Exploring narratives surrounding flooding: Effects and perceived causes of the 2014 Somerset Levels and Moors floods

Author: Lotte E. A. Hoeijmakers
Date: 14-06-2018
DECLARATION

This work has not previously been accepted in substance for any degree and is not concurrently submitted in candidature for any degree.

Signed .......................................................... (candidate) Date ..........14-06-2018..........

STATEMENT 1

This dissertation is being submitted in partial fulfillment of the requirements for the degree of ..MSc......................... (insert MA, MSc, MBA, MScD, LLM etc, as appropriate)

Signed .......................................................... (candidate) Date ..........14-06-2018..........

STATEMENT 2

This dissertation is the result of my own independent work/investigation, except where otherwise stated. Other sources are acknowledged by footnotes giving explicit references. A Bibliography is appended.

Signed .......................................................... (candidate) Date ..........14-06-2018..........

STATEMENT 3 – TO BE COMPLETED WHERE THE SECOND COPY OF THE DISSERTATION IS SUBMITTED IN AN APPROVED ELECTRONIC FORMAT

I confirm that the electronic copy is identical to the bound copy of the dissertation

Signed .......................................................... (candidate) Date ..........14-06-2018..........

STATEMENT 4

I hereby give consent for my dissertation, if accepted, to be available for photocopying and for inter-library loan, and for the title and summary to be made available to outside organisations.

Signed .......................................................... (candidate) Date ..........14-06-2018..........

STATEMENT 5 - BAR ON ACCESS APPROVED

I hereby give consent for my dissertation, if accepted, to be available for photocopying and for inter-library loans after expiry of a bar on access approved by the Graduate Development Committee.

Signed .......................................................... (candidate) Date ..........14-06-2018.............
Disclaimer: During the process of writing this dissertation, the author has done her utmost best to reflect the participants’ narratives, opinions and nuances as accurately as possible. The author fully recognises that the experiences the participants, residents of the Levels, and employees of the Environment Agency went through were emotional and distressing, and none of the comments made are aimed to disregard this in any way, shape or form.
Acknowledgements

First and foremost, a big thank you to my supervisors: Dr. Thomas Smith and Dr. Mark Wiering for their support, enthusiasm and belief in my project. Thank you for pulling me through when I didn’t believe in it and thank you for remaining critical through my enthusiasm. Also, a big thank you to Dr. Andrew Williams for being the best tutor I could have wished for. Thank you for all the help and listening to me over the last year.

To my parents, for their everlasting support through this two-year programme, all of my past endeavours, and all of my future antics to come. Thank you for all of the help and advice through these hectic times and thank you for being there for me. I love you.

To all my amazing friends and peers, for being there and accompanying me on this crazy journey. Thank you for listening to me when I needed advice, or when I needed someone to talk to. Thank you for all the fun times when I just needed to forget about everything for a minute. We may not always be in close proximity to each other, but all of you have a piece of my heart. Also, a big thank you to all the wonderful people at CUTri, for providing me with an outlet and distraction when I needed it, and for putting up with my complaints and enthusiasm through this whole ordeal, you’re all amazing creatures.

And last but certainly not least: A big thank you to the lovely inhabitants of the Somerset Levels and surrounding areas for being so kind to invite me into their homes and tell me about their experiences. As well as all other people I have interviewed or whom have taken the survey, for opening up to me about such a profound and often personal event in their lives. Thank you for allowing me to listen to your stories.
Table of Contents

Acknowledgements ........................................................................................................................................... 4

Abstract .......................................................................................................................................................... 8

1 Introduction .................................................................................................................................................. 9
  1.1 Research aims .......................................................................................................................................... 11
    1.1.1 Research questions ......................................................................................................................... 11
    1.1.2 Research design ............................................................................................................................... 12

2 Existing literature and theoretical framework ......................................................................................... 14
  2.1 Existing literature ..................................................................................................................................... 14
    2.1.1 Environmental hazards, flooding and climate change ........................................................................ 14
    2.1.2 Attitudes towards climate change .................................................................................................... 16
    2.1.3 Effects, responses and responsibility ............................................................................................... 17
  2.2 Theoretical framework ........................................................................................................................... 21

3 The Somerset Levels and Moors ................................................................................................................ 24
  3.1 Geography and physique ....................................................................................................................... 24
  3.2 Institutional structure ............................................................................................................................... 25
  3.3 The 2013-2014 Somerset floods: facts and figures ............................................................................... 27

4 Methodology and research framework .................................................................................................... 29
  4.1 Research strategy and conceptual framework ......................................................................................... 29
    4.1.1 Triangulation ..................................................................................................................................... 30
  4.2 Research methods ...................................................................................................................................... 31
    4.2.1 Qualitative methods .......................................................................................................................... 31
    4.2.2 Mixed methods: Online questionnaire ............................................................................................... 34
  4.3 Limitations, problems and positionality ................................................................................................... 34
  4.4 Ethical considerations ............................................................................................................................. 35

5 Analysis and results ..................................................................................................................................... 37
  5.1 Those affected, those flooded, and experts ............................................................................................ 37
    5.1.1 Those affected vs. those flooded ........................................................................................................ 37
5.1.2 The expert – local spectrum ................................................................. 39

5.2 Causes of the 2014 flooding on the Levels .................................................. 40

5.3 Effects of the 2014 flooding on the Levels ..................................................... 45

5.3.1 Effects on those flooded ................................................................................. 46

5.3.2 Effects on those not flooded ........................................................................... 50

5.4 Discrepancies and misconceptions ................................................................... 51

5.4.1 Blame and polarisation ..................................................................................... 52

5.4.2 “The d-word”: Dredging .................................................................................. 55

5.4.3 ‘Fake news’, the media, and communication ..................................................... 55

6 Conclusions and recommendations .................................................................... 58

6.1 Different attitudes towards flooding and responsibility ........................................ 58

6.2 Main findings .................................................................................................... 59

6.3 Reflections ........................................................................................................ 60

7 References ......................................................................................................... 62

Appendices .......................................................................................................... 66

Appendix A: Ethical Approval Form ....................................................................... 67

Appendix B: Overview of interviewees ................................................................. 73

Appendix C: Interview guide Experts ..................................................................... 74

Appendix D: Interview guide Residents ................................................................. 76

Appendix E: Online questionnaire .......................................................................... 78

Appendix F: Photos used in photo elicitation ........................................................ 82

Interview A ........................................................................................................... 82

Interview F, G, H .................................................................................................. 84

Appendix G: Routes mobile interviews .................................................................. 88

Interview C ........................................................................................................... 88

Interview D ........................................................................................................... 88
List of Figures

Figure 1: Satellite image of the flooded Somerset levels in 2014. Source: (NASA 2014) .......................... 10
Figure 2: Map of Somerset County within England. Source: Wikipedia 2018a ................................. 13
Figure 3: Human-environment interactions in relation to hazards. Source: Burton et al. 1978, as adapted by Smith 2013 ................................................................................................................................. 15
Figure 4: Resistance and resilience measures in flooding situations. Source: Dhonau et al. 2016 ...... 19
Figure 5: Framework of flood policy evolution. Source: Johnson et al. 2005 ................................. 20
Figure 6: Scale of causes. Source: Author ......................................................................................... 22
Figure 7: Scale of responsibility. Source: Author .............................................................................. 22
Figure 8: Theoretical framework describing the relationship between causes and responsibility. Source: Author ................................................................................................................................. 23
Figure 9: The Somerset Levels and Moors. Source: Wikipedia 2018b .............................................. 25
Figure 10: Institutional structure of Councils and authorities in this study. Source: Author .......... 26
Figure 11: Area covered by the SDBC. Source: SDBC 2018 ............................................................ 27
Figure 12: Updated theoretical framework describing different types of responses. Source: Author 58

List of Tables

Table 1: Major categories of environmental hazards. Source: Smith 2013 ........................................... 14
Table 2: Research questions and methods .......................................................................................... 31
Table 3: Methodological aims and methods ...................................................................................... 31

List of Diagrams

Diagram 1: Number of respondents affected. Source: Author .......................................................... 38
Diagram 2: Causes of the 2014 flooding according to questionnaire respondents. Source: Author... 42
Diagram 3: Main cause for the 2014 flooding according to all respondents. Source: Author .......... 44
Diagram 4: Noted effects of flooding. Source: Author ...................................................................... 45

List of Abbreviations

IPCC Intergovernmental Panel for Climate Change
EA Environment Agency
DEFRA Department for Environment, Food & Rural Affairs
SDBC Somerset Drainage Boards Consortium
FLAG Flooding on the Levels Action Group
Abstract

In the winter of 2013-2014, the United Kingdom was affected by several floods across England and Wales. This research study explores the narratives from both experts and locals concerning the causes and effects of the 2014 flooding on the Somerset Levels and Moors. Through in-depth interviews (N=10) and an online questionnaire (N=21) the study aims to describe the effects on the individuals in the community, as well as the perceived causes by community members, local experts, and scientific experts. Lastly, the research attempts to dissect the discrepancies and polarisation between the Environment Agency and the residents. The 2014 flooding has had a big impact on the mental health of both residents and Environment Agency staff. The floods also effected the financial situation of many residents. Generally, it also strengthened the community bond. The Environment Agency concludes that the flood was caused by severe extended rainfall over a long period of time. Most residents often believe the flooding was due to the lack of maintenance, but do also largely recognise that severe weather patterns did play a role.
1 Introduction

The scientific consensus around climate change, especially the human contribution to this is widespread. Changes in extreme weather and climate events have been observed over the last decade, and different facets of it are likely or very likely to increase (IPCC 2013).

According to the Intergovernmental Panel for Climate Change (IPCC):

“it is extremely likely that human influence has been the dominant cause of the observed warming since the mid-20th century.”

- IPCC 2013, p.17

One of the most notable results of climate change is more frequent and more extreme weather patterns. This includes more, and more intense periods of rainfall. Combining this with a rise in sea level, can possibly create the ‘perfect storm’ in low-lying areas: flooding.

In a country like the Netherlands, flooding is a big part of the national historical narrative (Giebels 1995). Having gone through a traumatic flood event in 1953 with over 1800 casualties, the Dutch national discourse surrounding flood prevention has been intensively government funded. However, the United Kingdom does not have such a strong national story surrounding flooding. Flooding that occurs in the UK is generally brief, and only in small areas (Wheater 2006), making it less of a national issue, and more of a regional one.

One British county that gained international fame when it flooded in 2014 is Somerset. The Somerset region is well-known for its issues with flooding over the recent past. The last flood, in early 2014, was the ‘largest flood event ever known’ (Environment Agency 2015), when the river Parrett and the river Tone spilled over their banks (see Figure 1) (NASA 2014).

Large parts of the Somerset Levels and Moors -as the flooded area is officially called- were inaccessible for months due to the flood waters -that at its peak reached a height of almost 2 meters- and around 40 inhabitants were evacuated from their houses for a longer period of time (BBC News 2014).

Over the weeks that the Somerset Levels and Moors were flooded in 2014, regional, national and international media extensively covered the areas hardships, attracting politicians from all over the country who went to show their support to the residents, such as Nigel Farage and prime minister David Cameron (Smith et al. 2017).
In this study, firstly a research question is proposed to lead the research, followed by a summary of existing literature and a concluding theoretical framework. In the following chapter, the characteristics of Somerset and the flooding will be discussed, followed by a description of the used methods. Next, the gathered data has been analysed and the first research sub-questions have been answered. Lastly, the conclusion draws together the main findings and theoretical framework, ending with some reflections on the research project.

The research project focusses around the opinion of inhabitants is towards these floods, and -more specifically- what their opinions is about why they happened. There can be many different reasons for flooding, but what do the inhabitants of the area describe as reason? And do they mention climate change?

When talking about causes, the effects should not be neglected. What are the impacts and effects it has had on those flooded and the authorities involved? And do those ideas differ between those who were flooded, and those who were involved professionally?

A lot of academic research has been done concerning flooding and local’s perceptions. However, the literature concerning the experience of flooding, the presumed reasons behind it and the actions residents take is ambiguous, inconclusive and in some cases opposing in nature. For this reason, this research aims to further study, and contribute to the academic knowledge on the perceived reasons...
behind flooding as experienced by individuals who have experienced them or have been affected or involved in other ways.

1.1 Research aims

The aim of this research is to get a deeper understanding of how flooding is experienced by people whom have been personally affected by them, and how they look back on them over time. The research project will focus on the perceived origins of flooding on multiple scale levels, and eventually attempt to define whether or not people at the ‘ground-level’ link flooding to environmental changes such as climate change. Next to this, the research will also look into the perceived effects that the flooding has had on those affected. Lastly, this research aims to look into a possible discrepancy between the perceived origins of flooding by those affected and experts, as described by other authors (e.g. Tapsell and Tunstall 2008; Demeritt and Nobert 2014; Walker-Springett et al. 2017).

In this research project, the author will be conducting an in-depth study of the possible causes and effects of flooding as perceived by individuals which have been affected by one or more major floods. By focussing on both ‘locals’ and experts, this research study aims to discover if there is a discrepancy between these two actors (as described by other authors), and if yes, where these discrepancies exist and what their origin is.

By investigating the different perspectives within the study, the research project aims have a significant societal impact by providing better awareness of these differences, ultimately hoping to provide a better mutual understanding between all parties involved.

