

Identifying the challenges of a socially just approach to flooding adaptation policy: A case study for the Glasgow City Region



Figure 1. National Floods in Scotland (Scottish Environment Protection Agency, 2017)

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List of Acronyms

GCR	Glasgow City Region
UK	United Kingdom
UKCCRA	United Kingdom Climate Change Risk Assessment
SEPA	Scottish Environment Protection Agency
EU	European Union
RQ	Research Question
UKCP09	United Kingdom Climate Projections 2009 – Met Office climate model
ECCA	European Climate Change Adaptation Conference
NFVI	Neighbourhood Flood Vulnerability Index
SFRI	Social Flood Risk Index
NGO	Non-Governmental Organisation
CRC	Climate Ready Clyde

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Abstract

The Glasgow City Region (GCR) is faced with significant impacts of flooding due to climate change, and adaptation will be crucial to alleviate the adverse effects. A socially just adaptation approach can ensure those most vulnerable to flooding have the required support in adaptation policy. The concept of social justice has increased in prominence within adaptation literature, but the extent to which it is incorporated into policy has yet to be considered for the GCR. This dissertation conducts a mixed research methods approach to identify the challenges in achieving socially just adaptation policy for the GCR. This is by way of interviews with local authority representatives and social justice experts, analysis of secondary data spatially mapping social vulnerability to flooding, analysis of climate projections, and identifying best practice from European policy efforts. Results reveal that socially just adaptation policy is in its nascence in the GCR, with some evidence of incorporation into local policy. Gaps identified and recommendations given from Europe relate to a broad-based, holistic governance and policy approach, which advances understanding of social vulnerability and procedural justice through utilising multiple forms of policy evidence.

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1. Introduction

Climate change is argued to be one of the most defining challenges for humanity this century (IPCC, 2014). Response has historically focused on mitigation through reducing greenhouse gases (Pielke et al., 2007), but with growing evidence of the severity of climate impacts, adaptation has risen to prominence on the policy agenda (Prutsch et al., 2014). One such impact is flooding (Cisneros et al., 2014), where increased frequency and intensity of precipitation is expected to increase flood risk (Met Office, 2009). Flooding is one of the principle climate impacts for the UK, with increased flood risk projected as early as next decade (Sayers et al., 2017). Of the UK, Western Scotland, and the Glasgow City Region (hereafter GCR), is expected to be one of the worst areas affected; with the Met Office's high emission scenario projecting as much as a 55% increase in winter precipitation for the GCR (Scottish Government, 2009). The GCR thus warrants attention as the context of research on flooding adaptation.

The physical risk of flooding will interact with social dimensions, to produce primary and secondary social impacts: a key social issue in the UK is inequality, which is expected to increase with climate change (Brisley et al., 2012). Climate impacts will not distribute equally across society, with those most vulnerable to climate change expected to experience the greatest impact (Stern, 2006; HR Wallingford, 2012). If one considers low income, an indicator of social vulnerability (of which there are many), low income communities typically contribute the lowest in household greenhouse gas emissions (Fahmy et al., 2011; Preston et al., 2013). And yet, such communities are more likely to live in areas at higher risk of climate impacts (Walker et al., 2015), are least able to respond to climate stresses, such as changes in food prices (Street et al., 2016), and lastly, are more likely to be marginalised from decision-making (Chalmers et al., 2008).

In light of the above, there is growing focus amongst adaptation literature on socially just adaptation, where policies are designed to support those most vulnerable to climate change (Benzie, 2014). This is in response to previous UK climate policy that did not consider social justice, leading to both maladaptation and increased vulnerability of marginalised groups as a result (Benzie, 2014). Schlosberg et al.'s (2017) recent assessment on adaptation policy argues for broader, more transformative adaptation options. Lemos and Dilling (2007, p.111) echo this argument that society needs to rethink adaptation, where they write "the solution, rather than the problem, has framed adaptation strategies". Bautista et al. (2015) argue that adaptation should not just correct inequality failures, but eliminate inequality, while Walker et al. (2015), put forward the related idea that adaptation should combine with broader societal development. A uniting theme from these papers is that adaptation options cannot be proposed oblivious to the societal context within which they are introduced, and must consider their effectiveness alongside social development. This inclines a focus towards socially just adaptation.

In addition to high projections of future physical flood risk, the GCR has the greatest number of communities in Scotland where social flood vulnerability is assessed to be the most severe (Kazmierczak et al., 2015). Thus, considering socially just adaptation to flooding is urgently needed for the GCR. A concluding statement

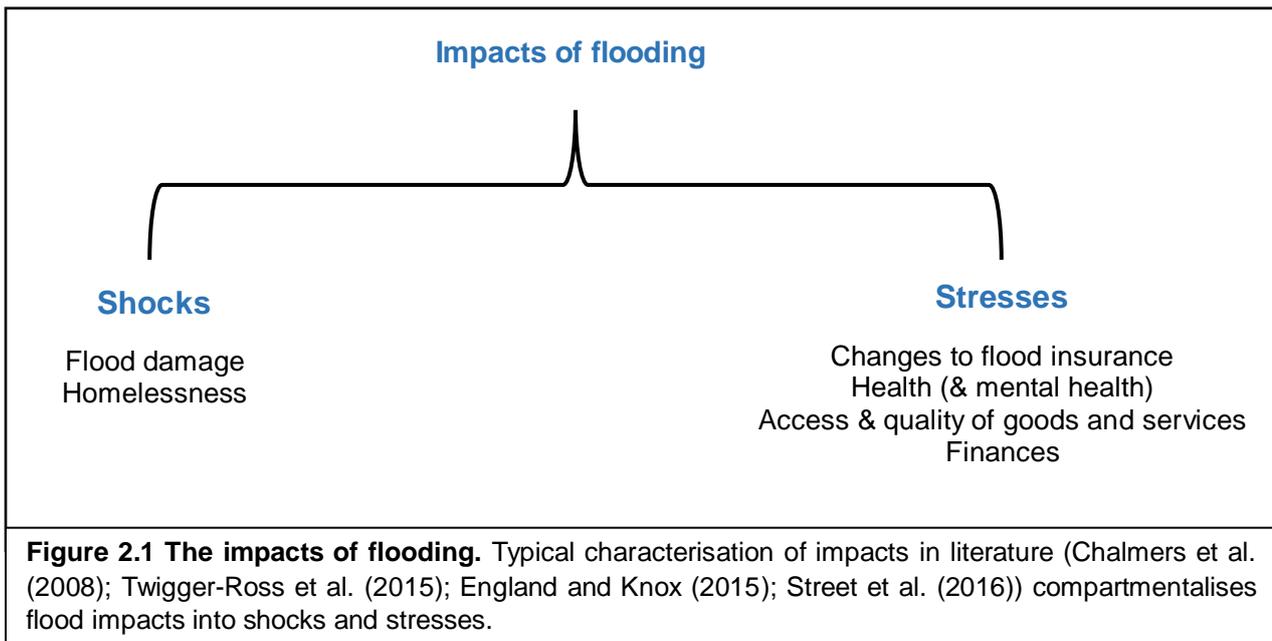
from the latest UK Climate Change Risk Assessment (UKCCRA) (Street et al., 2016) questions whether local and national adaptation policies incorporate the concept of social justice. The report argues that this is a key research gap at present, and it is one that this dissertation seeks to answer, for the GCR.

2. Literature Review

2.1 The climate impact of flooding for the GCR

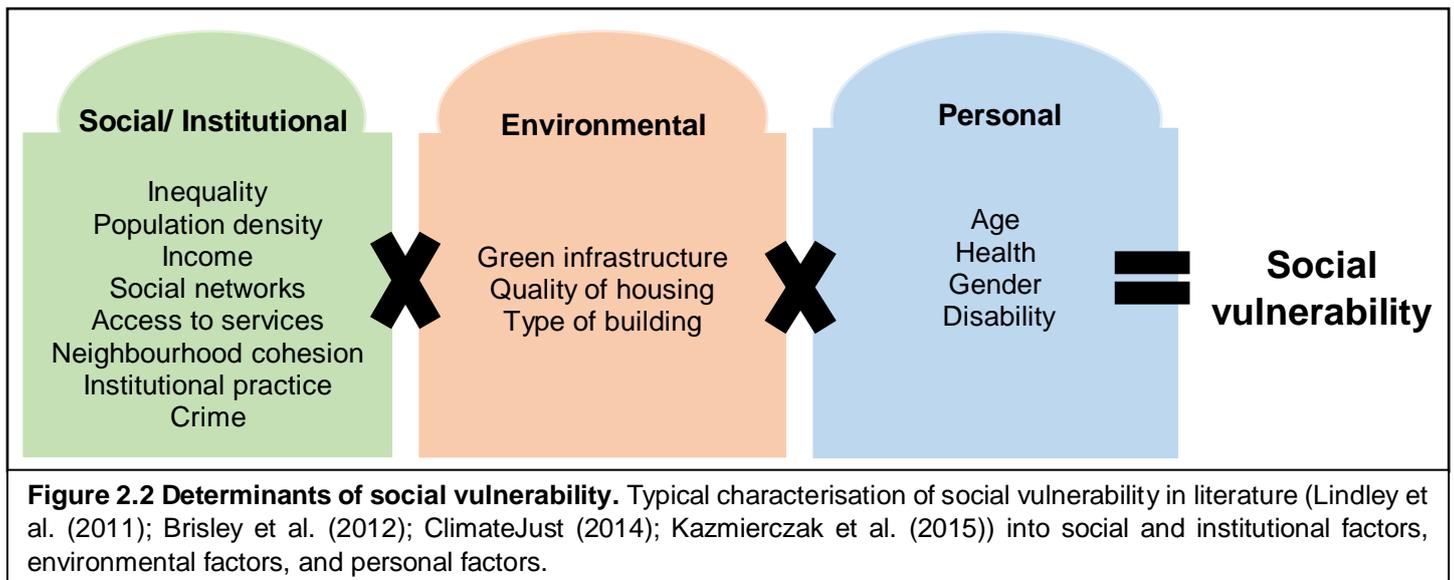
An assessment of future flood risk in the UK (Sayers et al., 2015) reports a substantial future increase (50%) in flooding, even under a low emission scenario (2°C climate change) (Sayers et al., 2015). Increased risk is projected to be greatest in deprived neighbourhoods, areas susceptible to coastal and fluvial flooding, and areas with little flood defences or benefit from defences (Sayers et al., 2015). Increased flood risk is highly unevenly distributed across the UK, with more than three-fold increases in some areas compared to others. For the GCR, the associated flood risk management plan (Glasgow City Council, 2016) identifies 22 catchments at a high risk of flooding. This corresponds to nearly 30,000 residential and non-residential properties, and an anticipated annual cost of £67 million (Glasgow City Council, 2016). An earlier assessment commissioned by the Scottish Environment Protection Agency (SEPA) found that peak flows could increase 27% across Scottish rivers and coasts by 2080, under a high emission scenario (Kay et al., 2011). Taken altogether, the evidence suggests flooding will become more severe for the GCR in the future.

Many public buildings are particularly susceptible to flooding, which has negative implications for vulnerable individuals in accessing health, social and other public services during the event of a flood (Sayers et al., 2015). This secondary impact reveals that there are direct and indirect effects of flooding for vulnerable communities, characterised in Figure 2.1 (following page) as shocks (direct) and stresses (indirect). Thus, vulnerable communities in the GCR face multifaceted flooding impacts, all of which need to be considered in the design and implementation of flood adaptation policy. Furthermore, the significant increase in physical flood risk aforementioned suggests that vulnerable communities will have to adapt very quickly to avoid the effect of increased and multifaceted flooding impacts. A key question is therefore the scale of change that vulnerable communities will face in increasing their resilience to flooding. This study's first research question (RQ) attempts to answer this for the GCR.



2.2 Social vulnerability to flooding

Flood disadvantage is characterised in literature as the combination of three aspects: an individual's risk of exposure, awareness of risk, and adaptive capacity (Environment Agency, 2005). Flood disadvantage can also be expressed collectively on a community-level (Twigger-Ross et al., 2015; Fazey et al., 2017). An individual's adaptive capacity is linked to an individual's social vulnerability, and the latter can be broken down as being shaped by social, environmental and personal attributes (as seen in Figure 2.2, following page). Nevertheless, defining social vulnerability to flooding is not a clear-cut process, and there appears a gap in literature in terms of the concept's clarity: analysis of social flood vulnerability in England by the Environment Agency (2005) found the cause is not demographic specific, and policy which groups society demographically is likely to be ineffective. Similarly, Walker et al.'s (2015) assessment of UK flood risk found a heterogeneous pattern, where there is disparity between flood risk and income group. Here, vulnerability was characterised solely by low income, when in reality there are numerous determinants (as shown in figure 2.2). Despite this, income is often focused on in policy schemes to reduce vulnerability (Benzie, 2011). Therefore, for English adaptation policy at least, there may be a risk of inaccurate characterisation that does not identify all vulnerable groups.



The determinants of vulnerability in Figure 2.2 (above) are used in maps characterising social vulnerability to flooding for Scotland and the UK (Lindley et al., 2013; ClimateJust, 2014). The maps also combine the determinants of social vulnerability with physical flood risk, often called 'flood disadvantage'. Such maps are the first of their kind for flooding policy-makers in the UK (Lindley et al., 2013; ClimateJust, 2014; Kazmierczak et al., 2015). Community flood vulnerability is considered relatively, rather than on absolute levels (Kazmierczak et al., 2015). This avoids a subjective threshold at which one defines vulnerability, but entails that the score of neighbourhoods is determined in comparison with the score of other neighbourhoods included in the map. In other words, the Scotland and UK maps are likely to display a different social vulnerability score for the GCR. Moreover, the average community vulnerability score may not be particularly representative for sparsely populated or socially diverse neighbourhoods (Kazmierczak et al., 2015). It therefore appears a research gap has arisen in terms of analysing whether the flood vulnerability maps fully identify social vulnerability for policy-makers, and this will be explored in this study's second RQ.

2.3 Social justice theory

An understanding of the subjectivity of social vulnerability requires a consideration of the theory which underpins social justice. The concept of social justice partly stems from the United States' environmental justice movement (Bautista et al., 2015), which sought to establish the root cause of higher environmental risk for certain demographic groups (Schlosberg, 2013). Social justice also developed from a reconsideration of environmental justice in the context of climate change (Schlosberg, 2013): environmental justice argues all individuals have a right to a suitable environment, and growing awareness of climate change therein formed a new concept of climate justice (interchangeable with social justice) (Schlosberg, 2013). Social justice is typically compartmentalised into procedural and distributional justice, examining the processes (procedural) and outcomes (distributional) of adaptation planning (Adger et al., 2006; Grasso, 2007; Popke et al., 2016).

Distributional justice is incorporated in part in centralised UK policy-making, with a consideration of the impact of policy, in terms of costs and benefits across society, monitored in the Treasury Green Book (HM Treasury, 2016). Procedural justice, as well as the concept of being heard in decision-making processes (i.e. having recognition and not being misrepresented), is also about having views considered and being included in governance structures (Twigger-Ross et al., 2015). Procedural justice also involves empowering individuals so that they can take ownership of adaptation, for example providing prospective housing tenants with local flood information (Brisley et al., 2012). Many of the procedural justice characteristics aforementioned are present, at least in the narrative, of current Scottish Government legislation. Empowering communities so that they can adapt is a goal of the Scotland Climate Change Adaptation Framework (Scottish Government, 2009). Meanwhile, the Community Empowerment (Scotland) Act (2015) embeds in Part 2 of the Act (Community Planning) that local authorities have a duty to liaise with, consult, and discuss improvements of a local area with local community organisations, and also address socio-economic inequalities. However, the Act does not specify how all individuals will be consulted, instead focusing on members of community organisations. Mees et al's. (2016) analysis of citizen participation in European flood policy-making corroborates this for the UK, arguing that the UK is at the forefront of participatory policy-making, but engaging with some the most vulnerable individuals in society is still not yet achieved. Thus, there appears a gap in UK policy in terms of fully engaging with all aspects of the community. The extent to which this, and other aspects of social justice, is explored in flooding policy within the GCR, will be analysed in this report's third RQ.

There are many ways that justice can be defined, and some definitions are more sensitive to the idea of social justice than others. Schlosberg (2012) argues that justice is beyond a consideration of distributional impact and participation. It is also considering what individuals need to live, extending the idea of distributional impact to consider the varying needs of different members of society. This capabilities-based approach of considering justice has philosophical underpinnings of Amartya Sen's 'Equality of What' lecture in 1979, where it was argued that well-being is not solely about an individual's possessions, but about what they can achieve (Sen, 1980). The capabilities-based approach to justice contrasts, and adds a deeper meaning of social justice to, earlier philosophies of distributional justice: these include Rawl's difference principle (options that assist those most vulnerable), egalitarianism (true equalness) or utilitarianism (justice for the most people) (Nussbaum and Sen, 1993). UK policy-making has been analysed as adhering to utilitarianism justice principles (Mees et al., 2016), which isn't the definition of justice that is most sensitive to social justice (the capabilities-based approach). Therefore, UK policy may need to alter its theoretical foundations of justice to fully consider social justice.

2.4 Adaptation through a social justice lens

Much of adaptation theory lends itself to a social justice analytical frame. One of the first and highly cited analytical frameworks on assessing the merit of adaptation policy was that of Adger et al. (2005). One of the authors' four criteria for successful adaptation is legitimacy, which Adger et al. (2006) subsequently argue adaptation is not legitimate if it is not just. Legitimacy in adaptation can be sought through multi-stakeholder and community engagement (Prutsch et al., 2014), and in so doing adhering to procedural justice. An attribute of climate change adaptation and social vulnerability is that they are context-specific, unique to the location in question (Brisley et al., 2012; Prutsch et al., 2014), and that they are uncertain, because climate change science is not fully understood (Eakin et al., 2009; Prutsch et al., 2014). This raises ethical arguments for policy-makers, because the climate impacts on those most vulnerable in society could be greater than projected (Adger et al., 2006). Despite this, Adger et al. (2009) stress that uncertainty should not be an excuse for inaction on adaptation, as adaptation is required immediately, and uncertainty can be accounted for in decision-making.

Goldman and Riosmena's (2013) analysis of the adaptive capacity of Tanzanian Maasailand reveals another common theme in adaptation, identified also in the UK by Brisley et al. (2012) and Benzie (2014), that the strategies communities use to adapt are constantly changing with time, because climate change impacts are ever-evolving. Interestingly, Goldman and Riosmena (2013) found an escalation of climate change created a more unequal community, where those most affluent saw their adaptive capacity increase, but those most vulnerable saw their adaptive capacity decline. This echoes findings from Lemos and Dilling (2007) and Brisley et al. (2012) that climate change will exacerbate inequalities. It additionally mirrors Benzie's (2014) analysis of social justice in UK policy, where there is evidence that previous adaptation strategies have been maladaptive, in that they have increased the vulnerability of those most vulnerable to climate impacts. The underlying theme from these papers is that societal adaptation cannot be successful if it does not assist those most vulnerable and link to broader societal development (Prutsch et al., 2014).

In light of the above literature, this dissertation has combined Adger et al.'s (2005) framework for successful adaptation with Brisley et al.'s (2012) framework for successful social justice (figure 2.3, following page). This is to allow a consideration of adaptation policy in the GCR, in light of both the concept of social justice, and the objectives of successful adaptation. Regarding RQ3, it will be used to assess the success of current efforts of integrating social justice into adaptation policy.

