consisted of a presentation and discussion session about contemporary flood risk with presentations by representatives of public authorities. 28 participants joined the walk, during which several locations in Borgharen were visited, and pictures taken by citizens during the floods (e.g. flooded house, floodplain) were shown. Many participants shared experiences and stories. The walk provided a direct and informal platform for sharing knowledge. As for the discussion session, 35 participants attended, including 7 authority representatives from Rijkswaterstaat, the safety region Zuid-Limburg, Maastricht municipality, the water board Limburg, and the province of Limburg.

On Monday May 8, the second pilot action took place at the elementary school of Borgharen. Two groups of school students met with local senior citizens (among others from the local senior day care) to learn about the citizens' experience with floods. The students, who were invited to play the role of journalists, prepared and posed questions to the seniors. Two groups of 17 and 30 children, 9-10 years old and 11-12 years old respectively, participated.

The pilot actions were evaluated. The pilot action on May 7 was evaluated by reviewing researchers' notes taken during the implementation and by analysing an ex-post questionnaire that all participants filled in. The May 8 pilot action was evaluated by means of an ex-ante questionnaire for the students, researchers' notes, plenary review of the pilot action with all participating parties, and content analysis of student 'journalistic' reports of the pilot action. Additionally, ex-post evaluative interviews were held with several participants four to five weeks after the pilot actions.

For both pilot actions, it proved pivotal to have local citizens with much knowledge and narrative skills joining the activities, as they steered the conversation towards interesting and thought-provoking topics (both during the walk and with the school students). When organising similar actions, it is recommended to ensure there are knowledgeable and charismatic speakers initiating and keeping the discussion alive. The vividness of the stories told to the students is also regarded as an important factor influencing their interest and attention for the information they received.

Furthermore, the interactive, relatively informal setup of the first pilot action (the walk and discussion) appears to have contributed to knowledge creation and sharing among the participants. Authority representatives reported to have learned much about the impact the floods had on citizens. This may have triggered some reflection on the way these authority representatives approach flood risk mitigation. As for the participants, their motivation to act against flooding seems not to have increased much due to the activities. For instance, most of them indicated to not be particularly willing to (co-) organise any similar event, although willing to join future events, and only about half of the participants contemplated flood risk preparedness measures. An initial sceptical attitude of both participants and authorities to the urgency of flood risk mitigation may have undermined this motivation building.

In spite of much advertising and efforts to also attract 'young' and 'uninformed' people (those with no experience with major floods), we were unable to motivate this target group to participate in the May 7 pilot action. Organisers of similar events should take into account the difficulty of reaching a target group that has little interest in the subject at hand and try to devise strategies to reach them (indirectly). One option could involve reaching parents through their children via school activities, asking the children to discuss their experience with their parents as we did during our school activity.

The meeting between the young students and the senior citizens was deemed fruitful, as the primary goal was to inform the younger students about floods and make them aware of the possibility of floods in their villages. The students' reports revealed they have learned important information about, for instance, that the water cannot really be stopped, solidarity during floods, and moving valuable belongings upstairs. The choice of role-playing as type of participatory action was particularly appreciated by the students and has helped achieving the goals.

Finally, besides providing relevant information about the impacts of the pilot actions, the ex-post interviews were an opportunity to remind participants of the project and to encourage experience sharing within their network. The evaluation stage can thus also be valuable for capacity building.

A summary of the results is presented in Table I. To sum up, authority representatives may consider organizing these participatory actions to achieve a more complete insight into the impact floods

(however minor) may have on citizens, while community representatives could organize this kind of actions to reach a larger audience (also within the community), including authorities, with their relevant experience. Reaching an appropriate target group is herein a key challenge that requires extensive contemplation of promotional methods.

Table 1. Breakdown of the pilot actions, specifically the goals set, the expected changes beforehand, the achieved changes or goals, and the identified enabling or disabling factors for these achievements.

Initial set goals	Expected changes	Achieved changes/goals	Enabling/disabling factors
May 7 pilot action: walk + discussion session			
<ul style="list-style-type: none"> • Walk: sharing memories of past floods • Discussion: making clear that flood risk is topical, that flood dynamics have changed 	<ul style="list-style-type: none"> • Citizens share memories • Authorities share knowledge with citizens, citizens become more aware • Citizens become more motivated to act on flood risk mitigation 	<ul style="list-style-type: none"> • Authority representatives became more aware of impact of floods on citizens • Information about flood risk mitigation was shared by authorities 	<p><i>Enabling</i></p> <ul style="list-style-type: none"> • Direct meeting, all participants equal • Open and transparent discussion • Many contributions of local citizens (stories) • Using visuals, e.g. pictures <p><i>Disabling</i></p> <ul style="list-style-type: none"> • Target group not reached • Sceptical attitude of participants towards current flood risk
May 8 pilot action: meeting students and senior citizens			
<ul style="list-style-type: none"> • Making students aware of what floods are and what they can mean for people • Making clear there is a flood risk in Borgharen 	<ul style="list-style-type: none"> • Students learn about floods, learn the specifics of what to do and what can be done during a flood • Students become aware they are in an area that is subject to flood risk 	<ul style="list-style-type: none"> • Students have learned new things about floods, particularly about local experiences with floods and how floods were dealt with 	<p><i>Enabling</i></p> <ul style="list-style-type: none"> • Vivid storytelling by senior citizens • Role-playing as active way of involving students • Using visuals, e.g. pictures <p><i>Disabling</i></p> <ul style="list-style-type: none"> • Short preparation time • Little discussion of contemporary/future flood risk

Executive summary (Dutch)

Het EU-project CAPFLO ontwikkelt hulpmiddelen voor sociale capaciteitsopbouw tegen overstromingsrisico's middels participatieve processen in overstromingsgevoelige gemeenschappen. Sociale capaciteiten voor overstromingsbeheer worden beschouwd als de beschikbare middelen (kennis, motivatie, netwerken, financiën, participatie) op verschillende beleidsniveaus (van individu tot overheid) voor de anticipatie van, reactie op, omgang met, het herstel van, en de aanpassing tot, in dit geval, rivieroverstromingen.

Om dit te bewerkstelligen zijn participatieve 'testacties' uitgevoerd in vijf casussen in Europa. Eén van deze casussen, uitgevoerd door de Vrije Universiteit Amsterdam, vond plaats in Itteren en Borgharen, twee (voormalig) overstromingsgevoelige dorpen in de gemeente Maastricht. De evaluatie van de al bestaande capaciteit onthulde dat de sociale capaciteit (bijv. overstromingskennis, participatie in hoogwaterbeleid) over het algemeen goed ontwikkeld is in de dorpen. Echter, er werd ook geconstateerd dat, door de nieuwe overstromingsinfrastructuur en de afwezigheid van grote overstromingen in de laatste twintig jaar, inwoners zich over het algemeen veilig wanen en weinig gemotiveerd zijn om overstromingsrisico's te verminderen. Daarbovenop komt de bevinding dat de ervaringskennis die veel mensen hebben opgedaan tijdens de overstromingen in de jaren '90 gedeeltelijk verouderd is doordat de nieuwe infrastructuur (te weten nieuwe dijken en meer ruimte voor de rivier) de huidige overstromingsdynamiek heeft veranderd van een langzame en geleidelijke instroom van water tot een snelle stijging en langzame uitstroom van het water ('badkuipeffect').

De begin mei 2017 uitgevoerde participatieve testacties in de Nederlandse casus richtten zich daarom op kennisdeling en motivatievergroting in de gemeenschappen. Er zijn twee testacties uitgevoerd, waarbij de eerste zich richtte op de algemene bevolking van Itteren en Borgharen en de tweede op leerlingen van de lokale basisschool.

De eerste testactie vond plaats op zondag 7 mei en omvatte twee participatieve activiteiten. De eerste was een wandeling door het dorp met verhalen van lokale inwoners over hun ervaringen met overstromingen en bijdrages van overheidsvertegenwoordigers die vertelden over uitgevoerde overstromingsmaatregelen. De tweede activiteit was een presentatie- en discussiesessie over hedendaagse overstromingsrisico's met presentaties van overheidsvertegenwoordigers. 28 mensen namen deel aan de wandeling waarin men verschillende locaties in Borgharen bezocht waar bijbehorende foto's van de overstromingen, genomen door inwoners, werden getoond (bijv. overstroomd huis, weide). Veel deelnemers deelden ervaringen en verhalen. De wandeling verstreekte een direct en informeel platform voor het delen van kennis. Aan de discussiesessie namen 35 deelnemers deel, inclusief zeven overheidsvertegenwoordigers (Rijkswaterstaat, veiligheidsregio Zuid-Limburg, gemeente Maastricht, waterschap Limburg, en provincie Limburg).

Op maandag 8 mei vond de tweede testactie plaats op de basisschool in Borgharen. Twee groepen leerlingen ontmoetten oudere lokale inwoners (van o.a. de lokale ouderenopvang) om te leren over de ervaringen van de ouderen met overstromingen. De leerlingen werden gevraagd om de rol van journalist op zich te nemen, waarbij ze vragen hebben voorbereid en gesteld. Twee groepen van 17 en 30 leerlingen, respectievelijk 9-10 en 11-12 jaar oud, deden mee.

De testacties zijn geëvalueerd. De testactie van 7 mei is geëvalueerd met notities van de onderzoekers en een analyse van een vragenlijst ingevuld door deelnemers na afloop van de actie. De testactie van 8 mei is geëvalueerd door middel van een vragenlijst voor de leerlingen aan het begin van de dag, notities van de onderzoekers, een plenaire beoordeling van de testactie met alle betrokkenen, en een inhoudsanalyse van de 'journalistieke' verslagen die zijn geschreven en ingeleverd door de studenten. Bovendien zijn er evaluatie-interviews gehouden met deelnemers vier tot vijf weken na de uitvoering van de acties.

Voor beide testacties bleek het cruciaal dat er lokale inwoners met veel kennis en vertelkunsten deelnamen aan de activiteiten, omdat zij de conversaties naar interessante en stimulerende onderwerpen stuurden (zowel tijdens de wandeling als met de leerlingen). Het wordt aanbevolen om bij het organiseren van vergelijkbare activiteiten zeker te stellen dat er goed geïnformeerde en charismatische sprekers meedoen om de discussie levendig te houden. De levendigheid van de verhalen verteld aan de leerlingen wordt ook gezien als belangrijk bij de beleving van en aandacht voor de informatie die de leerlingen kregen voorgeschoteld.

Verder lijkt de interactieve en relatief informele opzet van de eerste testactie (wandeling en discussie) bijgedragen te hebben aan de kenniscreatie en -deling tussen deelnemers. Overheidsvertegenwoordigers hebben aangegeven dat ze veel geleerd hebben over de impact die overstromingen hebben gehad op de inwoners. Dit zou een reflectie kunnen teweegbrengen van deze vertegenwoordigers over hun benadering van overstromingsrisicovermindering. De motivatie van de deelnemers om actie te ondernemen tegen overstromingsrisico's lijkt niet erg vergroot. De meeste gaven bijvoorbeeld aan dat ze niet een vergelijkbare actie zouden organiseren, doch wel bijwonen, en slechts de helft van de participanten overweegt actie om zich voor te bereiden op overstromingen. Een sceptische beginhouding van zowel deelnemers als vertegenwoordigers jegens de urgentie van overstromingsrisicovermindering zou de motivatietoename hebben kunnen ondermijnd.

Ondanks veel promotie en moeite om ook 'jongere' en 'on geïnformeerde' mensen (zonder ervaring met overstromingen) te interesseren, is het ons niet gelukt hen te motiveren om deel te nemen aan de testactie op 7 mei. Organisatoren van vergelijkbare acties zullen rekening moeten houden met de moeilijkheid om een doelgroep te bereiken die niet geïnteresseerd is in het onderwerp en zullen strategieën moeten overwegen om hen (indirect) te benaderen. Een mogelijkheid is om ouders via hun kinderen te bereiken met activiteiten op de school door de kinderen te vragen het hier met hun ouders over te hebben, zoals is gedaan tijdens de schoolactiviteit in Borgharen.