1.1.1 Research questions

The overarching research question for this research is:

**What are the causes of the 2014 flooding on the Somerset Levels and Moors and the effects on flooded communities as perceived by those affected and involved?**

To be able to answer the main research question, the research focusses on the following sub-questions:
1. What has caused the flooding according to the government and people living on the Somerset Levels?
   a. Did those who had their property flooded take precautionary measures? And if so, what kind?
   b. What do people living on the Somerset Levels and Moors mention as reasons behind flooding?
   c. What do the EA and the Councils perceive as the reason(s) behind the flooding in 2014?
   d. Do experts and those affected observe a link between climate change and flooding, and why?

2. What effect has the flooding had on the daily life of people affected by the 2014 Somerset Levels and Moors floods?
   a. How has the flooding impacted the way they think about their environment?
   b. Do those who had their property flooded think the floods have affected them? How and why?
   c. How do the experts think the flooding has influenced those affected by the 2014 Somerset Levels floods?

3. Are there discrepancies or misconceptions between the government’s statements, and the locals’ perception?
   a. Are there differences between the observed causes and effects by experts and those flooded? If yes, what are they?
   b. What do the EA and the Councils assume the origin(s) of flooding are according to those flooded? And vice versa?
   c. What do the EA and the Councils assume the effect(s) of the flooding on those who had their property flooded is? And vice versa?

1.1.2 Research design
This research will be a case study of a community. In this case, a group of individuals who live in an area that has been affected by major flooding: the Somerset Levels and Moors. These individuals will be questioned about their ideas of the reasons and origins of the floods and how these have impacted their daily lives.

Next to those whom have experienced the flooding first hand, experts – those who were in a position of authority during the flood - will be asked similar questions.
Looking at different types of case studies, this case is most similar to a unique case, in which a case is chosen because of its uniqueness (Bryman, 2008). The uniqueness in this instance would be the perception of the inhabitants towards the specific case of their town. These issues can range from the big housing development plans on floodplains to (human-induced) climate change. Next to that, the case also has elements of an exemplifying case, which attempts to capture everyday circumstances and situations (Bryman 2008), because the research also aims to answer how ‘locals’ view the issue of flooding on different levels.

In this research, a mixed methods approach was used, integrating both qualitative and quantitative methods, to aim to provide a comprehensive analysis of the data and observations.

1.1.2.1 Case study selection

As mentioned before, this research study will be a case study of a community. The research project will focus on perceived causes and effects of major flooding. Therefore, in order to conduct the research, a community in an area that had experienced major flooding in the past needed to be found. Preferably, this region would have an accessible community as well as accessible experts and policy makers.

One of the most well-known regions in the United Kingdom that have been affected by major flooding in the past, is Somerset. Somerset (see Figure 2), and more specifically the Somerset Levels and Moors have been subject to major flooding twice over the last decade, most recently, in early 2014 (FLAG 2016). The community that will be studied for this research is therefore the people living in the Somerset region. More specifically, those whom have personally been affected by major flooding in the area. More details on the area will be given in chapter 3.
2 Existing literature and theoretical framework

This chapter will attempt to display the existing academic literature surrounding the wider themes in this research project: hazards, flooding, effects and perceptions. Using this overview, a theoretical framework will be developed which will further guide the research in order to answer the research questions previously proposed.

2.1 Existing literature

This section focusses on the existing academic literature concerning the broader subject of hazards, flooding, perceptions, and effects. Firstly, the general theme of environmental hazards, flooding and climate change will be explained. Next, attitudes towards both flooding and climate change will be addressed. Lastly, the literature review will investigate the different academic articles that describe the effects, responses, and responsibilities towards flooding and flood-risk.

2.1.1 Environmental hazards, flooding and climate change

As much as us humans like to control our environment, there will always be things that are beyond our control. We have yet to find a way to fully control Mother Nature, and until then we will have to find a way to manage the environmental hazards and risks that come with living on planet Earth. Environmental hazards can be both man-made, like airplane accidents, and natural, like earthquakes for example. Therefore environmental hazards and disasters can generally be split up into two groups: natural hazards and technological hazards, as displayed in Table 1 (Smith 2013). Natural hazards are by default caused by natural processes and phenomena, technological hazards on the other hand are mostly caused by human errors (Smith 2013; Doorn 2015).

Table 1: Major categories of environmental hazards. Source: Smith 2013

<table>
<thead>
<tr>
<th>Natural hazards (extreme geophysical and biological events)</th>
<th>Technological hazards (major accidents)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geologic – earthquakes, volcanic eruptions, landslides, avalanches</td>
<td>Transport accidents – air accidents, train crashes, ship wrecks</td>
</tr>
<tr>
<td>Atmospheric – tropical cyclones, tornadoes, hail, ice and snow</td>
<td>Industrial failures – explosions and fires, releases of toxic or radioactive materials</td>
</tr>
<tr>
<td>Hydrologic – river floods, coastal floods, drought</td>
<td>Unsafe public buildings and facilities – structural collapse, fire</td>
</tr>
<tr>
<td>Biologic – epidemic diseases, wildfires</td>
<td>Hazardous materials – storage, transport, misuse of materials</td>
</tr>
</tbody>
</table>

However, because of our increasing presence and impact on the landscape and environment around us, natural hazards may be impacted or even caused by human activity. As Smith (2013) notes:
“(…) although all ‘natural hazards’ are triggered by physical forces, certain events and their outcomes may be influenced by human actions, whether deliberate or unintended.”

- Smith 2013, p.5

This causes the previously ‘hard’ distinction between natural and technological hazards to become more fluid, creating room for terms such as ‘quasi-natural hazards’, ‘socio-natural hazards’ and ‘natural-technological hazards’ (Smith 2013; Doorn 2015).

Because of this increasingly complicated relationship between humans, the environment, and hazards and disasters, it becomes more and more difficult to find the source of the problem. In a lot of cases these origins are even a combination of both natural and anthropomorphic causes (Smith 2013). This increasingly intertwined relation between human and natural factors, and environmental hazards is displayed in Figure 3.

![Figure 3: Human-environment interactions in relation to hazards. Source: Burton et al. 1978, as adapted by Smith 2013](image)

Figure 3 explains that under normal circumstances, natural events and human use systems feed into environmental resources. However, when there are technological failures or extreme natural events, they can create environmental hazards. These hazards in turn provoke a human response, which feed back into the human use system and the natural events system (Burton et al. 1978; Smith 2013).
It also explains the important influence of global change on both types of hazards. Unfortunately, climate change is putting more and more pressure on global change, which in turn influences both natural events and human use. One of these environmental hazards that will probably increase in frequency is flooding (Alexander et al. 2016; NASEM 2018).

Within the current scenarios for climate change, the risk of flooding will also increase in the United Kingdom. The sea level rise and increased precipitation will heighten the possibility of coastal, fluvial and surface water flooding in the UK. Currently, it is estimated that one out of every six residential and commercial properties are at risk of some form of flooding. And according to worst case projections, the number of people at risk of flooding could more than double by 2080 (Alexander et al. 2016).

Rivers in the UK are small compared to global standards, and floods therefore tend to be smaller-scale events. They are nevertheless devastating to affected communities. In urban areas, development projects can have major a impact on flooding. Creating impermeable surfaces causes water to bypass the natural storage capacity of the soil, drastically increasing flood peaks into the local drainage systems. In rural areas, the main reason for flooding is prolonged rainfall in winter. In these cases the soils are wet and runoff from storms is readily generated, again creating flood peaks into the drainage system (Wheater 2006).

### 2.1.2 Attitudes towards climate change

With climate change being related to flooding (Alexander et al. 2016; NASEM 2018), it is important to look at the different attitudes people have towards climate change. With the increasing importance of climate change, ‘sustainability’ and ‘sustainable development’ are becoming more and more prominent concepts.

Both ‘sustainability’ and ‘sustainable development’ are concepts that have been around for quite a while, and both are often used interchangeably. However, in general, users of either one of these concepts have different narratives and intentions (Robinson 2004). In his article, Robinson (2004) argues that environmentalists that use the concept ‘sustainability’ often intend a ‘value change’, wanting to change lifestyles and individual values as well as wanting to preserve nature (from a romantic viewpoint). On the other hand, people that use the term ‘sustainable development’ are often inclined to look for a ‘technical fix’, wanting to conserve nature (from a utilitarian perspective) and thinking the solution to the environmental problem can be found in technology (Robinson 2004).

These ideas seem to have an overlap with the idea of natural and technological hazards as described by Burton et al. (1978) and Smith (2013). Both the framework by Robinson (2004) and Burton et al.
(1978) mention a natural dimension and a technological dimension. As well as for the natural and technological hazards, these two narratives are at the two ends of a spectrum and most environmentalists’ responses lie somewhere among the spectrum. However, it is important to note that the framework by Burton et al. (1978) is still mostly based on facts, while the framework by Robinson (2004) is based on perceptions and attitudes.

But attitudes towards climate change also depend on a lot of different variables: they are culturally driven, socially organised, and politically oriented. All of these factors tend to be localised and personalised constructions (Lo and Jim 2015). Opposition towards the idea of anthropogenic climate change and environmentalism may come from opposing beliefs, uncertainty around the phenomenon, or threatening of social identity. In the midst of all this, self-affirmation may help reduce the defensiveness of opposing climate change (Fielding et al. 2014).

There are multiple reasons and methods through which people change their attitudes, beliefs and behaviours towards climate change (Fielding et al. 2014). Changing these attitudes dramatically often occurs during or after major events:

“dramatic events may simultaneously attack personal beliefs as well as social relations. Rather than being changed by the force of argument, attitudes are changed by the force of circumstance”

- Hernes 2012, p.12

Looking specifically at flood victims, people that live in flood-prone areas often downplay their potential risk. They often fail to respond to public awareness campaigns and as a result, do not take recommended steps to reduce risk of property damage, injury or even death (Demeritt and Nobert 2014).

2.1.3 Effects, responses and responsibility

Responses towards flooding happen on two scale levels: the individual or community level, and a policy-driven governmental level.

2.1.3.1 Responses and responsibility on individual and community level

Research shows that people who have experienced floods have a heightened awareness of flood-risk (Spence et al. 2011). However, people whom have experienced an extreme weather event or flooding do not show a significant change of attitude towards climate change (Spence et al. 2011; Konisky et al. 2016). Even though respondents were more aware of flood-risk and felt that they were able to have
an impact on climate change, participants showed little intent to change their behaviour (Spence et al. 2011).

On the contrary, research by Rudman et al. (2013) suggests that a direct experience with extreme weather could increase pro-environmentalism. In a comparative study on the effect of hurricane Sandy and hurricane Irene on attitudes towards green politicians, showed that hurricane Sandy changed the communities’ attitude towards these politicians. However, there was no noticeable effect of hurricane Irene towards pro-environmental attitudes. The researchers believe that the large difference in media coverage between Sandy -which got a lot of attention- while hurricane Irene only got minor coverage in the media, may have been a contributing factor to this difference (Rudman et al. 2013).

The experience of flooding can have both positive and negative effects on communities affected by them. Floods can create a stronger sense of community, creating a group of ‘insiders’ that have all gone through the same experience. On the flip side, this also creates a group of ‘outsiders’ containing for example relatives, friends, or neighbours (Tapsell and Tunstall 2008; Walker-Springett et al. 2017). These ‘outsiders’ often fail to fully understand the impact flooding has had on the group of ‘insiders’, creating a “community of the flooded” (Tapsell and Tunstall 2008, p.135).

Research conducted on the amount and value of property and valuables saved during flooding concluded that the level of insurance does not seem to affect the efforts of those flooded to save their property and valuables. The research by Parker et al. (2007) shows that people with new-for-old insurance were just as likely to take action and be just as successful at it as people without insurance. Next to this, the study found that the number of people in a household also increases the value of property that is saved from the flood waters (Parker et al. 2007).

In order to prepare for flooding and make properties more resilient, homeowners can take a number of resistance measures to prevent floodwater coming in. When bigger floods occur, flood water might still enter the property. This may even be desirable, as keeping large amounts of water out of the house may cause the building to collapse (Environment Agency 2018b). Different resistance and resilience measures to minimise flood damage can be found in Figure 4.
However, it needs to be noted that behaviour in response to flooding and damage savings made are complex in nature. Therefore the variety in individual responses remains largely unexplained (Parker et al. 2007).

Flooding can also have a major impact on the physical and mental well-being of the people affected. Experiencing flood, and the subsequent damage to people’s property and personal possessions can have serious effects on both the inhabitant’s health, feeling of security and sense of self-identity and place identity (Tapsell and Tunstall 2008).

A study conducted on the health impacts of the 2013-2014 floods in Somerset found that a majority of the participants noted mental health and wellbeing effects, both at community and individual level, regardless of having their property flooded. A few participants also mentioned physical health consequences, but linked those to the stress and anxiety caused by being flooded (Walker-Springett et al. 2017).