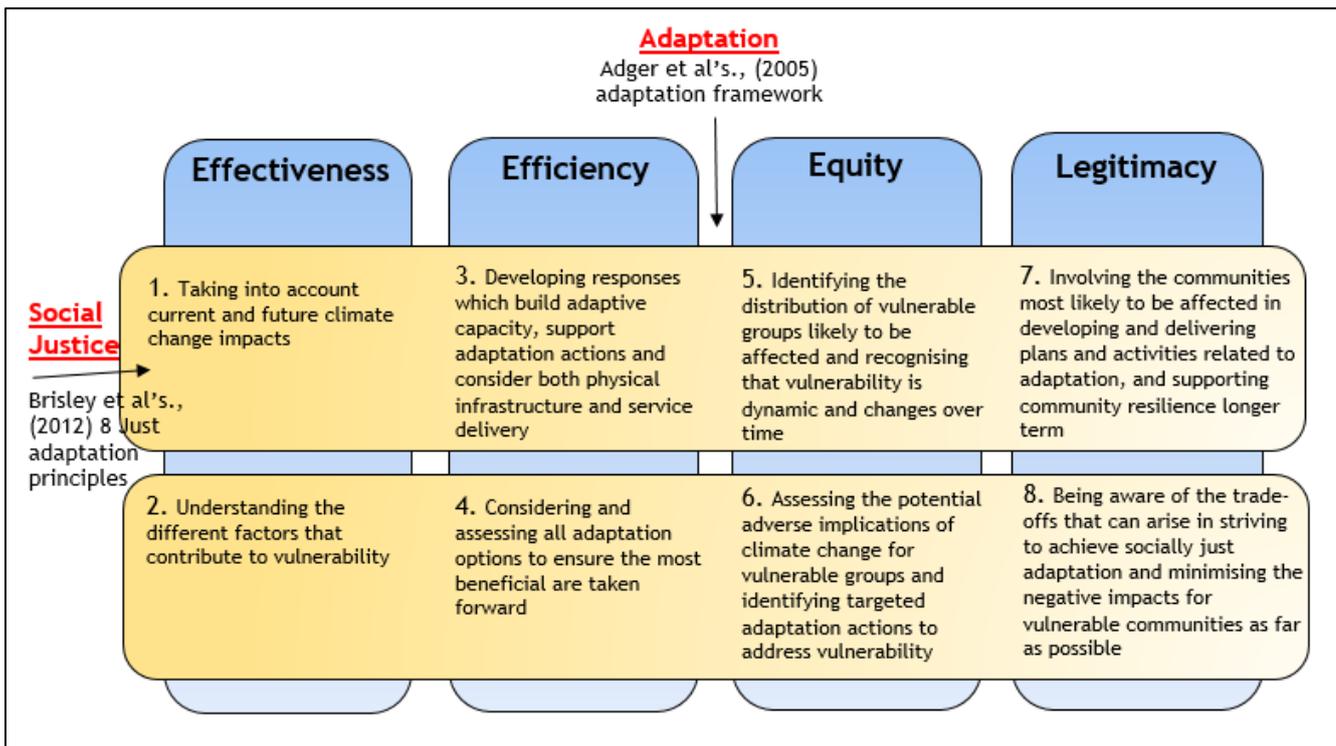


Figure 2.3 This study's hybrid analytical framework from Adger et al. (2005) and Brisley et al. (2012).

2.5 The incorporation of social justice in flooding adaptation – to what extent has it been considered?

There is consensus amongst literature that socially just adaptation is not fully considered in UK flood adaptation policy. There is some evidence that distributional justice is considered in other sectors, for example the 2010 Marmot Review (Marmot et al., 2010) commission by the UK government, which highlighted health inequality in the UK. For adaptation policy, the approach broadly adheres to either the risk-management, social vulnerability or resilience paradigm (Eakin et al., 2009), with Benzie's (2014) assessment of social justice in UK policy concluding that most policies favour a risk-management adaptation perspective, rather than social vulnerability. Benzie (2014), alongside Adger et al. (2009) and Ribot (2011), argue this is because social vulnerability is complex and constantly changing, (as seen in section 2.2), thus policy-makers prefer a more concrete policy approach. Lindley et al.'s (2011) assessment of socially just flooding policy in the UK found that vulnerability is expressed by personal and environmental factors, but still fails to fully consider social factors, that will interact with the two factors aforementioned. Twigger-Ross et al. (2015) argue that flooding policy remains centred on a reactive, rather than proactive response. Crichton (2002) analysed the narrative of vulnerability in flood insurance and found, similarly to the risk-management paradigm, that vulnerability is typically considered in terms of the susceptibility of buildings to a flood event, rather than an individual's social characteristics that render them vulnerable.

However, promising is new analysis by Fazey et al. (2017) that, for climate change adaptation in Scotland, policy has shifted from a risk-based to a more holistic, vulnerability-based perspective. There is therefore a key research question in to what extent Scotland is beginning to incorporate social justice in adaptation planning. The Climate Change (Scotland) Act (2009) obliges public bodies to report their adaptation actions annually under public duties reporting. Moreover, there is evidence of proactive policy planning and building adaptive capacity in, at least in the narrative of, the Climate Change Adaptation Framework (Scottish Government, 2009a). However, building adaptive capacity is described in the framework as giving individuals “the skills and tools to adapt” (Scottish Government, 2009, p.3), which suggests an inclination towards favouring autonomous adaptation, but arguably vulnerable individuals will need further support beyond their own means to adapt to flooding. Moreover, plans to engage the local community, for example through online flood information programmes, are absent in detail on how they will reach all societal groups (in this case, those without the time to engage with such information). Finally, social justice and vulnerability is mentioned in the Climate Change Adaptation Framework (Scottish Government, 2009a), but actionable policy is argued to be lacking (Chalmers et al., 2008). Thus, there is evidence that Scotland is more progressive than the UK on adaptation. This dissertation seeks to further such evidence by both analysing the extent of this progress, and secondly, analysing what the challenges are that hinder further progress on socially just adaptation. This will be analysed for the GCR using the analytical framework outlined in section 2.4.

2.6 Key challenges identified in literature of incorporating social justice

In assessing the incorporation of social justice into UK adaptation policy, literature identifies three key challenges for future socially just policy. Each theme will be addressed in turn, and reflected on in this study’s discussion in terms of whether the GCR faces similar challenges.

1. Trade-offs, subjectivity, and the need for transparency

An inevitable aspect of characterising vulnerability is that, as a subjective process, it will involve some biases (Adger et al., 2009). The significance of this is that the choice or policy approach taken will determine what actions will be proposed, and trade-offs will occur (Adger et al., 2009). A government, for example, may in some instances favour economic efficiency and fairness in social justice policy, whereas local communities affected by a flood may favour reducing vulnerability. For these reasons, much of literature (Adger et al., 2006; Adger et al., 2009; Eakin et al., 2009; Benzie et al., 2014) argues for transparency in any adaptation policy. It is thus important for policy to be explicit about chosen timeframes and subjectivities involved. This may centre on the choice of definition for social vulnerability, and the indicators used to create flood vulnerability maps.

2. Social justice and wider socio-economic development

The integration of social justice in adaptation policy raises questions of the wider socio-political landscape (Ribot, 2011). As Brisley et al. (2012) and Twigger-Ross et al. (2015) argue, achieving distributional justice in planning policy is constrained by the reality of austerity and reduced support for local flood defences.

Investment in flooding adaptation is particularly at risk because it is not ring-fenced in local authority budgets (England and Knox, 2015), thus local authorities requiring finance for more immediate priorities may spend the money elsewhere. Awareness of the impact of the wider political landscape has gained attention, being a distinct theme in the latest UKCCRA (Street et al., 2016) where in the previous assessment it was discussed as a policy recommendation (HR Wallingford, 2012).

3. The need for cross-sectoral policy support

To effectively achieve socially just adaptation arguably requires cross-sectoral support and embedding social justice in all areas of UK policy, not solely adaptation (Street et al., 2016; Sayers et al., 2017). Achieving both a united cross-scale and cross-sector approach to adaptation is argued in the latest UKCCRA (Street et al., 2016) as a key governance challenge at present. Socially just adaptation to flooding should also combine with socially just adaptation of other climate impacts, because climate impacts interact to dampen or exacerbate the original impact of flooding (Street et al., 2016).

This study will consider whether the gaps identified at the national level are the case for the GCR, in answering RQ3. Any gaps identified will then be explored by analysing European approaches to social justice that the GCR can learn from. This will be explored in RQ4. Section 2.7 below summarises this dissertation's RQs.

2.7 Aim and research questions

The aim of this project is to assess the challenges of achieving socially just adaptation for those most vulnerable to flooding in the GCR. This is in order to provide policy recommendations to better integrate considerations of social justice into adaptation planning in the future.

To answer this, the following RQs will be studied:

- RQ1. What is the scale of climate change for the GCR, and how might this impact on social justice?
- RQ2. What are the challenges in identifying vulnerable individuals to flooding?
- RQ3. What are the challenges in integrating social justice with adaptation planning?
- RQ4. What are the lessons learnt from other exemplar approaches to integrating social justice with adaptation?

3. Methodology

3.1 Area of study



Figure 3.1 Scotland (Google Maps, 2017a)

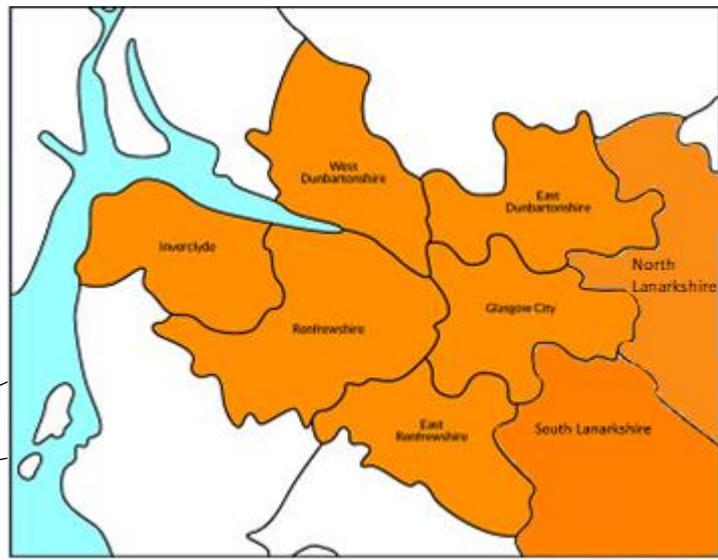


Figure 3.2 GCR (edited from Hub West Scotland, 2017)

This study analyses flood adaptation policy in the GCR. A case study approach was chosen to evaluate a local situation in depth, and identify context-specific challenges for policy-makers. As social vulnerability is context-specific (Prutsch et al., 2014), a general study of the UK would not pick up distinct local policy challenges, and be beyond the timeframe of a masters dissertation in order to analyse with equal case study depth. The GCR was chosen as the location of study because, as ascertained in this study’s literature review, Scotland is considered forward-thinking in adaptation policy, while the GCR is highly vulnerable to flooding: Glasgow is one of the top 24 UK cities of relative economic decline, while Scotland has the highest expected annual flood damage of any UK country (Sayers et al., 2017). The GCR is located in the western lowlands of Scotland, in the British Isles (figure 3.1, above left). It comprises of Glasgow City Council and seven other local authority councils (figure 3.2, above right).

Local Authority	Population	Buildings at risk	Annual damage (million)
Glasgow City Council	615,000	13,000	£10 m
North Lanarkshire	339,400	550	£0.73 m
South Lanarkshire	317,100	680	£1.9m
Renfrewshire	175,900	3,530	£4.4 m
East Dunbartonshire	107,500	(no principle risk areas)	(no principle risk areas)
East Renfrewshire	93,800	690	£1.1 m
West Dunbartonshire	89,900	3,200	£18.5 m
Inverclyde	79,200	1,300	£2.1 m

Figure 3.3. Population (ONS, 2017), buildings at risk, and annual damage for principle at risk areas (SEPA, 2015a) for the 8 local authorities in the GCR.

Figure 3.3 (previous page) provides related flood statistics for each council. As can be seen from figure 3.3, West Dunbartonshire is the most at risk economically from flooding. Findings from Sayers et al. (2017) corroborate this, where it was analysed that West Dunbartonshire is the second most at flood risk area in the UK, (from an average of flood risk indicators). To answer this project's four RQs, both qualitative and quantitative research methods were utilised, from both primary and secondary datasets. Mixed methods were chosen to allow analysis of physical flood risk, a quantitative concept, with social vulnerability, a qualitative concept. Combining research methods also allows a greater depth in research in terms of allowing corroboration of results from different types. The remaining sections of this methodology detail the data collection and analysis techniques used to answer each RQ.

3.2 Scale of change of climate impact, GCR (RQ1)

RQ1 is answered through an impacts-based approach (Benzie, 2014): the Met Office's (2009) dataset of physical climate projections, United Kingdom Climate Projections 2009 (UKCP09), is used to provide an overview of climate projections for the GCR until 2080. This includes temperature and precipitation projections, and is still considered robust in the value of projections given (Met Office, 2009). All main types of flood risk (coastal, fluvial, and pluvial) are considered here. Due to the time constraints of a masters dissertation, the impact of climate change was narrowed in scope to solely consider flooding. Flooding was chosen because it is a principle impact projected for the GCR (Street et al., 2016), and also because there exists secondary datasets that spatially map both social vulnerability to flooding and flood disadvantage (physical flood risk combined with social vulnerability) (Kazmierczak et al., 2015; Sayers et al., 2017), so that a social justice angle of analysis can be given. The Met Office's physical climate projections were analysed with Microsoft Excel using descriptive statistics (mean, median, interquartile ranges and standard error), to summarise the datasets' main trends.

3.3 Identifying vulnerability to flooding in the GCR (RQ2)

Two datasets are used to analyse the socio-spatial distribution of flood vulnerability in the GCR. The map by Kazmierczak et al. (2015) provides a value of present-day social vulnerability to flooding and flood disadvantage for different neighbourhoods in Scotland. This study also analyses a recent map published by Sayers et al. (2017), which includes future projections of flood disadvantage. This allows an analysis of how social vulnerability to flooding will change through time as the impact of flooding progresses (Met Office, 2009; Sayers et al., 2017). A gatekeeper from the Joseph Rowntree Foundation provided an introduction from which to ask permission to use the dataset. Analysing both maps attempts to fill a research gap in literature as detailed in the latest UKCCRA (Street et al., 2016), that social vulnerability has not yet been considered dynamically through time. Analysing both maps also overcomes the bias as identified by the Environment Agency (2005), that by providing a comparative value of vulnerability, the maps are sensitive to their area of analysis. In other words, the Sayers et al. (2017) UK wide dataset will likely provide a different flood disadvantage profile of the GCR than the Kazmierczak et al. (2015) Scotland map. Analysing both datasets thus allows any discrepancy in social vulnerability score to be transparent.

Both quantitative and qualitative analysis, as discussed by Glatthorn and Joyner (2005), is used to analyse the floods maps, allowing a thorough analysis of data which may not be picked up through quantitative or qualitative techniques alone (Babbie, 2013). Both datasets were analysed for their social vulnerability to flooding scores, and their flood disadvantage scores. Mapped Kazmierczak et al. (2015) data as prepared by England (2017a; 2017b) was used. The Sayers et al. (2017) dataset was mapped onto GIS software by overlaying both the Neighbourhood Flood Vulnerability Index (NFVI) (a score of social vulnerability to flooding) and Social Flood Risk Index (SFRI) (a score of flood disadvantage) metrics from the dataset onto the shapefile of local authority boundaries. This was done by linking to the location 'code'. Z-scores, scores that represent a data's standard deviation, were manually classified onto GIS in accordance with the report's associated score boundaries (Sayers et al., 2017). The Sayers et al. (2017) dataset was also analysed using the inferential statistic, the Students T-Test, to investigate whether the visual difference in z-scores observable on the GIS maps are statistically significant, to a 95% confidence limit. Appendix A.1 details the t-test result.

3.4 Socially just adaptation: evaluating current progress (RQ3)

To evaluate the current incorporation of social justice in adaption policy within the GCR, this study conducts fourteen semi-structured interviews. Semi-structured interviews were chosen to gain in-depth qualitative data, which allows a degree of flexibility on interview content, depending on interviewee response (Babbie, 2013). Eight interviews were conducted with a representative of each local authority in the GCR. This systematic sampling strategy (Babbie, 2013) was chosen to gain an understanding of how social justice may be incorporated differently within each of the eight local councils. For many local authorities, interview data was collected in addition to written responses of initial interview questions, which allows a corroboration of the findings from interview data. Written responses were additionally collected for interviewees who preferred initially responding in written form prior to interviews. This also overcomes validity limitations in semi-structured interviews, where the technique has been criticised in literature as involving some subjectivity, in terms of what topics the interviewer chooses to ask follow-up questions about (Franklin and Blyton, 2011). This dissertation is sensitive to the subjectivity which underpins social research. For example, interview data is analysed with an awareness that the interviewer is not external to the conversation data, and that interview questions composed will inevitably reflect the worldview of the interviewer (Farganis, 2011).

The remaining six interviews were conducted with social justice experts, to compare local authority interviews with an expert, in-depth view of the incorporation of social justice in UK policy at present. A judgemental sampling strategy (Babbie, 2013) was chosen to identify interviewees, based on who has extensive experience in the field, which will inevitably involve some bias (Babbie, 2013). Information and informed consent letters (see appendix A.2 for copies of both) were provided to interviewees prior to interviews, and prior consent sought for any voice recording. This is in accordance with the ethical principles of informed consent, anonymity, and confidentiality in social research as detailed by Franklin and Blyton (2011) and the University's Information Protection Policy (University of Leeds, 2017a) and Research Data Management

Policy (University of Leeds, 2017b). See Appendix A.3 for a copy of interview questions, and Appendix A.4 for an extract of an interview transcript.

A colleague from the organisation Climate Ready Clyde acted as a gatekeeper for contacting all local authority interviewees and some social justice expert interviewees, having worked with them previously. Other interviewees were contacted from meeting at the 3rd European Climate Change Conference (ECCA) in June 2017, and via email. Interviews were conducted in person during ECCA, or alternatively by phone or by Skype. Interview recordings were transcribed into interview transcripts, and subsequently analysed using the software NVivo (see Appendix A.5 for evidence of interview analysis using NVivo). Thematic discourse analysis was conducted whereby the most common themes were established by axial coding across interviews (Bazeley and Jackson, 2013). Due to the time and labour constraints of a masters project, it was not possible to organise workshops with community stakeholders, as has been utilised in previous methodologies analysing socially just adaptation (Fazey et al., 2017). The limitation of this is that social vulnerability in this research is not being defined directly by the individuals in question, rather by social justice experts or practitioners, and this will inevitably involve some bias in results. To ascertain a deeper understanding of social vulnerability in the GCR, this research could be extended further by liaising with local communities, to corroborate initial findings that have been identified here, from use of this study's analytical framework to highlight gaps in the current adaptation approach.

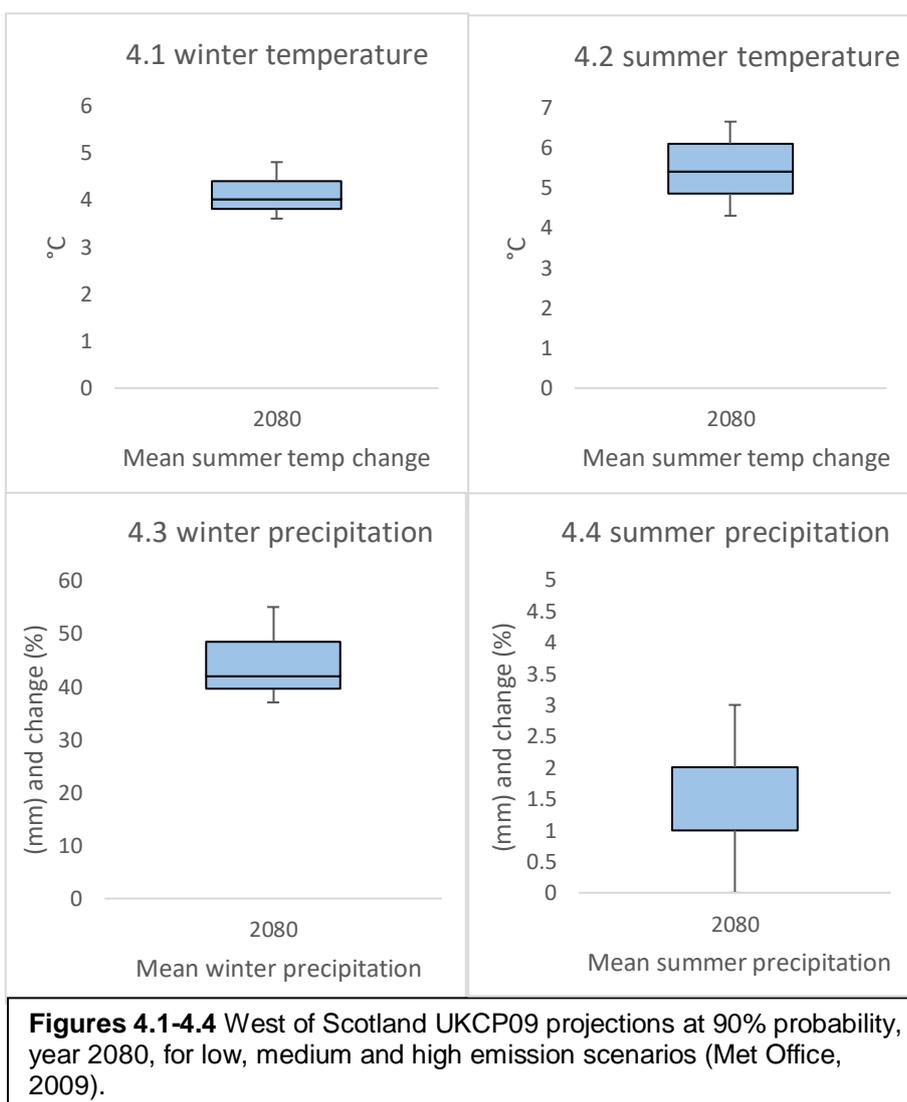
3.5 Lessons learnt from other approaches to integrating social justice in adaptation (RQ4)

Lastly, data analysed thus far was supported with evidence of socially just adaptation planning at the European level, to compare and further analyse the extent to which social justice is incorporated into adaptation. To do this, an analysis of exemplar European case studies of social justice was conducted. A shortlist of case studies was prepared through interviews with the European Environment Agency (who are currently analysing socially just adaptation in Europe), through presentations at ECCA, and through a systematic search of case studies on the European Climate-ADAPT database (see appendix A.6 for further information). Three exemplar case studies were chosen from this shortlist for analysis, considering the current gaps in GCR adaptation policy as highlighted in analysis for RQ3. Case studies were not restricted to English-language documents. The hybrid analytical framework (see figure 2.3) was also used to analyse each case study in terms of the lessons that could be learnt for the GCR.

