

Public perceptions of climate change in Wales

Summary findings of a survey of the Welsh public conducted during November and December 2012



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Cover image: Carmarthen Bay from Dylan Thomas's boathouse, image by Stuart Capstick

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The research in this report is carried out by the Climate Change Consortium of Wales (C3W)



Climate Change Consortium of Wales
Consortiwm Newid Hinsawdd Cymru

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Foreword



There is increasing evidence that greenhouse gas emissions will continue to rise, which potentially could see global warming of between 4°C and 6°C within the next century. This type of temperature increase would present significant disruption to life in Wales and the natural resources we rely on.

This report on public perceptions of climate change comes hot on the heels of The Climate Change Commission for Wales 2nd Annual report which was published on 18th February 2013. The Commission's report identified a number of priority areas in tackling climate change, including the need to build resilience to manage the impact of climate change, reducing emissions from the built environment, addressing the transport challenge, and the need to engage society amongst others.

When we talk about public perceptions it raises the important issue of engagement. It is so important that the public are engaged through issues that matter to them. This puts a requirement on government and other organisations to make climate change related communications and initiatives real and relevant.

This research into public perceptions of climate change in Wales provides extremely useful insight, and will assist the work of the Climate Change Commission for Wales in the years to come, along with government, public sector organisations, and other service providers as Wales makes the needed transition to a greener and cleaner economy. Making sure that Wales has a sustainable future is the responsibility of everyone, including the Welsh public. Having a detailed understanding of public perceptions can be used to examine current

behaviour change initiatives along with helping to create new and even more integrated approaches.

The Climate Change Commission for Wales works closely with a number of partner organisations, including the Met Office, which has outlined the future climate science extremes for Wales, and predicted short-term weather patterns. These include drought and flooding such as were evident in the Welsh climate during 2012. The issue of flooding is a constant in the survey findings, with around a quarter of respondents having been directly affected by flooding.

The findings, therefore, that the public have a high level of concern about climate change, comes at a time when climate change has slipped down the political agenda, with economic recession dominating the headlines. Political and business leaders need to react to this public concern and implement innovative strategies, initiatives, and projects that address the causes of climate change and best respond to the consequences of climate change.

As Commissioner for Sustainable Futures and Chair of the Climate Change Commission for Wales I would like to thank the team at C3W for conducting this important piece of research and urge politicians, civil servants, businesses, community leaders, academics and other stakeholders to use this information. It not only sets a benchmark for current public perceptions in Wales but should be used to help form new approaches to behaviour change work, deliver new services and create better plans for a sustainable future.

Peter Davies

**Commissioner for Sustainable Futures and
Chair of the Climate Change Commission for Wales**

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Executive Summary

Climate change presents a formidable challenge to societies across the globe. The infrastructure, economy, natural environment, and health and wellbeing of people in Wales are each expected to be affected by climate change in the coming years. In its policies, the Welsh Government has asserted its commitment to urgent and sustained action to cut greenhouse gas emissions. Whilst the case for action on mitigation remains, there is also a clear need to develop effective adaptation approaches in anticipation of consequences, which have become unavoidable in Wales and elsewhere. However, mitigation and adaptation efforts are unlikely to be fully effective without significant awareness, engagement and buy-in from the population of Wales as a whole.

This report examines public perceptions of climate change in Wales at the end of the year 2012, using a nationally representative survey (n=1,001) of the Welsh public. The main aims of the survey were to examine people's views regarding the reality of and human contribution to climate change, their concerns about the impacts of climate change, perspectives on climate change adaptation, and attitudes towards policy and behaviour change. As this survey was conducted at the end of a year when Wales experienced serious levels of high rainfall and associated flooding, the link between people's experience of flooding and climate change perceptions is also explored, including by the use of an additional oversample in a heavily affected part of Wales (n=100).

Key findings

A large majority of the Welsh public are of the view that the Earth's climate is changing, and most accept at least some role for human activity in its causation. High levels of concern about climate change are expressed – more so than has been the case in most UK surveys for some years. This evidence supports the view that concern about climate change in the UK may be beginning to rise again following a decline towards the end of the last decade, a trend also seen in other developed countries.

The impacts of climate change are perceived to be close to home and relevant to the here and now. Over half the respondents consider that their local area is likely to be affected, and/or that Wales is already experiencing the effects of climate change. At the same time, high levels of concern are expressed about the effects of climate change in developing countries and on the natural world.

Around a quarter of survey respondents report having been directly affected by flooding, with one in twenty people having experienced property damage. Those who have experienced flooding are more likely to see their local area as vulnerable to climate change,

and more likely to say that Wales is already feeling the effects of climate change. Experience of flooding is also associated with higher levels of concern about the effects of climate change on oneself and Wales. These findings contribute significantly to the international scientific debate about the links between experiences of extreme weather and changes in people's climate risk perceptions.

Respondents narrowly favour an emphasis on mitigation (addressing the causes of climate change) over adaptation (responding to the impacts of climate change). Nevertheless, most perceive there is already a need to take action to adapt to climate change. Around three-quarters consider increased risk of flooding in the future to be a priority area for adaptation measures, compared to a minority of respondents who view health risks from heat-waves and wildfires to be important. Responsibility for climate change adaptation is situated primarily at the national (Wales and UK) government level, while strong support is expressed for the Welsh Government emissions reduction target of 3% per annum.

Age and gender effects are observed for key measures of climate change perceptions. Female respondents are more concerned about climate change than are males. Older and younger age groups tend to be least concerned about the effects of climate change, with older people least likely to express a willingness to change their behaviour to help address climate change.

Implications of findings

It is often thought that achieving public engagement with climate change is difficult because it is not a matter that is relevant to people's daily lives or concerns. The results of the present study challenge this view. On a range of measures, survey respondents have affirmed the reality, proximity and importance of climate change to people living in Wales. These findings point to the need to justify and develop future decarbonisation initiatives within a framework that clearly stresses their significance for addressing climate change.