The research also found that individuals who were not flooded continuously endured feelings of stress and anxiety during the event, related to not knowing if they were going to be flooded eventually. Those that did get flooded -along with the beforementioned stress factors- were also impacted by the stress of ‘secondary’ factors, such as recovery activities and communicating with insurance companies (Walker-Springett et al. 2017).
2.1.3.2 Responses and responsibility on policy and governance level

Flood-risk management deals with a lot of factors that are not necessarily policy-based. As can be derived from Figure 5, there are a number of areas that interact in different ways with one another. In the framework developed by Johnson et al. (2005), they identify contextual factors, behavioural factors, the problem domain, and the policy domain. Often, issues in flood management policy are raised after a severe flooding event (Johnson et al. 2005). However, it is not sure that raising these issues will change anything for the better in flood policy, especially if the flood event is only experienced on a local scale. If there is a flood event that is experienced on a national scale, a window of opportunity may open, which can catalyse policy change, which can affect technology, knowledge, political context, and even values, beliefs and norms (Johnson et al. 2005; Donaldson et al. 2013). Flooding remains a difficult issue to solve through environmental policy, as it is always experienced locally, while the issue itself plays on a global scale (Donaldson et al. 2013).

Another hurdle is the opposing approaches towards spatial planning on the one hand, and water planning on the other hand. Where water management is highly technocratic and focussed on singular issues, spatial planning is participatory, to some degree political, and focussed on responding to a
multitude of objectives and constraints (Wiering et al. 2015). In addition, the financial resilience system for flooding in England can be considered contradictory as well. As Wiering et al. (2015) note:

“Responsibility for purchasing cover and having individual resilience is at the household level; however, the viability of the market is maintained through the spreading of the burden spatially and ultimately therefore resilience is achieved through the collective capacity of policyholders.”

- Wiering et al. 2015, p.48

A high level of trust in the government is often associated with a low level of individual preparedness, as well as a lower level of perceived flood risk. However, in some English cases, the distrust in the agencies managing flood-risk resulted in feelings of distrust, powerlessness and even fatalism (Demeritt and Nobert 2014). Therefore, fast action and good communication are vital to preserve the community’s trust (Tapsell and Tunstall 2008; Demeritt and Nobert 2014).

The research by Tapsell and Tunstall (2008) also uncovered a large discrepancy between the origins of the flooding as perceived by respondents as opposed to the Environment Agency:

“Respondents largely attributed the flooding to someone opening nearby flood gates. Other factors suggested were new building in the floodplain and lack of river dredging. Explanations given by the Environment Agency on the cause of the flood as being the truly exceptional severity of the rainfall were rejected by the majority of the respondents”

- Tapsell and Tunstall 2008, p.148

Flood warnings are one of the prominent tools used to inform inhabitants for oncoming flood-risk. Interestingly enough, such flood warnings are particularly important to people whom have no previous experience with flooding. Once people have significant experience with flooding -with their property being flooded four or more times- receiving a flood warning seems to have little effect on the value of property saved from damage due to flood (Parker et al. 2007). Parker et al. (2007) note:

“Ironically, therefore, warnings are less likely to be received by those who would benefit most from them: those without prior experience of flood waters in their homes”

- Parker et al. 2007, p.206

2.2 Theoretical framework

Looking into the theory surrounding environmental hazards, we have seen that there are two general types of hazards: natural hazards and technological hazards. However, as noted before, because of
the increasing impact of humans on their environment, the line between the two is fading, creating room for quasi-natural hazards (Smith 2013; Doorn 2015). The realm of environmental hazards could therefore be imagined as a scale rather than two boxes: with the one extreme being natural hazards, the other extreme being technological hazards, and a variety of quasi-natural hazards or natural-technological hazards in between (see Figure 6).

From the literature, we can derive that flooding -especially in the developed world- is a quasi-natural hazard, rather than a natural hazard (Smith 2013; Doorn 2015). The origins of flooding therefore, lie somewhere along the scale between natural and technological hazards. Along this scale, policy makers, experts and those affected can pinpoint different origins of flooding, creating a better understanding of the individual differences of both respondents and origins.

Next to the natural – technological scale, another spectrum can be identified: the governmental – individual scale (see Figure 7). In preventing hazards or reducing damage, those affected by them attribute responsibility differently. One may think that the government or a governmental body is responsible for protecting individuals. When talking about floods, this results in protection through flood-protection schemes and other flood-risk management tools (Demeritt and Nobert 2014). Another individual may think that they themselves are solely responsible for minimizing damage done by hazards, or in this case floods. This can be done through the use of sandbags and adapting their property to minimize damage by floodwaters (e.g. heighten power sockets, ‘tanking’ the walls) (Dhonau et al. 2016).

Just like the natural-technological scale, this distinction is a scale. People who live in a flood-prone area usually rely on governmental protection, even though they may have their own measures in place. In low-lying areas such as the Somerset Levels, the water is actively being pumped out of the
area. This type of intervention needs to happen on a larger scale than just an individual one. However, the dependence on these governmental measures may vary, which will be visualised through the scale.

The two scales that are displayed in Figure 6 and Figure 7, combine into a theoretical framework that will help to determine the attitudes that both experts and locals have towards the origins and responsibility for the floods. This theoretical framework is displayed in Figure 8.

![Theoretical framework describing the relationship between causes and responsibility. Source: Author](image)

The theoretical framework in Figure 8 will provide a guideline to answering parts of research question 1 -on the perceived causes- and 3 -on potential discrepancies between experts and inhabitants.

When looking into the effects that the flooding may have on those living in affected communities, the literature provides a number of different elements that could potentially be impacted:

- Mental health, or mental state (Tapsell and Tunstall 2008; Walker-Springett et al. 2017)
- The affected community (Tapsell and Tunstall 2008; Walker-Springett et al. 2017)
- The households’ finances (Parker et al. 2007; Wiering et al. 2015)
- Property and personal belongings (Parker et al. 2007)

These factors have been taken into consideration when elaborating on the details of the methodology in chapter 4, as well as analysing the data, and answering research question 2, on the effects of the flooding.
3 The Somerset Levels and Moors

As the Somerset Levels and Moors are such a unique case within the different examples of flooding in the United Kingdom, it is important to elaborate on the characteristics of the place and the community.

The region of Somerset is located in the South West of England (see Error! Reference source not found.), neighbouring the city of Bristol, as well as Gloucestershire, Wiltshire, Dorset and Devon. The county’s town seat can be found in Taunton. The area is mainly flat, thinly populated and predominantly agricultural (Wikipedia 2018). The Levels have an elaborate history going back to the prehistoric ages, with several settlements on the higher grounds in the area. Later on, the Romans used the area for sea salt extraction, while the Saxons incorporated parts of the moors into their estates. One of the other notable moments in the Levels’ rich history is the Battle of Sedgemoor, that was fought near Westonzoyland, a town in the middle of the Somerset Levels and Moors (Wikipedia 2018).

3.1 Geography and physique

The Somerset Levels and Moors -most often called the Somerset Levels, or the Levels- is a low-lying basin in the north and centre of Somerset County. It consists of a submerged and reclaimed landscape, laying only slightly above mean sea level (Wikipedia 2018). The Levels lay between the Quantock Hills and the Mendip Hills, with the Polden Hills and several other higher -previously island- areas sticking out from the otherwise flat profile (see Figure 9). There are several rivers flowing through the Levels: the Tone, Isle, Yeo, Brue and Parrett all feed into the Bristol Channel (Williams 1970).

The first drainage of the area dates back to the early 1200s, with monasteries being responsible for most of the work. Most drainage in the area was done through rhynes (the local name for drainage ditches and channels). Currently, the Levels are drained through the rhynes, rivers, and the King’s Sedgemoor Drain -an artificially built channel. A number of pumping stations in the area now pump water from the rhynes into the rivers and drains (Wikipedia 2018).
The Bristol Channel is known for its extreme tidal differences, and the Somerset coast is no different. With mean high water springs of over +6 meters and mean low water springs of -3 meters, the tidal differences are large to say the least. Luckily, these tides do not pose a large threat to the Somerset coast because of their temporary nature. But they do pose a threat to the inland areas due to the tide moving up the river Parrett. Because the tide moves up the river twice a day, it cannot effectively get rid of the silt. This leads to a build-up of silt in the Parrett. This in turn results in the river not being able effectively accommodate for freshwater floods running down (Williams 1970).

3.2 Institutional structure

The institutional structure of governmental actors within England and the United Kingdom in general, can be confusing. Figure 10 illustrates the relationship between the actors and agencies involved. The agencies with a blue outline are specifically concerned with the environment or water management. The agencies and actors with a black outline are governmental actors and councils.
On a governmental level, the department concerned with the management of the environment is the Department for Environment, Food and Rural Affairs (DEFRA). Within this department, there are three agencies responsible for environmental and flood policy: the Scottish Environment Protection Agency (on Scottish territory), the Northern Ireland Environment Agency (in Northern Ireland) and the Environment Agency (responsible for both English and Welsh territory).

The Environment Agency (EA) has over twenty offices all over the country. The office concerned with the Somerset Levels and Moors is located in Bridgwater, on the edge of the Somerset Levels (Environment Agency 2018a). The Environment Agency is in charge of managing a wide variety of environmental issues and topics, including flood risk policies and strategies.

On a smaller water management scale, the drainage boards are responsible for managing water levels for “the protection of people, property and the environment” (SDBC 2018). To manage the operations and affairs of the two existing drainage boards in Somerset, the Somerset Drainage Boards Consortium (SDBC) was formed in 2005, to replace smaller consortia arrangements in the area. The SDBC consists of two drainage boards: the Axe Brue Internal Drainage Board and the Parrett Internal Drainage Board (SDBC 2018). These areas do not follow county or district borders, but follow the catchment area of the respective rivers they are named after (see Figure 11) (ADA 2017).
On a smaller institutional scale, Somerset County is divided into five district councils, of which Sedgemoor District Council is the body concerned with the Somerset Levels and Moors. Within the Sedgemoor District Council there are a number of parish councils, two of which mainly encompass the Levels: the Othery Parish Council and Westonzoyland Parish Council.

It has to be noted that the Somerset County Council and all the other lower-ranking councils have very little influence on the policies created by DEFRA and the Environment Agency. Although there is space for some bottom-up feedback from the councils, the councillors—especially those on parish level—usually act as spokespeople for the inhabitants, rather than policy makers.

### 3.3 The 2013–2014 Somerset floods: facts and figures

Between December 2013 and March 2014, the United Kingdom endured a number of long and highly unusual winter storms that caused prolonged periods of flooding all over England and Wales. The Environment Agency estimates that the economic damages caused in that period are around £1 300 million. Most of this damage occurred in England, and the greatest proportion of damage was felt by residential property holders, with an estimated £320 million over 10 465 properties (Environment Agency 2016).
During that time, the existing flood defences protected around 1.4 million properties and over 25 000 hectares of agricultural land across England and Wales. In comparison to that, an estimated amount of 10 465 properties and 45 000 hectares of agricultural land were flooded in that time. In Somerset, this comes down to 3 500 protected properties and 20 000 hectares of dry agricultural land (Environment Agency 2016).

Unfortunately, not all land could be protected. Over the three-month period between 1 December 2013 and the end of February 2014, the EA issued 155 severe flood warnings, implying danger to life.

“The flood warnings issued by the Environment Agency will have allowed the emergency services (such as police and fire crews) to prepare for and assist with evacuations. These evacuations will have helped to prevent further knock-on effects, such as the need for rescues. RMAs [Risk Management Authorities] assisted with the implementation of several temporary flood defences which helped to prevent flooding of thousands of properties.”

- Environment Agency 2016, p.38

On the Somerset Levels, one of the main actions taken was the pumping of floodwaters. At the peak of the flooding, over 100 pumps were used to remove floodwater from the Levels and Moors, which included 18 pumps from the Netherlands. Pumps were removing 1.5 million tonnes of floodwater from the Levels per day in early February. Next to that, the EA also deployed over 150 000 sandbags and constructed earth bunds to protect more than 20 properties in the area (Environment Agency 2016).

The Devon and Somerset Fire and Rescue Services recorded 870 employees being deployed to the Somerset floods, assisted by 87 personnel from other fire and rescue services. The fire and rescue services noted a total of 4 985 hours as being deployed on the levels (Environment Agency 2016).

Access to the area was also severely disrupted. In Somerset the A631 -the road going through Burrowbridge- was closed of 12 weeks, as well as some rural areas being affected by routes in and out of the villages being closed off. As a result of this, some villages became cut off, and others faced detours. The inhabitants of Limington, Somerset faced an initial detour of 17 miles, followed by being cut off completely for 36 hours. For a number of weeks, accessing Yeovilton, Somerset was only possible by crossing an airfield by escorted vehicle (Gurner et al. 2014).
4 Methodology and research framework

This chapter will describe the strategy and methods used to answer the following research questions:

1. What has caused the flooding according to the government and people living on the Somerset Levels?
2. What effect has the flooding had on the daily life of people affected by the 2014 Somerset Levels and Moors floods?
3. Are there discrepancies or misconceptions between the government’s statements, and the locals’ perception?

The following sections will attempt to explain the research strategy, the different aspects of the chosen methods and provide a methodological framework. Next to this, it will outline the chosen case study, as well as limitations and positionality, concluding with ethical considerations that are required for this research.

4.1 Research strategy and conceptual framework

The relationship between theory and findings can be described through deductive and inductive approaches. This study is focussed around both of these approaches. In the deductive approach, the literature research results in a hypothesis, to which the findings are measured. While in an inductive study, theory is the outcome of the research conducted (Bryman 2012; Babbie 2013). Part of this research structure is deductive, as a literature study has been conducted and a theoretical framework will help structure part of the findings. However, this research is also largely led by its observations and findings which in turn hope to deduce a theory. This research project is therefore a mixture of both deductive and inductive research.