4. Results

4.1 RQ1 – climate projections and scale of climate change, GCR

Figure 4.1 (top right) and figure 4.2 (top far right) show the median, interquartile ranges and extremes in winter and summer temperature change projected by UKCP09 for the West Coast of Scotland at 2080. The range in projection is for three climate change scenarios (low, medium, and high future emissions) (Met Office, 2009). Figure 4.3 (bottom right) and figure 4.4 (bottom far right) show the corresponding rainfall projections. Data is of a 90% probability level, the Met Office’s most severe probability level, described as “Very unlikely to be greater than” (Met Office, 2014, p1). Therefore, Figures 4.1-4.4 represent the higher end of climate change projections.



Figures 4.1-4.4 demonstrate that the west of Scotland is projected to have milder, wetter winters, and warmer, slightly wetter summers. At 2080, mean winter precipitation change across the low, medium and high emission scenarios is a 44% increase. Considering this in light of the current climate, today’s January rainfall of 202 mm (Met Office, 2017) could increase to 291mm. Similar results were discussed in interviews with a local authority, who spoke about the recent reappraisal of SEPA’s pluvial maps from a 1 in 30 year flood event to a 1 in 5 event, signalling flood risk is becoming more extreme. The GCR therefore has just a few decades to adapt drainage systems to a significantly higher monthly rainfall. The range of winter rainfall projections is 37-55% increase, and so local planning must also contend with uncertainty when adapting the GCR to increased winter precipitation. The precipitation projections, lying at the upper-end of estimates, are nevertheless of a similar magnitude to observed trends: between 1961-2006, winter precipitation increased 58.2% across the west of Scotland, the second-highest observed increase across the UK (Met Office, 2009).

4.2 RQ2 – identifying social vulnerability to flooding

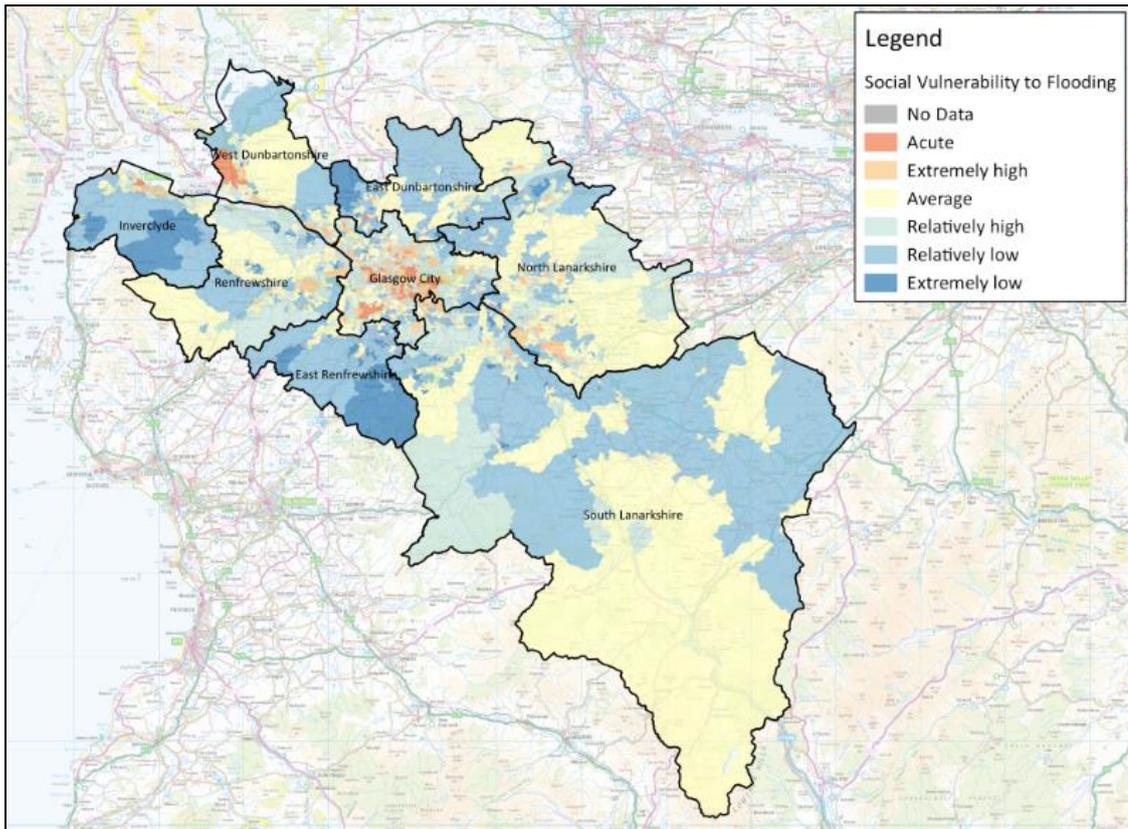


Figure 4.5 (England, 2017a, mapped from data by Kazmierczak et al., 2015). Social vulnerability to flooding for the GCR.

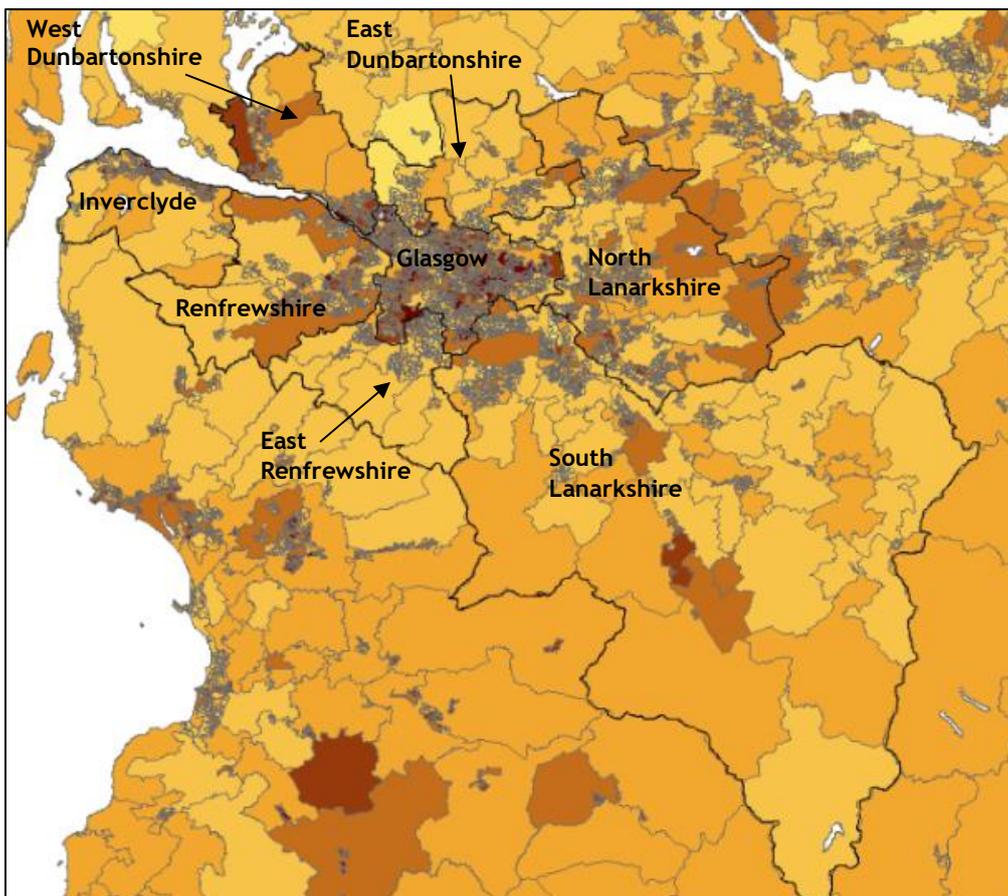
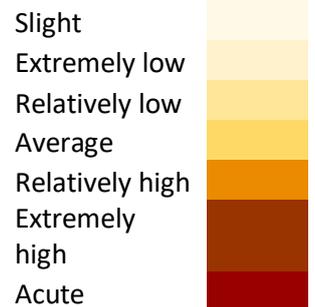


Figure 4.6 Neighbourhood Flood Vulnerability Index (NFVI) (also known as social vulnerability to flooding), the GCR. Mapped onto GIS by data taken from Sayers et al. (2017). Areas that are white equate to no score.

Map Scale – vulnerability classification



Figures 4.5 and 4.6 reveal the GCR has a complex pattern of distributional social vulnerability to flooding. The GCR contains areas acutely vulnerable and areas at a relatively low vulnerability. Nevertheless, the majority of local authorities have neighbourhoods with a vulnerability score higher than Scotland's average. There is general agreement with both the Kazmierczak et al. (2015) and the Sayers et al. (2017) maps, in terms of the spatial pattern of social vulnerability to flooding. The most vulnerable neighbourhoods are found along the river Clyde and in the city of Glasgow. However, there are pockets of higher vulnerability areas in other local authorities. One notable discrepancy between the two flood maps is that the central area of South Lanarkshire has an acutely vulnerable area on the Sayers et al. (2017) map, whereas the Kazmierczak et al. (2015) map found a comparatively average flood vulnerability. The maps reveal a visual distinction between neighbourhoods, but a statistical test (t-test) was conducted to investigate whether the z-score results for two neighbourhoods are statistically different. Chosen were the neighbourhoods of Greenock in Inverclyde and Carstairs in South Lanarkshire; of different vulnerability classifications on the Sayers et al. (2017) map. To a 95% confidence limit, the t-test found the two areas analysed are not statistically significantly different in z-score (p value = 0.06).

	Kazmierczak et al. (2015)	Sayers et al. (2017)
Unit of vulnerability	Community-level Scores are standard deviation z-score values, as a comparison to mean value	Community-level Scores are standard deviation z-score values, as a comparison to mean value
Relevant metrics	Social vulnerability to flooding (Fig. 4.5) Flood disadvantage (Fig 4.8)	Social vulnerability to flooding (NFVI) (Fig 4.6) Flood disadvantage (SFRI) (Fig 4.9)
Scope of analysis	Scotland	United Kingdom (UK)
Dynamics of vulnerability	Present-day	Present-day Future vulnerability accounted for in SFRI dataset (see figure 4.10) including estimates of population change and future adaptation
Calculation of flood disadvantage	An individual's sensitivity x adaptive capacity x exposure	characterisation as used in Kazmierczak et al. (2015)
Areal unit	6,506 data zones across Scotland, each containing 500-1,000 residents	Average population density of data zones: 760 residents

Figure 4.7 Methodological comparison of Kazmierczak et al. (2015) and Sayers et al. (2017) vulnerability maps.

Figure 4.7 above compares headline methodological aspects of both studies, in order to investigate the challenges in identifying vulnerable groups. Both studies have a similar characterisation of social vulnerability and areal unit (both use data zones of population density of several hundred citizens). Where they differ is the geographic extent included in analysis. Sayers et al. (2017) is a dataset for the whole of the UK, not just Scotland, and uses population and other projections to give a future consideration of vulnerability in their related flood disadvantage (SFRI) metric. As community flood vulnerability scores, both maps' zonal classifications are area averages. A limitation with this is that areas with an average or low community

vulnerability, but a small number of highly vulnerable individuals, would nevertheless score relatively low. Another cause for discrepancy is the choice in data to inform vulnerability indicators. For example, both studies use slightly different, indirect indicators for estimating crime in each dataset. They may also use datasets of different years; Kazmierczak et al. (2015) utilises census data from 2001, although the authors argue that most data zones have seen little change in population since.

Flood disadvantage metric

Both studies combine their social vulnerability to flooding metrics with physical exposure to flooding. Figures 4.8 and 4.9 (following page) reveal the social vulnerability metric overlaid with physical flood risk to produce a flood disadvantage metric. Note that the Sayers et al. (2017) Social Flood Risk Index (SFRI) is the metric for flood disadvantage, not the metric for social vulnerability to flooding, which is the Neighbourhood Flood Vulnerability Index (NFVI). The Kazmierczak et al. (2015) dataset combines the social vulnerability metric with risk of all three main types of flooding (fluvial, coastal and pluvial) whereas the Sayers et al. (2017) SFRI metric chosen combines the social vulnerability metric with risk of two main types of flooding (fluvial and coastal).

Comparing figure 4.8 (following page) of flood disadvantage with social vulnerability (figure 4.5, p.19) from the Kazmierczak et al. (2015) dataset reveals some differences in neighbourhood classification. For example, in figure 4.8, the coast of Renfrewshire along the River Clyde has relatively high flood disadvantage, but in figure 4.5, the same area has below average social vulnerability. The area is therefore at high risk of flooding, but comparatively lower in social vulnerability, when compared to the whole GCR. Therefore, in addition to differences between datasets, there is also a difference in result within a dataset, depending on whether social vulnerability is combined with other metrics.

Lastly, comparing Sayers et al. (2017) present flood disadvantage (SFRI) (Figure 4.9, following page) with flood disadvantage under a 4°C climate change future at 2050 (Figure 4.10, p.23) reveals some differences. The 4°C climate change metric reflects a realistic future scenario of minimal climate change mitigation (Sayers et al. 2017). In comparison, the UKCP09 projections in RQ1 reflect the full range of emission scenarios (Met Office, 2009), in order to investigate the full range of projections. Analysing the most severe climate change scenario for RQ2 rather allows a consideration of the most severe possible outcome for social vulnerability amidst climate change. Under the 4°C climate change scenario, projections are mixed, with some areas of Glasgow found less flood disadvantaged in the future, whilst some areas are more flood disadvantaged.

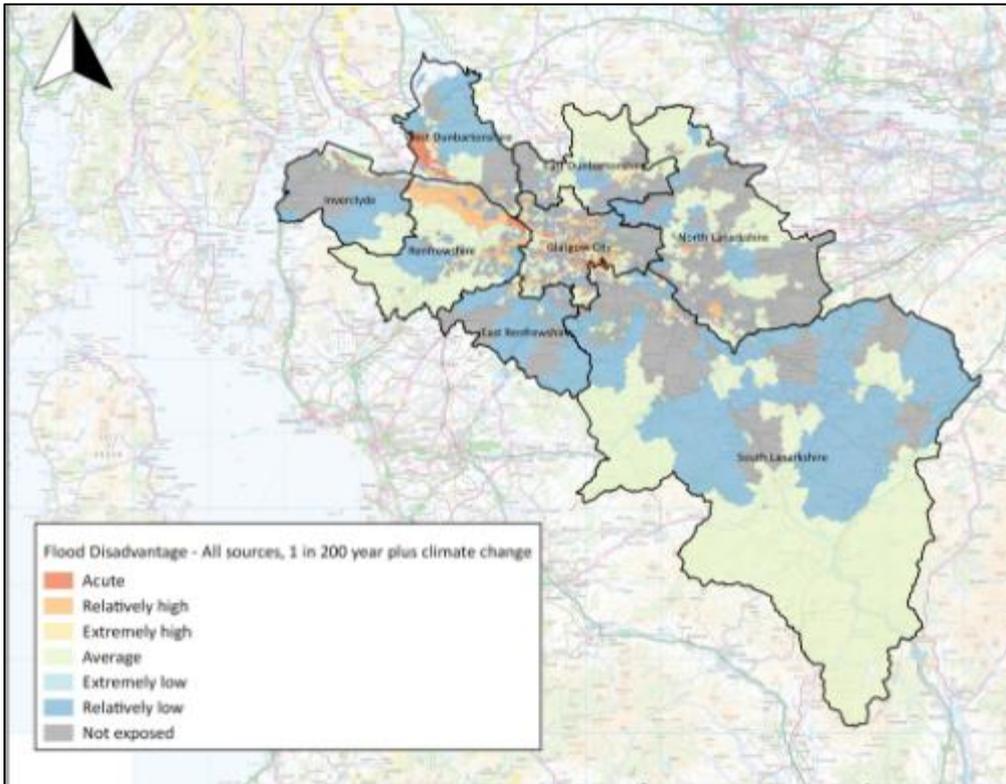
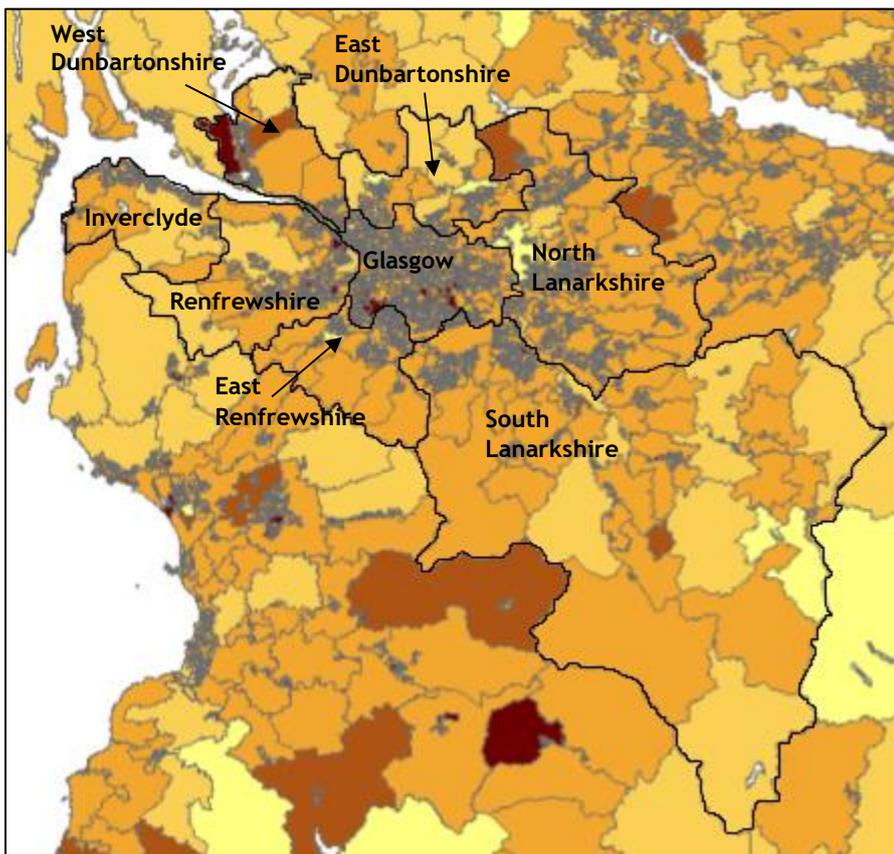
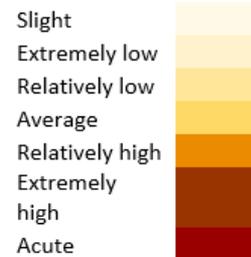


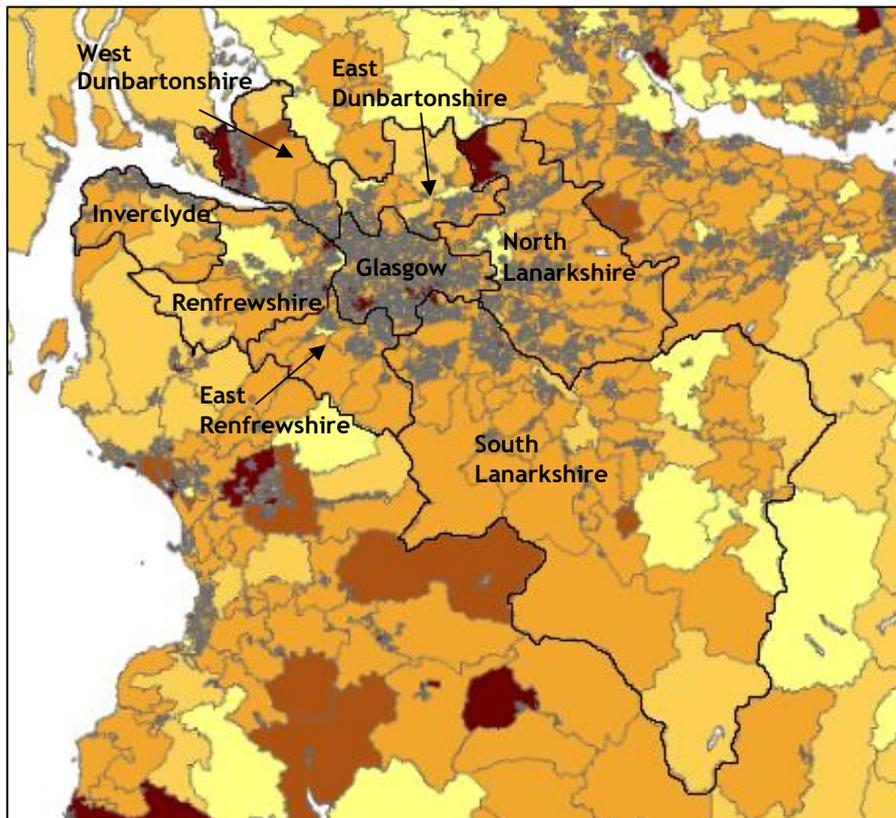
Figure 4.8 (England, 2017b, mapped from data by Kazmierczak et al., 2015). Flood disadvantage for the GCR (1 in 200 year flood return), including climate change and all types of flooding (pluvial, fluvial, coastal).