The present study also suggests that the opportunity exists for a more constructive dialogue with the public around climate change than is often assumed to be possible. Such a dialogue will need to incorporate a new narrative linking climate change with the rising risk of extreme weather impacts, emphasising at the same time the value of acting both to mitigate against and adapt to such events. This does not mean, however, that the argument for action at the policy and personal level should be confined simply to appeals to local or economic self-interest. Indeed to do so would be to overlook the fact that people's concerns also extend to those living elsewhere in the world, and to the wider impacts of climate change upon the natural world. Striking the correct balance in emphasising both local and global concerns is possibly the most important challenge for climate change communication and public engagement over the next decade.

Introduction

In this report we examine perceptions of climate change among a representative sample of the Welsh public. The report has five main aims:

- (i) measure key indicators of public opinion about climate change in Wales and situate these in the context of findings from other recent studies;
- (ii) examine people's experiences of flooding and how this may be related to perceptions of climate change;
- (iii) investigate attitudes towards climate change adaptation as a general approach, in specific contexts, and with respect to climate change mitigation;
- (iv) examine attitudes towards climate policy and personal action on climate change;
- (v) characterise demographic factors influential in determining climate change perceptions, and provide an overview of other individual, geographical and socioeconomic data obtained by the survey.

Climate change presents a formidable challenge to societies across the globe. Even as the Intergovernmental Panel on Climate Change (IPCC) has made increasingly definitive statements about human impacts on the climate¹, emissions of greenhouse gases have continued to grow worldwide².

It now appears increasingly unlikely that global emissions will be stabilised at a level enabling temperature rise to be kept within two degrees Celsius³, the internationally agreed target to avoid dangerous changes to the climate. As such, whilst the case for action on mitigation remains, there is also a clear need to develop effective adaptation approaches in anticipation of consequences that have become unavoidable.

The UK-wide Climate Change Risk Assessment 2012 identified a number of areas of particular significance for Wales⁴. The infrastructure, economy, natural environment, and health and wellbeing of people in Wales are all expected to be affected in the coming years. For example: before the end of the century, the proportion of agricultural land which is regularly flooded is projected to increase fourfold, with residential and business properties also at increased risk of flooding; higher average winter temperatures are expected to lead to lower winter mortality, however the elderly and other vulnerable groups will be at increasing risk of illness and death due to higher average summer temperatures.

¹ Le Treut et al. (2007)

² IEA (2011).

³ New et al. (2009)

⁴ Climate Change Risk Assessment for Wales (2012)

Internationally, a wide range of climate-related impacts are expected to lead to severe food and water shortages, loss of land and risk to life from rising sea levels and flash flooding, and damage to ecosystems and biodiversity⁵.

In its policies the Welsh Government has asserted its commitment to urgent and sustained action to cut greenhouse gas emissions⁶ and has expressed its aspirations to be an exemplar nation, noting that its target of 3% annual emissions reductions “puts Wales at the forefront of commitments by smaller nations to reduce greenhouse gas emissions”⁷. The Climate Change Strategy for Wales⁸ sets out ways to achieve this across society, encompassing the transport, agriculture, residential and business sectors. With respect to adaptation, additional approaches have been laid out in the government’s Adaptation Delivery Plan⁸, such as developing strategies to respond to heat-waves and flood risks, and working with partners in developing nations to achieve effective responses to climate change.

Key to achieving emissions reduction and effective approaches to adaptation, is involvement by civil society. Domestic energy consumption alone accounts for over a quarter of carbon emissions; where the impact of personal transport and carbon embedded in goods and services is included, this proportion becomes far higher⁹. As such, individuals’ involvement in what may broadly be defined as ‘behaviour change’ is essential¹⁰. Climate change is also a societal and political challenge, requiring citizens’ participation (or at least consent) for effective mitigation and adaptation to occur¹¹.

Given the importance of public engagement, a substantial literature has now evolved which seeks to document and explain public perceptions of climate change. Studies have shown that climate change perceptions are influenced by a variety of factors, both particular to the individual and their life experiences, and regarding the wider social context¹². For example, research has sought to understand the role of values and worldviews¹³, assess what impedes and promotes climate change concern¹⁴, predict and alter environmentally-significant behaviour¹⁵, and develop effective approaches to communicate climate science¹⁶.

⁵ Parry et al. (2007) / IPCC Working Group II

⁶ Welsh Government (2010a)

⁷ Welsh Government (2010b)

⁸ Welsh Government (2010c)

⁹ Druckman and Jackson (2009)

¹⁰ Stern (2011); Welsh Government (2011); Behavioural Insights Team (2011)

¹¹ Compston and Bailey (2008)

¹² Swim et al. (2010); Upham et al. (2009)

¹³ Kahan et al. (2011); Dietz et al. (2007); Schultz and Zelezny (1999); Crompton (2010)

¹⁴ Lorenzoni et al. (2007); Howell (2013)

¹⁵ Stern (2002); Abrahamse et al. (2005)

¹⁶ Shuckburgh et al. (2012); Rabinovich et al. (2012)

Although the Welsh public has been surveyed previously on their views about climate change, this has tended to be as a sub-sample of an overall British or UK study¹⁷. Consequently, margins of error may be relatively large and sampling may not be geographically representative. The study reported here focuses exclusively on Wales and surveys people across the country.

Themes of the research

The survey is used to provide a **snapshot of public opinion** at a critical juncture for Wales and the wider world. Prior to the research undertaken for this report – the end of 2012 – a gradual but sustained increase in public scepticism¹⁸ about climate change over a period of around five years had been observed in the UK, the USA and parts of Europe¹⁹, but there have also been some very recent hints of a resurgence in interest and concern²⁰. It was an open question, therefore, how the Welsh public would respond on a number of key indicators. Perceptions of the reality, human contribution, scientific consensus and importance of climate change are among the measures used here.

It has been argued that climate change is often a non-salient issue for people on account of its being seen as something which is distant in space and time – as affecting other places and people, and as occurring at some (perhaps distant) point in the future²¹. The survey thus seeks to appraise the **perceived immediacy** of climate change.

Related to this, there is growing research interest in the idea that where people do have direct, personal experience of weather events which are potentially linked to climate change, this may affect their perceptions²². Both before and during the research reported here, Wales experienced a series of major flooding events that affected many people and parts of the country. The research looks at whether and how people's **experience of flooding** in Wales might be connected with their perceptions of climate change. As well as incorporating a number of survey items designed to obtain information on people's reported experience of flooding, the survey utilises an **additional data sample** (n=100) gathered in a part of Ceredigion which experienced particularly heavy flooding in the summer of 2012, prior to the survey being administered.