De ontmoeting van de jonge leerlingen met de oudere inwoners is als succesvol ervaren, aangezien het primaire doel was om de jongere leerlingen te informeren over overstromingen en hen bewust te maken van de mogelijkheid dat er een overstroming plaatsvindt in hun dorpen. Op basis van de geschreven rapporten denken we dat de leerlingen interessante kennis hebben opgedaan over bijvoorbeeld dat het water niet echt gestopt kan worden, solidariteit tijdens overstromingen, en het verplaatsen van kostbare spullen naar hogere verdiepingen. Het rollenspelaspect werd gewaardeerd door de leerlingen en heeft geholpen om de doelen van de testactie te bereiken.

Tenslotte dienden de evaluatie-interviews, naast dat ze relevantie informatie over de impact van de acties opbrachten, ook als herinnering en als aansporing voor de deelnemers om hun ervaring te delen binnen hun netwerk. Het evaluatieproces kan dus ook nuttig zijn voor de capaciteitsopbouw.

Tabel II geeft een samenvatting van de resultaten. Samenvattend kunnen overheidsvertegenwoordigers overwegen om dit soort acties te organiseren om een beter overzicht te krijgen van de impact die overstromingen (hoe kleinschalig dan ook) kunnen hebben op burgers.

Gemeenschapsvertegenwoordigers kunnen dergelijke acties organiseren om een bredere doelgroep (ook binnen de gemeenschap), inclusief autoriteiten, te bereiken met hun relevante ervaringen. Het bereiken van een relevante doelgroep is daarbij wel een belangrijke uitdaging die uitgebreide overweging van promotiemethodes vereist.

Tabel II. Overzicht van de testacties, specifiek de gestelde doelen, de verwachte veranderingen in capaciteit, de behaalde veranderingen/doelen, en de geïdentificeerde ondersteunende en blokkerende factoren.

Vooraf gestelde doelen	Verwachte veranderingen	Behaalde veranderingen/doelen	Ondersteunende/blokkerende factoren
Testactie 7 mei: wandeling + discussie			
<ul style="list-style-type: none"> • Wandeling: ervaringen met overstromingen delen • Discussie: duidelijk maken dat overstromingsrisico's actueel zijn, dat de overstromingsdynamiek is veranderd 	<ul style="list-style-type: none"> • Inwoners delen herinneringen • Overheden delen kennis met burgers, burgers worden bewuster • Burgers raken gemotiveerder om iets te doen aan overstromingsrisicovermindering 	<ul style="list-style-type: none"> • Overheidsvertegenwoordigers zijn bewuster van de impact van overstromingen op burgers • Informatie over overstromingsrisicovermindering is gedeeld door overheden 	<p><i>Ondersteunend</i></p> <ul style="list-style-type: none"> • Directe ontmoeting, alle deelnemers gelijk • Open en transparante discussie • Veel bijdrages van lokale inwoners (verhalen) • Gebruik van visualisatie, zoals foto's <p><i>Blokkerend</i></p> <ul style="list-style-type: none"> • Doelgroep niet bereikt • Sceptische houding van deelnemers jegens huidige overstromingsrisico's
Testactie 8 mei: ontmoeting leerlingen en oudere inwoners			
<ul style="list-style-type: none"> • Leerlingen bewuster maken van wat overstromingen zijn en kunnen betekenen • Duidelijk maken dat er een overstromingsrisico is in Borgharen 	<ul style="list-style-type: none"> • Leerlingen leren over overstromingen, leren de specifieke aspecten over wat ze moeten en kunnen doen tijdens een overstroming • Leerlingen bewuster dat ze in een gebied wonen met overstromingsrisico's 	<ul style="list-style-type: none"> • Leerlingen hebben nieuwe kennis opgedaan over overstromingen, in het bijzonder over lokale ervaringen met overstromingen en hoe met overstromingen is omgegaan 	<p><i>Ondersteunend</i></p> <ul style="list-style-type: none"> • Levendige vorm van verhalen vertellen • Rollenspel als actieve manier van betrokkenheid leerlingen • Gebruik van visualisatie, zoals foto's <p><i>Blokkerend</i></p> <ul style="list-style-type: none"> • Korte voorbereidingstijd • Weinig discussie over hedendaagse/toekomstige overstromingsrisico's

1 Introduction

This report illustrates and evaluates the participatory process planned and implemented by the Institute for Environmental Studies of the Vrije Universiteit Amsterdam (IES-VU) in the parishes of Itteren and Borgharen in Maastricht, between February and May 2017. The participatory process included:

1. the validation with stakeholders of the social capacity assessment conducted using the CAPFLO Capacity Assessment Tool in 2016;
2. the identification and development, in conversation with the relevant stakeholders, of the content of two pilot actions aimed at improving the social capacities that had been identified as weak in the case study area;
3. the implementation of the two pilot actions in the case study area;
4. the evaluation of the two pilot actions implemented.

The report first outlines the characteristics of the case study area, including a short illustration of the social and civic capacity assessment conducted for Task C of the CAPFLO project in June 2016. It then discusses the rationale behind the capacity building process. This includes a description of the processes of planning, implementation, and evaluation of the participatory processes. It finally reflects on the potential of the implemented participatory pilot actions to improve social and civic capacity.

2 Characteristics of the area selected for participatory actions

2.1 Geographical, political, administrative and social features of the selected area

The Dutch case study is focused on the parishes of Itteren and Borgharen, located in the municipality of Maastricht in the province Limburg. These parishes border the river Meuse, a rain-fed river with an international river basin located in five countries. The river-stretch where the parishes are located is called *Grensmaas*. This is a narrow, fast flowing, slightly meandering trench of about 60 meters width. The river is too steep in this region for navigation, so the Juliana canal was constructed in 1935, starting at Borgharen. Itteren and Borgharen are enclosed between the Meuse and the Juliana canal.

The city of Maastricht is the administrative capital of the Province of Limburg with a population of around 122,000 inhabitants. Itteren and Borgharen have approximately 1,000 and 1,850 residents respectively, of which most have lived for a long time or their entire life in the parishes. 70 percent of the respondents to the survey conducted for CAPFLO in June 2016 was older than 50. Not all respondents live in Itteren and Borgharen, but this figure implies an uneven balance between young and older generations in the case study area. Both parishes have a distinct economic culture, Itteren being more an agricultural farmer's village and Borgharen being composed of people working in the second and tertiary sector.

As part of Maastricht, Itteren and Borgharen fall under the municipality jurisdiction. Both parishes have a *Buurtraad*¹ (or *Dorpsraad*), a local council which functions as an intermediary between the residents and authorities through the chairman of the council. Residents can participate in working groups of the councils; a relevant Borgharen working group for this study took part in the discussions (*Klankbordgroepen*) regarding the Grensmaas project within the *Maaswerken* program (for gravel extraction, river widening and nature restoration).

2.2 Flood risks in the area

The Grensmaas is an unpredictable river stretch. At Borgharen the average discharge is about 221 m³/s (Berger 2002), but this figure can vary between less than 25 m³/s and 3,000 m³/s during peak flows in winter or spring (De Bruijn 2005). In 1926 the highest discharge level of 3,175 m³/s was recorded at Borgharen (Parmet et al. 2001). This magnitude of discharge has a return period of about 250 years. Minor floods along the Grensmaas occur when the discharge exceeds about 2,000 m³/s at Borgharen. Such discharges, with a probability smaller than about 1:50, possibly overtop the embankments surrounding the villages in this region (including Itteren and Borgharen). These flood events have caused damages to buildings, infrastructure and agricultural land, but no casualties. Even extreme discharges have never resulted in loss of lives, yet damages have been severe.

¹ A new policy of the municipality of Maastricht requires the so-called 'neighborhood platforms', such as the *Buurt- and Dorpsraden* in Itteren and Borgharen, to transform into 'neighborhood networks' before the end of 2018. This new form of community initiative is provided with less financial support from the municipality than the old form (Gemeente Maastricht 2016b: 5), stimulating communities to acquire financial resources from other sources. This could affect the financial capacities of communities in the near future.

In 1993 and 1995 extreme discharges of 3,120 and 2,860 m³/s were recorded in the Meuse in South-Limburg. In Borgharen the maximum recorded discharge was 2,870 m³/s (Schrojenstein Lantman 2004). The December 1993 flood led to the evacuation of 8,000 people in South-Limburg and a financial damage assessed at about 122 million Euros. There were no casualties. In late January 1995, the water in the Meuse again reached extremely high levels. Itteren and Borgharen were the first to be affected by the rising water and inhabitants were strongly advised to leave the villages. In the following week, a precautionary evacuation of approximately 200,000 people in the entire Dutch river basin region was executed, due to uncertainty about the resistance of the dikes (Rijkswaterstaat 2007). Although the dikes managed to withstand the water levels, many houses in Itteren and Borgharen were flooded.

In January 2003, the highest discharge level measured at Borgharen was 2,730 m³/s. Thirty inhabitants of Itteren and Borgharen requiring special assistance were evacuated out of precaution. Roads towards the parishes were only accessible with special trucks. Due to the protection measures that had been implemented after the 1990s floods, the flood was less damaging than the events in 1993 and 1995. When the water reached high levels again in 2011, special concrete embankments were placed along the dikes, ensuring protection against discharge levels up to 2,500 m³/s. Again, inhabitants requiring special care or assistance were evacuated on advice of the regional team of aid services. Table 2 below summarizes the discharges and water levels measured in Borgharen during the four most recent floods. The bottom rows indicate the discharge and water levels for events with a return period of 1/10 years, 1/50 years, and 1/250 years (Risicokaart 2016).

Table 1. Water discharge and height at Borgharen (Risicokaart, 2016).

Flood event	Peak discharge Borgharen	Water level Borgharen
1993	3,120 m ³ /s	45.86 m
1995	2,870 m ³ /s	45.68 m
2003	2,730 m ³ /s	45.65 m
2011	2.270 m ³ /s	45.10 m
Flood protection level		
1:10 years	2260 m ³ /s	45.36 m
1:50 years	2865 m ³ /s	45.88 m
1:250 years	3431 m ³ /s	46.25 m

2.3 Management of flood risks in the case study area

Many actors are involved in flood risk management in South-Limburg. Public authorities include on national level the national authority for water and infrastructure management (*Rijkswaterstaat-RWS*), and two ministries (Infrastructure and Environment; and Security and Justice). The ministries are responsible for the Dutch flood risk policy, whilst RWS implements this policy in the form of water management infrastructure. The most relevant national flood risk mitigation plans include the *Maaswerken* programme for river widening and gravel extraction; the *Delta programme* for the river Meuse for new flood protection infrastructure; and a national awareness programme including an informative website and app about flood risks. On regional level water boards (the water board *Roer*

en Overmaas² in the case study area) are responsible for water management of (and infrastructure for) local water bodies, and the ‘safety region’ South-Limburg coordinates emergency services (e.g. in times of flood emergencies). The province of Limburg manages environmental and spatial planning, including infrastructural standards and permissions in for example floodplains. The municipality of Maastricht is responsible for local flood protection, and is currently developing a high-water safety plan for the city in consultation with the citizens (see Gemeente Maastricht 2016a). Within the municipality, local communities can form ‘neighbourhood platforms’, such as the village councils in Itteren and Borgharen. These platforms can apply for funding to address community issues, such as awareness of flood risk. The *Buurtraden* are closely connected to municipal authorities and are involved in discussions about regional flood infrastructure programmes. Non-public actors include NGOs, such as *Natuurmonumenten*, and citizen organizations, such as the workings groups of the village councils. For an overview of actors’ roles and involvement, see Table 2.

Table 2. Type and level of actors involved in flood risks prevention and management in the selected area.

Level	Type of actors				
	Political	Bureaucratic	Experts	Economic / financial	Social
National government	X	X	X	X	X
Regional safety region			X		
Regional water boards		X	X		
Provincial government	X	X		X	
Municipal government	X	X	X	X	X
Local ‘Buurtraden’				X (acquisition)	X

2.4 Social capacities for flood risks prevention and management in the area

An assessment of the social capacity to mitigate, prepare and deal with flood events in the communities of Itteren and Borgharen was carried out by means of interviews with citizens and flood management authorities and a survey conducted in June and July 2016. The results of the investigation showed that overall social capacities are well developed in the communities of Itteren and Borgharen. One of the key reasons is that the parishes are for a large part inhabited by families who have lived in the area for generations. This has allowed the inhabitants to build and pass on experience-based knowledge about living with the river and its floods, or ‘high water’ as Dutch people often say (e.g. flood events in 1926, 1993, 1995, and to a minor extent 2003 and 2011). There is motivation and capacity among citizens to work together and embark in community activities. Also, over the past two decades communities and authorities have learned to communicate and interact in a constructive way. However, the lack of significant flood events over the past twenty years, coupled with the development of flood infrastructure which have altered local flood dynamics, may have rendered part of the community flood knowledge obsolete. For instance, knowledge about the speed and intensity with which a flood would reach the villages may be outdated. Other knowledge remains useful, though, such as simple actions to do when the water reaches the doorsteps.