Epistemological considerations “concern the question of what is (or should be) regarded as acceptable knowledge in a discipline.” (Bryman 2012, p.27) This research study lies between critical realism and interpretivism. In a critical realism approach, in the researcher recognises that her or his conceptualisation of reality is “simply a way of knowing that reality” and acknowledges that context is important (Bryman 2012, p.27). The findings are therefore not necessarily generally applicable. Interpretivism focusses on the understanding that social action is subjective, and that any deduced causal explanation or conclusion has to be referenced to social action rather than external forces (Bryman 2012). While this study does reference external forces such as major flooding, it also focusses on the social construct and narrative surrounding it, making the research project both critical realist and interpretivist.
Lastly, ontology describes the perspective of the nature of social reality (King and Horrocks 2010). While objectivism (or realism) subscribes to the idea that social phenomena and their meanings happen independently from social actors, constructionists (or relativists) believe that the world is more complex and unstructured (King and Horrocks 2010; Bryman 2012). Constructionists believe that “our understandings and experiences are relative to our specific cultural and social frames of reference, being open to a range interpretations.” (King and Horrocks 2010, p.9) This research takes a more constructionist approach, as it acknowledges the background of different individuals, and the author believes that participants’ responses are based upon their social narrative, culture and community. This constructionist approach can also be found in the methodology, with a focus on the use of qualitative methods.

4.1.1 Triangulation

The triangulation of methods is believed to be a way to better understand the phenomenon and leads to achieving the research objectives in a better way (Kumar 2014). Triangulation within this research will be achieved through the use of mixed methods, more specifically through the use of the following methods:

- Photo elicitation
- Semi-structured interviews
- Mobile interviews
- Online questionnaire

The methodology of this research is mostly qualitative, but also has quantitative aspects. The qualitative part of this research consists of conducting semi-structured interviews, and on occasion combining those with photo elicitation and mobile interviews. By conducting an online survey, the research study also incorporates quantitative measurements in its methodology, as well as gaining some more qualitative insights. Table 2 displays an overview of the research questions that are proposed above and how these relate to the research methods.
4.2 Research methods

During this research, a variety of methods will be used in order to answer the research questions. As mentioned above, using a multitude of methods; combining qualitative and quantitative methods provides a more complete picture of the research study. However, using different methods within this research will also make it easier to reach participants, as described in the methodological aims in Table 3.

Table 3: Methodological aims and methods

<table>
<thead>
<tr>
<th>Methodological aims</th>
<th>Method(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provide a visual framework and/or incentive</td>
<td>Photo elicitation, Mobile interviews</td>
</tr>
<tr>
<td>Collect a large amount of (qualitative) easily accessible data</td>
<td>Online questionnaire</td>
</tr>
<tr>
<td>Detailed knowledge and opinions on the matter</td>
<td>Photo elicitation, Semi-structured interviews, Mobile interviews</td>
</tr>
</tbody>
</table>

The following sections will describe both the qualitative and the mixed methods approach used in this research project in more detail.

4.2.1 Qualitative methods

4.2.1.1 Semi-structured in-depth interviews

When interviewing different participants within the research project, a semi-structured interview design has been used. A semi-structured interview is an interview in which there is a list of specific questions or topics to be discussed, but interviewees have fairly large freedom in how to respond (Bryman 2008). The structure has characteristics of both unstructured interviews as well as structured
interviews. The design is structured in the way that most of the interview is pre-determined, both in structure as in content, both solidified in the interview guides (see Appendix C; Appendix D). However, additional questions were asked, where these seemed relevant to the researcher, as well as the interviewee being asked open-ended questions.

The benefit of the structured side of these interviews is that they provide uniform information that is easier to compare. While the unstructured side of the interviews allows for more in-depth research on certain topics (Kumar 2014).

4.2.1.2 Photo elicitation

To provide a more visual framework and try to engage participants more into the research, photo elicitation was used during semi-structured interviews with locals and local representatives (see Appendix F). Photo elicitation is based on “the simple idea of inserting a photograph into a research interview” (Harper 2002, p.13).

Images can evoke deeper elements of the consciousness, because the visual part of the brain developed before the verbal part did (Harper 2002). Comparative research found that the use of photo elicitation sharpened the memory of the participants and reduced misunderstandings (Harper 2002). Harper notes he considers “photo elicitation useful in studies that are empirical and rather conventional: photo elicitation may add validity and reliability to a word-based survey” (p. 22).

Photo elicitation is a well-known method in social sciences. It is widely used in research concerning the experience of food (e.g. Lachal et al. 2012; Justesen et al. 2014), research among children and young people (e.g. Leonard and McKnight 2015; Pickering 2015), and research within underprivileged communities (e.g. Barrington et al. 2017). However, the method is relatively unknown in the field of spatial planning or environmental studies.

The use of photographic images in research can evoke three dimensions of experience: information, effect and reflection (Mountian et al. 2011). This aspect is especially important in this research study. As this research focuses on all of these aspects: firstly, the participants will pass on information through the pictures. Secondly, through these images and the questions asked, the participant will show how these situations have affected them and others. Lastly, because the flooding happened a while ago, the images will provide a reflective framework for the respondents.

The use of photo elicitation can also engage people into the research that would step forward when doing semi-structured interviews (Kong et al. 2015). However, some researchers have also encountered wariness when asked to participate, mostly in work-related research as well as concerns involving anonymity and power-relations (Mountian et al. 2011). For this particular research project,
these concerns are covered under the ethical approval, which have also been solidified in the consent forms that are signed by both participant and researcher.

4.2.1.3 Mobile interviews

Going different places and having a change of scenery can be very beneficial for social research. As eloquently put by Murray (2009, p.23): “When we interview participants in their homes, the discussion will reflect participants’ view and emotionality associated with their home.” Parts of this research have aimed to cater to this change of environment, interviewing participants while on the move through their ‘home’ area.

Because the area that had been flooded is quite big – and not all interviewees are able to walk bigger distances – parts of the interviews have been conducted while riding in a car (see Appendix G). In this setting, the interviewee is driving the interviewer through the landscape, while talking about the different impacts the flooding has had on the landscape, as well as its impact on the inhabitants of the area.

As Murray (2009, p.22) mentions, mobile research is not about “finding ‘truth’ but about investigating placed narratives”. This rationale follows the used ontology for this research, looking into narratives rather than explicit ‘truths’.

4.2.1.4 Sampling methods

As the interviews have been conducted with experts, expert and judgemental sampling has provided respondents for these interviews. When using judgemental sampling, the author selects respondents whom she finds most relevant and seem to have the required information. In expert sampling, the respondents are known experts (Kumar 2014). Kumar (2014, p.244) notes that these types of sampling are “extremely useful when you want to construct a historical reality, describe a phenomenon or develop something about which only a little is known”, as is the case in this research project.

In conducting the photo elicitation, snowball sampling has been used to find respondents for this research project. Respondents were reached through the network of other participants. This sampling method is useful if the researcher knows little about the studied population, and it may be difficult to frame that population (Bryman 2012; Kumar 2014), which is the case in this research.

In finding participants for the mobile interviews, a combination of snowball sampling, judgemental sampling and accidental sampling has been applied. The participants were initially selected through snowball and judgemental sampling, as they were primarily selected for a semi-structured interview. However, some participants were in possession of a car, and were willing and able to drive around their neighbourhood, making the sampling method partially accidental as well.
4.2.2 Mixed methods: Online questionnaire

An online questionnaire has been used within this study as an additional source of both qualitative and quantitative data. Online surveys can be a quick and easy solution to gathering both qualitative and quantitative data quickly, as well as reaching large groups of people (Bryman 2012). Next to this, it can also reach participants who would otherwise be uncomfortable or unwilling to participate (Marshall and Rossman 2016). Next to this, online questionnaires are usually completed with less unanswered questions, leading to less missing data (Bryman 2012).

Questionnaires can include both closed and open-ended questions. Open-ended questions can provide in-depth information, if formulated correctly. They also provide a lot of freedom for the respondents and take away a lot of interviewer-bias. However, when respondents aren’t able to express themselves, information may be lost (Kumar 2014).

On the other hand, the use of closed questions often limits the depth and variety of the information gathered, as well as being more prone to interviewer-bias. However, ‘ready-made’ answers and categories make the analysis of data easier, as well as it being easier to fill in (Kumar 2014).

Because of the advantages and disadvantages for both types of questions, the online questionnaire used in this research study consists of both closed and open-ended questions. Through using both types, the research aims to collect as much information as possible, trying to maintain the balance between a possible interviewer-bias and providing a survey that is as accessible as possible to fill in. The questions asked in the survey can be found in Appendix E.

4.2.2.1 Sampling method

While conducting the online questionnaire, both convenience sampling and snowball sampling have been used to reach respondents. A convenience sample is -as the name implies- a sampling method that is mostly convenient for the researcher (Bryman 2012; Kumar 2014), which in this case is easy accessibility. Some respondents may have also been accessed through snowball sampling, in which case respondents are reached through the network of previous respondents (Bryman 2012).

4.3 Limitations, problems and positionality

Because the sample size for the interviews is small (N=10 for interviews, N=21 for online questionnaire), the sample cannot be considered representative of the community as a whole. Rather, it represents the opinions, experiences and narratives of individuals. Next to that, other factors such as political preference, age, gender or educational level cannot effectively be accounted for. This may have affected the quality of the research outcome. Furthermore, in-depth interviews -and qualitative
research in general—always involves unique individuals and can therefore provide different outcomes as opposed to a large scale quantitative research.

Another limitation is the internet-based approach of the online survey. There can be a number of issues concerning the reliability of online research: access to internet can be highly variable within a community; it is difficult to probe respondents; and only a limited amount of the research questions can be answered through internet-based research, whereas interviews can provide a wider framework to answer questions (Bryman 2012).

Looking into flood-related research shows that this area has been extensively researched over the last couple of years. This may result in a ‘research-tired’ attitude in both locals and experts, which will make it harder to conduct research and find suitable and willing participants, creating a larger chance for a non-response error (Bryman 2012).

Because of the use of snowball sampling and other non-probability sampling methods, it is hard to have a representative group of respondents for a multitude of reasons. Most prominently, because participants are acquaintances, and people tend to surround themselves with people with similar views and beliefs (Kumar 2014). The research project has attempted to account for this by approaching different organisations through which to start the sampling process. However, a fully representative sample is impossible to ensure on this scale.

As a researcher one always tries to not influence the research with a personal opinion, however some sort of bias or subjectivity can never be completely eliminated. Growing up in a country that is not the UK might possibly affect the researchers’ positionality, as well as the researchers’ educational background in sustainability, sustainable development and the environment.

Lastly, not being a native speaker of the language might cause a barrier between the researcher and the interviewee. Although the researcher is fluent in English, the many different accents that one can find all around the UK can sometimes prove to be hard to adapt to in the beginning. This issue has been resolved by recording (and occasionally videotaping) the interviews, so the data can be analysed after the interviews, if there are any uncertainties.

4.4 Ethical considerations

This research involved the direct interaction with a variety of residents from the area affected by the 2014 Somerset floods, as well as experts and semi-experts from neighbouring areas, and therefore ethical considerations are required to ensure integrity. The ethical considerations will follow the Cardiff University guidelines, and the ethical considerations form has been filled out before the start
of the data collection (see Appendix A). When interacting with participants, an informed consent statement has been created and distributed among all participants. Through the form, voluntary participation in this research will be ensured, and participants will be ensured the option to withdraw at any point during the research. Data will be and remain anonymised and privacy of participants will be of paramount importance. Personal details will not be used in the research without explicit consent of the participants. It has become apparent to the author that the community is very small and therefore anonymisation of data might be more difficult than in larger sample groups. The author has done her utmost best to keep descriptions of participants as vague as possible, without losing valuable context to the research.

Physical and mental well-being of participants will be of utmost importance and everything will be done to ensure the well-being of participants. The author acknowledges that the experiences interviewees went through can be considered emotional and even traumatic. Bringing up these sensitive topics during the interviews has been done with utmost care, mental health was only briefly addressed directly, and participants have been told that they do not have to share anything they do not feel comfortable with.

The work of other authors has been acknowledged and referenced using the Harvard referencing system, to the researchers’ best intentions and capacity. Through the research the highest level of objectivity in discussions, analyses and any other parts of the research will be maintained.
5 Analysis and results

This chapter aims to draw together the data collected through the different interviews and the conducted online survey. The questions in both methods have been stated differently but do pursue to contribute to answering the same research questions. During data collection, different types of questions were asked, and qualitative and quantitative data were combined. Therefore, the data provides a bigger picture of individual narratives, as well as providing for triangulation.

This chapter uses a distinct differentiation between ‘interviewees’ and ‘respondents’. In this chapter, ‘interviewees’ are considered to be participants whom have been a part of an interview within this research study. A ‘respondent’ on the other hand, is an individual that has filled in the online questionnaire, that was also part of this project. Within this research, there are 10 interviewees, spread across 8 interviews. As well as 21 respondents whom participated in the online survey.