¹⁷ For example, Spence et al. (2010) surveyed 185 respondents in Wales as part of a larger British study of 1,822 people; Shuckburgh et al. (2012) included a Wales subsample in their survey of attitudes to climate change but results were mostly aggregated to the UK level.

¹⁸ Climate change 'scepticism' encompasses doubts about the reality, human causation and importance of climate change – but is also often used to describe a range of other attitudes, for example mistrust in climate science or doubts about the relevance of acting on climate change.

¹⁹ Poortinga et al. (2011); Whitmarsh (2011); Gallup (2011); Pidgeon (2012)

²⁰ Borick and Rabe (2012); Eurobarometer (2011)

²¹ Lorenzoni and Pidgeon (2006); Spence et al. (2011a)

²² Spence et al. (2011b); Whitmarsh (2008). Whilst it is highly problematic to link any singular flooding event to climate change, nevertheless the risks of disruptive flooding are increased by climate change (Pall et al., 2011).

There has been little previous research examining people's perceptions of climate change **adaptation** – that is, ways of responding to the impacts of climate change²³. Several original measures are introduced into the survey to gauge public perceptions in this area. In particular, the survey looks at the relative importance assigned by people to adaptation compared to mitigation, and examines beliefs about priorities for adaptation and responsibility for it. Different approaches for adapting to climate change are contextualised to projected impacts and possible policy responses in Wales.

The survey investigates attitudes towards environmentally-significant **behaviour and behaviour change** both in general terms and with respect to particular choices (e.g. home energy use). Constructs known to relate to behavioural intentions are also explored, including perceived **individual responsibility** for action and beliefs about the **efficacy** of individual and collective action²⁴.

The survey also obtains data on a range of other demographic, socioeconomic and individual variables of relevance for climate change perceptions. These include measures of place attachment (perceptions about the area in which one lives), personal values and worldviews, Welsh identity and language ability, rural/urban living, and household wealth and geographic deprivation. Analyses using these measures are not reported here, however these will be incorporated in future studies and publications.

The full list of survey items used and response distributions obtained are given in Appendix A to the report.

²³ Adaptation refers to actions which are taken to respond to the *consequences* of climate change, such as modifying infrastructure to cope with changes in weather and temperature. Adaptation is commonly contrasted with mitigation, the latter being measures which are designed to reduce the *causes* of climate change, especially via emissions reductions.

²⁴ Koletsou and Mancy (2012)

Research methodology

The survey was carried out by Opinion Research Services (ORS) on behalf of the Climate Change Consortium of Wales, using Computer Assisted Telephone Interviews (CATI).

The survey interviews began on 8th November 2012 and ended on 7th December 2012.

Main sample

Random Digit Dialling (RDD) was used to contact a core sample of residential telephone numbers across Wales. In recognition that certain sections of the population are under-represented, given a lower prevalence of fixed landline telephones, telephone numbers were stratified by Welsh Index of Multiple Deprivation (WIMD) data and households contacted according to anticipated response rates for each stratum, based on previous survey data gathered from the ORS Wales Omnibus. This process sought to ensure representative coverage in the achieved sample across each WIMD decile.

In addition to the sample of fixed landline telephone numbers, ORS included a sample of mobile telephone numbers²⁵ to ensure appropriate coverage for households without fixed landline telephones. This also improves coverage among certain socio-demographic groups less likely to use fixed landline telephones even where they are available. Of the 1,001 interviews conducted for the main sample: 6% were conducted with residents that only had a fixed landline telephone; 56% were conducted on a fixed landline telephone with residents that also had a mobile; 30% were conducted on a mobile telephone with residents that also had a fixed landline; and 8% were conducted with residents that only had a mobile telephone.

The main survey sample was weighted in terms of respondents' local authority area and the relative deprivation of the area in which they live. The sample was also weighted to take account of respondents' age, and their working status and tenure (as a proxy for social grade). Once weighted, the survey data was broadly representative of the population of Wales.

Socio-demographic and location characteristics of the main sample (n=1,001) are given in Appendix B.

²⁵ These contact telephone numbers were obtained from a panel database held by ORS. Mobile telephone contact numbers were used for panel members for whom no landline contact number was recorded for an address. A random sample of mobile numbers was selected, again based on anticipated response rates stratified by WIMD decile.

Oversample in an area affected by flooding

In addition to the core sample, a further 100 interviews were undertaken with residents living in an area that had experienced flooding during the spring and/or summer of 2012.

An area in Ceredigion to the north of Aberystwyth (around the villages of Tal-y-bont, Dol-y-bont, Penrhyncoch and Llandre) was a focus for these interviews²⁶.

Using GIS systems, ORS identified four telephone exchange prefixes which covered 92% of all residential telephone numbers in the selected area. Telephone numbers with these exchange prefixes that had previously been selected as part of the main survey sample were excluded; however all other numbers with these exchange prefixes were randomised for selection in the additional oversample.

Reporting of findings

Results are given in the report in terms of percentages of respondents answering to a particular category (e.g. 'strongly agree') and/or in aggregate for two or more response categories (e.g. where overall agreement is compiled from 'strongly agree' and 'tend to agree' responses). Percentages are rounded to the nearest integer both in the main part of the report and in Appendix A. Where an aggregate percentage is reported this is calculated from exact data and then rounded; as such, these may occasionally differ slightly from the sum of the corresponding figures given in Appendix A.

The main results (based on a sample size of 1,001 interviews) are accurate to within +/- 3.10% for a 50% finding, 2.68% for a 75% or 25% finding, and 1.86% for a 90% or 10% finding (all at a 95% confidence level).

²⁶ The area covered the following Lower Super Output Areas based on the 2001 UK Census boundaries: W01000520 Borth 1; W01000521 Borth 2; W01000523 Ceulanamaesmawr; W01000548 Tirymynach; W01000549 Trefeurig.

Findings

Section 1

Public perceptions of climate change: key indicators

This section of the report examines measures of public perceptions which have been used over a number of years and research contexts. Studies suggest that people's views on some fundamental aspects of climate change, and regarding the salience of climate change as an issue, tend to fluctuate over time. Perceptions may vary as a result of factors such as economic and political circumstances, media stories, and weather events²⁷. Appraising public perceptions at a particular moment in time – in this case, late 2012 – thus provides a snapshot of public opinion which may be linked to particular conditions.