At the same time, the research revealed that the motivation of citizens to prepare for floods has decreased since the last major floods in the 1990s and is currently very low due to an increased sense

² As of January 1, 2017, water board Roer en Overmaas merged with water board Peel en Maasvallei to form water board Limburg, covering the entire province.

of safety. This is primarily attributable to three reasons: 1) the new flood infrastructure (essentially dikes and works for widening the river bed) which has decreased flood risk; 2) a traditional dependence on the government to mitigate flood risk on large scale; and 3) and the absence of major floods in the past twenty years. The ability of citizens to proactively participate to activities related to flood risk mitigation and preparedness (e.g. public debates on flood protection measures, preparedness actions) is low due to the combination of diffuse low motivation and people's own perception of having insufficient knowledge about flood risk mitigation to contribute meaningfully to any activity.

In light of the analysis, an important point of vulnerability of the communities of Itteren and Borgharen has been identified in the paradox between people's confidence on their own experience-based knowledge and perception of high safety, and the reality of potentially very different dynamics of an unlikely but not impossible flood event. Accordingly, a number of basic capacity building goals were established. These are:

- 1) Increasing Knowledge by sharing authority knowledge regarding contemporary flood risks with citizens
- 2) Demonstrating how flood dynamics have changed since the last major floods and how this may affect how citizens can deal with floods personally
- 3) Increasing Motivation of citizens to act on flood risk (e.g. preparedness) by explaining and elaborating that flood risk has been decreased but not removed

Having set the goals, the next phase consisted of the selection of the most appropriate Participatory Mechanisms and pilot actions to achieve the goals. The participatory process and related outcomes are illustrated in the following chapters.

3 Participatory capacity building process: Planning

3.1 Validation and co-design of the pilot action³

The planning phase of the participatory process took place between February and April 2017 and used email correspondence, telephone interviews, a survey, and one meeting with local stakeholders. This phase had two goals:

- 1) validate with the involved stakeholders and public authorities the outcome of the capacity assessment and the capacity building goals identified for the pilot actions;
- 2) select and form a pilot action to be implemented in May 2017 based on preferences and ideas of authorities and citizens.

This planning phase did not require too many resources, as all consultation was conducted within the Dutch network of participants involved in the CAPFLO project that was previously established (Task C). During both the planning and the implementation, the guiding principles for participation that were established in the Participatory Tool of Task D were followed (see de Voogt & Munaretto 2017: 32-33).

3.1.1 Validation of the capacity assessment and selection of the pilot action

The validation of the local capacity assessment was done in consultation with public authorities and local active stakeholders, selected from the list of interviewed people for Task C. 21 potential interviewees were selected based on their presumed knowledge about the local situation and other relevant issues discussed during the Capacity Assessment; some former interviewees having a national or regional focus in their work were not consulted as it was deemed irrelevant for this phase of the research. Some interviewees were identified in other interviews ('snowballing sampling') or because the initially selected interviewees did not respond.

The consulted people were contacted with an email containing three elements: (1) a (translated into Dutch) brief summary of the Task C1-3 report, including the filled-in Capacity Assessment Table and four suggested participatory activities to improve social and civic capacity in the pilot action (See Appendix B); (2) a request for feedback on the summary and the actions, especially focusing on the capacity assessment and how the activities could contribute to improving capacity; (3) an invitation for a telephone interview. This interview was held to give the stakeholders the opportunity to elaborate more on their opinion concerning the capacity assessment and the suggested activities and to offer them the possibility to suggest potential alternative activities. In total, eleven interviews were conducted (for interview questions, see Appendix A).

After this validation, an online survey was sent to 55 citizens living in Itteren and Borgharen (and surroundings). Their contact details were acquired during the CAPFLO survey for the capacity assessment in June 2016. The initial idea of this survey was to provide the citizens an opportunity to express their view on the suggested activities and to give any new suggestions. However, it was regarded as more worthwhile to give these citizens the opportunity to comment about the content of the activities rather than the structure. Waiting for all responses about the structure of the pilot

³ During the planning stage, for long the aim was to only organise the pilot actions on May 7. Only during April was the idea established to organise another meeting on May 8 with elementary school students and senior citizens. The planning of this meeting is described in Section 3.2.

action would have taken too much time and would have left too little time for the promotion and preparation of the pilot action.

Accordingly, the content of the two selected activities (a walk in Borgharen and an discussion meeting on a Sunday afternoon, see 4.1.) was based on the survey. The participants to the survey were asked to choose, from a list of options, which sites in and around Borgharen they would have liked to visit during the walk. Between the walk and the information meeting, a small exhibition of pictures and items related to the floods in the area was planned. Respondents were asked whether they wanted to contribute to this exhibition with any items. As for the information meeting, they were asked to express their preference for the public authorities they wanted to see represented at the meeting and for the topics they wanted to be discussed. The last question of the survey asked the respondents if they were interested in participating in the pilot action. Table 3 presents an overview of potential setbacks addressed in this process.

The survey was open from March 3 until March 20, 2017. One reminding email was sent on March 9. Seventeen responses were collected. Based on the responses, in deliberation with the authority representatives and local citizens who had already been contacted earlier for the validation of the Capacity Assessment, the schedule and content of the pilot action were established in April 2017.

Table 3. An overview of potential setbacks/risks that were considered in the assessment validation and the selection of participatory activities for the pilot action and the strategies implemented to tackle them.

Risks/setbacks foreseen	probability that risks occur (low /medium / high)	Impact of expected risks on the effectiveness of actions (low/medium/high)	Strategies for mitigating identified risks and results
Low response rate emails + telephone interviews	Low-medium (the potential interviewees know the project and are considered to be interested in and engaged with the project)	Low	Frequent reminders were sent to those potential interviewees that had not responded. In the end, 11 interviews were held with representatives of the most important actors.
Low response rate surveys	Medium (survey participants know the project from the previous survey, in which they indicated to be interested in any further participation)	Medium (a low response rate for this survey may indicate low interest of these people in participation. This indicator should be used for potential further action regarding the promotion of the pilot action)	A reminder was sent to those people who had not responded after one week. People were asked to distribute the survey to other people. Total responses: 17 out of 55 people contacted initially.
Refuted capacity assessment by large share	Low	High (actions are aimed at weak capacities; new capacity assessment will need pilot action with new focus)	Interviewees largely agreed with the capacity assessment. Doubts have been considered and if acknowledged were integrated in this report.

3.1.2 Results of the interviews and the survey for the capacity assessment validation and selection of the pilot action

The interviews discussed both the capacity assessment and the structure of the pilot action, whilst the survey discussed the content of the pilot action.

3.1.2.1 Feedback on the capacity assessment

Eleven telephone interviews were held with key informants, either professionals or local citizens engaged in flood risk management. Respondents were asked for their opinion and feedback on the capacity assessment. Important stakeholders (Rijkswaterstaat, Limburg Province, safety region, water board, municipality, local citizens/councils) were all represented by at least one interviewee. This section provides a brief overview of some doubts and suggestions formulated by these interviewees. It should be noted that all interviewees who had read the summary of the capacity assessment indicated to generally agree with the results.

Three interviewees were not sure about the possibilities for flood insurance, generally stating that it is unclear whether such an insurance exists and whether all citizens could apply for this insurance. On financial resources for community action, two interviewees were hesitant to agree with the high scores, as they considered it difficult for communities and community councils to find budget for projects apart from ordinary administration budget.

Three interviewees raised doubts about the need to discuss flood risk when the probability is as low as it is now in Itteren and Borgharen (between 1:250 and 1:500). Two of them mentioned the possibility of scaring people if flood risk is discussed. Two interviewees argued it is logical that people are not very motivated to prepare for something with this low probability of occurring. Two interviewees thought that awareness about flood risk is not as low as we suggested it is.

One interviewee raised the concern that the wording “head of the council” may be misleading, stating that the councils are collectives with assigned tasks and not elected official authorities. He suggested to use “chairman” or refer to the “de Buurtraad” as a collective when discussing the role of these groups in flood risk management.

All comments have been considered and the capacity assessment report as well as other communications adjusted accordingly when considered relevant.

3.1.2.2 Structure of the pilot action

Most of the interviewees shared their opinion about the proposed participatory activities for the pilot action, as well as suggested other possible activities. Those who did not share their opinion on this matter did not read the summary of the report or did not feel they could give a relevant opinion.

Opinions of interviewees about the suggested activities were labelled as positive (+), negative (-), neutral (0), or 'n/a' if no opinion was given. An overview is presented in Table 4.

In sum, the storytelling night received a +3 vote; the simulation of flood emergency actions +3; the workshop on flood safety +1; and the guided walk +5, with some conditions provided by interviewees. For instance, Interviewee 3 indicated that the walk would work because people would

spontaneously begin to talk about flood experiences among each other if the main subject were to be flood risk. According to him, the simulation would work if it involved a scenario of what would happen when the dikes break.

These results have been used to finalize the structure of the pilot action. The suggestions have been combined to form two activities: a walk with stories about floods in the past and a discussion session with information about contemporary and future floods. The discussion session is a simplified form of a workshop during which authority representatives both discuss flood safety and show a simulation of floods.

Table 4. Listing of indicated preferences for suggested participatory activities for the pilot action of interviewees. ‘+’ indicates a positive preference, ‘-’ negative, ‘0’ neutral, ‘n/a’ indicates no comment given about preference for this activity.

Interviewee	Suggested Participatory Activities			
	1. Story night experiences	2. Simplified simulation	3. Workshop flood safety	4. Guided walk and app
#1	+	+	+	n/a
#2	+	-	0	n/a
#3	+	+(if adapted)	-	+(if adapted)
#4	-	n/a	n/a	n/a
#5	+	n/a	n/a	+
#6	+(for elder people)	+	n/a	+(for new people)
#7	-	n/a	+	+
#8	n/a	n/a	n/a	n/a
#9	n/a	n/a	n/a	n/a
#10	0	+	n/a	+
#11	n/a	n/a	n/a	n/a

3.1.2.3 Content of the pilot action

Regarding the content of the walk and the discussion session, a questionnaire was sent to citizens that previously participated in the CAPFLO research and had provided contact details for further participation and information regarding the project. This population was selected because firstly, it would have been too difficult and time-consuming to distribute the questionnaire among others of whom we did not have the email address. Secondly, it was thought that these people would recognize the CAPFLO project (its logo) and would therefore be more inclined to fill in the questionnaire. Participants were invited, though, to distribute the survey amongst their social circles to reach more people. The initial email was sent to 55 people; 17 responses were registered.

The survey asked 5 questions: (1) which locations the participants would like to visit during the walk; (2) whether they have anything to contribute to the exhibition; (3) which authorities they would like to see represented; (4) what the authorities should discuss during their presentation; and (5) whether people would be interested in participating in the pilot action. If yes, they were asked to fill in their contact details. If not, they were asked why, so that we could have changed anything regarding the action if multiple respondents indicated the same reason.

The results of question 1, 3 and 4 are presented in Appendix C. To sum up, most respondents expressed interest in visiting the strengthened dikes around Borgharen as well as the Meuse and new natural areas; also, they expressed interest in having the municipality of Maastricht and Rijkswaterstaat represented and discuss 'high water and floods in the future' and 'future plans for the Meuse and high water approaches'. Most of the respondents (n = 13) indicated to be interested in joining the action and provided their contact details. Some respondents indicated to have something to contribute to the exhibition and were contacted about this. Of the four people not interested in participating, three indicated to be unavailable on May 7.