The first section of this chapter will provide a line out of different terminology that arose during the research: looking into the differences between people who had been affected and those who had their homes flooded, as well as the different scales on which participants could be considered experts. The sections after this will follow the themes and concepts that are used in the research questions of this study, these being the causes, effects and discrepancies that have been uncovered in this research.

5.1 Those affected, those flooded, and experts

The research questions talk about several groups of people involved in the flooding, and therefore being involved in the research study. During this study, it became apparent that these groups needed to be defined further. The following sections go deeper into the different groups of people involved in this research study.

5.1.1 Those affected vs. those flooded

While conducting the research it became evident that not only those whose property had flooded were badly affected. This is might be an obvious point to make, but it is important for the context of the research to distinguish a difference between those who had their property flooded and those who were affected in other ways.

Out of the 21 respondents of the online questionnaire, 9 people (43%) that their property or belongings had been affected, while 8 respondents (38%) note that they had been affected in other ways (see Diagram 1). These other ways include disrupted and significantly longer commutes (4...
respondents) as well as homes being cut off or even inaccessible despite fact that they weren’t flooded.

Diagram 1: Number of respondents affected. Source: Author

One respondent notes working as an engineer for the Environment Agency, whom also notes a significant impact. This can also be derived from the interview conducted with people working at the Environment Agency. One of the interviewees mentions a significant impact on employees of the EA at the time of the floods:

“I’m sure they didn’t like coming in for a shift, picking up the phone to be verbally abused. For 8 hours. And then go home and come back again, and come in for the next shift, pick up the phone and be verbally abused by the same person.”

– Interviewee B1, Expert, Bridgwater, 23 April 2018

One of the inhabitants that had been flooded himself also observed the impact on the employees at the Environment Agency.

“It affected him [Interviewee B1, EA expert], because he was off sick ill afterwards because of all the hassle. And he was one of the managers at the Agency. So it affected a lot of people.”

– Interviewee F, inhabitant, Moorland, 9 May 2018

The effects on inhabitants of the flooded area whom did not have their property flooded should be noted as well. One respondent notes not being able to return home for three months, despite not
having his property flooded. Others note commuting distances drastically increasing with one respondent noting:

“a normal 2 mile journey to work in Long Sutton became a 14 mile one”

— Respondent #21, 3 May 2018

Of course, the impacts on the people who had their property flooded for an extended period of time, have been affected by the floods in very significant ways as well, as will be discussed extensively in the following sections. But this does not mean that the impact on those not flooded should be overlooked or dismissed. The literature also addressed that those who were not flooded reported stress and anxiety during the event, because of the constant worry of becoming flooded (Walker-Springett et al. 2017). On top of that, those not flooded may have had their friendships affected, as the flooding could have caused misunderstandings between parties that were and were not flooded (Tapsell and Tunstall 2008; Walker-Springett et al. 2017).

5.1.2 The expert – local spectrum

During the research it also became evident that the group of previously determined experts was not as specialised as was hoped. The group of experts therefore effectively narrowed down to employees of the Environment Agency. Next to that, people who fulfilled positions in both the Sedgemoor District Council as well as the Westonzoyland Parish Council were interviewed. Because of the small, rural, and often communal nature of the area, these ‘executive’ community members whom have lived within the Somerset Levels for many years, have expert knowledge of their surroundings and know many people that have been affected in some way or the other. One interviewee took on a mediating role as both district councillor and police civil servant, mediating between affected inhabitants and executive bodies and agencies.

“I’m not really an expert, but I’m trying to sound like one. (...) We all turned into hydraulic engineers at the pub”

— Interviewee C, local councillor, Westonzoyland, 23 April 2018

Because of this rather informal level of expertise within the local community and the singular expertise that is coming from the Environment Agency, it is difficult to deduce triangulated data from the predefined experts. For practical reasons within answering the research questions it is therefore easier to consider both the local experts as well as the professionals at the EA as ‘experts’ in comparing their opinions to the ones from others affected.
It needs to be noted however, that the people working at the Environment Agency are the only experts interviewed with scientific knowledge about the issue. The local experts interviewed - as mentioned before - have a thorough understanding of their local environment, which is also acknowledged by the EA:

“There is no question about it, is that they are very, very well informed of what’s going on in a 3 km circumference of where they live. They’re experts. No question about that. But you spread it out a little bit, and then they see that there’s a lack of clarity - a lack of understanding.”

– Interviewee B1, expert, Bridgwater, 23 April 2018

However, the attitude from the EA employees remains sceptical, as they also note that the local experts’ knowledge does not spread far from their home, which implies that they might not be able to see the bigger context of the flooding. As well as their scientific background in the field being limited, as they are not trained in the field of hydrology or managing flood-risk. Their focus expertise for this research study is therefore considered to be with their in-depth knowledge of the community and their often mediating position during and after the 2014 flooding.

Within this research, 2 scientific experts have been interviewed that work at the Environment Agency, one of which was also in an executive position during the flooding in 2014. Additionally, one of the participants that has been interviewed as a resident of a flooded property was also an employee of the Environment Agency at the time. Lastly, there is one respondent in the questionnaire that identified himself as an employee of the EA. Next to this, two people have been interviewed with the specific intent of getting to know their expert local knowledge as parish and district councillors during the time of the floods.

5.2 Causes of the 2014 flooding on the Levels

One of the primary focus points of this research is the perceived causes of the floods, as described in research question 1: What has caused the flooding according to the government and people living on the Somerset Levels? This section aims to dissect and answer this question. One of the first elements to look at when studying the causes of the floods on the Somerset Levels is the Environment Agency. As previously determined, they are the only party in this research study that have a scientific background as to why the Levels and Moors flooded in early 2014. According to the experts interviewed at the Environment Agency, there’s really only one cause: consistent rain over a long period of time.
“It rained a lot. We’d had one dry day. From 18th of December to beginning of March. (...) it was the spread of the rain. You know, we’ve had the 5th wettest March [this year] on record. Didn’t flood anybody. That’s because we had: Rain. Period of dry. Rain. Period of dry. Rain. And that’s the luxury that we didn’t have in 13-14. We had rain every day. And for us, it’s fundamental.”

– Interviewee B1, expert, Bridgwater, 23 April 2018

An article by Wheater (2006) notes that in rural areas flooding often happens in winter, as the soil becomes wet and saturated with water, creating a readily generated runoff of rainwater. The consistent and intense amount of rain being the cause of the flooding is also reflected in the report written by the Environment Agency (2016).

When asked to list all the causes of the 2014 flooding, most respondents to the questionnaire mentioned poor maintenance (76%) as one of the causes, closely followed by severe weather (71%) (see Diagram 2). Poor maintenance, especially dredging -or the lack thereof- have been a major factor in the debate between the Environment Agency and the locals (which will be further discussed in chapter 5.4). It is therefore not surprising that it comes out as one of the top causes in the questionnaire.

“And the big hobby horse was the dredging at the time.”

– Interviewee C, local councillor, Westonzoyland, 23 April 2018

The emphasis on dredging within this area, and within the debate on causes of the flooding is rather large. This topic which will be addressed further in chapter 5.4.2. Dredging is also the main focus of the main action group within the area: The Flooding on the Levels Action Group (FLAG). FLAG was and is one of the major platforms of volunteers in the area, as well as pushing the residents’ interests after the floods. It has to be noted, that respondents for the online questionnaire were gathered through a Facebook page which was run by FLAG. This may have caused a bias within the results. However, it was also mentioned by almost all interviewees during this study as something that was considered a cause by either themselves or other people within the community.
As mentioned before, the Environment Agency considers the severe weather to be the main culprit of the 2014 flooding on the Somerset Levels and Moors. This opinion is shared by most of the respondents of the questionnaire, with 15 respondents listing it as one of the causes. However, during the interviews, not all interviewees were sold on this idea. Some noted that it had rained a lot this year, but the Somerset Levels had not flooded. Some attributed this to the improved measures in place by the EA, others attributed it to the failure of the EA to stop the flooding in 2014.

“But we’ve had 3 years now of, you know, this year we did get a lot of rain. And it didn’t come our way. And it’s just a really gradual building up people’s confidence.”

– Interviewee A, inhabitant, Moorland, 20 April 2018

A cause that is closely related to poor maintenance, is bad river defences. With 48% of respondents listing this as one of the causes, it is the third biggest cause listed in the questionnaire. This might be related to comments of a small number of respondents and interviewees mentioning a reservoir that had been released, because it was about to breach, therefore flooding Moorland and the Somerset Levels even more.

“I don’t know. I’ve heard both sides of the story. Some people swear it was true, they knew the guy that was on duty that night that opened the flood gates to relieve the pressure. The Environment Agency have sworn blind, put their hand on a bible and said: ‘No, it never happened.’ But the water did suddenly surge forward. It must’ve come from somewhere. Where? Who knows.”

– Interviewee E, inhabitant, Moorland, 9 May 2018
Some residents seem to distrust the Environment Agency in their claims, with some residents also feeling like information has been withheld from them. More of these misunderstandings and discrepancies between the experts’ statements and the residents’ perceptions will be addressed in chapter 5.4. This is also reflected in other literature on previous flooding in other parts of England, with the analogy between the two situations being incredibly accurate. In a 2008 article, Tapsell and Tunstall wrote:

“Respondents largely attributed the flooding to someone opening nearby flood gates. (...) Explanations given by the Environment Agency on the cause of the flood as being the truly exceptional severity of the rainfall were rejected by the majority of the respondents”

– Tapsell and Tunstall 2008, p.148

A surprisingly high number of respondents defined other causes within the previously set causes in the survey. However, there is not a singular answer that can be derived from this. Some respondents mention a redirection of funds, others mention new housing projects on the floodplains in Bridgwater. Two respondents note that the lack of trees and other foliation further up in the catchment area which in their opinion increased the flow of water from higher and more upstream areas. A cause that was also mentioned by one of the interviewees.

Only 7 out of 21 respondents note that the characteristics of the landscape on the Somerset Levels are to blame for the flooding. Employees at the Environment Agency are quite clear in their opinion that the landscape characteristics of the area, being a moor and being drained constantly are a major contributor to as to why the water ended up in the Levels and stayed there for the amount of time that it did. One respondent to the questionnaire noted:

“This area is named after the “summer people” because it could only be inhabited in the summer.”

– Respondent #4, 18 April 2018

When asked what the primary reason for the flooding was and being asked to pick one of the previously mentioned causes, over half of the respondents’ noted the poor maintenance as the main cause of the flooding (see Diagram 3). Only a quarter of respondents agree with the statements from the Environment Agency noting that severe weather would have been the main cause of the flooding in 2014.
Again, a small number of respondents also noted other factors causing the flooding, respectively noting the amount of rainfall, poor management of upstream catchment and lack of funding as the main causes for the 2014 flooding on the Levels and Moors. The amount of rainfall in this sense can be seen as synonymous with severe weather, which is also the reason given by the official report of the Environment Agency (Environment Agency 2016), as well as expert interviewees. Poor maintenance seems to be a consistent factor in perceived reasons by locals in England, as this also came up as the main culprit in a study by Tapsell and Tunstall (2008).

With only 4 respondents noting climate change as one of the reasons behind the flooding, and none of the respondents seeing it as the main cause of the flooding, there seems to be no perceived connection between climate change and flooding by the respondents. This corresponds with findings by Spence et al. (2011) and Konisky et al. (2016), who found that even though extreme weather events -like flooding- increases the awareness of flood-risk perception, it does not significantly change their attitude towards climate change. This may also be due to the fact that flooding is experienced locally, and climate change is a global issue, as argued by Lo and Jim (2015). However, several interviewees did mention climate change as a contributing factor, although being uncertain whether this could be proven or not.

“I think one of the things that we’re seeing – I think it’s climate change. But I’m not sure that we’ll ever be able to prove that in my lifetime. It will be done by back analysis, 50 years hence, somebody will say: ‘Oh yes, it was- we could see the signs.’”

– Interviewee H2, inhabitant, Moorland, 9 May 2018
5.3 Effects of the 2014 flooding on the Levels

This section aims to clarify the effects the flooding has had on those flooded, affected and involved, as well as provide an answer to the second sub-question: What effect has the flooding had on the daily life of people affected by the 2014 Somerset Levels and Moors floods? As mentioned in the literature review in chapter 2, there are already quite a lot of known effects of flooding. These include a major impact on physical and mental well-being (Tapsell and Tunstall 2008; Walker-Springett et al. 2017), as well as their health, feeling of security, self-identity and place identity (Tapsell and Tunstall 2008). On top of which the sense of community can also be strengthened or weakened, depending on the circumstances (Tapsell and Tunstall 2008; Walker-Springett et al. 2017). Within both the interviews and the questionnaire, these factors were specifically addressed. In the questionnaire, people were asked to rate whether they agreed or disagreed with certain statements. The statements and the level of agreement can be found in Diagram 4. To assess the general opinion, the Likert scale has been used to quantify the respondent’s answers from strongly disagree (1) to strongly agree (5). Respondents could also choose to neither agree nor disagree if they felt impartial or ambiguous towards the statement.

Diagram 4: Noted effects of flooding. Source: Author

The 2014 flooding affected (me) ...

As a whole sample group, all respondents of the questionnaire disagreed or strongly disagreed with the statement that the flooding had had no effect on them. All but one respondent (95%) found it had
had a profound effect on the community as a whole. Other factors have a wider distribution and will be addressed in the following sections.