In this section, we also report findings regarding the types of immediate associations made by people with climate change. These are important to document as the term 'climate change' can conjure up a wide variety of ideas – ranging from reference to catastrophic events, to doubts about climate science, to observations about changing weather.

1.1 Beliefs about the reality and causation of climate change

Central to any consideration of public perceptions of climate change is whether people accept the basic reality of climate change and believe that there exists a human component to its causes.

- **The majority of survey respondents (88%) considered that the world's climate is changing, in response to the question 'as far as you know, do you personally think the world's climate is changing or not?'**²⁸. Only 4% of respondents answered 'no' to this question (a further 7% answered 'don't know').
- **Just over half of survey respondents (52%) were of the view that climate change arose from a combination of natural processes and human activity. A further third (35%) considered that it was due mainly or entirely to human activity. Around one in ten respondents (11%) stated that climate change was due mainly or entirely to natural processes**²⁹.

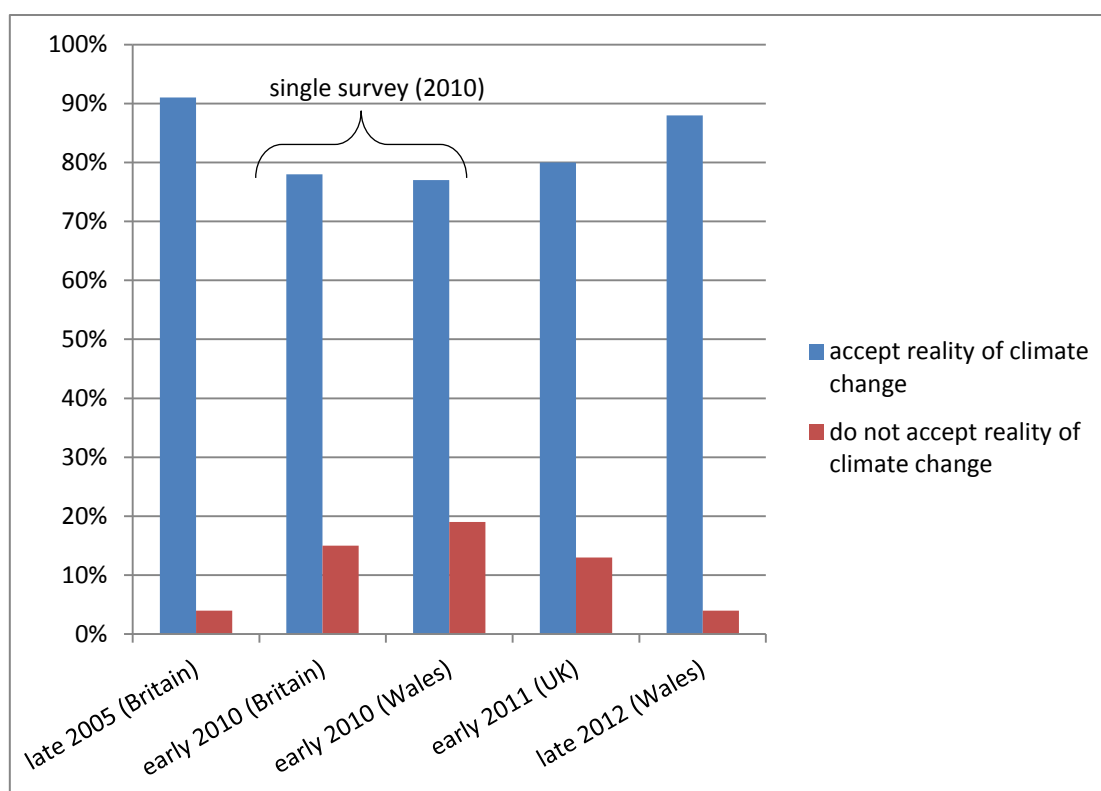
²⁷ Scruggs and Benegal (2012); Brulle et al. (2012); Shum (2011)

²⁸ This item is intended to gauge views about whether climate change is occurring, irrespective of cause or importance. A negative answer to this question has been conceptualised as 'trend scepticism' in the literature (Poortinga et al., 2011; cf. Rahmstorf, 2004).

²⁹ A further 2% answered either 'don't know' or that 'there is no such thing as climate change'.

In line with previous surveys of public perceptions, we find that most people accept that climate change is occurring. Nevertheless, the finding that fully 88% are of the view that the climate is changing is higher than that obtained in UK-wide surveys³⁰ undertaken in 2010 and 2011 – although slightly lower than the figure of 91% obtained in 2005 (see Figure 1)³¹.

Figure 1 Levels of acceptance that the climate is changing³²



Respondent sample sizes: 2005 (n=1,491); 2010 (Britain n=1,822; of which Wales n=185); 2011 (n=1,007); 2012 (n=1,001)

³⁰ Shuckburgh et al. (2012); Spence et al. (2010); Poortinga et al. (2006)

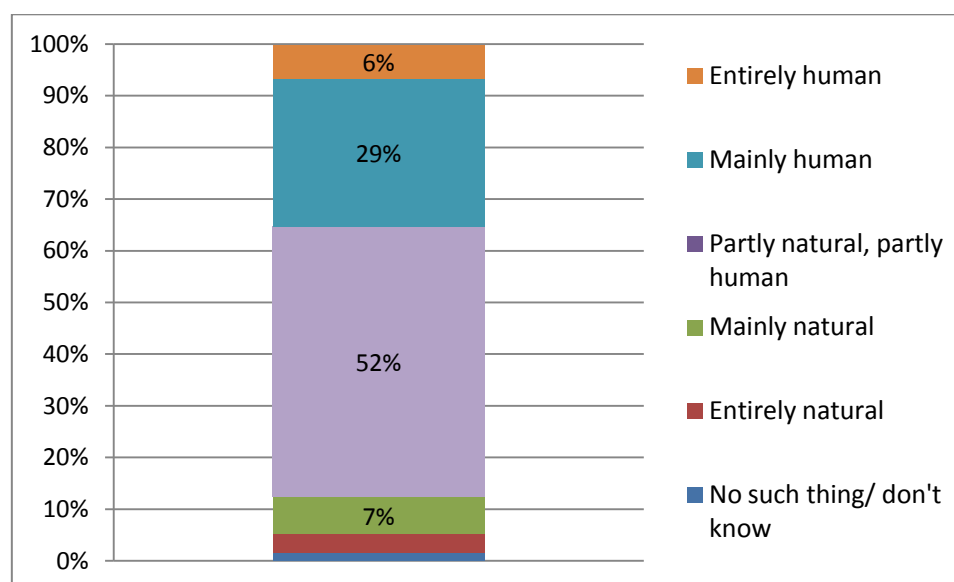
³¹ It is notable that the figure obtained in the present study is very close to that obtained for Welsh respondents in a 2011 survey (Shuckburgh et al., 2012), where levels of belief in the reality of climate change were among the highest in the UK: in that survey, 90% of people in Wales considered that the climate is changing (by comparison, only 73% of London respondents and 72% of East Midlands respondents were of this view). The small number of respondents who were Welsh in the 2011 survey means, however, that margins of error were high.