3.1.3 Organisation of the pilot action

In deliberation with the interviewees, two participatory activities were established for this pilot action:

- 1) a walk through Borgharen with local citizens sharing stories about floods along the way (a combination of Suggestion 1 and 4); the goal of this activity was for citizens to relive their past experiences with floods, to provide a contrast with contemporary flood risk in the following activity;
- 2) an informative meeting about the current state of affairs regarding flood risk (a combination of Suggestion 1, 2, and 3); the goal of this activity was to share professional knowledge regarding flood risk with citizens, in order for citizens without flood experience to learn more about flood risk and for citizens with experience that their experience-based knowledge may be outdated.

For the walk, local active citizens were invited to share stories about the floods in the 1990s. The walk would bring the participants to locations where pictures would be shown of that time. Possible locations that were suggested in the survey included buildings and houses flooded in the 1990s, reinforced dikes around Borgharen, and the Meuse and new natural (retention) areas. For the discussion session, a meeting room was arranged in Borgharen (*Gemeenschapshuis Haarderhof*). Participants would gather at the same location where the exhibition and the informative meeting would take place. The walk was expected to take 1 to 1,5 hours.

Partially functioning as a break and partially as an attraction, after the walk an exhibition of more pictures and posters about anything related to floods in the region was planned at the gathering place. Snacks and drinks were also planned. In the survey, participants were asked whether they could contribute to this exhibition with any items. We also personally asked our local contacts in the parishes and in the municipality whether we could use their collection of material for the exhibition. The break was planned to take about 30 minutes.

The second activity comprised an interactive meeting during which public authority representatives presented on a particular subject regarding flood risk. Three presentations of 15 minutes each were planned, followed by 20-30 minutes of Q&A and discussion. Some probing questions were prepared for the discussion. A professional facilitator was planned to moderate the activities.

After establishing the structure and basic content of the actions, on April 18 we organized a meeting with dinner in Itteren to coordinate and align the specific content of the activities. The meeting involved the researchers and those who had expressed intention to be involved in the organisation

and implementation of the pilot action, including people contributing to the stories during the walk; people sharing their knowledge during the informative meeting; and the authorities involved.

Approximately one month before the pilot action took place, an invitation email was sent to those who had expressed interest in joining the event. Invitees were asked to confirm their presence. Through the same medium, reminders were sent after three weeks.

3.1.4 Media/promotional strategy

Local leaders (e.g. members of the local councils) were asked to promote the events in their network during March/April 2017. With the help of one person who is known for his professional participatory work in the area, a press release was distributed among local and regional news agencies about the upcoming activities. A journalist working for the provincial news network who had been contacted in 2016 was also informed of the activities. Some of these agencies have picked up the story, including the regional newspaper *De Limburger* and the local television broadcaster *RTV Maastricht*.

Promotional messages were submitted to local periodicals. The message includes a general description of the project and its goals, a brief description of the activities, an invitation with the date and location, and contact details. The Borgharen periodical was published around the end of March, and the Itteren periodical was published around mid-April. A message about the actions was also published in the March newsletter of the Grensmaas consortium, said to reach 7,000-8,000 subscribers.

Additionally, on April 18 the researchers joined a meeting (*Klankbordgroep*) in the context of the Grensmaas project. This was part of a series of meetings periodically held by the Grensmaas consortium with the local authorities and citizens to discuss the activities related to the Grensmaas project. Participants to the meeting included representatives of the municipality, the water board, the safety region, the Grensmaas consortium, and local citizens. We were invited to present our work and to promote our activities.

On April 18, while in Maastricht, we also distributed flyers and posters about the upcoming pilot action. These were distributed among local public places (e.g. municipal office, cultural centres, churches, pubs) and placed in randomly picked individual mailboxes in Itteren and Borgharen.

3.2 Implementing a second pilot action: meeting with elementary school students and senior citizens

At the end of March 2017, we received an email from an employee at the local senior day care, expressing interest in the planned pilot action. The coordinator of the senior day care explained that senior citizens at the day care regularly talk about their experiences with flood events in the 1990s and asked for more information. In the follow-up correspondence, the idea was established to organise a meeting in which the senior citizens could share their stories and experiences with the local elementary school students, as these students have never experienced a major flood before, even though most of them live in a floodplain. The local school is small and almost all children live in either Itteren or Borgharen, as surrounding areas have their own elementary schools. Apart from regular senior visitors of the day care, other local senior citizens were invited to join the meeting, as even though we had met the people at the day care, we were not sure they would be able or keen to

talk much in front of groups of students. The other invitees were known to us from previous involvement in the CAPFLO research and most were able and happy to join the meeting.

The meeting was set up to be an assignment for the students in which they would have to play the role of a journalist interviewing the senior citizens about the past floods in the villages. In the morning before the meeting, the students were given a very short class about what floods are and what they have meant for the region, and afterwards they had to develop some questions to ask the senior citizens. After the meeting with the seniors, the students were asked to hand in a short report on their findings, to be submitted within 2 weeks. These reports were meant to function as indicator of what the students had learned and what kind of information had stuck with them.

In coordination with the coordinator of the senior day care and the director of the local school, the meeting was planned for Monday May 8, 2017 at the school. Students of the age of 9 to 10 years old ('group 5/6' in Dutch terms) formed the first group to ask questions and students of 11 to 12 years old ('group 7/8') formed the second group. Each group discussion was planned to take one hour. Some time at the end of each meeting was reserved for the researchers to ask evaluative questions to all involved parties, including the teachers, about their thoughts on this meeting and its organisation.

The teachers were given some guidelines on the action, including an explanation on the goal of the action within the framework of the CAPFLO research. We provided some questions for the children to ask, in case the students had been unable to think of proper questions.

3.3 Planning the evaluation of the capacity building process

In accordance with the guidelines established by the CAPFLO consortium, an ex-post evaluation questionnaire was created to evaluate the changes in social capacity as a result of the pilot action on May 7 (see Appendix D). The questionnaire was filled in by all participants at the end of the pilot action on May 7. As the pilot action focused on knowledge sharing and motivation, most of the questions focused on these aspects of social capacity; other aspects such as networks and participation were considered to a lesser extent too. Some questions regarded the planning and organization of the pilot action. Furthermore, 3 participants (e.g. local storytellers during the walk, presenters during the discussion session) were interviewed three weeks after the pilot actions. This ex-post evaluation aimed to gather insights on the impact of the actions, through questions about what has been learned and to what extent the experience was shared in the participant's network (see Annex F).

As for the evaluation of the May 8 pilot action, we have adopted a different approach as it was considered irrelevant and ineffective to ask questions about social capacity building, even if termed in lay language, to elementary school students. The action with the school was primarily aimed at knowledge sharing and awareness raising, but also at motivation to a minor extent. Before the short class on floods was given, the students were asked to fill in an ex-ante questionnaire with six questions asking about their knowledge on floods (Appendix E). After the conclusion of the action, we asked the students, as well as the senior citizens and the teachers, what they liked the most about the entire action and what they had learned. The short report that all students had to hand in served as an ex-post evaluation. Through a content analysis of the reports, we aimed to gain some

insights on what made an impression on the students' mind and from that reflect on how students could be motivated to remain informed about flood risk.

3.4 Expected change and link to the FRMP

Considering the outcomes of the capacity assessment as discussed in Sections 2 and 3, and provided that this assessment was not refuted significantly by validating stakeholders, the participatory process focused on two key social capacities, namely knowledge and motivation. Specifically, we aimed to leverage the existing experience-based knowledge of citizens on flood risk to build motivation and new knowledge in the communities through the pilot actions. Although part of the experience-based knowledge was deemed outdated, much of it was considered still relevant and worth sharing and passing on to fellow (new) citizens and students along with professional knowledge of authorities on current flood risk. In that light, the good communication between the authorities and the communities could be leveraged to facilitate the knowledge sharing process.

By confronting citizens with the possibility that their knowledge of dealing with floods may be of no help in case of a new flood event, it was expected to trigger people's motivation to learn more about the flood dynamics of a potential future flood. This, combined with the explanation of why new flood protection infrastructure only decreases and not fully eliminates the probability of flood events, was expected to contribute to build relevant knowledge in the communities. The capacity of citizens to proactively participate in flood risk management was also expected to be influenced by an improvement in knowledge and motivation. Finally, engaging the community leaders (e.g. *de Buurtraden*) in the ideation, planning and implementation of the pilot actions was expected to invoke a sustained possibility to perform actions related to flood risk mitigation in these communities in the future, without any external support.

The indicators of knowledge and motivation, as given in the Participatory Tool (de Voogt & Munaretto 2017: 24) were used to assess change. However, considering that this change is only hypothesised, the assessment also addressed changes to the other dimensions, albeit in perhaps less detail. The evaluation followed the guidelines as provided in Annex F of the Participatory Tool (idem: 113).

The participatory process was primarily oriented to contribute to knowledge and motivation by providing information in an interactive way with input from community members and local authorities. This picks up on the goal of the Meuse flood risk management plan to increase the self-reliance of citizens regarding flood crisis management (MI&E 2015: 113).

4 Participatory capacity building process: Implementation

4.1 Pilot action of May 7, 2017: walk and discussion session

In preparation of the two activities, we gathered exhibition material from our personal collections and by asking local citizens for pictures of the past floods, as well as the municipality of Maastricht to bring posters regarding flood risk plans for Maastricht (it was known to us that they have these posters). Five large collage posters were created to be used during the walk and during the exhibition. Both activities were facilitated by Saskia Bisschops, a colleague from the Open University of Heerlen, who had prior experience with facilitating public participation activities. Table 5 summarizes the pilot action's main characteristics.

Table 5. Pilot action conducted on May 7: main characteristics

Title	Planned action (yes/no)	Changes (in the participatory mechanism or activity, duration, target group, etc.) to the originally foreseen action	Participatory mechanism used for its delivery	Description of participatory activities carried out	Duration	Target group	Contribution to the expected change
Overstromingen in Itteren en Borgharen: toen en nu	yes	Route of the walk was changed slightly (but this was anticipated); additional authority presenters during walk; target group not reached; no profound, elaborate discussion in last session	Combination of citizen engagement initiative (walk) and simplified deliberative workshop (discussion session)	See Section 4.1.1.	3,5 hours	A large varied public was invited, but special focus on people who have not experienced floods themselves	See Section 5

4.1.1 Activity 1: Walk through Borgharen

During the stakeholder meeting on April 18, a route was determined with the help of local citizens. One citizen volunteered to talk about his experiences near his house, of which he had pictures that could support his story. Another citizen volunteered to talk near a dike, a location of which he had pictures from when it was flooded (before the dike was constructed). We decided to also include a path along the dikes in the route, as it was anticipated that people would be more inclined to talk about experiences, knowledge or anything related to floods when walking near the Meuse river. The walk was planned to have two local citizens, one authority (water board), and one stakeholder (Consortium Grensmaas) to discuss flood risk from their point of view, but other participants were also to be invited by the hostess to take the floor.

In total, between 25-30 participants joined the walk. The walk stopped 8 times on different locations where a participant felt like sharing an experience or story. During these stops, several participants followed up on each other with personal experiences. This was also possible because many participants, both authorities and citizens, knew each other well as members of small communities but also through inter alia the participatory efforts of the Grensmaas Consortium (see Section 3.1.4.). We also noticed that participants were sharing stories and discussing among each other between the plenary stops. The collage posters of flood pictures may have helped triggering these memories too. Some interesting notions that were mentioned during the walk:

- Before the floods of 1993, people would actually celebrate when the water had come (“kermis”, literally funfair);
- Tip from a citizen: having different electricity circuits for downstairs and upstairs results in still having electricity upstairs during a flood;
- The solidarity between citizens during the floods: people were helping each other more than usual;
- In 1993, the mayor of Maastricht organised a meeting about possible obligatory evacuation, but nobody attended, as nobody contemplated evacuating;
- With the construction of the new dikes, only the villages are protected, not the roads. Thus, the annoyance of being cut off remains when there is high water, but there is much less solidarity because nobody is really affected directly nor severely any longer.

The pictures below give an impression of the walk.