5.3.1 Effects on those flooded

The group that comes to mind first when researching the effects of flooding is the group of people whom had their property flooded. 6 out of the 10 people interviewed during this research study had their property flooded for extended periods of time.

“But we were out of the cottage for 14 months because it was the drying period that took the time. And it all had to be re-plastered and everything.”

– Interviewee F, inhabitant, Moorland, 9 May 2018

For many properties, the evacuation seems to be rather unforeseen and quick. Many interviewees mention seeing the water coming for weeks, but never thinking that they would be evacuated. This has had an immense mental impact on the inhabitants.

“(…) when we left, we’d had a month of watching the water come. And, so the gentleman across the road actually described it as water torture ‘cause you could see it coming.”

– Interviewee A, inhabitant, Moorland, 20 April 2018

A lot of interviewees also mention that they have seen a lot of people struggle with these mental issues around them, some until the day of today. Some interviewees mention people whom do not want to speak about the flooding anymore, or just wanting to move on with their lives. Others have not spoken about the effect the flood waters have had on them ever since they happened. One interviewee mentions a difference between women and men in the ability to speak about the issue.

“I’m not being sexist when I think I say that it affects women more than men. Because I think women are the home-makers in the sense, aren’t they? Historically, let’s say. It annoys me when people say: ‘Oh, my wife didn’t work, she stayed at home and brought the children up.’ She didn’t work? What did she do bringing the children up? What’s bringing children up? That’s work, isn’t it? When I think back of the different people who were affected. It seems to be that the wives were affected more than the men. But then is it us being: ‘Oh, I’ve got to be- we’re men, we’re’ -like that psychology?”

– Interviewee F, inhabitant, Moorland, 9 May 2018

Results from the questionnaire give a more diverse image of the mental impact of the flooding. 63% of those who had their property flooded agree or strongly agree with the statement that the flooding
impacted them mentally. Two of the respondents (25%) feel ambiguous towards that statement, while one respondent strongly disagrees it affected them mentally. This is interesting as it opposes the general findings of the interviews. All interviewees that had experienced the flood first-hand noted mental health effects and losing a feeling of security.

“And the other thing I would’ve lost would probably be my sense of security. We all think our homes are our castles. Well, mine was besieged and destroyed, and I was deprived of my home for 9 months.”

– Interviewee G, inhabitant, Moorland, 9 May 2018

This loss in sense of security is also noted in the literature by Tapsell and Tunstall (2008). The findings of both the research by Tapsell and Tunstall (2008) and by Walker-Springett et al. (2017) support the reports by the interviewees that the flooding has had a large mental impact. However, the findings from the online survey contradict this view, as the result from the questionnaire is not significant.

Literature about whether or not flooding can strengthen the community bond points out that in many cases it can intensify the relationship between different members of the community, but it also points out that in some cases it can create us-them contradictions that can damage connections (Tapsell and Tunstall 2008; Walker-Springett et al. 2017). In these cases, the flooding can drive a wedge between long-lasting friendships. If one person or couple has had their property flooded, but the other has not, it can lead to miscommunication and misunderstanding from both sides. The results from this study show a similar pattern.

“There were rifts as well. There were two couples I can think of, who were very, very friendly. They’d all been teachers together or something. And one couple were flooded, and one couple weren’t. And neither of them could actually appreciate the other ones’ problems. And they had drifted apart. It did go both ways.”

– Interviewee H1, inhabitant, Moorland, 9 May 2018

However, many interviewees mention how the community came together and became stronger through this flood, helping each other. Some interviewees also mention that in the short term, it negatively affected the communities’ ties, as many inhabitants were out of the area for the months following the floods which made it hard to keep in contact.

“It broke it up. Because people were living in different places. So you didn’t see people. You didn’t know how they were getting on. What progress was happening in their properties. (...) But then when people could start coming into the village, they weren’t living here. There was a few still
here. But the majority of people had moved out. So unless you actually saw someone (...) Or if you were coming out here, you wouldn’t have seen them. And as I say, being away like we were, 14 months. Yes, I caught up with some people, but other I didn’t. So you didn’t know what was going on. Some have never come back.”

– Interviewee F, inhabitant, Moorland, 9 May 2018

However, almost all interviewees mention that it made the community bond stronger than before, as people were trying to help each other, as well as being able to relate to one another because of the flooding.

“I think probably, it’s better now than it ever was. Because there was no ‘well you got flooded ‘cause you’re a bad person, and you smell because...’. There was none of that because we all got it. So everybody had to go. But it took a long time to come back, because obviously everybody was out for 9 months. (...) So yeah, it probably took a good 18 months, by the time people had been home, but it has brought everybody together because we all suffered exactly the same.”

– Interviewee A, inhabitant, Moorland, 20 April 2018

One participant mentions having built a friendship with people from other parts of the UK that came to volunteer. Most interviewees mention their thankfulness for all the help and goods they received from people all over the country.

“There was a lot of volunteers. An awful lot of people from all over the country volunteered to come and help. (...) We had a big hedge that died, because of the flooding. And [husband] happened to see one of them and was saying to them about it. The next day they came, complete stripped the hedge out, down to the ground level. They even swept up after themselves. They were amazing. They were clearing out houses. They were doing jobs for people. Rescuing things that people- were precious to them. I can’t praise them highly enough. They were wonderful.”

– Interviewee E, inhabitant, Moorland, 9 May 2018

Within the flooded respondents in the questionnaire there seems to be a consensus that the flooding impacted the community, all respondents that reported being flooded either agreed or strongly agreed with the statement that it affected the community. Most also agree or strongly agree that it affected themselves socially, apart from one respondent whom disagreed with the statement.

Because the evacuation was rather rushed, and because many did not foresee the severity and the length of the evacuation, precautionary measures that were taken were minimal.
“We thought 200mm over that vast area would be an awful lot of water. And therefore, we couldn’t contemplate any more than that. As [Interviewee H1, wife] says, we’ve taken those things upstairs. We’d raised the furniture that was left downstairs. On bricks and put yoghurt pots around the feet of the table and things like that. So, a couple of bricks and a yoghurt pot. We would have coped with the 200mm of water.”

– Interviewee H2, inhabitant, Moorland, 9 May 2018

Other interviewees mention not taking measures at all, and not having changed this since either.

“We’ve had to go back with things [e.g. plugs] higher, but that’s just building regs [regulations] these days not because we’ve chosen to do that.”

– Interviewee A, inhabitant, Moorland, 20 April 2018

Out of the 9 respondents of the survey that noted that their property or belongings had been affected by the flood, 8 respondents agree or strongly agree with the statement that their property had been affected. One respondent disagreed with the statement noting:

“My property was one of only 15 not flooded in Moorland.”

– Respondent #15, 19 April 2018

Even though a lot of interviewed locals lost a significant amount of belongings and property during the floods, most people that have been interviewed note that they themselves haven’t been financially affected as such. Most interviewees mention having insurance, but they also note that they know residents that were not insured for flooding. Another interviewee notes that the insurance rates have gone up over the last year, increasing their financial burden four years after the event.

“It’s [the insurance cover costs] rocketed up for a lot people. There’s things in place now called flood wave insurance. But the insurance companies have to buy into it and it is a lot of money.”

– Interviewee A, Moorland, 20 April 2018

However, it needs to be said that those flooded did lose personal belonging that cannot be replaced, such as photographs, furniture that had been inherited and other belongings with emotional value.

The responses within the questionnaire seem to slightly contradict this. Most respondents that have been flooded feel either ambiguous (25%) towards the statement that the flooding has impacted them financially or agree (25%) or even strongly agree (50%) with the financial impact of the event. One respondent also mentions a £320k insurance cost. This could be explained by the fact that some houses in the area are made of cob, as some interviewees also mention. This historic way of building
walls could contribute to the lengthiness and large costs of the renovations for these particular houses. The statement in the literature by Parker et al. (2007) supports this vision, as it also mentions that regardless of type of insurance cover, people were likely and willing to save as much possessions as possible.

The flooding also impacted the way inhabitants think of their environment. As previously mentioned, the flood affected the sense of security of some inhabitants, but some interviewees also mention that people have become more ‘jumpy’ when it starts raining a lot, or if nearby fields flood.

“I think probably everybody would say that – everybody gets a bit jumpy, everybody does – ‘Oh my god it’s gonna rain!’”

– Interviewee A, inhabitant, Moorland, 20 April 2018

This effect is also reflected in the literature, as Spence et al. (2011) notes that the experience of flooding can heighten the awareness of flood-risk, in addition to the previously mentioned mental effects (Tapsell and Tunstall 2008; Walker-Springett et al. 2017).

5.3.2 Effects on those not flooded

The effects on those who have not been flooded should not be underestimated. The sample size on the interviews for this particular group is smaller, with only 4 interviewees. However, 10 respondents (48%) of the online survey mention that they have family or friends that had been flooded or that they had been affected in other ways.

Within the group of respondents that did not have their property flooded, there is a bigger gap between feeling socially impacted and feeling that the community has been affected. 90% of respondents strongly agree that the community has been affected by the flooding, with only one respondent noting they agreed with the statement. However, the social impact on themselves seems to be weaker. Seven respondents (70%) note that they feel the flooding affected them socially, with the remaining respondents feeling ambiguous (10%) or disagreeing that they have been socially affected by the flooding (20%).

Even though the property of the respondents has not been affected, a majority still mentions being financially affected by the flooding. Six respondents (60%) agree or strongly agree with this statement, 20% feel ambiguous and the remaining 20% do not feel they have been financially impacted by the floods in 2014. The relatively big number of people that have not been flooded but have been financially impacted could be explained by the fact that commuting distances for people in the area had massively increased due to the flooding.
“Commute to work was double the distance and time, cost etc.”

– Respondent #10, 18 April 2018

It is hard to define effects on the mental health of those affected but not flooded. In the questionnaire, most respondents’ answer to the question whether or not the flooding impacted them mentally is that they either disagree or feel neutral towards that statement. However, two respondents do strongly agree with that statement, one of them being an engineer at the Environment Agency. During the interview with employees of the Environment Agency, the personal and mental impact that the flood operation had had on the people working at the EA was also mentioned.

“People went through marriage breakups, a lot of people didn’t see their children’s birthdays, they didn’t see their Christmas parties, they didn’t see their graduation. So, a lot of people put a lot of effort into helping people. But, put that into some context, of course outside this building there are people who were flooded. They’d lost their possessions, and I guess – at the end of the day, the possessions that they’ve lost they can’t replace. Similar for the people who manage the flood, they will never ever replace those events that they missed through those 11 weeks and 3 days.”

– Interviewee B1, expert, Bridgwater, 23 April 2018

This statement shows that the impact of the flooding on professionals is also profound. Of course, as the interviewee notes himself, 11.5 weeks is not comparable to 9-14 months of being away from home. But the impact of those 11.5 weeks of working more than full-time hours and missing profound life events such as birthdays and graduations should not be underestimated. As well as the long-term effects it has had on some peoples’ relationships, like broken marriages.

5.4 Discrepancies and misconceptions

One of the main differences between the Environment Agency and the inhabitants is the perceived causes of the flooding in 2014. While the EA strongly emphasises that it was the severity of the continuous rain, many inhabitants believe it is a lack of maintenance, and therefore the Environment Agency is to blame. The following section focusses on the apportioning of blame on by the inhabitants, followed by a discussion on dredging and a discussion on the role of the media, fake news and urban legends, while aiming to provide a framework to answer the last research question: Are there discrepancies or misconceptions between the government’s statements, and the locals’ perception?
As mentioned before, the debate seems to be very polarised between the Environment Agency on the one hand and the flooded residents on the other. Through the interviews, there are many remarks noting what ‘they’ think or ‘they’ should have done, implying the Environment Agency did not do enough to ‘save’ the people on the Levels. Some interviewees and respondents seem to blame the Environment Agency for what happened, going as far as saying the EA ran out of diesel to power the pumps, or -as mentioned before- that they opened a reservoir upstream. According to employees at the EA, there are many misconceptions about the function of the Environment Agency in general, as well as in handling the floods.

“Blame must be apportioned. Whatever happens, blame must be apportioned, and clearly the Environment Agency is to blame, even though people aren’t even aware of what we stand for. What we do. We are still in the Environmental Agency. There is a huge lack of understanding. It displeases me that 22 years after the agency was born, we are still having to -not necessarily defend, but to explain to people what our role is. You know, people say: ‘you’re responsible’. No. We have two responsibilities. One is to issue flood warnings, and the second is that when we do deliver works, we have responsibility to maintain and enhance the environment. That’s it. Everything else is permissive powers. So, in other words, we’re under legal obligation. If it’s affordable, if it’s technically justifiable and feasible, we will do it. And at the top, we work out: do we have the money? Yes. Can we afford it? Yes. Is it doable, by an engineering perspective? Yes. Is it doable from an environmental perspective? Yes. Then, three yesses make it worth it. But the first thing is, is that we always stumble on the first.”

– Interviewee B1, expert, Bridgwater, 23 April 2018

Almost all of the misconceptions and discrepancies mentioned in this section are about the sometimes emotional debate between the Environment Agency and the inhabitants of the Somerset Levels and Moors. Employees at the EA often feel blamed or might even feel like a scape-goat for what happened during the flooding, while it is not perceived as being a main task of the Agency to deal with this. One of the interviewed residents of the area, whom also worked for the Environment Agency at the time, also expressed feeling guilty about the situation.