4.9 Present-day Social Flood Risk Index (SFRI) for the GCR (flood disadvantage). Mapped by data taken from Sayers et al. (2017). Includes coastal and fluvial flooding.

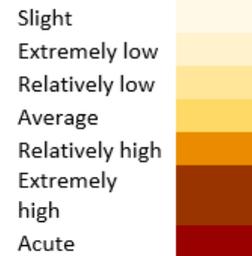
Map Scale – vulnerability classification





4.10 2050 Social Flood Risk Index (SFRI) for the GCR (Flood disadvantage), under a 4°C climate change scenario. Mapped by data taken from Sayers et al. (2017). Includes coastal and fluvial flooding.

Map Scale – vulnerability classification



4.3 RQ3 – current extent of social justice in adaptation planning

Figure 4.11 (below) provides an overview of the most common themes identified in interviews, highlighted by axial coding. The key findings will now be discussed in turn.

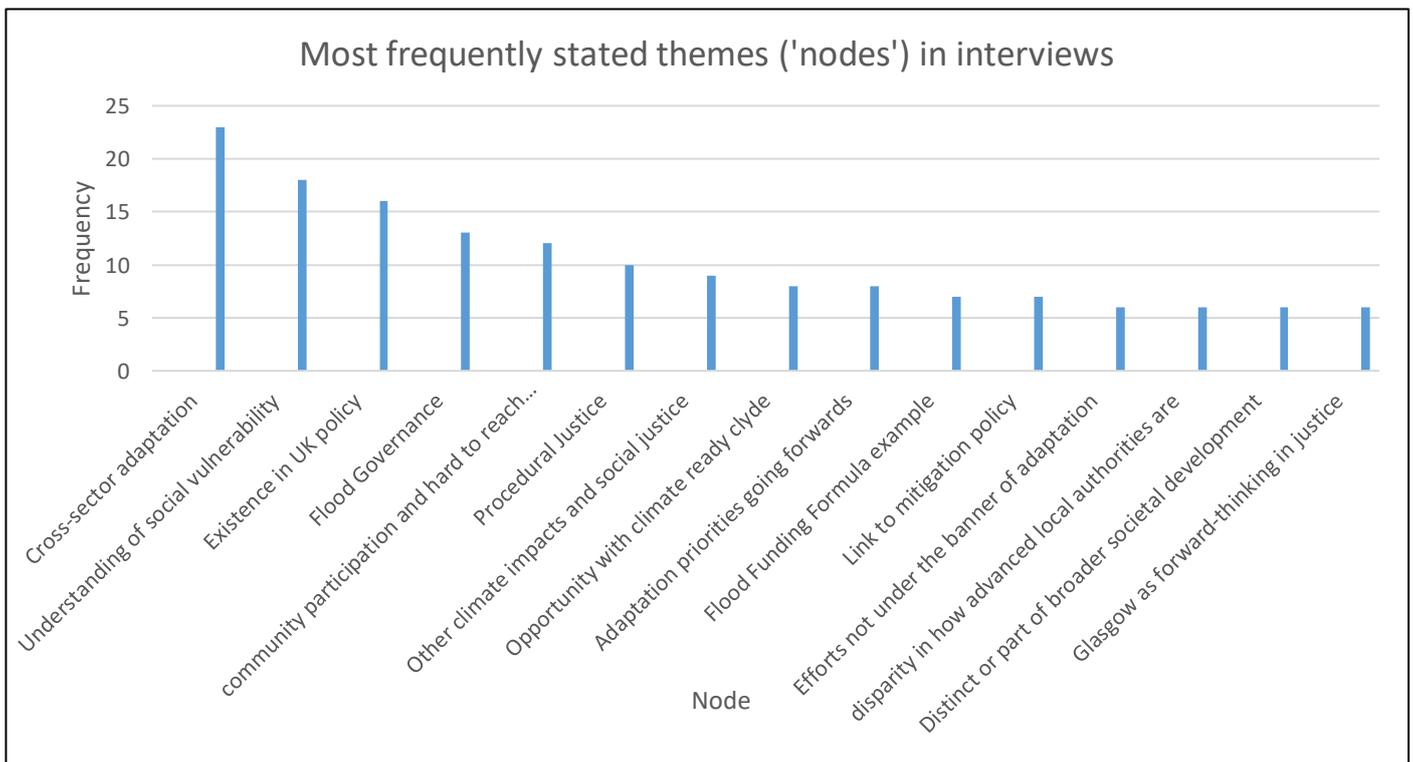


Figure 4.11. Summary graph of interview nodes (most common themes of interviewees)

Interview results: social justice experts

Social justice is beginning to be incorporated into UK adaptation planning, but this is rather in terms of awareness than actual policy, and what evidence there is of policy incorporation tends to be specific cases for specific projects, rather than systematic.

“Domestically it’s patchy, and we don’t really think about it in a systematic way”

“The requirement [with the Flood Funding Formula] to bring in additional funding to get schemes off the ground could effectively prejudice the areas that have less resources”

Most interviewees highlighted the Flood Funding Formula as an example of distributional justice in UK policy, where an uplift in funding is provided for addressing flood risk in deprived communities. However, interviewees highlighted several issues with the formula translating into greater support, including that to receive grant funding relies on a successful bid of partnership funding by the local community, not easily obtainable in some locations.

The concept of socially just adaptation is not yet present across policy sectors, although there is some evidence that it is being considered in planning, public health and climate change mitigation.

“There is general awareness that it is an important issue...but it does tend to be in the more local planning settings”

“In Scotland there is debate on EU Membership and Independence Referendum, which dominates political landscape and reduces headspace for thinking”

Where policy needs to improve, is in achieving a systematic, cross-sector understanding of socially just adaptation in other areas of policy-making. In other words, embedding the concept across transport, housing and other policy. A key challenge highlighted by interviewees is that this task sits alongside a busy political landscape at present, with austerity, Brexit, and even climate change mitigation, superseding the focus on flooding adaptation.

The nuances of the concept are not yet understood by policy-makers, because the patterns of social vulnerability to flooding are complex. This renders it challenging to fully represent the concept in social and environmental policy-making.

“There is no one agreement, even in academic literature we don’t find clear definitions”

“You might have, say elderly middle class people who aren’t in brilliant health, but are perfectly capable of taking care of themselves”

“You have the same issues when you talk about poverty, people don’t necessarily recognise themselves as such and don’t like being labelled”

A key theme highlighted by interviewees is that vulnerable individuals or communities can also be resilient to climate change and able to adapt to flooding, due to for example social capital that can assist them. Many communities may disagree or feel stigmatised with being classified as a vulnerable social group. The socio-

spatial vulnerability maps to flooding available for policy-makers, although hugely beneficial in adaptation planning, are not nuanced enough to solely highlight the distributional picture of flood vulnerability.

There is evidence of procedural justice, but a gap in engaging with hard-to-reach societal groups.

Many interviewees argue that some communities have less of a voice in terms of processes and outcomes in decision-making.

“There are big questions (on projects) about who is in the room and who comes to these engagement activities... and there is some area of working with community groups as intermediaries”

The idea of utilising intermediaries, such as existing community groups, charities, and Non-Governmental Organisations (NGOs), to reach marginalised individuals, was principally discussed as a possible solution to more successfully delivering procedural justice.

Considering the broader adaptation agenda, many interviewees expressed that flooding has the most advanced understanding in policy.

“There are levels for flood risk assessment and local authorities do strategic risk assessments, but I think a big area, a chasm as whole, is overheating”

Looking forwards to the future, a priority area is adaptation to heat, particularly in relation to social care and health.

Climate change mitigation was simultaneously addressed at length by interviewees alongside adaptation.

“We see a lot of integration between mitigation and adaptation, at the EU level there is a strong drive to integrate these issues...it makes the system more complex...but the system by nature is very interlinked”

It appears evident that there is a real opportunity, and advantage from, incorporating social justice into both climate change policy spheres, rather than considering both in isolation.

Interview results: local authority representatives

Corroborating the view of social justice experts, social justice is beginning to be incorporated into local adaptation and wider policy planning, but is not yet fully advanced.

“Work might not be headed as adaptation, but we are trying to find out within our own organisation all the stuff that comes under that. That’s the stage we are at, at the moment”

There is multiple evidence from interviewees that reducing social vulnerability already exists in local authority work, but more often than not, it is not formally linked to adaptation policy.

There is disparity in how advanced different local authorities in the GCR are in terms of understanding of socially just adaptation.

“I’m certainly trying to get them to think in that way, to think more of a holistic adaptation, but I don’t think it’s quite caught hold of yet”

“In that forum I can talk about things such as climate change adaptation and try and promote it... branch out and get people together”

However, all interviewees spoken to had a sophisticated understanding of the concept. Many expressed the view that the pressing challenge is disseminating such knowledge across the council, to systematically embed the concept. Interviews revealed cross-sector local authority understanding with colleagues is minimal at present. Similarly, the Public Sector Climate Change Duties (2015) Report from Local Authorities reveals that vulnerable areas are still considered largely in terms of physical flood risk.

Similarly to the views of social justice experts on cross-sector adaption planning, there is evidence that adaptation objectives are considered alongside planning, evident in several local authority development plans.

“To a certain extent, yes. So within legislation there is a section about planning to have regard to what’s within the local flood risk management plans”

The Climate Change Act (2009) and Flood Risk (Scotland) Management Act (2009) dictate that all local authorities must adhere to the Acts, and consequently, housing strategies cannot develop without consultation of how it will impact flood management. In particular, regarding the use of green infrastructure to deliver adaptation, societal development, planning, and mental health objectives. There was little evidence of aligning objectives across other sectors.

There is evidence of procedural justice in the GCR.

“We had a very extensive community engagement... 3500 local residents...in some instance from those more hard to reach groups”

“We use multi agency assessments from the community risk register... and we do lots of partnership funding”

The GCR’s Clyde and Loch Lomond Flood Risk Management Plan (Glasgow City Council, 2016) engaged local communities through two public consultations. However, there was on the whole little evidence from interviews in how hard-to-reach groups are considered in the consultation process for the management plan. In particular, plans for Potentially Vulnerable Areas (SEPA, 2015b), mention engaging solely with businesses and certain community groups (rather than all members of the community). Participation in adaptation policy mirrors the trend at the national level described by social justice interviewees, in that it typically incorporates community groups that are not fully representative of the wider local population.

Considering the broader climate change agenda, adaptation to flooding is enacted separate to local authority work addressing other climate impacts.

“Is flooding enacted alongside work on heat risk, or other impacts? No, I wouldn’t say so at present”

“Most people in the council don’t know what climate adaptation is...they would automatically go to talk about carbon reduction”

The discussion from many interviewees highlighted that climate change mitigation is more evidently incorporating social justice concepts than adaptation policy at present.

There is a real opportunity, noted uniquely by each local authority interviewee, of furthering the ground on socially just adaptation going forwards, with the Climate Ready Clyde (CRC) initiative.

“We certainly don’t at this stage. Maybe being part of CRC might help us look towards that”

“But as we get more into CRC that’s an area I’m particularly interested in, especially when our councils driving more looking at social injustice, poverty”

Focusing on cross-sector dialogue with the whole GCR, the initiative has the framework and attributes to address the key gaps aforementioned in current policy.

To address current challenges requires an attention to flooding, adaptation and social policy governance.

“Flooding is a physical event...but we’ve drawn for political purposes boundaries in a completely arbitrary way. Complexity is driven by reality”

As can be seen from figure 4.12 on the following page, policies relevant to socially just adaptation is a complex picture, not confined to adaptation and flood risk management. There is also cross-over between mitigation and adaptation policies at the national level. The governance picture within each policy is also complex. For example, flood risk management for the eight local authorities in the GCR is contained in the Clyde and Loch Lomond Flood Risk Management Plan (2016), but two other local authorities (Argyll and Bute and Stirling councils) are included in the plans. This highlights that flood governance follows catchment, rather than local authority boundaries. Scottish Water, SEPA, National Parks and the Forestry Commission all have joint responsibility to enact the plan.

Many interviewees did not work in adaptation in isolation across the council, but highlighted the difficulty in aligning work across different departments. Additionally, the Flood Risk Management (Scotland) Act (2009) was created as Scottish Law in accordance with the European Commission Floods Directive. It is an open question of future governance whether there will be changes to the Act during the repeal process of European Law amidst the UK exiting the European Union (EU). Lastly, it is important to note that flooding, alongside all emergency response apart from terrorism, is the responsibility of the devolved Scottish Government. Nevertheless, many UK policies interact in the governance of social justice and adaptation policy.

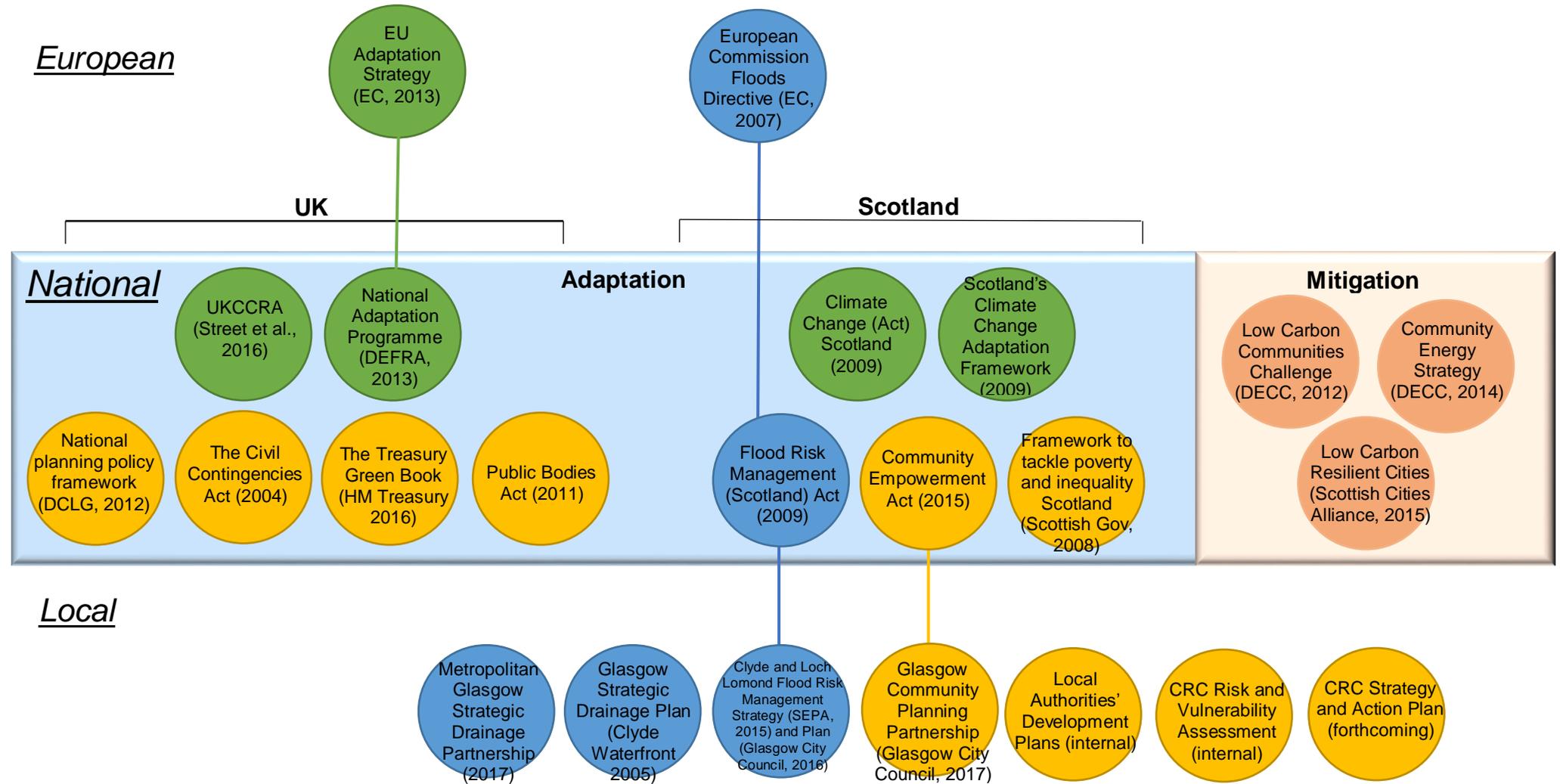


Figure 4.12. Socially Just Adaptation Governance. Policy landscape of social justice and flooding adaptation for the GCR, as ascertained from interviews (non-exhaustive). Principle policies, frameworks, and strategies are identified at the local, national and European level. A distinction between UK and devolved (Scottish) policy is given, as well as adaptation and mitigation policy. Policies are characterised as adaptation (green), flooding (blue), mitigation (red), or other sector (yellow).

Analytical framework

Considering this study's hybrid analytical framework, which uses Brisley et al.'s (2012) 8 just adaptation principles and Adger et al.'s (2005) four criteria for successful adaptation, the framework is used to evaluate adaptation to flooding policy in the GCR from interview results. Please see appendix A.7 for information on how the score was graded.

No.	Socially just principles	Criteria for successful adaptation	GCR
1	Taking into account current and future climate change impacts	<i>Effectiveness</i>	Evidence of consideration
2	Understanding the different factors that contribute to vulnerability	<i>Effectiveness</i>	Evidence of consideration
3	Developing responses which build adaptive capacity, support adaptation actions and consider both physical infrastructure and service delivery	<i>Efficiency</i>	Evidence of consideration
4	Considering and assessing all adaptation options to ensure the most beneficial are taken forward	<i>Efficiency</i>	Evidence of consideration
5	Identifying the distribution of vulnerable groups likely to be affected and recognising that vulnerability is dynamic and changes over time	<i>Equity</i>	Some evidence
6	Assessing the potential adverse implications of climate change for vulnerable groups and identifying targeted adaptation actions to address vulnerability	<i>Equity</i>	Not considered
7	Involving the communities most likely to be affected in developing and delivering plans and activities related to adaptation, and supporting community resilience longer term	<i>Legitimacy</i>	Some evidence
8	Being aware of the trade-offs that can arise in striving to achieve socially just adaptation and minimising the negative impacts for vulnerable communities as far as possible	<i>Legitimacy</i>	Not considered

Figure 4.13 Evaluation of current efforts of flooding adaptation policy in the GCR through Brisley et al.'s (2012) 8 just adaptation principles. These are classified into one of Adger et al.'s (2005) four successful criteria for adaptation policy. Green = evidence of consideration, Orange = some evidence of part consideration, Red = not considered.

4.4 RQ4 - lessons learnt from exemplar efforts to integrate social justice and adaptation

Analysing interview findings through this study's analytical framework, it is observable that there are several key gaps in socially just adaptation policy that the GCR is yet to incorporate. Figure 4.13 reveals that principles 5 and 7 are considered somewhat, while principles 6 and 8 are yet to be fully considered. This study next analyses the lessons learnt from three case study adaptation policy approaches in Europe, which achieve principles 5-8. For further detail on each case study, please see appendix A.8. Only case study details relevant to the analytical framework, and transferable policy lessons for the GCR, are included below. Some case studies focus on adaptation to heat, but include wider lessons on adaptation relevant to flooding, the focus of this dissertation.

Case Study 1. Heatwave Adaptation Strategies, Nice (Ministère de la transition écologique et solidaire, 2017) and Paris, (Agence d'Écologie Urbaine, 2015) France

Principle 5:

5	Identifying the distribution of vulnerable groups likely to be affected and recognising that vulnerability is dynamic and changes over time	<i>Equity</i>	Some evidence
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The narrative of this policy approach in France on adaptation planning to heatwaves is an example of local-scale, community self-organisation. In both cities, a register is drafted of vulnerable individuals who are disproportionately impacted by heatwaves. A formalised register allows practitioners to identify and plan adaptation actions, and it can be readily updated over time. Additionally, individuals rather than neighbourhoods are documented, which provides a higher resolution of vulnerability than the community-level flood vulnerability maps in the UK. Indicators of vulnerability used include those over 65 living alone, those over 60 who are housebound, those who are disabled, and those with a health condition. Recognising multiple indicators reveals a dynamic approach to assessing individual vulnerability, and although the indicators used are specifically relevant to heat impacts, the idea of using multiple indicators is transferable to flooding adaptation. When a heatwave has been announced, vulnerable individuals are contacted face-to-face by a community representative, who will direct the individual to a health or social service, should they require it. It is an example of formalising equity into adaptation policy, the second of Adger et al.'s (2005) four criteria for adaptation, as the approach is embedded in France's Heatwave Plan and National Adaptation Strategy.