4.1.2 Activity 2: Discussion session about contemporary and future flood risk

After a break with the exhibition (and drinks), the discussion session was initiated. Three presentations were planned, from representatives of Rijkswaterstaat, the safety region Zuid-Limburg, and the municipality of Maastricht. Rijkswaterstaat and the municipality were selected because they were able to join the meeting, and the pilot action questionnaire indicated a preference for Rijkswaterstaat and the municipality to be represented. As for the safety region, we thought that as a new organization, their work is less well known, so it would be interesting and novel for citizens to hear from them. The representatives were asked to present about the works of the authorities regarding flood risk in the region. The presentations were planned to be given one after the other, only allowing for clarification questions between the presentations. The discussion questions were to come after all three presentations were finished. Besides these three authorities, other authorities such as the water board Limburg and the province of Limburg were represented too, as well as the stakeholder Grensmaas Consortium. In total, 35 participants attended the session (some new people joined during the exhibition), of which 7 authority representatives. For an impression, see the pictures on page 22.

The first presenter was Eddy Ensink of Rijkswaterstaat, whose presentation was about river water level change due to the Maaswerken. With the use of videos of flood simulations in 2012 and 2015, he showed how the Maaswerken programme has influenced the peak levels of huge flood waves, and how Itteren and Borgharen are not easily flooded anymore.

Jan-Willem Gootzen, representative of the safety region, gave the second presentation, about the steps that the safety region takes when there are signs of a potential flood wave. He indicated that the safety region has some days of preparation time in case of a flood (at least three), and that the plans they make try to optimally use the time they have to make calculations, estimates, inform people, prepare and initiate evacuations, etc.

There were many questions for the safety region; this implies the organization and its work are less known by the citizens (as we had anticipated). For instance, a question was raised about the distribution of materials/resources between cities or regions in times of floods. Itteren and Borgharen are better protected than any other region in Limburg, so when there is a flood wave, other regions will be hit first. However, if the water level continues to rise, Itteren and Borgharen may be threatened too, but all resources to deal with floods (boats, army trucks, personnel, safety kits, food etc.) will be used (up) in other regions. In other words, it seems that Itteren and Borgharen are so well protected that if they are flooded, other parts of Limburg and the Netherlands will have been flooded long before. Materials and resources might be depleted to help the villages then.

Another participant asked about the role of the water board when the water overflows the dikes with, for instance, one centimetre. The representative of the water board, present in the public, answered that they annually adapt their plans to update models. As for the northern part of Limburg, in the coming years much will be done with sandbags because safety levels are much lower in this region.

The last exemplary clarifying question for the safety region was about the coordination with Belgium and Germany. The representative answered that the Germans help (with a large amount of material)

if there are not also floods in the German Rhine River as that would get priority. As for the Belgians, communication has improved much, especially through the collaboration with Rijkswaterstaat.

The third presentation was given by Gerard Wijnands, representative of the Maastricht municipality, who works on the MijMaas project, a participatory project aimed at identifying feasible measures for reducing water levels in the Meuse river near Maastricht. He elaborated on some potential measures that influence the surroundings of Itteren en Borgharen. For the planning and implementation of the project, Maastricht will collaborate with another municipality (Eijsden-Margraten) as well as the water board and the province.

There was a question about the list of proposed actions for decreasing water levels that was presented by the municipality representative, as to whether the order of the list represents priority. The presenter confirmed that there is a priority but only in terms of which proposals are investigated for feasibility first, not in terms of preference.

After conclusion of the third presentation, the three presenters were invited to sit at the table in front of the public, and the public was asked to pose any questions they had. One person asked whether the dikes at Borgharen can or will be heightened (in short term, maybe with sandbags). The water board representative responded that the national government has standards for safety, and that the dike rings around Borgharen and Itteren meet these standards. Every twelve years there is a check; if the dikes do not comply they will be adjusted. He added that it all depends on financial resources. One Rijkswaterstaat representative argued that upgrading the dikes in Itteren and Borgharen where the safety level is already relatively high compared to other areas along the Meuse, would result in a never ending process of upgrading. A clarifying question was asked by a participant concerning whether Maastricht would have problems if the dikes were raised in Borgharen. The answer was: no, but Itteren would. The water board representative added that for now, the water board Limburg focuses on increasing flood protection in Noord-Limburg, where safety levels are lower.

A question was asked in reference to the project CAPFLO and how it could be successful in communicating about the risks of living in a floodplain, reminding people of the risk, creating awareness in people who have not experienced the former floods themselves. On this point, another participant observed that despite the use of several kinds of advertising methods to promote this CAPFLO meeting, mostly people who are known to be interested in the topic joined the event. He added that people who are not interested will never join regardless of the advertising or awareness raising campaign. The water board representative suggested that people can have a say about what the water board does, by for example commenting online on their proposals. The safety region representative claimed there are national awareness campaigns, but these are mostly focused on coastal flood risk. One Rijkswaterstaat representative mentioned that high water protection is higher nowadays in Itteren and Borgharen, but high water safety is lower, because the water would come much more quickly, with more force, if a flood had to occur now. However, this observation, which is one of the key reasons of our choice for the pilot actions (i.e. building knowledge and understanding of current flood safety), did not trigger any further discussion.

The pictures on the next page show the setup of the second participatory activity on May 7.



4.2 Pilot action of May 8, 2017: Meeting of the senior citizens with the elementary school students

In agreement with the school director and teachers of the two groups of students, the meeting was planned to be held in a large room in the school. The posters with picture collages used on May 7 were put up on the walls of the room to give the students visual examples of the floods. Both meetings were facilitated by Saskia Bisschops.

Table 6. main characteristics of pilot action on May 8, 2017.

Title	Planned action (yes/no)	Changes (in the participatory mechanism or activity, duration, target group, etc.) to the originally foreseen action	Participatory mechanism used for its delivery	Description of participatory activities carried out	Duration	Target group	Contribution to the expected change
Ontmoeting basisschool-leerlingen en oudere generaties inwoners Borgharen en Itteren	Yes (from April 2017)	No major changes, most frequent speakers of the senior citizens were the citizens not regularly visiting the senior daycare (as was anticipated, see Section 3.2.)	Role-playing (students were journalists interviewing senior citizens)	See Section 4.2.1.	2x 1 hour (2 groups)	Local elementary school students (with no experience of major floods)	See Section 5

4.2.1 Meeting group 5/6 (9-10 years old), 13.15-14.15

The group consisted of seventeen children, and nine senior citizens attended the meeting. The facilitator pointed out the student to give turns in asking questions. The following questions were prepared by the students and asked (translated from Dutch):

- (1) Which floods have you experienced and how old were you?
- (2) How scary was the first flood that you experienced?
- (3) Which things in your house broke during the flood?
- (4) What should I do when my house would flood now?
- (5) Have you ever been evacuated and which belongings were you allowed to take with you?
- (6) How long did it take for the water get back into the Meuse river?
- (7) Did you help other people during the flood?
- (8) Which height did the water reach in your house?
- (9) How were you warned?
 - a. Extra: Did you have to call emergency services?
 - b. Extra: Was the water cold?

Additional to answering the questions, a senior citizen mentioned that the changing climate can result in the villages being flooded once again.

4.2.2 Meeting group 7/8 (11-12 years old), 14.15-15.15

This group consisted of 30 children, and eight senior citizens joined this meeting (one citizen had to leave after the previous meeting). This time, the teacher of the group gave turns to the students for asking questions. The following questions were prepared by the students and asked (translated):

- (1) Was it scary to experience the flood; if yes, why?
- (2) What was the first thing you did when you saw the water approaching?

(3) Were you informed beforehand that a flood would occur?

One of the answers: *the second time [1995] some people left before the flood came. Some people overreacted too: this school was closed for two weeks, while the water only came at the end of those two weeks.*

(4) How were citizens evacuated; were you yourself evacuated?

(5) Did you lose something precious and if yes, what?

(6) Were your belongings damaged heavily?

(7) After the floods, was there much damage and were houses still inhabitable?

(8) Where did you go when the water came?

(9) What can people do to prepare themselves for a flood?

One of the answers: *be aware, the dikes are finished but that does not mean the water will never come. Don't put expensive things or things that are difficult to break down on the ground floor.*

(10) Do you still often think about the Meuse river; what would you do differently now?

One of the answers: *the Meuse river, above all, is beautiful.*

The pictures below portray the May 8 pilot action.





5 Monitoring and evaluation of the participatory capacity building process

During the pilot actions, our role was primarily to observe and make notes about relevant stories, notions, interactions, and questions. We did not voice record any discussion, as that would require everyone's permission. We took pictures of the event to give an impression of the activities for anyone involved and other interested parties.

All participants to the events were involved in the evaluation of the pilot actions (unless they had some objections), including the authority representatives. Beforehand, the participants were made aware of our request for them to fill in the questionnaire afterwards, to prevent people from walking away. For the May 7 activities, there was a possibility that some participants only joined one of the two pilot actions, even though they were organised sequentially. The evaluations distinguished between participants joining both or either one of the two pilot actions to potentially differentiate between the social capacity building of both pilot actions. This evaluation aims to understand how participants have experienced the activities and what they have learned about flood risk and flood preparedness in their region.

The evaluation of more long-term impacts consisted of phone interviews with a selected number of participants conducted 3 weeks after the pilot actions. Participants were asked what they had done with the information they had gained through the events, if any at all, such as sharing and starting new initiatives regarding flood risk mitigation.

5.1 Evaluation of May 7 pilot action

The evaluation of the May 7 pilot action consisted of an ex-post questionnaire handed out after the conclusion of the discussion session. The two activities – walk and discussion – were evaluated as one pilot action, covered by one questionnaire (see Appendix D). Most questions had four options as answers, ranging from 0 to 3 with appropriate terms, in line with the Likert scale used in the Capacity Assessment Tool and Participatory Tool.

We handed out ex-post questionnaires to all participants, including authority representatives, but some participants failed to answer all the questions. Of the 35 participants that attended the discussion session, 27 participants filled in the questionnaire. Of these 27, three participants indicated to have only joined the discussion session. The questionnaire results are evaluated based on relative scores of the answers, because we argue that the relative scores given to back-to-back questions are more informative on how well the action can contribute to capacity building than the absolute average of the scores per question, which in the case of the indirect questions about built capacity mostly average around 2 (on the Likert-scale of 0 to 3; questions 4 to 10). Furthermore, to give a more complete and clearer picture of the results we report the percentage of responses to the multiple options in the questions where relevant.

Despite many participants pointing out they had joined in similar events prior to May 7 (out of 27, 26% occasionally and 56% often), over 90% of them indicated to have learned about flood risk and how it is managed due to the pilot action (questions 4, 5 and 9, avg. 2.26, 2.25, and 2.48).

In contrast, the average score for the question if people have learned more about how to prepare for a flood event is low (question 6, avg. 1.75). Participants reported to have either barely (33%) or moderately (58%) learned something about flood preparedness. This low score could most likely be explained by the fact that flood preparedness was not discussed by the authorities very elaborately as it was not one of the topics of discussion selected through the survey and the meeting in April. According to the expressed preferences, authorities addressed more what they do about flood risk, rather than what people can do to prepare or during a flood. The same explanation applies to the relative low score for the question if people think authorities communicate clearly about what people should do in case of a flood event (question 7, avg. 1.96). To this question 74% of the participants answered the communication is only moderately clear. Because the topics of discussion were selected through a survey and a pre-meeting, these low scores cannot be regarded as a failure of the pilot action, but rather the result of a conscious choice for the development of the participatory process.

An interesting observation concerns the average score for the question about the openness and regularity of discussions between citizens and authorities about flood risk, which is *relatively* low (question 3, avg. 2), with 30% of respondents indicating low and 44% of respondents indicating moderate presence of open and regular discussions regarding flood risk. In contrast, the score for the questions about the openness and transparency of the May 7 pilot action is *relatively* (very) high (question 8, avg. 2.88), with 88% of the participants reporting an open and transparent discussion. This may imply a couple of notions for this kind of participatory setup in which authority representatives and citizens are brought together and interact on the same level: first, citizens and authority representatives appreciate these meetings in which they can directly interact in a relatively informal setting; second, these direct, relatively informal interactions seem to facilitate a more transparent and open debate about flood risk. 86% of the participants indicated they would like to have more regular discussions about flood risk mitigation (question 14).

Although 96% of the participants have indicated that it is important for citizens to know about flood risk (question 10, avg. 2.5) and reported that they will probably (59%) or certainly (38%) join similar events in the future (question 12, avg. 2.33), many indicated they are unlikely (41%) or hesitant (27%) to organize such an event themselves (question 13, avg. 0.95), and only 54% contemplated to do something about flood risk preparedness. When asking what they would do most elaborations, if any, did not point to concrete personal measures. Motivationally, the walk and discussion may therefore not have triggered much in participants, although this might also be related to the general attitude of both citizens and authority representatives to de-emphasize flood risk (see Section 5.3.).