“I think everything [wife, Interviewee H1] says is exactly how I felt. But I had the additional burden. Because I felt guilty. It was working for the organisation [EA] that I did. And it used to be part of my responsibility to look after this area. It somehow felt it was my fault. So that wasn’t easy to cope with. Logically, I knew it wasn’t. I knew it was the amount of rain that we’d had.
And I knew that there was nothing I could have done that would have been any different from what my colleagues had done. So there was no point in me feeling like that.”

– Interviewee H2, inhabitant, Moorland, 9 May 2018

This feeling of guilt implies that his employer -the Environment Agency- is blamed by either himself or the community around this individual. The possible internal feeling of conflict of interest between the EA and the community, resembles the polarisation that was mentioned before. This distrust in the managing agency, as well as the blame on lack of maintenance is also reflected in the article by Tapsell and Tunstall (2008) in a study on flooding in different English cases.

The general idea of some interviewees and respondents is that the Environment Agency did not do enough or did not act fast enough. Some interviewees mention that they had been asking the EA for weeks to install more pumps but felt that the Environment Agency did not listen to their requests, and only started acting when it was already ‘too late’. Other mention going to the EA to warn them beforehand but getting dismissed.

“And about 5 years ago, just before the flood, my husband was so concerned about what he could see going on inside the river. He went to the Environment Agency and using his expertise [in oceanography, and movement of water and tides], tried to tell them that something was gonna happen. And got dismissed. You know, this is a bloke with 3 degrees. He knows what he’s talking about, and some young guy showed him a computer model and said: No. He said: No, but I’ve lived here for 30 years. ‘That’s accurate-’. ‘No, no, no’. And then it started raining, and it rained for about 3 weeks solid. And the moors that are designed to hold the water, they held the water, but there was nowhere for it to go.”

– Interviewee E, inhabitant, Moorland, 9 May 2018

This again shows the discrepancy between the inhabitants of the Somerset Levels and the actual power that the EA has. It however also shows that there is some common ground in the cause of the problem: the excessive amount of rain. The Environment Agency, on the other hand also mentions the lack of understanding that the residents have for the amount of time it takes to set up an operation this size, as well as the underappreciation of the amount of work that employees of the EA had done and were doing at the time. While inhabitants often feel like this has happened to them. This almost fatalist approach can also be found in the literature by Demeritt and Nobert (2014).

The literature also mentions that people living in flood-prone areas often downplay their potential risk and fail to accurately respond to public awareness campaigns (Demeritt and Nobert 2014). One of the interviewees’ responses clearly reflected this statement:
“We’ve always had power points that were about a meter, meter and a half off the floor. That was done deliberately, because we knew that it could flood here. And also, as we got older, it’s easier not to have to reach down all the time. And if you’ve got a table or something, to have the plug just above it is so much easier. So the electrics weren’t affected at all. We were lucky there. But no, we didn’t have any flood gates or anything like that. But we never expected it to flood. It never floods here. Except then it did. And we weren’t expecting it.”

– Interviewee E, inhabitant, Moorland, 9 May 2018

Rationally, most interviewees seem to know that they live in a flood-prone area. However, they did not feel threatened by the water before. This might perhaps be because the area has not flooded in almost 200 years, making it that residents have no previous flood experience. Literature by Parker et al. (2007) reflects this, as they note that flood warnings are particularly important to people with no previous flooding experience.

Adding to the idea that the flood was ‘to blame’ on someone or could have been prevented is the use of the police helicopter to tell the residents of the Somerset Levels to evacuate. A police helicopter flying over on Wednesday, telling the residents to evacuate came back in every interview conducted with residents. While it was not mentioned by both the local experts and the Environment Agency interviewees. Some residents believe that because the police helicopter was let up, there must have been some sort of decision made to flood the area beforehand.

“And the police wouldn’t get involved, sending a helicopter over off their own back. Decisions must’ve been made.”

– Interviewee G, inhabitant, Moorland, 9 May 2018

According to the EA, if anything like this were to have happened, the towns on the Somerset Levels would have been swept away by the force of the water coming in.

“And if you’re gonna speak to one person today and he will mention a reservoir -water being released. We continue to debunk that. Because the evidence and us deliberately flooding Northmoor to save the towns of Bridgwater and Taunton -why would we? Because Taunton and Bridgwater already have a flood defence scheme in place. And the release of water from a reservoir so far upstream would have washed away whole towns.”

– Interviewee B1, expert, Bridgwater, 23 April 2018
5.4.2 “The d-word”: Dredging

Within the area, one of the major action groups that have pushed both the media and the Environment Agency towards taking action -FLAG- is specifically centred around dredging. This makes “the d-word” as referred to by an interviewee- one of the most consistently mentioned factors in this research, or more specifically: the lack of dredging leading up to the floods in 2014. According to the Environment Agency, this is a very expensive and unsustainable measure. Because of the tidal nature of the rivers in the area, silt will come back up, and once you stop dredging, the rivers will silt up again. It is also an incredibly expensive measure and therefore not deemed a sustainable solution.

“We cannot, this is not sustainable. It’s- dredging, I’m sure you’ll ask me about dredging in a minute. If you’re not, you’ll be the first. That hasn’t asked me about dredging.”

– Interviewee B1, expert, Bridgwater, 23 April 2018

However, some interviewees and respondents believe that this would have been part of the solution to the problem or would have even prevented the whole flood event from happening.

“it’s huge, it’s – because they hadn’t done anything for this 20 years, what then happened was avoidable if they had carried on doing it. But hopefully we’ve caused enough of a stink this time, that things won’t happen for another 20 years. We need regular maintenance, because the river’s tidal.”

– Interviewee A, inhabitant, Moorland, 20 April 2018

Most of this debate comes down to the before mentioned ‘blame game’. And the following distrust in the governmental actors can lead to feelings of distrust and powerlessness, as pointed out by Demeritt and Nobert (2014).

5.4.3 ‘Fake news’, the media, and communication

During the interviews with the Environment Agency, the interviewees mentioned the large impact of social media during the flooding. The interviewees mention the beneficial impact it has had on the community, but also how they underestimated the impact of social media during and after the floods in spreading false information and ‘fake news’.

“I suppose if I ever doubted -some of the comments that have been made recently about fake news- the things that I saw in 2014 convinced me that there is fake news. It’s very easy to manipulate the news stories, and the agendas and things like that.”

– Interviewee H2, inhabitant, Moorland, 9 May 2018
According to literature, fast action and good communication are vital to preserve the community’s trust (Tapsell and Tunstall 2008; Demeritt and Nobert 2014).

Many interviewees also mention the large presence of the media, and the prolonged attention that the flooding event got from them. Some interviewees comment that the constant media attention took a mental toll on people, with some other inhabitants being scared of the media, to the point of running away from them.

“I was putting myself up to the media, because I’m not your average Mrs. Angry, to be trotted out. I’m trying to be the voice of reason. (…) And it didn’t really work. Because people don’t actually remember me, unless they come up to me in the street. They remember some of the other people who’ve been on. You know, the lady they poked with a sharp stick until she cried. Or something like that. Because that’s brilliant television. It was nothing like what life was actually like for us. I mean, people cried buckets, but it wasn’t in that photo opportunity kind of way. And it was one of the things that people found extremely difficult to cope with. Was the constant media attention actually. I saw people run away when the camera was produced. And actually physically run away.”

— Interviewee H1, inhabitant, Moorland, 9 May 2018

The article by Rudman et al. (2013) claims that prolonged media attention could have an effect on the perceptions of the inhabitants towards climate change. However, this does not seem to have happened in this case. This might be the case because of the narrative of the media attention, focussing around the lack of maintenance. This may in turn have increased the polarisation between the Environment Agency and the residents.

Communication has improved however. The debate seems to have been very emotional just after the floods but has calmed down in some perspectives.

“The first meeting I went to, they said: ‘Is there a grant for a body bag for EA staff?’ We were punched. We were kicked. We were spat at. That doesn’t happen now.”

— Interviewee B1, expert, Bridgwater, 23 April 2018
Some residents also realise the strain that the Environment Agency employees were on at the time of the floods.

“It’s not dear Robert [pseudonym], who works for the Environment Agency who when he stood up and said to people: ‘If this goes wrong again in the future, it’s my head on the block.’ And each time I see him, I go: ‘Oh it’s still there then Robert!’”

– Interviewee F, inhabitant, Moorland, 9 May 2018
6 Conclusions and recommendations

The following chapter aims to draw conclusions from the beforementioned analysis. Combining the analysis with the literature review, this chapter aims to answer the main research question, as well as proposing recommendations for the future, ending with some reflections on the research and research process.

6.1 Different attitudes towards flooding and responsibility

In chapter 2.2, a theoretical framework was introduced, focussing on both the responsibility aspect and the origin aspect (Figure 8). Combining this framework with attitudes found during the analysis of the data, creates an updated theoretical framework (see Figure 12). The theoretical framework provides four different categories of approaches or attitudes. These categories are an exaggerated representation of what one might typically find, and individual attitudes may have characteristics of multiple categories. The different categories are explained below.

![Updated theoretical framework describing different types of responses. Source: Author](image)

Firstly, category 1 approach sees the government as the main carrier of responsibility for the flooding, combined with the idea that the flooding was mainly a natural occurrence. They assumed the measures the government had in place were enough to protect them from the extreme weather conditions. They feel like they were to some degree let down by the governmental body, even though they know that the circumstances were extraordinary. This attitude is represented in a small part of the participants, often mixed with a category 3 attitude.
Category 2 attitudes view the government as the main entity to blame for the floods. As well as thinking the floods had technological causes. They assumed that the governmental measures were going to protect them, and feel like because of neglect, irresponsible management or even purposeful action, they have been flooded. They expect that the governmental bodies will function better in the future and - as it was a technical failure- they do not expect it to happen again. This category accounts for the largest group of interviewees and respondents. Most of the literature (e.g. Tapsell and Tunstall 2008; Demeritt and Nobert 2014; Walker-Springett et al. 2017) reflect the idea of a technical source of the problem, as well as ‘blaming’ the government to some extent.

In category 3, people think that the causes were natural and that they should protect themselves from the floods. They perceive the flooding as an unfortunate part of life in this area and take measures in and around their property to minimise the damage. This attitude was also found in a small group of participants, in combination with a category one stand-point.

Lastly, a category 4 approach sees the floods as a technological failure but believes that one should have individual protection in place. These individuals take measures in and around their property because of a lack of trust in the technologies in place. This attitude only seemed to be found in one interviewee whom mentioned taking many precautionary measures, while believing that the origins of the flood were technical.

It must be noted that the government is often solely responsible for maintaining and establishing technological features. It is unclear if the bias towards a category 2 approach is because of this, or because of the general distrusting narrative that has been built up over time. Participants with other attitudes often have a combination of category 1 and 3 approaches. They realise that the flooding has a natural origin but feel that protection should come from both government and the individual homeowner.

6.2 Main findings

What are the causes of the 2014 flooding on the Somerset Levels and Moors and the effects on flooded communities as perceived by those affected and involved?

Based on scientific evidence, the 2014 flooding on the Somerset Levels and Moors was caused by an excessive amount of rain over a longer period of time (Environment Agency 2016), as is a common cause of flooding in rural areas in the UK (Wheater 2006). Many residents of the Somerset Levels believe that the flooding also has to do with a lack of maintenance on the side of the Environment Agency. However, the EA notes that there is a cost-benefit analysis that is being made, and that it is
only obliged to deliver limited services on a limited budget. A number of residents fail to realise that the Environment Agency -and sometimes even particular employees- have no say in how much money they get to spend on ‘saving’ the Somerset Levels. Employees at the EA mention that they would like to spend more money, but that funds are limited and beyond their control.

The effects of the flooding on the Somerset Levels and Moors are variable from person to person. In general, most residents have been affected mentally by the flood, losing a sense of security, and having high levels of stress and anxiety both during and after the flood, as also reflected in literature by Tapsell and Tunstall (2008) and Walker-Springett et al. (2017). Staff at the Environment Agency was also affected mentally, which some residents fail to realise. Little to no academic research has been done on the effect of the 2013-2014 floods on the mental health of EA staff, which certainly provides an area of further research.

Many residents have also suffered financial losses due to the floods. This may be through uninsured losses, taking additional precautionary measures that were not covered, or by increased insurance cost further down the line, this is consistent with academic literature by Parker et al. (2007). Participants note that a positive effect that came out of the flooding was the increased communal bond, although some individual relations did suffer. This stronger communal bond, as well as some individual faded relations was also found by both Tapsell and Tunstall (2008) and Walker-Springett et al. (2017).

6.3 Reflections

I hope that through this research, future communication between both the Environment Agency and the residents will be more understanding of mutual differences. I was once told that in a debate or conversation, one can choose to stand on the green circle (open to feedback and different points of views) or the red circle (not willing to hear the other’s opinions and views). I was told that in order to have an effective conversation, both parties have to stand on the green circle. I hope that this research will bring all parties closer to that green circle.