Case Study 2. The Delta Programme, the Netherlands (Government of the Netherlands, 2017)

Principle 7:

7	Involving the communities most likely to be affected in developing and delivering plans and activities related to adaptation, and supporting community resilience longer term	<i>Legitimacy</i>	Some evidence
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The narrative of this policy approach is one centred on bottom-up, distributional and procedural justice, where flood defence responsibility is divided across the country into zones, and communities within each zone are responsible for the protection of dykes. This fully participatory approach of devolved responsibility to communities gives the project legitimacy in adaptation planning. The policy approach is holistic, with three simultaneous objectives; flood risk management, water availability, and climate-proofing design that works in tandem with local planning and development. With top-down influence, flooding and adaptation is cross-sectorally embedded in policy, with a clear structure of plans and frameworks. It is therefore a good example of formalising adaptation into policy and co-ordinating response, and formalising puts community resilience onto the policy agenda for the long-term. The writing style of the Programme's Strategy is distinctly different to some UK policy documents (that is, clear objectives in a set time-frame). Another advantage in terms of

legitimacy of the programme is that different regions and different stakeholders within each region communicate to enact the strategy.

Case Study 3. SHINE project, Islington (Islington Council, 2017; Burchell et al., 2017)

Principles 6 and 8:

6	Assessing the potential adverse implications of climate change for vulnerable groups and identifying targeted adaptation actions to address vulnerability	<i>Equity</i>	Not considered
8	Being aware of the trade-offs that can arise in striving to achieve socially just adaptation and minimising the negative impacts for vulnerable communities as far as possible	<i>Legitimacy</i>	Not considered

A London borough originally linking social care with mitigation and social justice by tackling fuel poverty, the scheme has since been expanded to consider adaptation to extreme heat and cold. The project socio-spatially maps vulnerable populations to create a database of vulnerable individuals to climate change. This was further supported by working alongside existing community groups, NGOs and charities, to determine who within the community is most vulnerable to extreme heat and cold. Community groups visit vulnerable individuals and offer services, such as providing cool packs and advice on adapting to weather extremes in their home. This reveals a tailored adaptation approach, where the likely climate change impacts on vulnerable groups have been recognised and addressed accordingly.

The narrative of this approach centres on achieving social care, which in tandem addresses climate change mitigation and adaptation objectives. The scheme has multiple objectives, demonstrating a core aim is to embed adaptation across social policy areas, in one policy approach. Not delivering social justice policy in isolation ensures the London borough can be sensitive to any interactions with other factors that might cause negative impacts for social justice. This is all the while focusing on and engaging with vulnerable groups, and how they define their barriers to adaptation. Thus, considering Adger et al.'s (2005) fourth criterion for successful adaptation policy, the holistic approach taken here is an example of increasing policy legitimacy.

5. Discussion

In this section, the key themes that were found across this dissertation's mixed methods results, deliberately conducted to see if findings corroborate across different result types, will be discussed. Principally, these themes are the scale of climate change that the GCR faces, and how this is particularly challenging for vulnerable communities. Secondly, the challenge in identifying who is most vulnerable to flooding, sensitive to definition, methodology and temporal resolution. Thirdly, the practicalities of the vision put forward by interviewees of socially just adaptation policy, considering the work capacity of local authorities. Policy recommendations from European case studies will then be presented in light of such challenges. Although this dissertation focuses on adaptation to flooding, the need for a broad approach to adaptation, where other climate impacts are addressed in tandem, was another key theme of interviews. Therefore, some of the recommendations in the discussion relate to heat impacts, but are also transferrable recommendations for flooding adaptation. A discussion that partly includes consideration of climate impacts besides flooding also allows for a consideration of how social justice challenges (identity of vulnerable groups, governance, and physical manifestation of impacts) might change for different climate impacts, highlighting another challenge for socially just adaptation policy.

5.1 The scale of climate change for the GCR

Analysis of the Met Office's UKCP09 projections reveals the urgency with which the GCR must adapt to flooding. The projected increases in temperature and rainfall are expected to cause greater flooding, as they increase the likelihood of more rain (rather than snow) and more intense rainfall (Kundzewicz et al., 2007). The starkest climate projection is for increased winter precipitation, but this also has the greatest uncertainty and range in projection of all climate results. It is challenging for policy-makers to plan adaptation actions with such a range in possible rainfall. The several degree projections of temperature increase are also worrying regarding heat impacts, with the 2003 heatwave in the UK having caused an estimated 70,000 additional deaths that year across Europe (WHO, 2017). Currently the Scottish government does not have a formal heatwave strategy or definition of heatwaves (confirmed in local authority interviews) thus the uncertainty surrounding flooding is likely to be interlaced with unchartered policy regarding heat impacts. Although this study analysed the upper end of climate projections, the Met Office's (2009) analysis reveals winter precipitation has already increased 58% during the latter half of last century (1961-2006). This demonstrates severe climate change is already underway.

This urgency of climate change is likely to hinder efforts to achieve social justice, as analysis from this dissertation's literature review found that, the more severe climate change becomes, the more unequal communities become (Goldman and Riosmena, 2013). Individuals with a low adaptive capacity become worse affected by the escalation of climate impact, whilst those with a high adaptive capacity are able to withstand impacts (Goldman and Riosmena, 2013). Other literature, and findings from interviews with social justice experts, supports this, arguing that climate change will exacerbate existing inequalities and constrain

the adaptive capacity of some individuals (Lemos and Dilling, 2007; Brisley et al., 2012). It therefore seems likely that it will take vulnerable groups longer to build adaptive capacity to the significant flooding impacts projected for the GCR. Therefore, the scale of rainfall change projected is particularly challenging for the adaptation of vulnerable groups, and provides further impetus for a socially just adaptation approach.

5.2 The challenge of identifying vulnerable groups

The challenge of the scale of flooding impact on vulnerable groups is met with obscurity when attempting to identify such vulnerable groups, as analysis of Kazmierczak et al.'s (2015) and Sayers et al.'s (2017) flood disadvantage maps show a complex pattern of social vulnerability across the GCR. Such findings mirror that of interviews and literature (Brisley et al., 2012), that vulnerability is context-specific to local place and climate impact, which compounds the development of a standardised policy. Nearly all neighbourhoods scored an average or above average vulnerability to flooding in the flood disadvantage maps, and related analysis by Sayers et al. (2017) found that Glasgow is one of the most vulnerable areas of the UK and in the top 24 UK cities of relative economic decline, while Scotland as a whole has the highest expected annual future flood damage of any UK country. Even if a perfect methodology existed for identifying social vulnerability, many results analysed here (climate projections, flood maps, interviews) highlight how widespread vulnerability to flooding is in the GCR.

There are important discussion points in terms of the subjectivities involved with the use of flood vulnerability maps as tools to assess social vulnerability. If neighbourhoods contain only a small number of vulnerable individuals, they will be represented by a comparatively lower vulnerability score. This is a limitation of a methodology assessing vulnerability relative to a whole population, rather than as an absolute term. One implication is that neighbourhoods could be overlooked as a priority in policy attempts to reduce vulnerability to flooding, when in effect a widespread issue of social vulnerability to flooding in the GCR is the case. Shue (2014) articulates this when arguing that it is difficult to state the boundary between fairness and unfairness in justice policy. As the authors of one map (Kazmierczak et al., 2015) advise, it is important to consider the map results not in isolation, but as an illustrative starting point in adaptation policy-making that, as interviewees articulated, initiates a conversation about socially just flooding adaptation with local councils.

There is also subjectivity in how social vulnerability is defined by both datasets. Both datasets adhere to literature consensus on the determinants of social vulnerability, and the characteristics measured via indicators match the characteristics of vulnerability explored in the literature review (see section 2, figure 2.2) (Lindley et al., 2011; Brisley et al., 2012, ClimateJust, 2014). However, whilst some indicators of vulnerability, such as age, are relatively straight-forward to capture with available socio-demographic data, some indicators such as crime have limited relevant data available. For example, the Kazmierczak et al. (2015) study was limited to rate of domestic break-ins in a neighbourhood as an indicator of crime. Consequently, both maps use slightly different statistics for this indicator, and as demonstrated in section 4.2 of the results, an area was found to have a different social vulnerability score, depending on whether the Kazmierczak et al. (2015)

or Sayers et al. (2017) map was analysed. This finding ties in to a theme argued by academic literature (Adger et al., 2009; Benzie, 2014) that for a complex concept such as social vulnerability, transparency in decision-making and subjectivities is key. For example, many interviewees expressed social vulnerability to flooding in terms of social deprivation or low income alone, and it is best that this choice of characterised social vulnerability is made explicit. Much easier stated than achieved, Benzie et al.'s. (2011) request for social vulnerability to be incorporated in a methodologically consistent way is likely to raise conflict between a standardised and context-specific policy approach.

5.3 The challenges of incorporating social vulnerability into adaptation policy – policy remit, governance, and procedural justice

Social justice experts conveyed in interviews that to be fully effective, current adaptation efforts could transform from a physical flood risk perception of vulnerability, currently fragmented and often not associated as adaptation work, to a holistic policy approach, embedded across all sectors, that considers adaptation, mitigation, and broader societal development simultaneously. A recent UK-wide assessment of the use of climate projections by local authorities similarly found that adaptation is constrained to one section of policy-making, rather than mainstreamed (Lorenz et al., 2017). Such so-called mainstreaming of adaptation policy is a common theme in literature (Benzie, 2014; Sayers et al., 2015), and a broad remit is arguably required to prevent maladaptation (Fazey et al., 2017) and to gain policy legitimacy (Alexander et al., 2017). One argument from recommending such a broad-based adaptation policy approach is whether socially just adaptation need even be considered distinct to broader social development policy (if both have similar policy objectives in reducing social vulnerability). Consensus from both literature (Benzie, 2011 and Twigger-Ross et al., 2015) and interviews is that it is necessary to have such a distinction to drive climate change through the policy landscape, which is not yet fully accepted or on the agenda. Benzie (2011) concedes that having non-climate defined objectives may entail greater political support, but climate change adaptation needs to be central to social justice in order to make aware of the nuances of the subject. As Fazey et al.'s (2017) recent work examining community resilience across the Scottish Borders found, climate change aided understanding in community workshops. Local authorities should also be emboldened with the results of public focus groups (Benzie, 2014) where citizens conveyed a principle of fairness and argued for policy-making to reduce inequality.

A challenge of such a vision is the practicalities and governance of such an approach. The latest UKCCRA (Street et al., 2016) questions whether local authorities have enough support and whether community governance is strong enough at present, to adapt to climate change. The strain on local authorities to deliver adaptation work given other pressing priorities was discussed by both experts and local authority practitioners in interviews. Lorenz et al. (2017) report from their UK-wide analysis that austerity has caused a decline in focus on adaptation since the publication of the 2013 UK National Adaptation Programme. Similarly, many

social justice experts in interviews expressed the opinion that adaptation policy should align with existing civil service institutional capacity, because councils are stretched in times of austerity.

The UKCCRA (Street et al., 2016) also argues that flood governance must take place at the catchment scale, which as interviewees highlighted, is different to local authority boundaries. Moreover, if adaptation to other climate impacts is to be enacted in tandem, the catchment scale is not the most appropriate scale for adaptation to heatwaves, typically at the city-scale. As interviews and figure 4.12 (Section 4.3) illustrate, socially just adaptation policy is at present complex, already intersecting with adaptation, mitigation, flood risk and social policy at local, national and international scales. This and interview results nevertheless demonstrate that the governance and cross-sector links are already established in the GCR. This needs to be reinforced and formalised in terms of cross-collaboration, to deliver a holistic adaptation policy approach.

Interviews highlighted that the greatest gap at present is in achieving procedural justice. This dissertation's literature review highlighted that engagement with hard-to-reach groups is similarly a gap in adaptation policy at the national level (Mees et al., 2016). Academic work in this field that examines community vulnerability and resilience to climate change (Lindley et al., 2011; Fazey et al., 2017) conducted consultations that involved community representatives, but did not set out to achieve a thorough representation of the community. Interviewees argued there remains a question in UK adaptation policy on whose views are shaping the decision-making process. For the GCR, there is evidence from interviews with local authorities that communities were consulted in the development of the Flood Risk Management Plan. All local authorities stated that it is council policy for some form of consultation process to occur. However, only one local authority gave an example of where hard to reach groups were being targeted in community consultations. Alexander et al. (2017) argue that participation needs to be beyond tokenistic if true legitimacy objectives are achieved (and legitimacy is an objective outlined in this dissertation's analytical framework, figure 2.3). If the GCR can achieve a fully-participatory consultation process going forward, the GCR will be exemplar in procedural justice that can provide an example for national policy in the future. Nevertheless, Alexander et al. (2017) highlight a crucial argument with regards to community participation in governance, where an increased local community role raises democratic legitimacy issues in terms of democratic accountability, and this needs to be considered. A procedurally just adaptation policy may also assist in reducing conflict in identification of vulnerability by individuals themselves: both literature (Leichenko and O'Brien, 2006; Fazey et al., 2017) and interviews raised the issue that many communities dislike and disagree with labelling of neighbourhoods as vulnerable communities.

5.4 Policy recommendations

The three policy recommendations for national socially just adaptation policy presented in this dissertation's literature review link closely to the gaps identified in this dissertation's results for the GCR. The issues of transparency at a national level (Adger et al., 2006) relate to the challenge this dissertation has found for the GCR in terms of the subjectivity in identifying vulnerable groups. Furthermore, that literature argues for a broad, cross-sectoral approach at the national level (Street et al., 2016) is also recommended here for the GCR, in light of the result of existing complex governance links active in contributing to social justice goals in the GCR (as visualised in figure 4.12).

Considering the points aforementioned in this discussion, that adaptation policy is constrained in the GCR by the expected scale of flooding impacts, the challenge in identifying vulnerable groups, and the challenges of a broad-remit approach on governance and procedural justice, the following recommendations are presented:

- Procedural justice could be advanced by using existing community groups within neighbourhoods to locate vulnerable individuals, as seen in Paris, Nice (France), and Islington (London). In the case of Islington, such findings were used to reinforce the data from social vulnerability maps to heat, an application that could be advantageous to corroborate GCR's flood disadvantage maps.
- A holistic adaptation policy could be advanced by following the approach taken to adaptation by the Netherlands. Within their adaptation strategy, other social policy objectives are formalised in tandem, and the cross-sector goals of flood risk management, water availability, and climate-proofing design are achieved simultaneously in actions. The strategy also has a wide reach beyond the relevant local and national authorities and public bodies; business and community groups are involved in the formulation of actions, and have responsibility to enact adaptation efforts. Such an approach has advantages of achieving higher awareness and engagement across all relevant actors, in a fluid and complex governance system.

Therefore, it is this study's recommendations that the GCR seeks to overcome the challenges in identifying vulnerable groups, and advance procedural justice, by corroborating with existing community groups as an additional dataset to compliment flood vulnerability maps. Furthermore, engaging with multiple sectors and multiple relevant actors by formalising socially just objectives within adaptation policy could be a route to opening up and advancing current adaptation policy.

6. Conclusion

In conclusion, increased precipitation coupled with increased temperature is likely to exacerbate flood risk, and in answering RQ1, is a scale of change particularly problematic for vulnerable communities, in terms of quickly responding by building their adaptive capacity to flooding. In answering RQ2, successfully identifying all vulnerable groups to flooding is incredibly difficult. The comparisons of Kazmierczak et al. (2015) and Sayers et al. (2017) datasets reveal the result of different methodologies in measuring social vulnerability, despite both datasets using very similar definitions of social vulnerability. Partly answering RQ4, the wealth of information that the flood maps provide could be combined with community vulnerability registers developed by existing NGOs, charities, and community groups, to try to overcome subjectivity in identifying vulnerable groups and enhance procedural justice. In answering RQ3, analysing interview results through a hybrid social justice-adaptation analytical framework reveals the GCR is beginning to incorporate the concept of social justice into adaptation planning. Advanced understanding however tends to be confined to certain projects. By further answering RQ4, this could be improved by following the holistic approach to flooding adaptation policy that is embedded across other policy areas, as seen in the Netherlands.

7. References

- Adger, N., Arnell, N.W. and Tompkins, E.L. 2005. Successful Adaptation to Climate Change across Scales. *Global Environmental Change*. [Online]. **15**(2), pp.77-86. [Accessed 09/05/17]. Available from: <http://doi.org/10.1016/j.gloenvcha.2004.12.005>
- Adger, N., Paavola, J. and Huq, S. 2006. Towards Justice in Adaptation to Climate Change. In: Adger, N., Paavola, J., Huq, S. and Mace, M.J. Eds. *Fairness in Adaptation to Climate Change*. Massachusetts: The MIT Press, pp1-19.
- Adger, N., Dessai, S., Goulden, M., Hulme, M., Lorenzoni, I., Nelson, D.R., Naess, L.O., Wolf, J. and Wreford, A. 2009. Are There Social Limits to Adaptation to Climate Change? *Climatic Change*. [Online]. **93**(3), pp.355-354. [Accessed 09/06/17]. Available from: <http://doi.org/10.1007/s10584-008-9520-z>
- Agence d'Écologie Urbaine, 2015. *Paris' Climate Energy Action Plan*. [Online]. Paris: Direction des Espaces Verts et de l'Environnement. [Accessed 10/08/17]. Available from: <https://www.paris.fr/municipalite/action-municipale/paris-pour-le-climat-2148>
- Alexander, M., Doorn, N. and Priest, S. 2017. [Forthcoming]. Bridging the Legitimacy Gap – Translating Theory into Practical Signposts for Legitimate Flood Risk Governance. *Regional Environmental Change*. [Online]. [Accessed 14/08/17]. Available from: <https://link.springer.com/article/10.1007/s10113-017-1195-4>
- Babbie, E. 2013. *The Practice of Social Research*. Thirteenth Edition. Canada: Wadsworth Cengage Learning.
- Bautista, E., Osorio, J.C. and Dwyer, N. 2015. Building Climate Justice and Reducing Industrial Waterfront Vulnerability. *Social Research: An International Quarterly*. [Online]. **82**(3), pp.821-838. [Accessed 14/06/17]. Available from: <https://muse.jhu.edu/article/603165>
- Bazeley, P. and Jackson, K. 2013. *Qualitative Data Analysis with NVivo*. Second Edition. London: Sage Publications Ltd.
- Brisley, R., Welstead, J., Hindle, R. and Paavola, J. 2012. *Socially Just Adaptation to Climate Change*. [Online]. York: Joseph Rowntree Foundation. [Accessed 19/05/17]. Available from: <https://www.jrf.org.uk/report/socially-just-adaptation-climate-change>
- Benzie, M., Harvey, A., Burningham, K., Hodgson, N. Siddiqi. 2011. *Vulnerability to Heatwaves and Drought. Case Studies of Adaptation to Climate Change in South-West England*. [Online]. York: Joseph Rowntree Foundation. [Accessed 29.05.17]. Available from: <https://www.jrf.org.uk/sites/default/files/jrf/migrated/files/climate-change-adaptation-full.pdf>
- Benzie, M. 2014. Social Justice and Adaptation in the UK. *Ecology and Society*. [Online]. **19**(1), pp.1-10. [Accessed 24/05/17]. Available from: <http://doi.org/10.5751/ES-06252-190139>
- Burchell, K., Fagan-Watson, B., King, M., Watson, T., Cooper, C., Holland, D., Jennings, H., Palmer, S., Thorne, D. and Whitehead, C. 2017. *Urban Heat: Developing the Role of Community Groups in Local Climate Resilience*. London: Policy Studies Institute. [Accessed 10/08/17]. Available from: http://www.psi.org.uk/news_article/urban_heat_report
- Chalmers, H., Pilling, A. and Maiden, T. 2008. *Adapting to the Differential Social Impacts of Climate Change in the UK*. Edinburgh: Sniffer.
- Cisneros, B.E., Oki, T., Arnell, N.W., Benito, G., Cogley, J.G., Döll, P., Jiang, T. and Mwakalila, S.S. 2014. Freshwater resources. In: Field, C.B., Barros, V.R., Dokken, D.J., Mach, K.J., Mastrandrea, M.D., Bilir, T.E., Chatterjee, M., Ebi, K.L., Estrada, Y.O., Genova, R.C., Girma, B., Kissel, E.S., Levy, A.N., MacCracken, S., Mastrandrea, P.R. and White, L.L. Eds. *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part*

A: *Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge, United Kingdom and New York, USA: Cambridge University Press, pp. 229-269.