For the question why people participated in the May 7 activities (question 15), the most frequent answers were 'out of interest' or 'work-related'. Obviously, people who are not interested will not likely join this kind of activity. However, it is likely that many people who are not interested also do not know much about flood risk, and those people are part of the target group of this type of activities. This raises the question how it would be possible to reach 'uninterested' public, and make these citizens aware of the importance of knowing about flood risk. Working with elementary school students might be an option to reach these people, as the children might talk to their parents about what they have learned. This may trigger an interest of parents.

A major issue of the pilot action, confirmed by the questionnaire results, is that we did not reach our target group, as all participants were older than 50 and many were knowledgeable, whilst the activities were mainly targeted to younger generations who came to live in the villages after the 1990s. This was also mentioned by two interviewees in the ex-post interviews. We have advertised the event as much as possible (see Section 3.1.4.), but apparently to no avail (at least among our target group). A couple of possible explanations are: people who have experienced floods are more interested in events about floods; and senior citizens who know each other (possibly because of the floods) may have encouraged or invited each other to join the activities. Also, many participants indicated they had previously joined similar events about flood risk at least occasionally (question 1, 82% occasionally or often) and 59% indicated they had already taken part in some prior CAPFLO action, whilst we were also looking to include new people too.

After conclusion of the activities as well as during the ex-post interviews, authority representatives reported to have learned about how citizens have experienced the past floods. This highlights the potential for this interactive participatory setup for bilateral knowledge creation and sharing, a possibility that we had not anticipated. Based on earlier CAPFLO interviews with authority representatives and community citizens in 2016, we were under the impression that authorities are generally aware of the impact floods can have on citizens, and what kind of experiences they have with floods. Finding that this is not the case, it is important to acknowledge this potential of bilateral learning, as proper flood risk mitigation does not only take into account the professional knowledge on floods, but also the emotional and experience-based knowledge of citizens that have been subject to flooding. One ex-post interviewed authority representative said he will submit a proposal to the quinquennial update of disaster management plans within his organisation to include a component of regularly finding out what the population is concerned with, because of the experience he has had with the CAPFLO action. Also, another representative said he had mentioned the CAPFLO project and our pilot actions when discussing a potential flood-related collaboration with a cultural organization. These findings imply that the pilot action with stories from citizens can be memorable events that stay in the back of people's minds when discussing related events, or which may even trigger a process of institutional change.

5.2 Evaluation of May 8 pilot action

For the evaluation of the May 8 action, we handed out an ex-ante questionnaire for the students to fill in. It included very simple (mostly multiple-choice) questions about floods (see Appendix E). It was meant to give an indication of the prior knowledge of students about floods in general and floods in Itteren and Borgharen specifically. The following questions were asked:

- (1) Which of the following situations describes a river flood the best?
- (2) What is a river dike?
- (3) Have there been floods in and/or near Itteren and Borgharen?
- (4) Have you ever talked to someone about what you should do during a flood in your neighbourhood? If yes, with whom?
- (5) What would you do as a first thing if a flood occurs where you live? (open question)
- (6) Are floods dangerous?

Some interesting observations from the results of this questionnaire include that 20 students (43%) thought floods in or near Itteren and Borgharen have only occurred a long time ago, whilst there was

a flood, albeit minor, in 2011. Of those 20, 13 were from group 5/6, the younger students (out of 17 in this group, 76%). Considering their age, they might have been too young to remember anything from these 2011 events, whilst the older students might just remember something from this time. Another interesting notion is that 64% of students had not discussed with anyone what to do during a flood. This might be an indication that their parents do not consider the risk of floods high enough to be important to discuss with their children. In sum, 92% knew there have been floods a long time ago, yet many of them had never talked about what to do during a potential future flood.

During the afternoon meetings, after all questions had been asked by the students in each group, we took some time to ask all participants, including the students, senior citizens, and teachers, about their thoughts on the activities. The students of both groups indicated they had liked learning about what they should do during a flood. Considering that they had never talked about this before, this is logical. The younger students also liked that they had to come up with a question and then actually ask it; the role-playing aspect might have worked well here to stimulate this younger group. The older group was interested to hear about people helping each other during the floods; this is an important lesson they might remember if a flood ever occurs again.

The senior citizens found it wonderful to talk to the students, especially because they were listening with much attention. They also thought it is important that the students know of these events. One citizen who also joined the May 7 activities semi-jokingly argued the questions asked by the students were better than the questions asked during the discussion session of May 7.

The teachers appreciated the introductory PowerPoint lesson as a nice introduction to floods. They suggested that having a longer approach to the activity would lead to better, more interesting questions from the school students. Now, due to the two weeks of holiday prior to the activities (that took place on Monday), the students only had the morning before the actions to think of questions. We acknowledged that we had overlooked the two weeks of holiday when suggesting this event and date 2,5 weeks before May 8 (on April 18, when we were in Maastricht, we visited the school director), as this holiday is only for elementary school students.

One important thing we noticed as observers is that this kind of activity depends much on the oral skills and knowledge/experience of the storytellers, in this case the local citizens. We were fortunate that some citizens who joined were very elaborate with their stories; one citizen even brought a pair of waders to show to the students (see pictures in Section 4.2.2.). Without this vivid storytelling, the attention of the students might quickly decrease as the meeting progresses. Also, if there is no interesting story to share, the students might not learn anything relevant.

5.2.1 Student reports on activities

The reports were written by small groups of students: the students of group 5/6 handed in four reports, students of group 7/8 handed in 15 reports. We have not looked at the quality of the reports, as this is not relevant for our research concerning capacity building. Rather, we have analysed the content in search of what was remembered by most of the students. This gives an indication of what the students pick up and think is the most interesting part, and what sticks to their mind. For this, we have scanned the documents for similar phrases multiple times, and come up with key phrases that were either repeated often by various groups of students, or that we thought were

important pieces of information for the development of the students' flood risk knowledge. Of course, the information the students have received also depended on the questions they asked, but many stories were told twice by the senior citizens. Table 7 provides an overview of the key phrases identified in (multiple) reports.

Three phrases are highlighted (bolded), as they are considered as both information often repeated by the students separately and as important information for them to increase their relevant knowledge on flood risk. For instance, many people believe the water can be stopped from entering the house by using sandbags etc., whilst the entry of the water can merely be postponed, not stopped. Hence, it is more important to move precious and expensive things to safe, 'dry' places such as higher floors. It is also important for the students to know that during a flood, citizens of a village can and should help each other. This solidarity can help people avoiding both physical and psychological, emotional damage, giving each other mental support.

Table 7. Key phrases mentioned in reports and amount of hits.

Key phrases	Group 5/6	Group 7/8	Total
There was much damage due to the floods	1	11	12
Use of extraordinary vehicles for evacuation (e.g. helicopter, hovercraft, boat)	2	8	10
As a child the floods can be fun/exciting, but as adult/parent it is not (due to damages, fear of loss)	2	6	8
Village became a 'family', people were helping each other		8	8
Moving (precious) things (upwards) and living on higher floors		8	8
The water could not be stopped really, despite usage of e.g. sandbags		6	6
Measures taken to prevent future floods (e.g. dikes, sluices)		5	5
The school of the students was flooded/closed		4	4
Tip: turn on the tap during flood to get clean water in house (instead of dirty water)	3		3
Water left after 3-4 days	3		3
Water came in slowly (but steadily)		2	2
Measures taken to mitigate future damages (in-house measures)		1	1

5.3 Quality of implementation of pilot actions

Both the walk and the school meeting were well received by the participants. The setup of the walk allowed much room for improvisation in both the route and the storytelling. Thanks to the recommendations and input of local citizens and some authority representatives the walk succeeded in its goal of sharing stories of past flood experiences as well as information about how flood risk is mitigated nowadays. The school meeting was largely out of our hands, depending much on the questions of the students and the input of the senior citizens. Especially this latter input was of high quality, resulting in vivid storytelling that maintained the attention of the students throughout the meeting.

As for the discussion session on May 7, it proved to be more difficult to achieve the initial goals because the discussion after the presentations did not take off in any thought-provoking direction, even though the walk had provided a good basis for open discussions. The questions asked did not really stimulate either the presenters or other participants to start a profound discussion about the consequences of a flood that would occur at present times. The only time this happened to some extent concerned the question about how to keep people aware of the risks of living in a floodplain (such as in Itteren and Borgharen), but the answers given by presenters were fairly standard, stating that there are some national campaigns and ways for participants to provide input in the plans of authorities. We think the length of the pilot action may have played a role, as energy could have been low after three presentations. A more interactive way of sharing knowledge, such as during the walk, might have sustained a more vivid discussion.

A final thought concerning the difficulties of triggering a good discussion and of conveying the message of our actions is that we had the impression that both local citizens and the authority representatives seemed to downplay the existing flood risk in Itteren and Borgharen. The emphasis regarding flood risk was on a different region Noord-Limburg, where safety standards are currently lower. It may be logical that with the relative good safety standards of the two villages, authority representatives do not want to give the impression that risk is high, but we still think they could have been more acknowledgeable of the fact that the flood risk still exists and will likely increase due to climate change if no future measures are implemented. Also, we were expecting more emphasis on the fact that the risk nowadays is related to the dynamics of a flood rather than the frequency. These notions were among our goals for the knowledge sharing part of the pilot action. However, the notion of little material and aid being available if a flood event ever occurs again may have triggered some thoughts among citizens about how it might be useful to take precautionary measures (e.g. water pumps, protect valuable belongings, separate electricity circuits, etc.) at home.

Nevertheless, the scores for the process given by participants in the May 7 ex-post questionnaire average 2.66 (Questions 16-19 in Appendix D), implying that participants found the organisation to be done well. All participants indicated that the activities were well organized; most reported the content was moderately (48%) or completely (44%) relevant for people to learn more about flood risk, and that they could completely express their opinion (83%). From our perspective, though, we see room for improvement in triggering a more fruitful and elaborate discussion as well as in communicating more clearly the objectives of our activities (46% indicated that objectives were moderately clear, and the remaining 54% indicated that the objectives were completely clear).

6 Conclusions

The conclusions focus on the results of the evaluations, but also take into account the planning and implementation of the pilot actions, as described in Chapter 3 and 4. Table 8 provides an overview of the initial goals set for the pilot actions, the expected changes, the realized changes/goals, and enabling/disabling factors.

For both pilot actions, it turned out to be pivotal to have local citizens with much knowledge and some narrative skills joining the activities, as they steered the conversation towards interesting and thought-provoking topics (both during the walk and with the school students). Thanks to our previous CAPFLO research in the villages, we already knew some of these citizens, so we could contact and persuade them to join and actively contribute to the pilot actions. When organising similar actions, it is recommended to make sure that there are at least a couple of good and knowledgeable speakers initiating and keeping the discussion alive, which would help stimulate other people to join the discussion and contribute, as during the walk in the villages. The vividness of the stories told to the students is also regarded as an important factor influencing the interest and attention of the students on the information they receive.

The walk and discussion on May 7 resulted in knowledge creation and sharing among the participants. We believe the interactive, relatively informal setup of the pilot action has contributed to this. We think a direct meeting between citizens and authority representatives outside of formal offices can have a positive effect on the willingness to listen to each other. This is also backed up by the appreciation of the openness and transparency of the discussions. It should be noted, however, that most of our participants, both citizens and representatives, already knew each other quite well. This may have influenced the effect of the pilot action setup on knowledge sharing. In spite of many participants knowing each other, the authority representatives reported to have learned much about the impact the floods have had on citizens. This may trigger a change in how these authority representatives approach flood risk mitigation in the future by taking into account the effects that floods can have on citizens, as one representative admitted in an ex-post interview.

In spite of much advertising and efforts to attract 'young' and 'uninformed' people, we were unable to motivate this target group to participate in the May 7 pilot action. Organisers of similar events should take into account the difficulty of reaching a target group that has little interest in the subject at hand, even if it is because the target group is simply unaware of the (importance of the) subject. As for the participants, their motivation to act against flooding has not increased much due to the activities, it seems. The initial sceptical attitude about flood risk may have influenced participants' receptivity to the discussion stimuli, especially because the presenters who initiated the discussion on flood risk also seemed to downplay the local flood risk. Whether the new information that participants have heard has really emphasised the importance of acknowledging there is still a flood risk remains largely unclear.