³² Respondents in each of four surveys between 2005-2012 were asked 'As far as you know, do you personally think the world's climate is changing or not?' 'Don't know' responses are not shown. Note that the 2010 data for Wales (Spence et al., 2010) was based on a small sample size (n=185) and so has a relatively high margin of error.

Beliefs about the degree to which climate change is caused by natural processes and/or human activities are broadly in line with previous work, which finds the most common viewpoint to be that climate change is ‘partly caused by natural processes and partly caused by human activity’, as shown in Figure 2. The proportion of people who perceive that climate change has a primarily human cause (i.e. is ‘mainly’ or ‘entirely’ human-caused) is very close to that obtained in a previous Welsh sample in 2010, where 35% were of this view³³. It is however lower than British figures obtained in the middle of the last decade³⁴.

Figure 2 shows the response distribution for the 2012 data, and Figure 3 data in comparison with previous surveys.

Figure 2 **Levels of belief in the natural and human component to climate change causation**³⁵

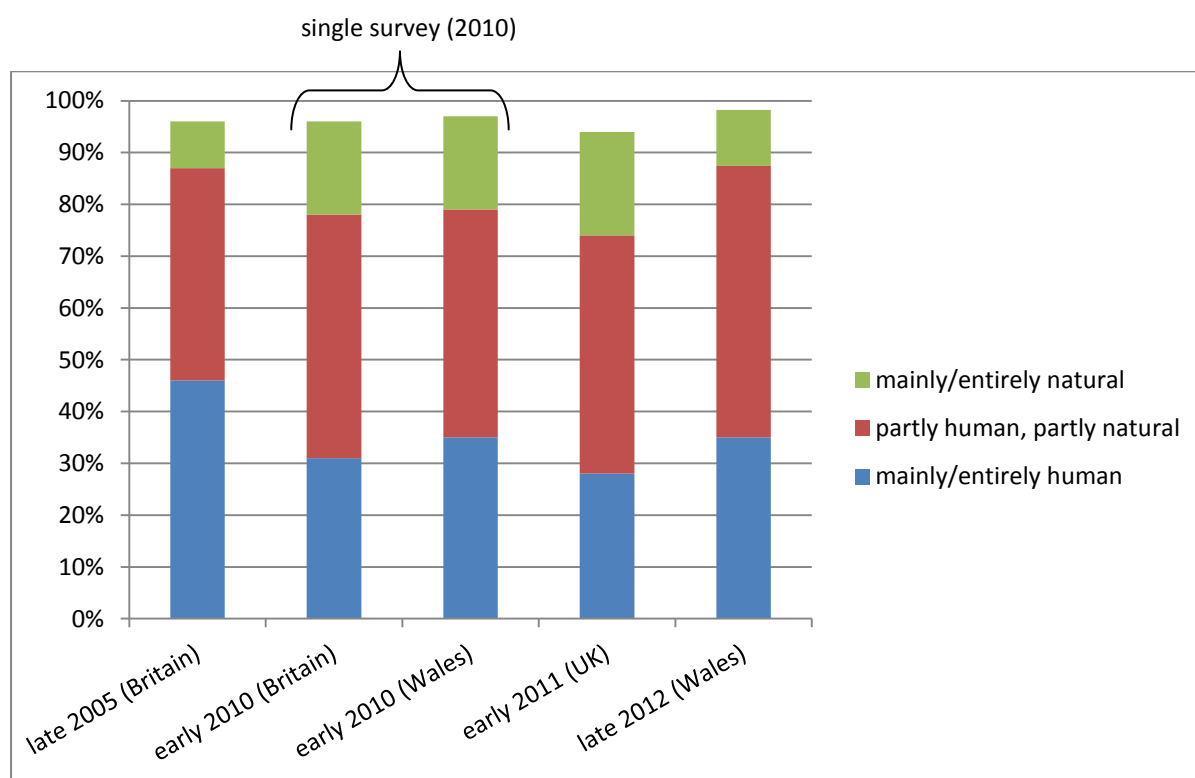


³³ Spence et al. (2010)

³⁴ The proportion of people responding that climate change is mainly/entirely human-caused was 46% in 2005 (Poortinga et al., 2006), compared to 35% in 2012.

³⁵ Respondents were asked ‘Thinking about the causes of climate change, which, if any, of the following best describes your opinion?’ Response options as presented followed the format ‘Climate change is entirely [/mainly] caused by human activities’, ‘Climate change is partly caused by natural processes and partly caused by human activities’, ‘Climate change is entirely [/mainly] caused by natural processes’.

Figure 3 Belief in natural and human causation over time³⁶



Respondent sample sizes: 2005 (n=1,491); 2010 (Britain n=1,822; of which Wales n=185); 2011 (n=1,007); 2012 (n=1,001)

1.2 Levels of concern about climate change

An approach often used in surveys of climate change perceptions is to ask people how concerned they are about climate change³⁷. Generally speaking, most respondents express some degree of concern when asked directly.