ClimateJust, 2014. *In Depth: Which Places are Disadvantaged?* [Online]. [Accessed 22/06/17]. Available from: <http://www.climatejust.org.uk/messages/depth-which-places-are-disadvantaged>

Climate Change (Scotland) Act 2009. [asp 12]. Edinburgh: Scottish Parliament

Clyde Waterfront, 2005. *Glasgow Strategic Drainage Plan*. [Online]. [Accessed 15/08/17]. Available from: http://www.clydewaterfront.com/projects/clyde-wide/glasgow_strategic_drainage_plan

Crichton, D. 2002. UK and Global Insurance Responses to Flood Hazard. *Water International*. [Online]. 27(1), pp.119-131. [Accessed 01/06/17]. Available from: <http://doi.org10.1080/02508060208686984>

Civil Contingencies Act 2004. (c.36). London: The Stationery Office.

Community Empowerment (Scotland) Act 2015. [asp 6]. Edinburgh: Scottish Parliament

Department for Communities and Local Government (DCLG). 2012. *National Planning Policy Framework*. [Online]. UK: Department for Communities and Local Government. [Accessed 15/08/17]. Available from: <https://www.gov.uk/government/publications/national-planning-policy-framework--2>

Department for Energy and Climate Change (DECC). 2012. *Low Carbon Communities Programme*. [Online]. UK: Department for Energy and Climate Change. [Accessed 15/08/17]. Available from: <https://www.gov.uk/government/publications/low-carbon-communities-challenge-evaluation-report>

Department for Energy and Climate Change (DECC). 2014. *Community Energy Strategy*. [Online]. UK: Department for Energy and Climate Change. [Accessed 15/08/17]. Available from: <https://www.gov.uk/government/publications/community-energy-strategy>

Department for Environment, Food and Rural Affairs (Defra). 2013. *The National Adaptation Programme*. London: HM Government. [Accessed 15/08/17]. Available from: <https://www.gov.uk/government/publications/adapting-to-climate-change-national-adaptation-programme>

Eakin, H., Tompkins, E.L., Nelson, D.R. and Anderies, J.M. 2009. Hidden Costs and Disparate Uncertainties: Trade-offs in Approaches to Climate Policy. In: Adger, N.W., Lorenzoni, I. and O'Brien, K.L. Eds. *Adapting to Climate Change: Thresholds, Values, Governance*. Cambridge: Cambridge University Press, pp. 212-226.

England, K. and Knox, K. 2015. *Targeting Flood Investment and Policy to Minimise Flood Disadvantage*. [Online]. York: JRF. [Accessed 01/06/17]. Available from: <https://www.jrf.org.uk/report/targeting-flood-investment-and-policy-minimise-flood-disadvantage>

England, K. 2017a. *Glasgow City Region – social vulnerability to flooding*. [Accessed 09/08/17]. Published internally.

England, K. 2017b. *Glasgow City Region – flood disadvantage*. [Accessed 09/08/17]. Published internally.

Environment Agency. 2005. *Flood Warning for Vulnerable Groups*. [Online]. Bristol: Environment Agency. [Accessed 21/06/17]. Available from: <https://www.gov.uk/government/publications/flood-warning-for-vulnerable-groups>

European Commission (EC). 2007. *The EU Floods Directive*. [Online]. [Accessed 15/08/17]. Available from: http://ec.europa.eu/environment/water/flood_risk/implem.htm

European Commission (EC). 2013. *The EU Strategy on Adaptation to Climate Change*. [Online]. Brussels: European Parliament. [Accessed 15/08/17]. Available from: https://ec.europa.eu/clima/policies/adaptation/what_en

Fahmy, E., Thumim, J. and White, V. 2011. *The Distribution of UK Household CO₂ Emissions: Interim Report*. [Online]. York: Joseph Rowntree Foundation. [Accessed 19/05/17]. Available from: <https://www.jrf.org.uk/report/distribution-uk-household-co2-emissions>

Farganis, J. 2011. *Readings in Social Theory. The Classic Tradition to Post-Modernism*. Sixth Edition. New York: McGraw-Hill.

Fazey, I., Carmen, E., Rao-Williams, J., Hodgson, A., Fraser, J., Cox, L., Scott, D., Tabor, P., Robeson, D., Searle, B.A., Lyon, C., Kenter, J. and Murray, B. 2017. *Community Resilience to Climate Change: Outcomes of the Scottish Borders Climate Resilient Communities Project*. [Online]. University of Dundee: Centre for Environmental Change and Human Resilience. [Accessed 19/05/17]. Available from: <https://www.dundee.ac.uk/cechr/projects/sbcrc/>

Flood Risk Management (Scotland) Act 2009. [asp 6]. Edinburgh: Scottish Parliament

Franklin, A. and Blyton, P. 2011. Sustainability Research: An Introduction. In: Franklin, A. and Blyton, P. Eds. *Researching Sustainability. A Guide to Social Science Methods, Practice and Engagement*. UK and USA: Earthscan, pp.3-16.

Glasgow City Council, 2016. *Clyde and Loch Lomond Local Flood Risk Management Plan*. [Online]. Glasgow: Glasgow City Council. [Accessed 22/06/17]. Available from: <https://www.glasgow.gov.uk/index.aspx?articleid=19470>

Goldman, M.J. and Riosmena, F. 2013. Adaptive Capacity in Tanzanian Maasailand: Changing Strategies to Cope with Drought in Fragmented Landscapes. *Global Environmental Change*. [Online]. **23**(3), pp.588-597. [Accessed 24/05/17]. Available from: <http://doi.org/10.1016/j.gloenvcha.2013.02.010>

Google Maps. 2017a. *Scotland (Satellite), 50km*. [Online]. [Accessed 29/06/17]. Available from: <https://www.google.co.uk/maps/@57.4004532,-4.9616442,7z>

Government of the Netherlands. 2017. *The Delta Programme*. [Online]. [Accessed 10/08/17]. Available from: <https://www.government.nl/topics/delta-programme>

Glasgow City Council. 2017. *Glasgow Community Planning Partnership*. [Online]. [Accessed 15/08/17]. Available from: <https://www.glasgowcpp.org.uk/>

Glatthorn, A.A. and Joyner, R.L. 2005. *Writing the Winning Thesis or Dissertation*. Second Edition. U.S: Corwin Press.

Grasso, M. 2007. A Normative Ethical Framework in Climate Change. *Climatic Change*. [Online]. **81**(3), pp.223-246. [Accessed 19/05/17]. Available from: [10.1007/s10584-006-9158-7](https://doi.org/10.1007/s10584-006-9158-7)

HM Treasury. 2016. *The Green Book: Appraisal and Evaluation in Central Government*. [Online]. [Accessed 16/06/17]. Available from: <https://www.gov.uk/government/publications/the-green-book-appraisal-and-evaluation-in-central-government>

HR Wallingford. 2012. *The UK Climate Change Risk Assessment 2012 Evidence Report*. [Online]. London: Defra. [Accessed 19/05/17]. Available from: <http://randd.defra.gov.uk/Default.aspx?Module=More&Location=None&ProjectID=15747>

Hub West Scotland. 2017. *Glasgow City Region*. [Online]. [Accessed 11/08/17]. Available from: <http://hubwestscotland.co.uk/partnership-working/>

IPCC, 2014. Summary for Policymakers. In: Field, C.B., Barros, V.R., Dokken, D.J., Mach, K.J., Mastrandrea, M.D., Bilir, T.E., Chatterjee, M., Ebi, K.K., Estrada, Y.O., Genova, R.C., Girma, B., Kissel, E.S., Levy, A.N., MacCracken, S., Mastrandrea, P.R. and L.L.White. Eds. *Climate Change 2014. Impacts, Adaptation and Vulnerability. Part A: Global and Sectoral Aspects*. Cambridge University Press, Cambridge, United Kingdom and New York, USA, pp. 1-32.

Islington Council, 2017. *Seasonal Health and Affordable Warmth*. [Online]. [Accessed 10/08/17]. Available from: https://www.islington.gov.uk/environment/energy-services/affordable_warmth

Kay, A.L., Crooks, S.M., Davies, H.N., and Reynard, S.N. 2011. *An Assessment of the Vulnerability of Scotland's River Catchments and Coasts to the Impacts of Climate Change*. [Online]. Wallingford: Centre For Ecology and Hydrology. [Accessed 22/06/17]. Available from: https://www.sepa.org.uk/environment/water/flooding/developing-our-knowledge/#FRM_climate_change

Kazmierczak, A., Cavan, G., Connelly, A. and Lindley, S. 2015. *Mapping Flood Disadvantage in Scotland*. [Online]. Scotland: Scottish Government. [Accessed 19/05/17]. Available from: <http://www.gov.scot/Publications/2015/12/9621>

Kundzewicz, Z.W., Mata, L.J., Arnell, N.W., Döll, P., Kabat, P., Jiménez, B., Miller K.A., Oki, T., Sen Z. and Shiklomanov, I.A. 2007. Freshwater resources and their management. In: Parry, M.L., Canziani, O.F., Palutikof, J.P., van der Linden P.J. and Hanson, C.E. Eds. *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge: Cambridge University Press, pp.173-210.

Leichenko, R. and O'Brien, K. 2006. Is it Appropriate to Identify Winners and Losers?. In: Adger, N., Paavola, J., Huq, S. and Mace, M.J. Eds. *Fairness in Adaptation to Climate Change*. Massachusetts: The MIT Press, pp97-114.

Lemos, M.C. and Dilling, L. 2007. Equity in Forecasting Climate: Can Science Save the World's Poor? *Science and Public Policy*. [Online]. **34**(2), pp.109-116. [Accessed 24/05/17]. Available from: <http://doi.org/10.3152/030234207X190964>

Lindley, S., O'Neill, J., Kandeh, J., Lawson, N., Christian, R. and O'Neill, M. 2011. *Climate Change, Justice and Vulnerability*. [Online]. York: Joseph Rowntree Foundation. [Accessed 15/06/17]. Available from: <https://www.jrf.org.uk/report/climate-change-justice-and-vulnerability>

Lindley, S. and O'Neill, J. 2013. *Flood Disadvantage in Scotland: Mapping the Potential for Losses in Well-Being*. [Online]. Edinburgh: Scottish Government Social Research. [Accessed 19/05/17]. Available from: <http://www.gov.scot/Publications/2013/10/5328>

Lorenz, S., Dessai, S., Forster, P.M. and Paavola, J. 2017. Adaptation Planning and the Use of Climate Change Projections in Local Government in England and Germany. *Regional Environmental Change*. [Online]. **17**(2), pp. 425-435. [Accessed 14/08/17]. Available from: [10.1007/s10113-016-1030-3](https://doi.org/10.1007/s10113-016-1030-3)

Marmot, M., Allen, J., Goldblatt, P., Boyce, T., McNeish, D., Grady, M. and Geddes, I. 2010. *Fair Society, Healthy Lives – The Marmot Review*. [Online]. Westminster: Department for International Development. [Accessed 14/08/17]. Available from: <https://www.gov.uk/dfid-research-outputs/fair-society-healthy-lives-the-marmot-review-strategic-review-of-health-inequalities-in-england-post-2010>

Mees, H., Crabbie, A., Alexander, M., Kaufmann, M., Bruzzone, S., Levy, L. and Lewandowski, J. 2016. Coproducing Flood Risk Management Through Citizen Involvement: Insights from Cross-Country Comparison in Europe. *Ecology and Society*. [Online]. **21**(3), pp. 1-14. [Accessed 22/06/17]. Available from: <http://eprints.mdx.ac.uk/20050/>

Met Office. 2009. *UK Climate Projections*. [Online]. [Accessed 19/05/17]. Available from: <http://ukclimateprojections.metoffice.gov.uk/24127>

- Met Office. 2014. *Changes in Summer Mean Temperature, High Emissions Scenario*. [Online]. [Accessed 27/07/17]. Available from: <http://ukclimateprojections.metoffice.gov.uk/23677?emission=high>
- Met Office. 2017. *Glasgow Climate*. [Online]. [Accessed 16/08/17]. Available from: <http://www.metoffice.gov.uk/public/weather/climate/gcuvz3bch>
- Metropolitan Glasgow Strategic Drainage Partnership (MGSDP). 2017. *Metropolitan Glasgow Strategic Drainage Partnership*. [Online]. [Accessed 10/08/17]. Available from: <http://www.mgsdp.org/>
- Ministère de la Transition Écologique et Solidaire. 2017. *Plan National d'Adaptation de la France aux effets du Changement Climatique*. [Online]. France: *Ministère de la Transition Écologique et Solidaire*. [Accessed 10/08/17]. Available from: <https://www.ecologique-solidaire.gouv.fr/adaptation-france-au-changement-climatique#e2>
- Nussbaum, M. and Sen, A. 1993. Introduction. In: Nussbaum, M. and Sen, A. Eds. *The Quality of Life*. Gloucestershire: The Clarendon Press, pp.2-6.
- Office for National Statistics (ONS). 2017. *Population Estimates for UK, England and Wales, Scotland and Northern Ireland*. [Online]. [Accessed 29/06/17]. Available from: goo.gl/XMXU8E
- Pielke, R., Prins, G., Raynes, S. and Sarewitz, D. 2007. Climate Change 2007: Lifting the Taboo on Adaptation. *Nature*. [Online]. **445**(7128), pp.597-598. [Accessed 19/05/17]. Available from: <http://www.nature.com/nature/journal/v445/n7128/full/445597a.html>
- Popke, J., Curtis, S. and Gamble, D.W. 2016. A Social Justice Framing of Climate Change Discourse in Policy: Adaptation Resilience and Vulnerability in a Jamaican Agricultural Landscape. *Geoforum*. [Online]. **73**(July 2016), pp.70-80. [Accessed 19/05/17]. Available from: [10.1016/j.geoforum.2014.11.003](https://doi.org/10.1016/j.geoforum.2014.11.003)
- Preston, I., Vicki White, V., Thumim, J., Bridgeman, T. and Brand, C. 2013. *Distribution of Carbon Emissions in the UK: Implications for Domestic Energy Policy*. [Online]. York: Joseph Rowntree Foundation. [Accessed 19/05/17]. Available from: <https://www.jrf.org.uk/report/distribution-carbon-emissions-uk-implications-domestic-energy-policy>
- Prutsch, A., Grothmann, T., McCallum, S., Schauser, J. and Stuart, R. 2014. Facing the Specific Challenges of Adaptation. In: Prutsch, A., Grothmann, T., McCallum, S., Schauser, J. and Stuart, R. Eds. *Climate Change Adaptation Manual*. London and New York: Routledge, pp.7-13.
- Public Bodies Act 2011*. [c.24]. London: The Stationery Office
- Ribot, J. 2011. Vulnerability before Adaptation: Towards Transformative Climate Action. *Global Environmental Change*. [Online]. **21**(4), pp. 1160-1162. [Accessed 02/06/17]. Available from: <http://doi.org/10.1016/j.gloenvcha.2011.07.008>
- Sayers, P.B., Horritt, M.S., Penning-Rowsell, E. and McKenzie, A. 2015. *Climate Change Risk Assessment 2017 Projections of Future Flood Risk in the UK*. [Online]. Watlington: Sayers and Partners. [Accessed 12/06/17]. Available from: <http://www.sayersandpartners.co.uk/uk-climate-change-risk-assessment.html>
- Sayers, P.B., Horritt, M., Penning-Rowsell, E. and Fieth, J. 2017. *Present and Future Flood Vulnerability, Risk and Disadvantage: A UK assessment. A report for the Joseph Rowntree Foundation Published by Sayers and Partners LLP*. [Online]. Watlington: Sayers and Partners. [Accessed 09/08/17]. Available from: <http://www.sayersandpartners.co.uk/flood-disadvantage.html>
- Scottish Cities Alliance. 2015. *Low Carbon Resilient Cities*. [Online]. Glasgow: Scottish Cities Alliance. [Accessed 15/08/17]. Available from: <https://www.scottishcities.org.uk/workstreams/low-carbon>

SEPA (Scottish Environment Protection Agency). 2015a. *Clyde and Loch Lomond Flood Risk Management Strategy*. [Online]. Scotland: Scottish Environment Protection Agency. [Accessed 03/08/17]. Available from: <http://apps.sepa.org.uk/FRMStrategies/clyde-loch-lomond.html>

SEPA (Scottish Environment Protection Agency). 2015b. *Potentially Vulnerable Areas (supporting evidence to Clyde and Loch Lomond Flood Risk Management Strategy)*. [Online]. Scotland: Scottish Environment Protection Agency. [Accessed 10/08/17]. Available from: <http://apps.sepa.org.uk/FRMStrategies/clyde-loch-lomond.html>

SEPA (Scottish Environment Protection Agency). 2017. *Flooding*. [Online]. [Accessed 08/08/17]. Available from: <https://www.sepa.org.uk/environment/water/flooding/>

Scottish Government, 2008. *Achieving our Potential: A Framework to Tackle Poverty and Income Inequality in Scotland*. [Online]. Edinburgh: Scottish Government. [Accessed 15/08/17]. Available from: <http://www.gov.scot/Publications/2008/11/20103815/0>

Scottish Government. 2009. *Scotland's Climate Change Adaptation Framework*. [Online]. Scotland: Scottish Government. [Accessed 19/05/17]. Available from: <http://www.gov.scot/Publications/2009/12/08130513/10>

Scottish Government, 2013. *Single Outcome Agreements*. [Online]. [Accessed 10/08/17]. Available from: <http://www.gov.scot/Topics/archive/SOA2012>

Scottish Government. 2015b. *Public Sector Climate Change Reporting*. [Online]. [Accessed 10/08/17]. Available from: <http://www.gov.scot/Topics/Environment/climatechange/publicsectoraction/publicsectorreporting>

Schlosberg, D. 2012. Climate Justice and Capabilities: A Framework for Adaptation Policy. *Ethics and International Affairs*. [Online]. **26**(4), pp.445-461. [Accessed 29/05/17]. Available from: <http://doi.org/10.1017/S0892679412000615>

Schlosberg, D. 2013. Theorising Environmental Justice: The Expanding Sphere of a Discourse. *Environmental Politics*. [Online]. **22**(1), pp.37-55. [Accessed 19/06/17]. Available from: <http://doi.org/10.1080/09644016.2013.755387>

Schlosberg, D., Collins, L.B. and Niemeyer, S. 2017 Adaptation Policy and Community Discourse: Risk, Vulnerability, and Just Transformation. *Environmental Politics*. [Online]. **26**(3), pp.413-437. [Accessed 15/05/17]. Available from: <http://doi.org/10.1080/09644016.2017.1287628>

Sen, A. 1980. "Equality of What?" In: *The Tanner Lecture on Human Values, 1980, University of Cambridge*. Cambridge: Cambridge University Press, pp.197-220.

Shue, H. 2014. *Climate Justice Vulnerability and Protection*. UK: Oxford University Press.

Stern, N. 2006. *Stern Review: The Economics of Climate Change*. [Online]. Cambridge: Cambridge University Press. [Accessed 24/06/17]. Available from: http://webarchive.nationalarchives.gov.uk/+http://www.hm-treasury.gov.uk/sternreview_index.htm

Street, R., Di Mauro, M., Humphrey, K., Johns, D., Boyd, E., Crawford-Brown, D., Evans, J., Kitchen, J., Hunt, A., Knox, K., Low, R., McCall, R., Watkiss, P., and Wilby, R. 2016. *UK Climate Change Risk Assessment Evidence Report: Chapter 8, Cross-cutting Issues*. [Online]. London: Committee on Climate Change. [Accessed 24/06/17]. Available from: <https://www.theccc.org.uk/uk-climate-change-risk-assessment-2017/>

Twigger-Ross, C., Brooks, K., Papadopoulou, L., Orr, P., Sadauskis, R., Coke, A., Simcock, N., Stirling, A. and Walker, G. 2015. *Community Resilience to Climate Change: An Evidence Review*. [Online]. York:

Joseph Rowntree Foundation. [Accessed 29/05/17]. Available from:
<https://www.jrf.org.uk/report/community-resilience-climate-change>

University of Leeds. 2017a. *Information Protection Policy*. [Online]. [Accessed 19/05/17]. Available from:
https://it.leeds.ac.uk/info/116/policies/249/information_protection_policy

University of Leeds. 2017b. *University of Leeds Research Data Management Policy*. [Online]. [Accessed 19/05/17]. Available from: <https://library.leeds.ac.uk/research-data-policies>

Walker, G., Burningham, K., Fielding, J., Smith, G., Thrush, D. and Fey, H. 2015. *Addressing Environmental Inequalities: Flood Risk*. [Online]. Bristol: Environment Agency. [Accessed 21/06/17]. Available from: <http://www.envia.bl.uk/handle/123456789/2816>

World Health Organisation (WHO). 2017. *Climate Change and Health*. [Online]. [Accessed 28/07/17]. Available from: <http://www.who.int/mediacentre/factsheets/fs266/en/>

8. Appendices

Appendix A.1. T-test result

Below is the result from a Students T-test (statistical test), to investigate whether there is a statistical difference in z-score between Greenock in Inverclyde and Carstairs in South Lanarkshire; of different vulnerability classifications on the Sayers et al. (2017) map.