Doing this research project has been an adventure with many ups and downs. My research was not off to the best start when I had both of my supervisors replaced due to unforeseen circumstances. However, my supervision from that point on has been as good as I could have hoped for. I also struggled gaining access to the community. As I am not a British citizen, both learning to understand the system, as well as trying to find willing respondents was tough at the start. I spent a lot of time researching my methodology, but -as anyone doing research will tell you- my methods continuously changed during my fieldwork. I gained a lot of inspiration from speaking to all the parties involved,
and really enjoyed my research from that point on, as I felt like I was starting to untangle the different theories and methods that had built up in my head. I am glad that this project has shown me how much I can enjoy doing academic research and I am hopeful that I can carry this attitude through to my PhD.
7 References


Environment Agency 2018b. Prepare your property for flooding: A guide for householders and small businesses. Available at:


King, N. and Horrocks, C. 2010. *Interviews in qualitative research*. Los Angeles: SAGE.


Appendices

Appendix A: Ethical Approval Form ................................................................. 67
Appendix B: Overview of interviewees ............................................................ 73
Appendix C: Interview guide Experts ............................................................... 74
Appendix D: Interview guide Residents .......................................................... 76
Appendix E: Online questionnaire ................................................................. 78
Appendix F: Photos used in photo elicitation .................................................. 82
Appendix G: Routes mobile interviews ......................................................... 88
Appendix A: Ethical Approval Form

CARDIFF SCHOOL OF PLANNING AND GEOGRAPHY

Ethical Approval Form

Student Projects (Undergraduate & Taught Masters)

This form must be completed and submitted to Evelyn Osborne email: OsborneE1@cardiff.ac.uk / Tel Ext: 76131 / Room 2.54 Glamorgan Building).

In the case of dissertations it is the responsibility of the student to submit the form, duly signed by their supervisor, and secure ethical approval prior to any fieldwork commencing.

A copy of the signed form should be included by all students with their final dissertation.

Title of Project: Postgraduate dissertation: Flooding, origins and perceptions on the Somerset Levels.

Name of Student(s): Lotte Hoeijmakers

Name of Supervisor/Module Leader: Dr. Thomas Smith

Degree Programme and Level: MSc European Spatial Planning and Environment Policy
Date: 06-04-2018

**Recruitment Procedures:**

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

* Cardiff University’s Child Protection Procedures:


If you have answered ‘yes’ to any of the above questions your supervisor will need to explain how you will deal with these ethical issues.
<table>
<thead>
<tr>
<th><strong>Data Protection:</strong></th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>9 Will you tell participants that their participation is voluntary?</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 Will you obtain written consent for participation? If “No” please explain how you will be getting informed consent.</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11 If the research is observational, will you ask participants for their consent to being observed?</td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>12 Will you tell participants that they may withdraw from the research at any time and for any reasons?</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13 Will you give potential participants a significant period of time to consider participation?</td>
<td>x</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If you have answered ‘no’ to any of the above questions your supervisor will need to explain how you will deal with these ethical issues.

<table>
<thead>
<tr>
<th><strong>Possible Harm to Participants:</strong></th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>14 Is there any realistic risk of any participants experiencing either physical or psychological distress or discomfort?</td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>15 Is there any realistic risk of any participants experiencing a detriment to their interests as a result of participation?</td>
<td>x</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
If you have answered ‘yes’ to any of the above questions your supervisor will need to explain how you will deal with these ethical issues.

### Data Protection:

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>Will any non-anonymised and/or personalised data be generated and/or stored?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>Will you have access to documents containing sensitive(^1) data about living individuals?</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>If “Yes” will you gain the consent of the individuals concerned?</td>
<td></td>
<td>x</td>
</tr>
</tbody>
</table>

If there are any other potential ethical issues that you think the Committee should consider please explain them to your supervisor. It is your obligation to bring to the attention of the Committee any ethical issues not covered on this form.

### Health and Safety:

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x</td>
</tr>
</tbody>
</table>

Does the research meet the requirements of the University’s Health & Safety policies?

[http://www.cf.ac.uk/osheu/index.html](http://www.cf.ac.uk/osheu/index.html)

---

\(^1\) Sensitive data are *inter alia* data that relates to racial or ethnic origin, political opinions, religious beliefs, trade union membership, physical or mental health, sexual life, actual and alleged offences.
<table>
<thead>
<tr>
<th>Prevent Duty:</th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>Has due regard been given to the “Prevent Duty” in particular to prevent anyone being drawn into terrorism</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


http://www.cardiff.ac.uk/public-information/policies-and-procedures/freedom-of-speech

Any changes to the nature of the project that result in the project being significantly different to that originally approved by the committee must be communicated to the Ethics Committee immediately.
**Supervisor’s declaration**

1/ As the supervisor/module leaders, I confirm that any ethical issues arising from this student project were discussed in advance with participating students (please indicate how here)

*No ethical issues of concern arise from this research.*

2/ As the supervisor/module leader (*please delete as necessary*) for this student project, I confirm that I believe that all research ethical issues have been dealt with in accordance with University policy and the research ethics guidelines of the relevant professional organisation.

Date 5/4/18 Name Tom Smith Signature

If any of the shaded boxes have been ticked the supervisor/module leader must explain below how the potential ethical issue will be handled:
### Appendix B: Overview of interviewees

<table>
<thead>
<tr>
<th>Interviewee acronym</th>
<th>Sex (Age group)</th>
<th>Relation to research</th>
<th>Type of interview</th>
<th>#</th>
<th>Date (Duration)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interviewee A</td>
<td>F (30-50)</td>
<td>Leader local action group, inhabitant home flooded Moorland</td>
<td>Semi-structured, photo-elicitation</td>
<td>1</td>
<td>20-04-18 (43 min)</td>
</tr>
<tr>
<td>Interviewee B1</td>
<td>M (50-70)</td>
<td>Performance Team Leader for the EA during floods, now specialist advisor</td>
<td>Semi-structured</td>
<td>2</td>
<td>23-04-18 (1h 11min)</td>
</tr>
<tr>
<td>Interviewee B2</td>
<td>F (20-30)</td>
<td>Employee EA, previously researched flooding on Somerset Levels</td>
<td>Semi-structured</td>
<td>2</td>
<td>23-04-18 (1h 11min)</td>
</tr>
<tr>
<td>Interviewee C</td>
<td>M (70-90)</td>
<td>Parish councillor Westonzyland, inhabitant of area surrounding the flooding</td>
<td>Semi-structured, photo-elicitation, mobile interviews</td>
<td>3</td>
<td>23-04-18 (53 min)</td>
</tr>
<tr>
<td>Interviewee D</td>
<td>M (70-90)</td>
<td>Sedgemoor District councillor</td>
<td>Semi-structured, mobile interviews</td>
<td>4</td>
<td>30-04-18 (52 min)</td>
</tr>
<tr>
<td>Interviewee E</td>
<td>F (40-60)</td>
<td>Inhabitant home flooded Moorland</td>
<td>Semi-structured</td>
<td>5</td>
<td>09-05-18 (36 min)</td>
</tr>
<tr>
<td>Interviewee F</td>
<td>M (60-80)</td>
<td>Inhabitant home flooded Fordgate</td>
<td>Semi-structured, photo-elicitation</td>
<td>6</td>
<td>09-05-18 (43 min)</td>
</tr>
<tr>
<td>Interviewee G</td>
<td>M (60-80)</td>
<td>Inhabitant home flooded Moorland</td>
<td>Semi-structured, photo-elicitation</td>
<td>7</td>
<td>09-05-18 (34 min)</td>
</tr>
<tr>
<td>Interviewee H1</td>
<td>F (50-70)</td>
<td>Inhabitant home flooded Moorland (couple)</td>
<td>Semi-structured, photo-elicitation</td>
<td>8</td>
<td>09-05-18 (1h 20 min)</td>
</tr>
<tr>
<td>Interviewee H2</td>
<td>M (50-70)</td>
<td>Inhabitant home flooded Moorland (couple)</td>
<td>Semi-structured, photo-elicitation</td>
<td>8</td>
<td>09-05-18 (1h 20 min)</td>
</tr>
</tbody>
</table>
Appendix C: Interview guide Experts

General introduction:

Could you tell me about your current position and what organisation you work for?

Is this different from your position in 2013-2014, if yes, what was your position at that time?

Were you in a position of authority during the floods of 2013-2014, or any previous flooding events?

What was the task of you and your organisation during the flooding?

Could you describe for me what happened within your organisation during and after the flooding in 2014?

Have there been changes since then?

Effects of flooding

Have you personally, or anyone close to you, been affected by the flood on the Somerset Levels in 2014 (or any other previous flooding)?

What effects did the flooding have on the landscape?

What consequences did the flooding have for the inhabitants of the area?

Financially?

Emotionally?

Socially?
Did the inhabitants of the area have measures in place to minimize the damage? If yes, what were they?

Did you notice a change in this after the flood?

If yes, how?

If no, why?

**Origins of flooding**

Are the foods a natural occurrence, a man-made induced occurrence, or a combination of both?

What do you think caused the flooding in 2014?

What was the opinion of the general public about the reasons behind the flooding

Why do you think this is the case?

What is your opinion about the relationship between climate change and flooding?

Why?

What is the opinion of the general public about the relationship between climate change and flooding?

Why?
Appendix D: Interview guide Residents

Section 1: General introduction:

Could you tell me about yourself and how long you’ve lived in this area?

Could you tell me where you were just before and during the flood in 2014?

Section 2: Effects of flooding

What was the effect of the flooding in 2014?

What effect did the flooding have on you and your household?

What effect did the flooding have on your and your household’s finances / financial situation?

What effect did the flooding have on your property?

What effect did the flooding have on the community?

What effects did the flooding have on the landscape?

Did you have protective measures in place (sand bags, high plugs etc.)?

If yes, what were they?

If no, why?

Has this changed since 2014? Why?

Was there support in place from the agency or the council?

What was it?

Has this changed since 2014?
Section 3: Origins of flooding

Could you describe for me what happened environmentally leading up to the flooding in 2014?

Could you describe to me what happened during and after the flooding in 2014?

What do you think caused the flooding in 2014?

Why?

How do the floods still have an impact today?

What does the EA and the Council state is the reason for the flooding in 2014?

Is your opinion different? If yes, how?

Why do you think this is the case?

Do you think climate change and flooding are related?

Why?
Appendix E: Online questionnaire

(Note: asterisked questions are compulsory)

Welcome!

This research project is part of my postgraduate dissertation at both Cardiff University and Radboud University Nijmegen (the Netherlands).

The aim of this research project is to investigate, and get a deeper understanding of the perceived reasons behind flooding, and the effect flooding has had on those affected. I will focus on both policy makers and those affected by the flood waters, as well as investigating a possible discrepancy and misunderstandings.

This questionnaire consists of 10 questions and takes less than 10 minutes to complete.

All information given is confidential and anonymised, and no individual will be identified in any report or publication.

Thank you very much for your help and participation!

If you have any questions, please don't hesitate to contact me at hoeijmakersle@cardiff.ac.uk!

Question 1*: Please tick the following box:

☐ I understand the information above and agree to be a part of this study

Question 2*: What is your gender?

☐ Female
☐ Male
☐ Other / Prefer not to say

Question 3*: What is your age?

☐ Under 18
☐ 18-25
☐ 26-30
☐ 31-35
☐ 36-40
☐ 41-45
☐ 46-50
☐ 51-55
Question 4*: Where did you live in early 2014?

- [ ] 56-60
- [ ] 61-65
- [ ] 66-70
- [ ] 71-80
- [ ] 80+

Question 5*: Were you personally affected by the flooding in 2014?

- [ ] Yes, my property and / or personal belongings were affected
- [ ] No, but I have close family or friends that were affected
- [ ] No, I was not affected by the flooding
- [ ] Other (please specify)

Question 6*: Please rate the following statements:

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neither agree or disagree</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>The 2014 flooding affected me personally</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>The 2014 flooding affected me socially</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>The 2014 flooding affected me mentally</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>The 2014 flooding affected me financially</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>The 2014 flooding affected my property and/or personal belongings</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>The 2014 flooding affected the community</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>The 2014 flooding didn’t affect me</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>
Question 7: Please describe what happened to your property, your surroundings and the community during and after the flooding in 2014?

[Blank space for answer]

Question 8*: What do you think cause the flooding in 2014? (Please check all that apply)

- [ ] Poor maintenance of rivers (lack of dredging etc.)
- [ ] Bad coastal defences
- [ ] Bad river defences (river lock gates, drainage channels, ditches etc.)
- [ ] Act of God
- [ ] Landscape characteristics (Area sitting around 3-4 meters above sea-level etc.)
- [ ] Severe weather
- [ ] Climate change
- [ ] None of the above
- [ ] Other (please specify)

[Blank space for answer]

Question 9*: Which of the above mentioned is the most prominent reason for the 2014 flood? (Please select one)

- [ ] Poor maintenance of rivers (lack of dredging etc.)
- [ ] Bad coastal defences
- [ ] Bad river defences (river lock gates, drainage channels, ditches etc.)
- [ ] Act of God
- [ ] Landscape characteristics (Area sitting around 3-4 meters above sea-level etc.)
- [ ] Severe weather
- [ ] Climate change
- [ ] None of the above
- [ ] Other (please specify)

[Blank space for answer]
Question 10: Are there any other impacts or origins of flooding, or do you have any other comments? Please mention them below:

Done
Appendix F: Photos used in photo elicitation

Interview A
Interview F, G, H
Appendix G: Routes mobile interviews

Interview C

Interview D