- **In the present research, high levels of concern about climate change were expressed: 36% stated that they were ‘very concerned’ and a further 48% that they were ‘fairly concerned’. Just under 9% answered that they were ‘not very concerned’ and 7% that they were ‘not at all concerned’.**

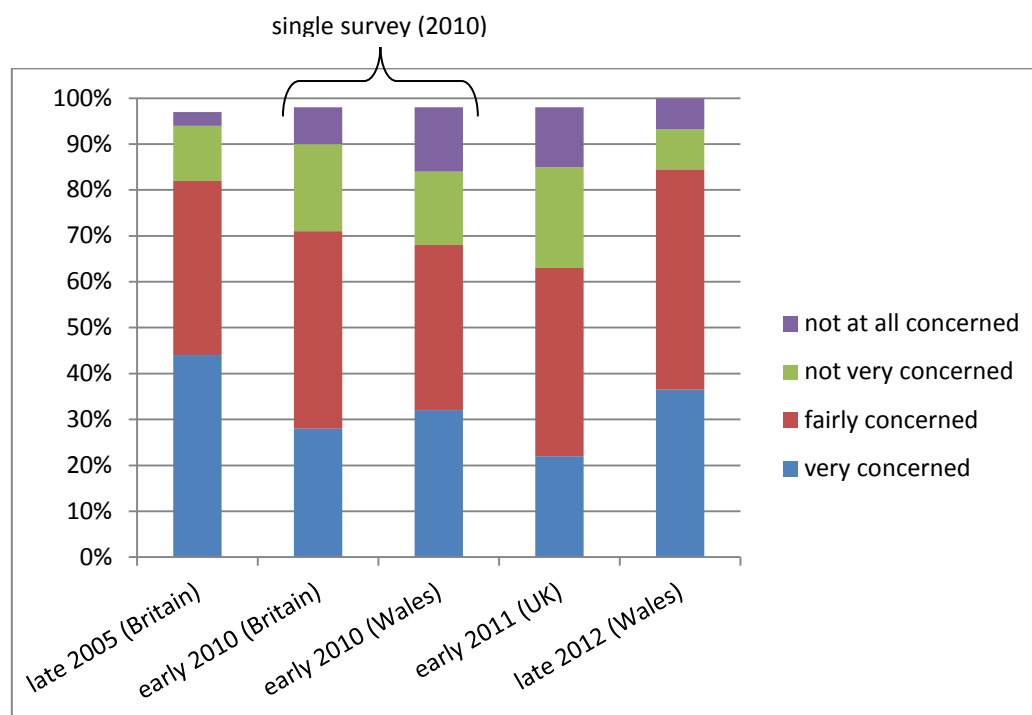
These figures are higher than those obtained in recent comparable surveys carried out across the UK and Britain, as shown in Figure 4. Indeed, data from the present study are

³⁶ Respondents in each of four surveys between 2005-2012 were asked: ‘Thinking about the causes of climate change, which, if any, of the following best describes your opinion?’ ‘Don’t know’ responses are not shown.

³⁷ In the present study, they are asked ‘How concerned, if at all, are you about climate change, sometimes referred to as ‘global warming’?’

closer to those obtained across Britain in 2005: not since this time has the proportion of people stating that they are either 'very' or 'fairly' concerned about climate change been at a level over 80%³⁸.

Figure 4 Levels of concern about climate change³⁹



Respondent sample sizes: 2005 (n=1,491); 2010 (Britain n=1,822; of which Wales n=185); 2011 (n=1,007); 2012 (n=1,001)

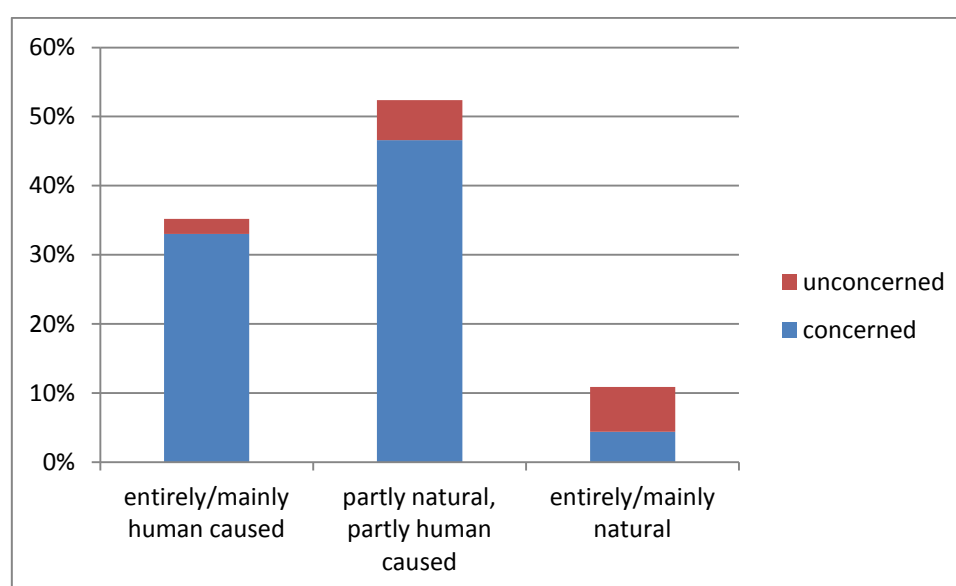
The findings from the present study also indicate that the extent to which people are concerned about climate change is closely associated with their perceptions of its underlying causation. As shown in Figure 5, the overwhelming majority of those perceiving climate change to have a primarily human cause are also either 'very' or 'fairly' concerned about climate change. By contrast, those who perceive climate change to be due primarily to natural processes are in the main unconcerned about climate change. These findings underline the importance of people's perceptions in relation to why climate change is

³⁸ The proportions of people stating that they were 'very' or 'fairly' concerned about climate change in 2005 were 44% and 38% respectively; the proportions stating they were 'not very concerned' or 'not at all concerned' were 12% and 3% respectively (Poortinga et al., 2006).

³⁹ Respondents were asked 'How concerned, if at all, are you about climate change, which is sometimes referred to as 'global warming'?' 'Don't know' responses are not shown.

thought to occur⁴⁰. A higher level of concern likely reflects a sense of responsibility for addressing a problem which is seen as the ‘fault’ of human actions⁴¹. By contrast, where climate change is considered a natural phenomenon, no such responsibility exists (and addressing emissions, for example, would in any case be ineffectual).