P-value (two tail) = 0.06 (two significant figures)

As the t-stat value is smaller than the critical two-tail value (see below), the null hypothesis is accepted. Therefore, to a 95% confidence limit, there is no significant difference in z-score between the two locations on the map.

t-Test: Two-Sample Assuming Unequal Variances

	<i>Variable</i> 1	<i>Variable</i> 2
Mean	0.810482	0.081952
Variance	1.167789	0.440892
Observations	26	6
Hypothesized Mean Difference	0	
df	12	
t Stat	2.117275	
P(T<=t) one-tail	0.027902	
t Critical one-tail	1.782288	
P(T<=t) two-tail	0.055805	
t Critical two-tail	2.178813	

A.2 Informed consent form and information sheet for interview participants

Blank informed consent form for participants

Both informed consent forms and information sheets were adapted from a template provided by the School of Earth and Environment for the purpose of masters research projects.

School of Earth and Environment		 UNIVERSITY OF LEEDS	
Consent to take part in: Socially just adaptation planning in the Glasgow City Region Masters Dissertation Project: Summer 2017			
			Add your initials next to the statements you agree with
I confirm that I have read and understand the participant information sheet dated 01/06/17 explaining the above research project and I have had the opportunity to ask questions about the project.			
I agree for the data collected from me to be stored and used in relevant future research in an anonymised form.			
I understand that relevant sections of the data collected during the study, may be looked at by individuals from the University of Leeds or from colleagues at Climate Ready Clyde, where it is relevant to my taking part in this research. I give permission for these individuals to have access to my records.			
I agree to take part in the above research project and will inform the lead researcher should my contact details change.			
Name of participant			
Participant's signature			
Date			
Name of lead researcher	Isabel Cotton		
Signature of researcher			
Date			

Information sheet for participants**UNIVERSITY OF LEEDS**

School of Earth and Environment
University of Leeds
Woodhouse Lane
Leeds LS2 9JT

01/06/2016

Dear Participant,

Thank you for agreeing to talk to me about your work. This letter is to give you some more information about the research I am doing, and a contact point if you would like to talk further.

About this research

I am a masters student at the University of Leeds, conducting this research as part of my masters dissertation project. The dissertation seeks to investigate climate change adaptation to flooding for the Glasgow city region, a region greatly impacted by flooding, and considered advanced on climate change adaptation.

A key focus of the research is the extent to which the principles of social justice are incorporated into adaptation planning for flooding. The semi-structured interviews that you have kindly agreed to participate in allows me to consider this, for the context of the Glasgow city region.

I will not directly identify you in writing up/discussing our research but given your role you may be identifiable in my reporting of the research. I am working with Climate Ready Clyde on the research, and may informally discuss the findings anonymously with colleagues from the organisation. The research will be used by myself in an assignment to be seen by teaching staff at the university, and external examiners as part of our quality assurance processes.

Contact point

If you have any questions or comments about the research, please do not hesitate to contact me via email on ee12ic@leeds.ac.uk
Thanks very much for your time taking part in my research.

Yours Sincerely,
Isabel Cotton

A.3. Copy of interview questions

Masters dissertation on social justice in adaptation to flooding
Interview questions
May/June 2017

1. Interviews with Local Authority (LA) representatives

#Theme 1: Background to adaptation policy/ work done by LA

- Does LA have an adaptation strategy, planning for flooding, flood management plan, and/or work on reducing impacts of flooding in the local council area – (if so, find out more/ where can I access?)
- (If yes on a climate change adaptation strategy, or flood management plan, find out more) When was the strategy released? Who is responsible to enact the strategy, and over what timeframes? Is the strategy/ work regularly updated?
 - In adaptation to flooding, where does responsibility lie?
 - (Are individuals expected to undergo adaptation autonomously- what support is available to individuals)
- Does the LA's work engage with any stakeholders, either in formulation or in proposed actions to adapt to flooding?
 - Are the local community involved, and how? / do local community groups support the strategy?
 - Investigate: resident's association and National Flood Forum's in each local authority – does the council liaise with them?
- Does any of this link to flooding strategies and planning at a national level in Scotland?
 - Does the LA receive national support (*resources, funding*) for flooding work?
 - Is this funding ring-fenced, and if not, is it sometimes spent elsewhere?
- Did you work on the council's annual progress report to the Scottish Government on adaptation efforts? (If so, find out more) Can I access a copy of the progress report?
- Does the strategy link up with private investment to get further funding for projects?

#Theme 2: the context of flooding impacts in the LA

- Are you aware of how prone your local authority is to flooding? Have there been any serious floods in the past few years?
 - If so, are you aware of who was most affected?
 - From this, do you know if the most vulnerable were hardest hit?
- Is adaptation to flooding enacted alongside all adaptation actions (for example, LA work on high temperatures in summer?) Is adaptation work combined or separate from the local authorities' other work on broader social development?
- What flooding adaptation options are currently active in the LA? (For example, perhaps physical barriers, raising awareness of flooding impacts). How were these options chosen?
- Do the flooding options link with broader statutory work, or private investment, such as the development of green infrastructure to increase retention of water in areas?

The theme of social justice within adaptation work/policy

- I am particularly interested in the concept of social justice in adaptation planning. Does the local authority's work on adaptation incorporate effort to reduce the vulnerability to those most vulnerable to flooding? *Social justice: can be considered as procedural justice – ensuring those most vulnerable, their voices are heard in decision-making. It can also refer to distributional justice – working to alleviate those most vulnerable from being hardest hit. Vulnerability: meant more here than just the physical sense of flooding vulnerability. Also an individual's health, their income, who they can call on to help (their social capital)*
- (if so find out more) (If prompted, how does the local authority consider the concept of social justice? How does the local authority define 'vulnerability to flooding'? Socially, economically, politically, relative or absolute?)
- In what ways does your work tie in with the Community Empowerment Scotland Act?
 - Part 2 Community Planning – all about it is the duty of local authorities to liaise with, consult and discuss improvements to a local community with local community organisations or members.
 - Planning must address socio-economic inequalities unless unsuitable in that particular plan.
- I understand Inverclyde council has a community justice partnership – does your council have something similar?
 - In response to Scottish Government's comments on community justice that principally seek to reduce crime and enhance community cohesion, but the outcomes proposed by the national strategy on

community justice indirectly empower the community, involve them in the decision-making, and enhance their capacity and resilience in the face of change.

- If so, in what ways do the adaptation strategies pursued by the LA reduce vulnerability? (*For example, does it consider ways to increase an individual's adaptive capacity, provide support or finance perhaps?*)
- With wider adaptation in general, what areas would you like to see greater focus on? (*are there areas of the strategy that addresses social justice where it could be improved?*)
- Does the LA have plans in general going forward with their work on flooding adaptation? Is there anything the LA would like to see included in the future?

2. Interviews with social justice experts

Theme 1: The extent to which social justice is an aspect of current UK adaptation planning

- To what extent is social justice incorporated into UK adaptation strategies/ planning/ policy?
 - If so, at what scale have you seen this most effective? (*Is this at the regional/city-scale - Which adaptation scale is driving social justice? Is there evidence of scalar conflict, in that, social justice is better implemented at some governance scales?*)
 - If so, do you know if it is embedded in planning across the UK, or only in some areas?
 - How is social justice being defined? Economically, socially, politically, absolute or relative? Do we know enough to know who is vulnerable? Are we constrained by it being complex and constantly changing?
 - Is this incorporation of social justice tokenistic or fully effective? Could this be distinguished by if power is being shifted? (*For example, flood insurance is autonomous adaptation and could exacerbate inequality and where people choose to live – substantive justice, insurance - making it most efficient but not most fair?*)
 - Overall, how effective do you think current efforts are at addressing the complex nature of social justice as presented by research in this field?
 - What do we mean by long-term in this context, and how far ahead does adaptation planning go?

Theme 2. Identifying key areas of improvement for adaptation planning in relation to social justice

- Are there aspects of social justice that strategies/ planning/ policy are addressing well, and other aspects that are overlooked? (*such as procedural justice and distributional justice?*)
- Considering a European context, are there areas of Europe where social justice is incorporated well?
- What, in your opinion, is the cause for any lack of social justice concepts in adaptation in the UK?
- How do you envision the nature of vulnerability will change as climate change progresses this century?
- Do you think that adaptation can also improve social justice, and is this being looked at? (*Conversely, have you seen any evidence that climate change adaptation planning hinders social justice?*)

Theme 3: Conflicts between social justice and climate change adaptation

- Is there conflict in self-identification, i.e. how do people classified as vulnerable see their circumstance? Is there a danger of stigmatisation? Or a danger of people not adapting, if they don't think they are vulnerable? Planned vs autonomous adaptation conflict?
- Is there any evidence that prioritising vulnerable groups over others more effectively addressed both adaptation and social justice?
- From working on my literature review, it seems that adaptation can exacerbate division amongst society, and those with higher adaptive capacity can successfully adapt, gaining an advantage because they have the means to utilise the adaptation strategy, at the detriment to others most vulnerable. How do you think we can avoid the risk of adaptation making it worse...If there is societal conflict in this, how can this be resolved?
- Other themes
 - Achieving the 'triple-win' social justice, adaptation, low carbon?
 - It seems to me that the theory of social justice has a danger of being ambiguous, contested, and subjective, besides the overarching principles of distributive and procedural justice. How do you think researchers in this field can avoid an expert's subjective judgement that contrasts with judgement on the ground? That is, a subjective judgement on what goals should be prioritised?
 - Is there a danger of articulating and prioritising social justice, when arguably, the factors that cause social justice should not exist, and we should instead concentrate efforts on broader societal development (reducing societal inequality)? Could they conflict with one another if done differently/ no synergy between them?

A.4. Extract of interview transcript

Interview, 13.06.17

(...not from beginning)

Interviewer: "So vulnerability is a lot easier to predict for some climate change impacts?"

Interviewee: "Yeah, I mean there are for heat and air quality factors like what kind of places do you live? For example top block of flats...I've just finished a paper on health impacts of climate change and interestingly the biggest health impact for flooding is mental health"

"It seems there does seem to be consensus of what social justice is, is it your opinion that we've grasped it fully and know who's most vulnerable?"

"Well some of my colleagues at UEA, when I was there talked about subjective and objective vulnerability, that is an interesting notion because you might have say elderly middle class people who aren't in brilliant health but are perfectly capable taking care of themselves and wouldn't feel at risk, they might be at heightened risk but might be able to manage their risk. There are quite shocking statistics, if you look at women and cardiovascular health risk, if you are a group of people who are doing physical labour vs managerial women, people in more medial jobs have five times higher cardiovascular health risk, and there is huge difference in life expectancy"

"I was wondering whether you thought that, one idea that keeps coming up is that it's important we embed social justice across all policy-making in UK not just adaptation, so part of my research will look at housing etc. do you think there are other sectors besides where you can see ideas of social justice in policy?"

"Well in health sector clearly it has been an issue on the agenda for a while, it's not because it is fully mainstreamed and effectively taken on board, it's rather because the health inequalities are so glaring it's very difficult to deny it is an important issue. If one puts in bluntly the UK is one of the second most unequal country in western world and if one wanted to integrate social justice across the policy areas one way in which you do, you kind of raise the welfare state and introduce transfers to a certain extent that you can narrow down income and welfare inequality. It does make a difference I can tell if one looks at how things pan out in Sweden and any other Nordic country, they narrow down the outcome gap not by remedying the problems but basically by distributing the income in society and also by providing public services in a different way so that you do not experience such divergent outcomes. I mean again it's that does not do the whole trick either, but if you don't have that it's quite difficult to you know just focus on problems"

"One of my questions was whether there are areas of Europe that incorporate social justice well?"

"Nordic countries do better than UK, I mean I don't have a very good understanding of it really, the strengths and weaknesses can be quite surprising, you can pick up a good practice somewhere without realising there are downsides that you are not necessarily aware. But I mean if you look at UK the Scottish SEPA has been very proactive on justice in general, and I think they have done really good work. I would easily say they are probably the big example of a proper take on this, I don't think I could name anybody else"

"Do you think social vulnerability to flooding will change in the future?"

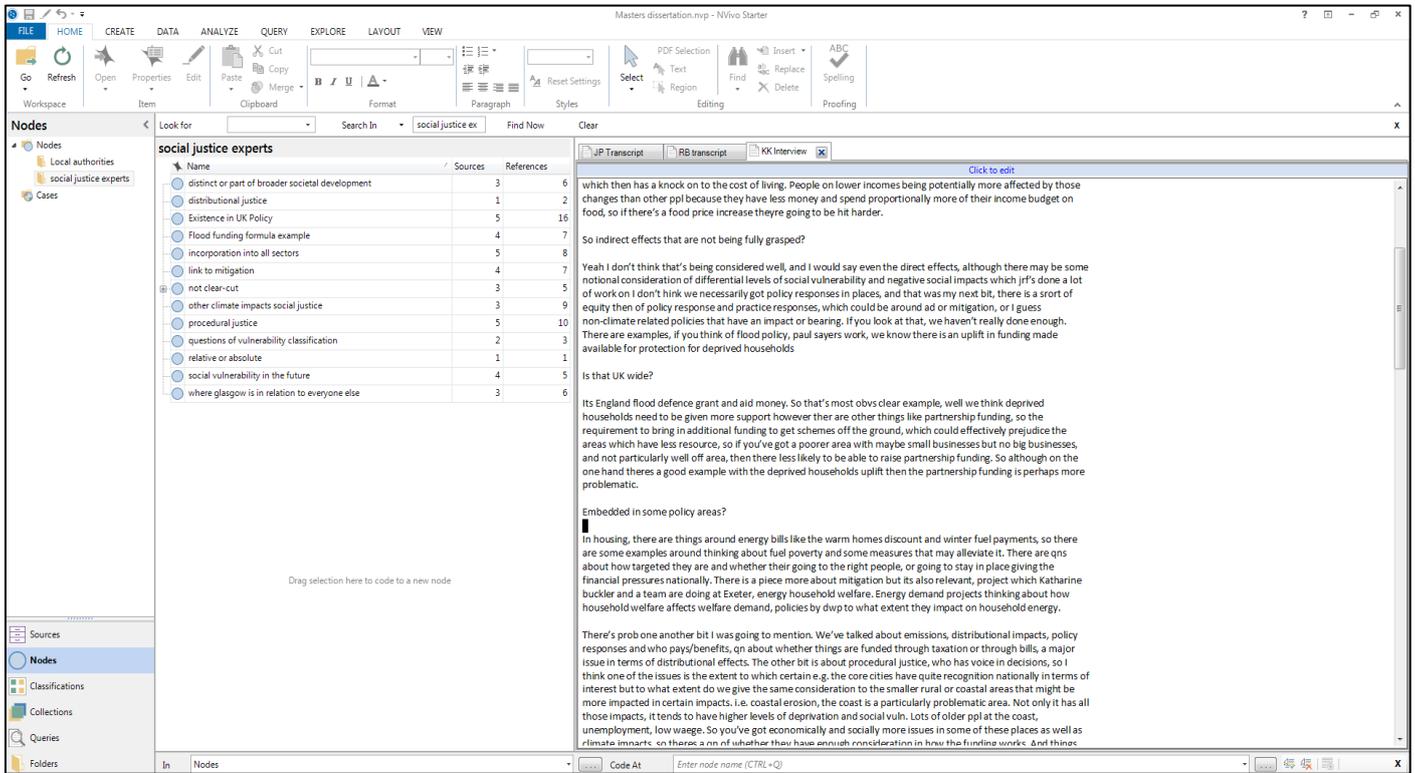
"Yeah I mean the flood related work we have done its obvs simply because of the climatic changes you will have more people being affected, at the same time the nature of those people will change, demography's getting older, but my feeling is it might be worse with regards to heat, and air quality, because the demographic changes there are quite drastic if you look at 2055 there will be more over 75 year olds, so truly vulnerable populations will be much bigger, they might be better health, we have pressure of NHS, healthcare provision. In the flood risk, physical flood risk will go up by some amount, flooding will become more likely, there are a few factors that would seem to alleviate the risk"

(Continued...)

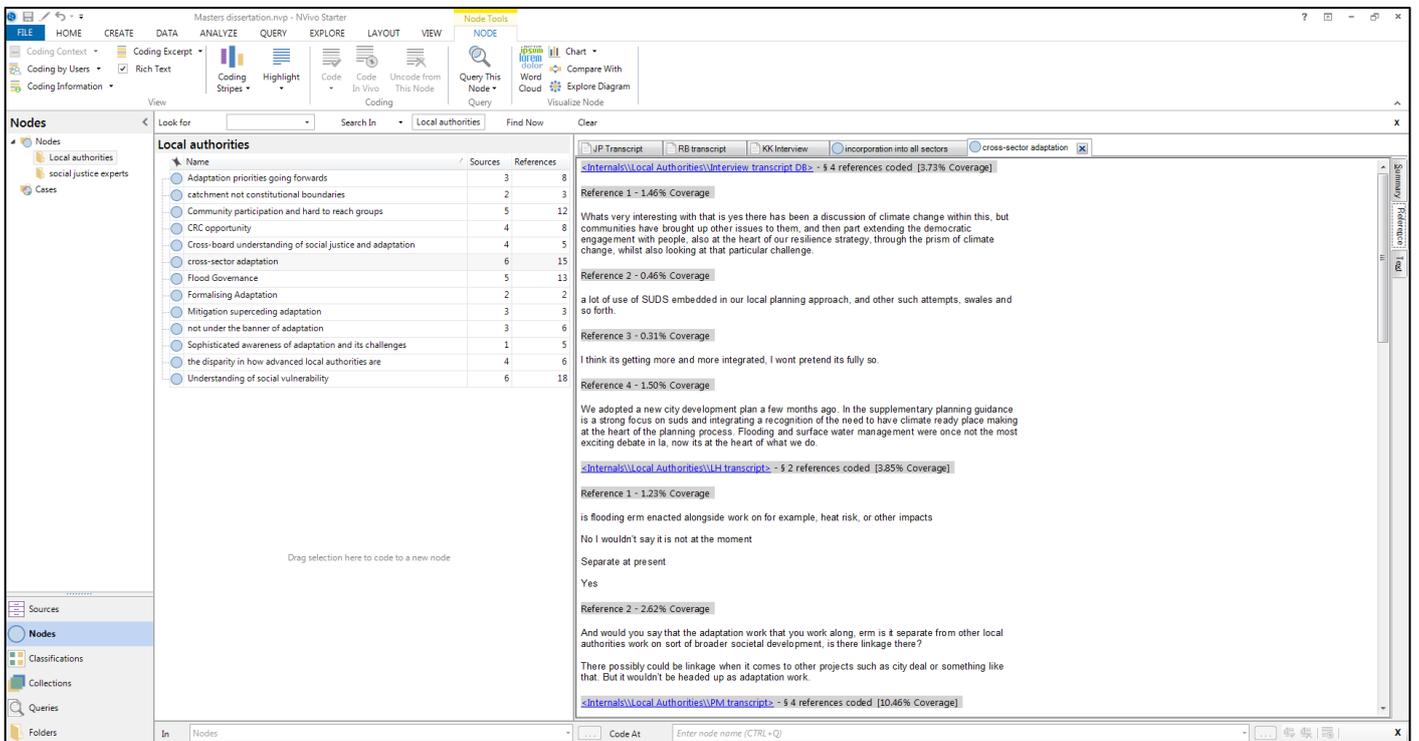
A.5. Axial coding and interview analysis with NVivo

The screenshots below demonstrate how NVivo software was used to code and analyse interview transcripts.

Interview transcript extract (right-hand side) and codes of interview themes (left-hand side):



List of interview quotes that fall into the 'cross-sector adaptation' code theme (right-hand side):



A.6. Climate-ADAPT Database

A database developed by the European Commission that provides example adaptation projects across the European Union. Several thousand examples exist on the database. Examples range from maps to formal publications and reports. The platform allows expertise in adaptation to be shared amongst practitioners in Europe. The database was searched to find examples of incorporating social justice in adaptation policy. This was combined with examples highlighted by interviews with European social justice experts, and case studies presented at the 2017 ECCA conference in Glasgow, to create a shortlist of socially just adaptation case studies in Europe. From this shortlist, Paris, Nice (France), Islington (UK), and the Netherlands were chosen as examples in this project, based on the current gaps in policy the GCR faces.