The meeting between the young students and senior citizens was deemed successful, as the primary goal was to inform the younger students about what floods are and make them aware of the possibility of floods in their villages. Based on the reports the students wrote, we believe they have

heard enough interesting things to remember this meeting for a long time. Also, they have been given some useful tips about what to do when a flood occurs.

The choice of role-playing as type of participatory action was particularly appreciated and has helped achieving the goals of the activity with the students. The students had to play the role of journalist and came up with questions for the senior citizens. Even though this was a very simple form of role-playing, especially the younger students liked the idea, probably because it stimulated their imagination and allowed them to take an active role in the activity. Basic role-playing can be considered an effective and easily implemented Participatory Mechanism (see De Voogt & Munaretto 2016) to raise awareness and share knowledge with young students.

Finally, we would remark on the ex-post interviews with stakeholders conducted three weeks after the activities to assess long term impacts. Besides providing relevant information about the impacts of the pilot actions, this evaluation proved to be an opportunity to remind participants of the project activities and to encourage sharing their experience within their network, for those who had not done this yet. Some interviewees, in fact, although declaring they had learned something useful through the pilot actions, did not think of sharing their experience. The ex-post evaluation, therefore, may have the added value of encouraging knowledge and experience sharing.

Table 8. Breakdown of the pilot actions, specifically the goals set, the expected changes beforehand, the achieved changes or goals, and the identified enabling or disabling factors for these achievements.

Initial set goals	Expected changes	Achieved changes/goals	Enabling/disabling factors
May 7 pilot action: walk + discussion session			
<ul style="list-style-type: none"> • Walk: sharing memories of past floods • Discussion: making clear that flood risk is topical, that flood dynamics have changed 	<ul style="list-style-type: none"> • Citizens share memories • Authorities share knowledge with citizens, citizens become more aware • Citizens become more motivated to act on flood risk mitigation 	<ul style="list-style-type: none"> • Authority representatives became more aware of impact of floods on citizens • Information about flood risk mitigation was shared by authorities 	<p><i>Enabling</i></p> <ul style="list-style-type: none"> • Direct meeting, all participants equal • Open and transparent discussion • Many contributions of local citizens (stories) • Using visuals, e.g. pictures <p><i>Disabling</i></p> <ul style="list-style-type: none"> • Target group not reached • Sceptical attitude of participants towards current flood risk
May 8 pilot action: meeting students and senior citizens			
<ul style="list-style-type: none"> • Making students aware of what floods are and what they can mean for people • Making clear there is a flood risk in Borgharen 	<ul style="list-style-type: none"> • Students learn about floods, learn the specifics of what to do and what can be done during a flood • Students become aware they are in an area that is subject to flood risk 	<ul style="list-style-type: none"> • Students have acquired new knowledge about floods, particularly about local experiences with floods and how floods were dealt with 	<p><i>Enabling</i></p> <ul style="list-style-type: none"> • Vivid storytelling by senior citizens • Role-playing as active way of involving students • Using visuals, e.g. pictures <p><i>Disabling</i></p> <ul style="list-style-type: none"> • Short preparation time • Little discussion of contemporary/future flood risk

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Appendix A. Telephone interview questionnaire

Thank you for accepting our request for an interview. You have participated to an interview for the CAPFLO project last June/July. You were interviewed by Stefania Munaretto and Maartje van der Knaap. Stefania is the principal investigator of this project. I have been hired as researcher to work with Stefania on the second part of the project. Maartje completed her internship and is no longer working on the project with us.

As you may recall, the project promotes the involvement of citizens, authorities and organized groups in joint activities that improve the awareness and preparedness to flood risk. Our case study are the parishes of Itteren and Borgharen in Maastricht. We first assessed the capacity of the communities in Itteren and Borgharen for flood risk mitigation, in order to know what kind of capacity is lacking and should be addressed by these joint activities. Your interview, together with other, was used to carry out this assessment. We now would like to ask your expert opinion on the results of our assessment.

Also, as we mentioned in the email, we are planning two joint activities with the involvement of citizens and public officials in Itteren and Borgharen, to take place in April 2017. We have sent you four suggestions for the activities. We would like to know your opinion about these activities and whether you have suggestions for other activities.

In relation to these two points I have 5 questions. But, before we start, I would like to ask you if I could record the interview. Everything you say will remain confidential and used anonymously only for research purposes.

Starting with the capacity assessment...

1. What are your (first) thoughts on the capacity assessment for Itteren and Borgharen and involved authorities?
2. What do you think about the identified strengths (communication, general knowledge, finance) and weaknesses (motivation, outdated knowledge)?
 - a. Can you name any other strengths or weaknesses of the flood risk management for these parishes?
3. Is there any important/relevant aspect or detail of flood risk management for Itteren and Borgharen that we seem to have overlooked or misinterpreted?

And now about the participatory activities...

4. What do you think of the suggested activities to increase motivation and update knowledge?

5. How do you think 'social capacity' for flood mitigation could be improved in Itteren and Borgharen, or in any other local area, through participation?

Finally...

6. Would you be willing to join (one of) these participatory activities in Itteren and Borgharen in April 2017?
 - a. Would you be willing to join as a facilitator/presenter/spokesman, or only as a general participant?

Do you have any final remarks or suggestions regarding the research?

Thanks for your time. We will keep you posted on the activities we will organize.

Appendix B. Participatory planning: Four proposed participatory actions

According to the Participatory Tool, the most useful Participatory Mechanism to increase knowledge among citizens as well as to motivate people is the deliberative workshop (de Voogt & Munaretto 2017: 27). Our following suggestions for pilot actions included characteristics of workshops. We also suggested a participatory action that comprises elements of Simulations to use the potential of simulations to increase motivation. In the end, in deliberation with citizens, the selected pilot actions primarily resemble a citizen engagement initiative (the walk, with input from local citizens) and a combination of a public meeting and a workshop (discussion is stimulated during the session with presentations from authority representatives). The selection of these two actions shows that the participatory nature of the planning process reduces the influence of theory on the pilot actions. Although theoretically other actions could have been favoured, organizers have to take into account the ideas and preferences of those that will be participating in or affected by the actions.

The following sections describe the suggested actions.

Storytelling night

Main question: How did citizens of Itteren and Borgharen deal with past floods and how is this knowledge still useful if a flood had to occur now?

The action includes experience-sharing about the past floods: stories, pictures, etc. Participants would include community members and public officials with experience, as well as community members without any flood experience. The facilitator stimulates discussions about how the past experience is still relevant for facing a new flood. Key experts from public authorities join the discussions to provide new/updated insights regarding flood risk in the area of Itteren and Borgharen.

The event targets citizens from Itteren and Borgharen who actively share their own knowledge, but they are also informed about any misconceptions. Small group discussions might accompany plenary sessions to allow people to go into detail, whilst collecting general information during plenary sessions. The action relates mostly to the response phase of floods, but also discusses the preparedness and recovery stages. It can be regarded as a deliberative workshop in which all participants (including officials) share their knowledge and experiences.

As a workshop based mostly on the experience of participants, little resources are necessary to implement the action. It will take no more than a few hours. A meeting room is required, and facilitating officials. These officials should be knowledgeable about flood risk and how to communicate about risk. Some financial compensation might be necessary to get adequate officials to join the actions.

Simple flood emergency simulation

Main question: what do to in case of a flood event?

The action consists of a simplified simulation of steps to take in a flood emergency situation. A representative of a public authority could illustrate the phases of flood emergency management by means of images, model scenarios, etc., from the moment of early warnings to evacuation and response. Participants would be guided in an interactive way through the understanding of what to do during the different phases. They are asked during the different stages what they think they would need to do, and the facilitator/representative would react and correct where necessary. It is encouraged to discuss misunderstandings or disagreements between people. The facilitator also discusses what steps (only those relevant for the case study area) authorities take to mitigate the risk of local damage and loss during a flood.

The action is meant for citizens from Itteren and Borgharen and mostly focuses on information dissemination. Nevertheless, the interactivity of the action ensures there is participation by participants, and can also lead to learning among the public officials present. For instance, they may learn that people do not know much about one particular aspect of the flooding, and may find that additional action is necessary to fill this knowledge gap. As the meeting is also regarded as a simulation exercise, the action can be regarded as a public meeting with hints of the Deliberative Workshop as well as Simulation and Role-playing.

As an informative meeting, facilitators with didactic skills are required. These officials should be knowledgeable about flood risk and how to communicate about risk. They probably need some preparation time for deciding what to present. Some financial compensation might be requisite to persuade adequate officials. The meeting will take no more than a few hours. A meeting room is required.

Interactive workshop about flood safety

Main question: what are the measures taken on different levels to increase flood safety?

This is an interactive workshop to address the multiple levels of safety: not only on Rijkswaterstaat scale (dikes) but also on household scale (safety kits) and community scale (communication network). Participants will share how their organization or how their personal contribution increases flood safety. Participants can learn from each other and become better informed about possible sources of assistance during floods.

As a genuine deliberative workshop with the active involvement of actors from all levels, this action requires more human resources than the previous ones. In addition to the participation of citizens, representatives from all relevant authorities have to be persuaded to participate actively. This might require some financial compensation, although the representatives do not have to be as skilled in 'teaching' as with the previous suggested actions, as they are participating on the same level as citizens. The event takes place within a few hours. A meeting room is required.

Guided walk along the Meuse: experiencing flood levels

Main question: what level does the water reach on different locations in the case study area when a flood occurs?

This action consists of a guided walk through Itteren/Borgharen during which local people could experience the potential levels that the river water could reach in different areas. In cooperation with developers of Overstroomik.nl (+app), smartphone or tablets would be used to show with augmented reality what a flood means for the area.

The confrontation with this 'augmented' reality could give participants an idea of the serious risk involved with flooding, and could subsequently increase their motivation to be proactive. Although the knowledge sharing is mostly limited to these facts about water levels, outlining scenarios during the walk could give citizens an idea of disastrous effects of floods.

This action depends on the usefulness of the *Overstroomik* app. It has not been tested yet by the organisers, so it has to be made sure that its application can be useful in illustrating the impacts of flooding. The action also requires facilitators (preferably a combination of the developers of the app and local stakeholders) that can enliven this walk by giving examples of what could happen in terms of, for instance, loss and damage. This requires much preparation by the researchers in collaboration with the facilitators.

Appendix C. Results survey about content of pilot actions: Questions 1, 3, and 4 of questionnaire.

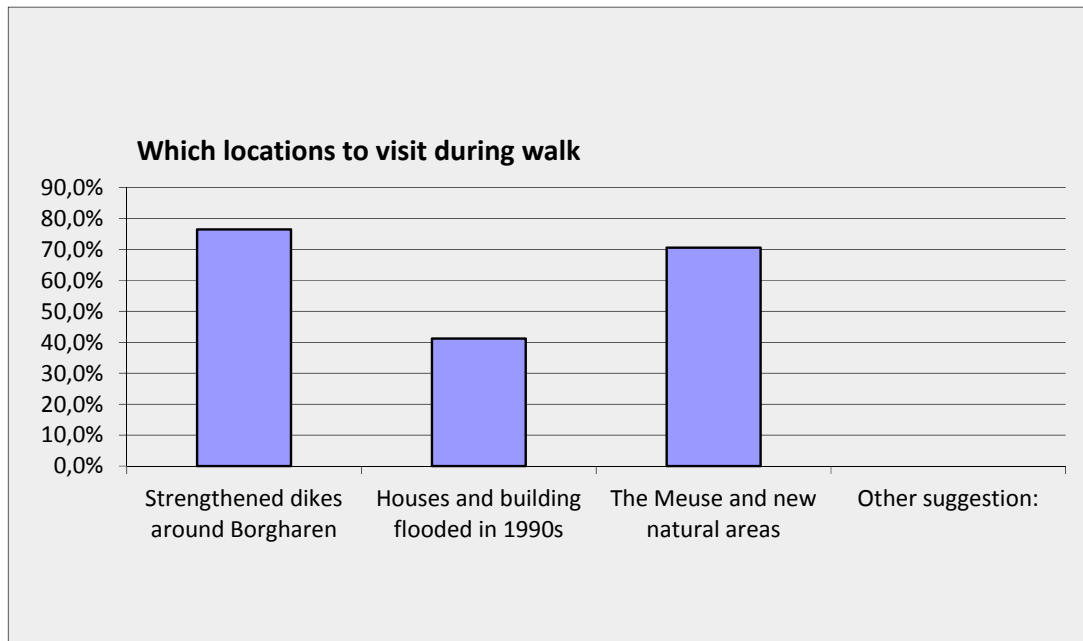


Figure 1. Question 1: which locations in and around Borgharen would you like to visit during the walk (max. 2 options)?