Figure 5 **Levels of concern about climate change and perceptions of causation**
Cross-comparison of levels of concern and perceptions of natural/human causation of climate change



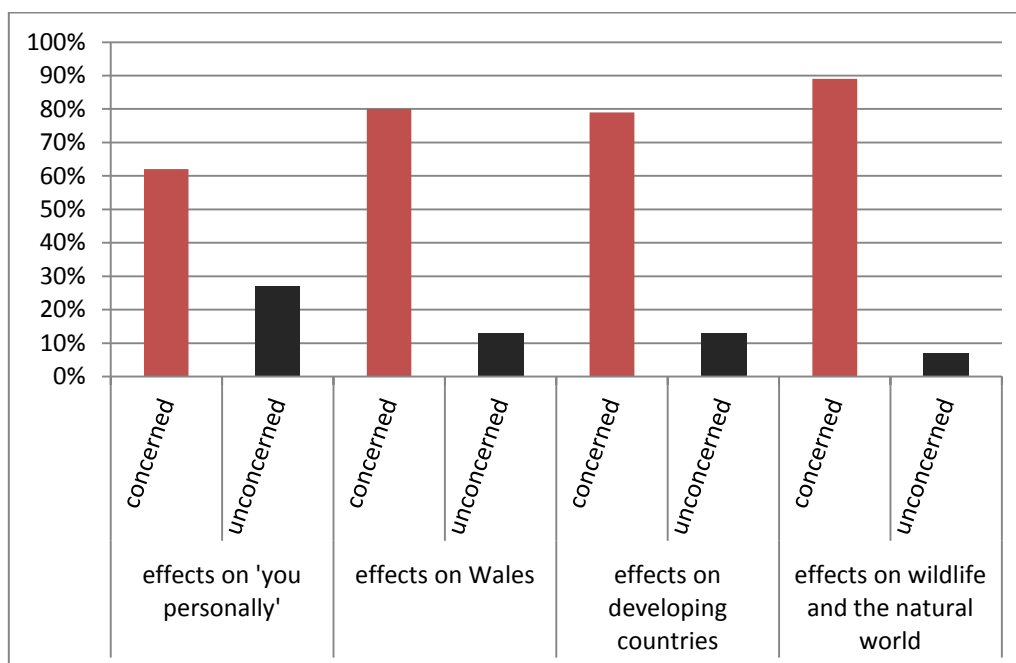
As well as gauging general concern about climate change, respondents were asked to indicate their concern about the potential effects of climate change on themselves personally, on Wales, on developing countries, and on wildlife and the natural world. Levels of concern about the effects of climate change on oneself are lowest overall, with highest levels of concern being for ‘wildlife and the natural world’. Figure 6 shows the distribution of responses, based on those answering either ‘very’ or ‘fairly’ concerned (labelled ‘concerned’) versus those answering ‘very’ or ‘fairly’ unconcerned (labelled unconcerned’)⁴².

⁴⁰ It should be noted that the study findings do not in themselves demonstrate that perception of causation of climate change determines level of concern. For some people, a lack of concern driven by other factors may also lead them to view climate change as a natural phenomenon.

⁴¹ Reflecting on similar findings from the USA, Weber (2010) argues that attributions of human responsibility have a higher likelihood of triggering the perceived need for ‘corrective action’.

⁴² A five point scale from ‘very concerned’ to ‘very unconcerned’ is used here, rather than the four-point scale used to gauge general concern.

Figure 6 **Levels of concern about different types of impacts of climate change**⁴³
Proportions of respondents who are concerned or unconcerned about the effects of climate change in each of four domains



1.3 Perceptions of climate science and the seriousness of climate change

Whilst there has been growing consensus among scientists on some of the basic tenets of climate science, previous studies have suggested that this has not been fully recognised by the public. For example, close to 100% of research active climate scientists consider that human activity is a significant contributor to increasing global temperatures⁴⁴; however, up to a fifth of the UK public have been found to disagree with the proposition that ‘most scientists agree that humans are causing climate change’⁴⁵. The reason for this discrepancy may be connected to what has been termed ‘uncertainty transfer’⁴⁶ – the sense that authentic uncertainties in climate science, such as those concerning projections of temperature increases or impacts, have been conflated with overall uncertainty about the core set of messages about warming trends coming from climate science (which in effect is far lower)⁴⁷ – or relate to the media having presented debates around climate change in

⁴³ Respondents were asked ‘Are you concerned or unconcerned with the potential effects of climate change on...’ for each of four domains. ‘Don’t know’ responses are not shown.

⁴⁴ Doran and Zimmerman (2009); Anderegg et al. (2010)

⁴⁵ Shuckburgh et al. (2012)

⁴⁶ Spence et al. (2011a)

⁴⁷ Pidgeon and Fischhoff (2011)

‘balanced’ terms, leading to the views of climate sceptics receiving disproportionate attention⁴⁸.

- **The majority of survey respondents (64%) answered ‘strongly agree’ or ‘tend to agree’ that most scientists agree humans are causing climate change⁴⁹. A sizeable minority (22%) however strongly disagreed or tended to disagree with this statement.** A further 14% stated either that they ‘don’t know’ or ‘neither agree nor disagree’.

The proportion of people acknowledging this scientific consensus is higher by around 4% than findings from a UK-wide survey carried out in early 2011 (60% agreement obtained) which was itself some 4% higher than British survey data obtained in early 2010 (56% agreement obtained)⁵⁰. This may be indicative of a trend over time in the proportion of people accepting the scientific consensus around a human component to climate change. It remains the case, however, that the overwhelming scientific consensus about a human contribution is not recognised by a sizeable minority.

One means by which the perceived seriousness of climate change can be gauged, is by asking people whether they feel it is exaggerated: a number of surveys in recent years⁵¹ have asked people whether they agree or disagree that ‘the seriousness of climate change is exaggerated’. This item is of interest because it aims to contrast people’s own judgement of the seriousness of climate change with their perception of how this is portrayed in general terms. The item has also been used as a measure of ‘impact scepticism’⁵² – comprising doubts about the severity of climate change, even where the reality and human component to it may be accepted.