Below is a link to database:

<http://climate-adapt.eea.europa.eu/>

A.7. Grading of current adaptation efforts in the GCR through this study's analytical framework

No.	Socially just principles	Criteria for Successful adaptation	GCR	Selection of evidence from interviews and associated local authority work
1	Taking into account current and future climate change impacts	Effectiveness	Evidence of consideration	<p><u>Interview Evidence:</u> <i>"We can use sensors to manage the level of water in the canal, in light of met office predictions of heavy rainfall, to allow it to be used for runoff, so we take pressure of the subsurface"</i> <i>"One particular refurbishment we did to a building, to cope with 1 in 200 year flood event, and that's happened several times now".</i></p> <p><u>Written/ Formal Policy Evidence:</u> Clyde and Loch Lomond Flood Risk Management Strategy (SEPA, 2015a) Public Sector Climate Change Reporting (Scottish Government, 2015b) Metropolitan Glasgow Strategic Drainage Partnership (MGSDP, 2017)</p>
2	Understanding the different factors that contribute to vulnerability	Effectiveness	Evidence of consideration	<p><u>Interview Evidence:</u> <i>"We put up a report to our politicians about what we've called a 'resilience conversation' (from a stakeholder consultation with community groups"</i> <i>"We certainly look at those areas an try to alleviate poverty, we have got a number of those types of schemes, I would imagine that would be the case that they are particularly susceptible to weather, and in fact they do record these flooding events"</i></p> <p><u>Written/Formal Policy Evidence:</u> Social Risk Register (internal)</p>
3	Developing responses which build adaptive capacity, support adaptation actions and consider both physical infrastructure and service delivery	Efficiency	Evidence of consideration	<p><u>Interview evidence:</u> <i>"It's something all local authorities have to do, single outcome agreements where they involve community planning in certain areas. The single outcome agreement considers the effects of climate change on citizens, infrastructure and green spaces, so it actually covers a range"</i> <i>"I've started engaging with our architects about the issue and hoping to assess a couple of projects about to be designed, but they I'm sure have standards that they're working to and if those standards incorporate adaptation, then it will have been taken care of already in there"</i></p> <p><u>Written/ Formal Policy Evidence:</u> Single Outcome Agreements (Scottish Government, 2013) Local planning must consult with the Clyde and Loch Lomond Flood Risk Management Plan</p>
4	Considering and assessing all adaptation options to ensure the most beneficial are taken forward	Efficiency	Evidence of consideration	<p><u>Interview evidence:</u> <i>"When I do presentations I do a balancing acts with my hands and say well a part of our climate change response is obviously heavy engineering, you do need bulldozers and rebar and concrete sometimes, and on the other hand is a matter of social policy. And these two things are absolutely compatible and we need to do both"</i></p> <p><u>Written/Formal Policy Evidence:</u> Potentially Vulnerable Areas plans (SEPA, 2015b)</p>

5	Identifying the distribution of vulnerable groups likely to be affected and recognising that vulnerability is dynamic and changes over time	Equity	Some evidence	<p>(Case-by case basis rather than formalised)</p> <p><u>Interview Evidence:</u> <i>“The main form of accommodation is flats, so if you are on the bottom floor flat, that is a sign of vulnerability. If you are a single elderly person with dementia etc. single parent, someone with disability, all these things. That flood risk vulnerability assessment is something that we’ve contributed with the Scottish government, we can look at that and go down to the fairly local level, and we can map that with our Scottish index with multiple deprivation, most challenging data zones. We can map those on each other. It’s one of those things, to be honest, it’s not always obvious It’s going to hit the most vulnerable”.</i></p>
6	Assessing the potential adverse implications of climate change for vulnerable groups and identifying targeted adaptation actions to address vulnerability	Equity	Not considered	<p>(what work is done is not recognised as social justice, or focuses on empowerment)</p> <p><u>Interview Evidence:</u> <i>“I don’t think when we do our work on adaptation that that (social justice) is kind of a driving factor, however it may aid that if you know what I mean, but I don’t think it’s a factor that we look at, at the moment”</i> <i>“One of the actions that we have in the new strategy is giving that support to communities to enable them to take action such things as adaptation and reducing their carbon emissions or just really living sustainably, and that comes from the new community empowerment Act”</i></p>
7	Involving the communities most likely to be affected in developing and delivering plans and activities related to adaptation, and supporting community resilience longer term	Legitimacy	Some evidence	<p>(evidence of community planning but not all societal groups are consulted)</p> <p><u>Interview Evidence:</u> <i>“It’s something all local authorities have to do, single outcome agreements where they involve community planning in certain areas. The single outcome agreement considers the effects of climate change on citizens, infrastructure and green spaces, so it actually covers a range”</i> <i>“That (Clyde and Loch Lomond Management Plan) was put out to consultation...I think from our perspective we put it on our website, flagged up the existence, and how people could make comments”</i></p> <p><u>Written/ Formal Policy Evidence:</u> Single Outcome Agreements (Scottish Government, 2013) Community Empowerment (Scotland) Act (Scottish Government, 2015a)</p>
8	Being aware of the trade-offs that can arise in striving to achieve socially just adaptation and minimising the negative impacts for vulnerable communities as far as possible	Legitimacy	Not considered	<p>Side effects and trade-offs of social justice not spoken about by interviewees</p>

Figure 5.4 Evaluation of current efforts of flooding adaptation policy in the GCR through Brisley et al.’s (2012) 8 just adaptation principles and Adger et al.’s (2005) four criteria for successful adaptation. Green = evidence of consideration, Orange = some evidence of part consideration, Red = not considered.

A.8. European case studies – further information

Evidence was taken from interviews with European social justice experts, and analysis of European adaptation policy documents.

Case study	Evidence from interviewees	Evidence from Formal policy documents
France	<p><u>Nice</u> When a heatwave has been announced, those most vulnerable to extreme heat are contacted face-to-face by a community representative. It is an example of community self-organisation approach, by finding who is most vulnerable to heat through community contacts and knowledge. This and the Paris case study below are part of the official Paris policy documents, the Paris Heatwave Plan and the France National Adaptation Strategy.</p>	<p><u>Nice</u> France's heatwave plan: (Ministère de la transition écologique et solidaire, 2017) A formal register is given to the mayor, those most vulnerable, eligible for the list, are those over 65 living alone, those over 60 who are housebound, those who are disabled, or with a formal diagnosis of a health condition. In the case of an emergency, the local authority will specifically direct those most vulnerable to social or health services, should they need it.</p>
	<p><u>Paris</u> Mantes-la-jolie is a suburb north of Paris where vulnerable neighbourhoods have been mapped into climate zones using population density overlaid with social data. The maps were used to analyse the effect of extreme heat, and results are shown to developers so that they can design the renovation of the district with community vulnerability to heat in mind. The project therefore addresses heatwave impacts through both physical and community-based measures, and incorporates social justice into housing, planning and development. It is also an example of community self-organisation, through community representatives contacting individuals.</p>	<p><u>Paris</u> In the Paris Adaptation Strategy: (Agence d'Écologie Urbaine, 2015) The Chalex file has been developed to assist those most vulnerable to extreme heat. There is also a project called 'Shopkeepers for Solidarity' where those working in the health profession and public sector are involved in contributing to identifying those most vulnerable to extreme heat.</p>
Netherlands	<p><u>The Delta Programme</u> Flood defence is compartmentalised into cells across the country with dykes. The community within that cell decides how their flood defences should be managed. An example of procedural justice, although the term social vulnerability is not used in the Netherlands. Also an example of equitability, although it is not explicitly stated.</p>	<p><u>The Delta Programme</u> (Government of the Netherlands, 2017) Three simultaneous objectives; flood risk management, water availability, climate-proofing design, therefore achieving adaptation in tandem with planning and development This Delta Programme on Flood Risk Management works in tandem with the Delta Programme on spatial adaptation, and the Delta Programme on freshwater supply, allowing social and natural impacts to be both addressed. A map tool has been developed that can link flood risk management with spatial adaptation, another example of its cross-sectoral approach. With the success of incorporating flooding adaptation in decision-making, evident in annual surveys to local government, the Delta Programme now turns to less high-profile and tangible climate impacts, such as the effects of drought and heat.</p>

<p>London</p>	<p><u>SHINE project, Islington</u> An example of a way to engage with hard to reach groups. It began with a policy addressing fuel poverty (began through climate mitigation) but is now addressing adaptation to extreme exercise. The borough has mapped those vulnerable to extreme heat by liaising with social care services, and have developed from this a database of vulnerable individuals. These individuals are entitled to visits from community helpers. <i>One interviewee said: "it shouldn't be very radical but it is very radical, because social care and heat/cold has not been looked at in tandem. Looking at social care data is quite uncommon due to data protection acts. This project is quite mature for an approach of community-led consideration of vulnerability. It's five years old and they have evaluated whether the policy works, so its mature in terms of its policy assessment"</i></p>	<p><u>SHINE project, Islington</u> (Islington Council, 2017) <u>Urban Heat: Developing the Role of Community Groups in Climate Resilience</u> (Burchell et al., 2017) A project running in the boroughs of Islington and Hackney. Goal: to prevent cold-related deaths from fuel poverty in the borough. Community helpers also provide health advice and 'stay cool' products to vulnerable residents to offset the impact of heatwaves. Those identified as vulnerable are the elderly, families with young children, and those with a medical condition. Reach: 13,500 households A project with multiple objectives (mitigation, adaptation, and social care).</p>
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A.9. Project risk assessment and internal research ethics application forms

Project risk assessment (email confirmation it has been approved by a member of Health and Safety):

 UNIVERSITY OF LEEDS	
Faculty of Environment	
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TAUGHT STUDENT DISSERTATION FIELDWORK RISK ASSESSMENT	
Name	Isabel Cotton
Contact Details (email/ phone)	07887 398 536; ee12ic@leeds.ac.uk
School / Institute	School of Earth and Environment
Module Code	SOEE5020M
ASSESSMENT	
<p><i>If you need any help in completing the assessment please refer to the supporting documentation or contact FOE-safety@leeds.ac.uk</i></p>	
+	
Summary of Project Proposal <i>Include a clear summary description of all the fieldwork data collection tasks, methodology and activities you intend doing.</i>	Interviews with Local Authority Representatives and Climate Justice experts, on the topic of incorporating social justice into climate change adaptation. The area of study is the 8 boroughs comprising the Glasgow City Region, although it is anticipated interviews will only take place in Glasgow City Centre. This aspect of my methodology is the only where I will be working away from campus and home study. The other aspects of my methodology are: Desk-based metaanalysis of European Adaptation Strategies [Online] Desk-based study of climate change datasets [Online]
Dissertation Supervisor(s) / Mentor(s) <i>Name and contact details</i>	Katy Roelich; K.E.Roelich@leeds.ac.uk
Will you be working alone in the field?	Yes
Name and contact details of your fieldwork buddy <i>Your buddy is someone who you can contact at any time while you are doing your work – preferably close to where you are working- they can be a friend, colleague or relative. A suitable call in / check in time should be considered if working in the field/ doing interviews (this will vary depending on what you are doing and where). Also consider what they will do should they be concerned, who they will call and when, and if out of university hours who they would call.</i>	(Not accompanying but living in a nearby city and will visit during the fieldwork) Sebastian Cotton (Brother) 7/1 Dean Path, Dean Village, Edinburgh EH8 8BH 07980 929 278



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Details of other group members (where applicable) <i>Name and contact details</i>	N/a
School Contact whilst on fieldwork <i>Please see supporting information document</i>	Student Support Office: 0113 343 1613 Supervisor Katy Raelich: 07584 573942
What are your arrangements for supervision while carrying out data collection? <i>e.g. who are you going to contact when you return or in an emergency</i>	I will be checking in and out with my Brother, who is living nearby. In an emergency I would ring the School on the phone number given above.
Is your medical form up to date?	Yes <i>If no please update here: Medical Form</i>
What is the location of the fieldwork? <i>Include specific locations, addresses, neighbourhoods or the nearest town / city; include maps and grid references for more remote locations. Do not just state for example "Leeds" or "France" If your research requires an overnight stay include the address and contact details of the accommodation.</i>	Climate Ready Conference Scottish Event Campus Exhibition Way Glasgow G3 8YW Alternatively, interviews may be in a public place during daylight hours in Glasgow City Centre Accommodation to be confirmed: either staying with my brother in Edinburgh, or a hotel in Glasgow city centre
When are you doing the work? <i>Include start and end dates and where applicable times. NB a more specific itinerary can be submitted to your supervisor when it is confirmed or if it changes.</i>	The conference is on the 5-9th June, all day. Interviews may take place a few days either side of this, in daylight hours (times to be confirmed)
Will you need to borrow field equipment from the School?	Yes <input type="checkbox"/> <i>If yes please indicate what If possible, I may borrow a voice recorder for the interviews.</i>
Does it involve any equipment not already identified above?	No <i>If yes please indicate what N/a</i>
What are the risks associated with the equipment and how are you going to reduce them?	No identifiable risk
Will you be bringing samples back for laboratory analysis?	No <i>If yes please indicate what, when and how many samples N/a</i>
What type of site are you working on? <i>This could be farmland, offices, town centre, workshop, cliffs, riversides etc.</i>	Exhibition centre or town centre
What are the risks associated with the site and how are you going to reduce them?	Low risk location; appropriate clothing and footwear



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Do you need Vaccinations?	No <i>If yes, what are they and have you had them?</i> Please select. Click here to enter text.
What is the current FCO advice for the Country FCO Travel Advice	Click here to enter text.

DECLARATION

I have answered the above accurately, if the project proposal or details change at any time during the project I will update my supervisor and if necessary update my fieldwork risk assessment.

Name	Isabel Cotton
Date	26/04/17

APPROVAL

The above assessment has been approved by the following from and academic and health and safety content respectively.

Name Academic Supervisor/ Module Lead	Katy Roelich
Date	27/04/17

Name Health and Safety Manager / Officer	Click here to enter text.
Date	Click here to enter text.

Internal Research Ethics Application Form

INTERNAL RESEARCH ETHICS APPLICATION

Part A: Do I need a full ethical review?

Ethical review is required for all research involving human participants, including research undertaken by students within a taught student module. Further details of the University of Leeds ethical review requirements are provided in the *Research Ethics Policy* available at:

<http://ris.leeds.ac.uk/ResearchEthicsPolicies> and at www.leeds.ac.uk/ethics.

1. Will your dissertation involve any of the following?	Yes	No
New data collected by administering questionnaires/interviews for quantitative analysis		No
New data collected by qualitative methods	Yes	
New data collected from observing individuals or populations	Yes	
Working with aggregated or population data	Yes	
Using already published data or data in the public domain	Yes	
Any other research methodology, please specify: Metaanalysis of research papers		

2. Will any of the participants be from any of the following groups? (Tick as appropriate)	Yes	No
Children under 16		No
Adults with learning disabilities		No
Adults with other forms of mental incapacity or mental illness		No
Adults in emergency situations		No
Prisoners or young offenders		No
Those who could be considered to have a particularly dependent relationship with the investigator, e.g. members of staff, students		No
Other vulnerable groups, please specify:		No

3. Will the project/ dissertation/ fieldwork involve any of the following: (You may select more than one)	Yes	No
The use of, or potential access to, NHS premises or facilities		No
NHS staff recruited as potential research participants by virtue of their professional role		No
Fieldwork taking place outside the UK		No
Fieldwork taking place outside the UK		No

4. Will the project/ dissertation/ fieldwork involve any of the following: (You may select more than one)	Yes	No
Research participants identified from, or because of their past or present use of services (adult and children's healthcare within the NHS and adult social care), for which the UK health departments are responsible (including services provided under contract with the private or voluntary sectors)		No
Collection or use of information from any users of these services (adult and children's healthcare within the NHS and adult social care)		No
Research participants identified because of their status as relatives or carers of past or present users of these services (adult and children's healthcare within the NHS and adult social care)		No
Adults who lack capacity to consent for themselves		No
Health-related research involving prisoners		No
A social care project funded by the Department of Health		No

If you answered 'yes' to ANY of the above questions in 2 or 3 then you will need to apply for full ethical review, a faculty committee level process. This can take up to 6 weeks, so it is important that you **contact your module leader (James Van Alstine: j.vanalstine@leeds.ac.uk)** for guidance with this application as soon as possible. Please now complete and sign the final page of this document. The application form for full ethical review and further information about the process are available at <http://ris.leeds.ac.uk/UoLEthicsapplication>.

If you answered 'yes' to ANY of the questions in 4 then you will need to apply for Health Research Authority approval: <http://ris.leeds.ac.uk/HRAapproval>.

If you answered 'no' to ALL of the questions in sections 2, 3 and 4 please continue to part B.

INTERNAL RESEARCH ETHICS APPLICATION

Part B: What do I need to consider during my dissertation?

5. Will the research touch on sensitive topics or raise other challenges?	Yes	No
Will the study require the cooperation of a gatekeeper for initial access to groups or individuals who are taking part in the study (eg students at school, members of self-help groups, residents of a nursing home)?		No
Will participants be taking part in the research without their knowledge and consent (eg covert observation of people in non-public places)?		No
Will the study involve discussion of sensitive topics (eg sexual activity, drug use)?		No
Could the study induce psychological stress or anxiety or cause harm or have negative consequences beyond the risks encountered in normal life?		No
Are there any potential conflicts of interest?		No
Does any relationship exist between the researcher(s) and the participant(s), other than that required by the activities associated with the project (e.g., fellow students, staff, etc)?		No
Does the research involve any risks to the researchers themselves, or individuals not directly involved in the research?		No

If you have answered 'yes' to any of the questions in (5), please describe the ethical issues raised and your plans to resolve them on a separate page. Agree this with your supervisor and submit it with this form. Again you MAY be referred for light touch or full ethical review.

6. Personal safety	Yes	No
Where will any fieldwork/ interviews/ focus groups take place?		
At the university or other public place (please specify below).	Yes	
At my home address		No
At the research subject's home address		No
Some other location (please specify below). Potentially at offices of interviewees, security/ personal safety issues detailed in risk assessment.	Yes	

If you conduct fieldwork anywhere except at the university or other public place you need to review security issues with your supervisor and have them confirmed by the Dissertation Co-ordinator who may refer you for light touch or full ethical review. A risk assessment may also be required:

<http://ris.leeds.ac.uk/HealthAndSafetyAdvice>. Write a brief statement indicating any security/personal safety issues arising for you and/or for your participants, explaining how these will be managed. Agree this with your supervisor and submit it with this form.

Please note that conducting fieldwork at a research participant's home address will require strong justification and is generally not encouraged.

Please see dissertation risk assessment (Appendix A) for the statement on security/personal safety issues, which has been agreed with my supervisor and faculty H&S.

7. Anonymity

	Yes	No
Is there a possibility of individuals being identified or re-identified from the dissertation, either directly or by combining the information in it with other information?		No

If you have answered 'yes' to question 7, please discuss this further with your supervisor. You need to provide a strong justification for this decision on a separate sheet. This application will need to be reviewed by the dissertation co-ordinator and may require a full ethical review.

8. Research data management

Will the research involve any of the following activities at any stage (including identification of potential research participants)?		Yes	No
a. Examination of personal records by those who would not normally have access			No
b. Sharing data with other organisations			No
c. Use of personal addresses, postcodes, faxes, e-mails or telephone numbers			No
d. Publication of direct quotations from respondents		Yes	
e. Publication of data that might allow individuals to be identified			No
f. Use of audio/ visual recording devices		Yes	
g. Storage of personal data on any of the following:			
	FLASH memory or other portable storage devices	Yes	
	Home or other personal computers	Yes	
	Private company computers		No
	Laptop computers	Yes	
Explain what will happen to the data you collect once you have completed the module:			
Interview transcripts and audio recordings will be destroyed.			

If you have answered 'yes' to any of the questions under 8, you must ensure that you follow the University of Leeds [Information Protection Policy](#) and the [Research Data Management Policy](#).

Dissertation Research Ethical Approval: Declaration

For students	<i>Please tick as appropriate</i>
Option 1: I will NOT conduct fieldwork with (data on) human participants for my dissertation.	
Option 2: I will conduct fieldwork with (data on) human participants for my dissertation.	Yes

For **options 1 and 2** - I confirm that:

- The research ethics form is accurate to the best of my knowledge.
- I have consulted the University of Leeds Research Ethics Policy available at <http://ris.leeds.ac.uk/ResearchEthicsPolicies>.
- I understand that ethical approval will only apply to the project I have outlined in this application and that I will need to re-apply, should my plans change substantially.

For **option 2** only:

- I am aware of the University of Leeds protocols for ethical research, in particular in respect to protocols on **informed consent, verbal consent, reimbursement for participants and low risk observation**. If any are applicable to me, signing this form confirms that I will carry out my work in accordance with them. (<http://ris.leeds.ac.uk/PlanningResearch>)

Student's signature: Isabel Cotton.....

Date: 26/04/17.....