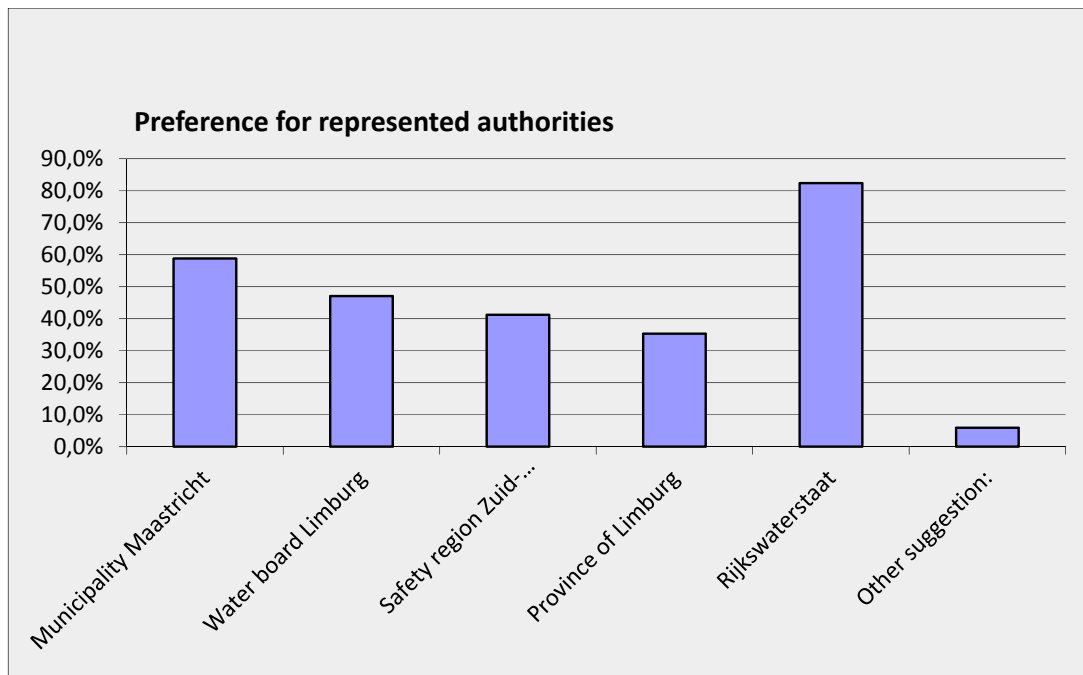


Figure 2. Question 3: which authorities would you like to see represented (max. 3 options)? Other suggestion: "Consortium Grensmaas"

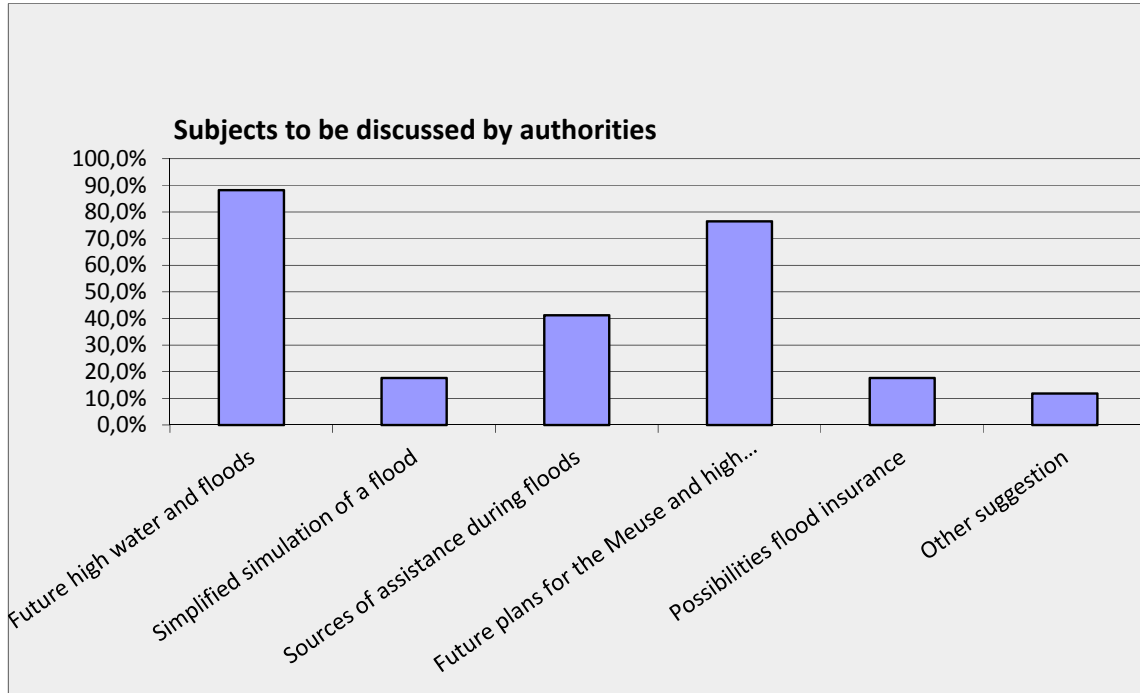


Figure 3. Question 4: which subjects should be discussed by the authorities during their presentations (max. 3 options)?
 Other suggestions: "how to flee from the high water level, in other words, will the infrastructure be adapted? By means of escape routes and/or bridges via Bosserveld and or Belgium?"; "Would the floods have happened with modern technologies (malfunctioning/outdated weir control, better estimate of incoming flood wave, computer control etc.)?".

Appendix D. Ex-post questionnaire May 7 pilot action (translated)

QUESTIONNAIRE for participants in the activities of May 7th in Borgharen

Your name (or initials) and year of birth _____

Residence (neighborhood/district if in Maastricht) _____

Which activities did you join today? Walk in Borgharen
 Discussion session about flood risk

Have you ever previously participated in a part of the CAPFLO research (e.g. interview, prior surveys, discussions)? YES, namely _____
 NO

PART I - About flood risk regardless today's activities

1. Before today, had you ever joined initiatives of citizens and/or public authorities related to flood risk protection (e.g. public events for information sharing, public debates on flood risk management plans or projects, etc.)?

0 = never 1 = rarely 2 = occasionally 3 = often

1a. If yes, are you still in contact with the citizens/authorities involved in these initiatives?

0 = never 1 = rarely 2 = occasionally 3 = often

2. Before today, have you ever taken actions to make sure you are prepared in case of a flood event?
 Yes
 No

2a. If yes, what kind of actions and when?

3. Irrespective of today's events, do you think there is an open and regular discussion between citizens and authorities about flood risk mitigation in your village/town?

*0 = not at all 1 = slightly 2 = moderately 3 = completely * Don't know*

PART II – About today’s activities

Now, take a minute to reflect on the activities you have joined today. Think of what you have heard about the past floods and the risk of future floods in your town/village. Please answer the following question accordingly.

- 4. Do you think you are more informed about flood risk in your village/town?
0 = not at all 1 = slightly 2 = moderately 3 = completely

- 5. Do you think you are more informed about how flood risk is managed (e.g. actions, infrastructures, projects, etc.) by the competent authorities in your village/town?
0 = not at all 1 = slightly 2 = moderately 3 = completely

- 6. Do you think you are more informed about how to prepare to face a flood event in your village/town?
0 = not at all 1 = slightly 2 = moderately 3 = completely

- 7. Do you think the competent authorities communicate clearly to citizens what to do in case of a flood event?
0 = not at all 1 = slightly 2 = moderately 3 = completely

- 8. To what extent would you say that today’s discussion was open and transparent?
*0 = not at all 1 = slightly 2 = moderately 3 = completely * Don’t know*

- 9. How would you rate today’s activities in terms of usefulness for your flood risk knowledge?
0 = useless 1 = not very useful 2 = quite useful 3 = very useful

- 10. After joining the activities, do you now think it is important that citizens are prepared for floods?
0 = not at all 1 = slightly 2 = moderately 3 = completely

- 11. After today’s activities, are you considering taking actions to make sure you are prepared in case of a flood event?
 - Yes
 - No

11a. If yes, what kind of actions are you considering? If no, why not?

12. In the (near) future, would you join similar initiatives of citizens and/or public authorities related to flood risk management and protection (e.g. public events for information sharing, public debates on flood risk management plans or projects, etc.)?

0 = unlikely 1 = possibly 2 = probably 3 = certainly

13. Would you consider organizing a similar event (about knowledge sharing) yourself (in collaboration with other people)?

0 = unlikely 1 = possibly 2 = probably 3 = certainly

14. Would you like more regular discussions between citizens and authorities on flood risk mitigation in your town/village?

- YES
- NO

15. Why did you participate in today's activity?

16. Were the objectives of today's activities clearly explained?

0 = not at all 1 = slightly 2 = moderately 3 = completely

17. Did you have the opportunity to state your questions and opinions?

0 = not at all 1 = slightly 2 = moderately 3 = completely

18. Do you think the content of today's activities has been relevant for helping citizens to prepare to flood risk in your town/region?

0 = not at all 1 = slightly 2 = moderately 3 = completely

19. Was the activity well organized?

0 = not at all 1 = slightly 2 = moderately 3 = completely

20. What are your general thoughts/suggestions about the organization of today's activities? (what did you learn, any suggestions/feedback, what could have been done better, etc.)

Would you like to be informed about the results of our research project?

If yes, please share with us your email address and/or your phone number. Your data is confidential and will be only used for communication about the project. Your data will be treated with confidentiality and the results of the research elaborated anonymously.

Name: _____

Email: _____

Phone n.: _____



Results will also be available on our website www.capflo.net

Stay tuned!

Appendix E. Ex-ante questionnaire May 8 pilot action (in Dutch)

Vragenlijst over overstromingen voor leerlingen van groep 5/6 en 7/8

Beantwoord de volgende vragen zonder te overleggen met iemand anders!

In welke groep zit jij?

- Groep 5/6
- Groep 7/8

1. Welke van de volgende situaties beschrijft een rivieroverstroming het beste?
 - a. Als het water van de rivier de andere kant op gaat stromen
 - b. Als het water van de rivier door de straten van jouw dorp stroomt
 - c. Als de hoogte van het water in de rivier afneemt

2. Wat is een rivierdijk?
 - a. Een verhoging van de grond die het water van de rivier tegenhoudt
 - b. Een persoon die de hoogte van het water in de gaten houdt
 - c. Een speciaal type boot om over smalle rivieren te varen

3. Zijn er overstromingen geweest in en/of rondom Itteren en Borgharen?
 - a. Ja, lang geleden
 - b. Ja, in de afgelopen jaren
 - c. Zowel antwoord A als B is correct
 - d. Nee

4. Heb je ooit met iemand gepraat over wat je zou moeten doen als er een overstroming is waar jij woont? Zo ja, met wie?
 - a. Ja, met _____
 - b. Nee

5. Wat zou jij als eerste doen als er een overstroming is waar jij woont?

6. Zijn overstromingen gevaarlijk?
 - a. Ja, altijd
 - b. Nee, nooit
 - c. Soms

Appendix F. Ex-post impact evaluation interview questions

1. What have you learned from the activities? Or: what aspect of the activities has stuck with you the most?
2. What aspect of the activities did you appreciate the most?
3. What could have been done differently? Do you have any suggestions?
4. After the activities had ended, you indicated that you were really interested in the stories and experiences of the citizens. Are you thinking of acting on this? (**only for those people that mentioned this**)
E.g. acquiring knowledge from these experiences that can be used by your organization, or organizing activities around these experiences/stories?
5. Do you or does your organization have any further plans for similar participatory activities?