- **In contrast to previous studies, less than a third (30%) of Welsh survey respondents considered that ‘the seriousness of climate change is exaggerated’; 60% disagreed or strongly disagreed with this statement.** Typically, in other studies around 40% of respondents have answered that they (strongly) agree that the seriousness of climate change is exaggerated; for example, in 2011, 44% of a UK sample were found to be of this view⁵³; 41% of a Welsh sample in 2010 likewise (strongly) agreed that the seriousness of climate change is exaggerated⁵⁴.

⁴⁸ Boykoff and Boykoff (2004)

⁴⁹ 28% of respondents answered ‘strongly agree’ and 36% ‘tend to agree’.

⁵⁰ Shuckburgh et al. (2012); Spence et al. (2010)

⁵¹ Shuckburgh et al. (2012); Spence et al. (2010); Eurobarometer (2008, 2009)

⁵² Poortinga et al. (2011) define ‘impact scepticism’ as comprising doubts that climate change will lead to substantial detrimental impacts.

⁵³ Shuckburgh et al. (2012)

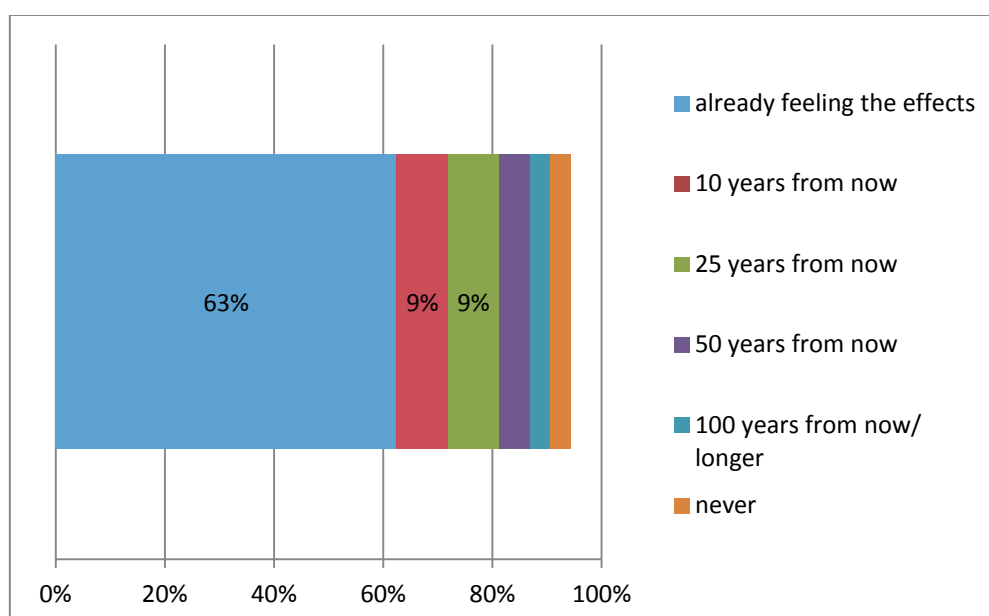
⁵⁴ Spence et al. (2010)

1.4 Perceived immediacy of climate change

Survey items were used to ascertain how distant in time and space climate change was perceived to be.

- **The majority of survey respondents (63%) perceived that Wales is already feeling the effects of climate change.** A further 9% considered that the effects will be felt ten years from now, and a similar proportion was of the view that they will occur 25 years from now. Only 4% of respondents answered '100 years from now or longer' and a further 4% answered 'never' (6% answered 'don't know' or did not provide an answer).

Figure 7 Perceived timescale in which Wales will feel the effects of climate change⁵⁵



These data indicate that for the majority of Welsh survey respondents, climate change is perceived to be a temporally immediate matter. The results of the present study suggest that for respondents in late 2012 in Wales, climate change was more likely to be seen as something actually happening at the present time, than was the case across a British sample some two years previously. The last major survey to ask this question, using a British sample in 2010, found that 41% of people were of the view that Britain was already experiencing

⁵⁵ Respondents were asked 'When, if at all, do you think Wales will start feeling the effects of climate change?' Response options were 'we are already feeling the effects', '10 years from now', '25 years from now', '50 years from now', '100 years from now or longer', 'never', or 'don't know'. 'Don't know' responses are not shown.

the effects of climate change; the Welsh subsample of this survey found 42% considered this to be the case⁵⁶.

Two further items appraised whether climate impacts were perceived to be geographically close to home.

- **A majority (65%) agreed or strongly agreed that their local area is likely to be affected by climate change, although close to a quarter (24%) disagreed.**
- **Similar proportions of respondents agreed as disagreed that ‘climate change will mostly affect developing countries: 42% (strongly) agreed versus 45% (strongly) disagreed.**

While in the past climate perceptions have often exhibited what has been termed ‘spatial optimism’⁵⁷ – that is, the tendency to perceive environmental problems to be worse in distant places than in one’s immediate locale – a majority of respondents in our study do consider that climate change is something of relevance to their local area. Again, climate change appears to be seen as something closer to home for respondents in Wales in 2012 than when this question was asked of a British sample in 2010: whilst a majority at this time did see their local area as likely to be affected, this was at a lower level of agreement⁵⁸.

The connection between one’s immediate location and the perceived impact of climate change is explored further in section 2 in light of people’s experience of flooding in Wales.

⁵⁶ Spence et al. (2010); of the UK sample a further 13% answered ‘in the next 10 years’ and 14% answered ‘in the next 25 years’; for the Wales subsample the figures were 14% and 10% respectively.

⁵⁷ Gifford et al. (2009)

⁵⁸ Spence et al. (2010) obtained 53% agreement (13% ‘strongly agree’ and 40% ‘tend to agree’) that my ‘local area is likely to be affected by climate change’ for the UK sample, and similar figures of 11% and 40% for the Wales subsample.

1.5 Unprompted associations with climate change

Close to the start of the survey, respondents were asked to report the ‘first things that come to mind’ about climate change. This method was used to ascertain which associations or images⁵⁹ are closely associated by people with climate change. This has the advantage of allowing a version of respondents’ own unprompted thoughts about climate change to be obtained.

The full analysis including quantification of these open-ended items is not reported here. However, an overview of the responses received and some illustrative examples are given.

The majority of responses concerned the consequences of climate change, usually in terms of physical impacts. These commonly related to impacts such as on polar ice caps and sea level rise, impacts on the weather and seasons, and/or changes to temperatures. For some, climate change was associated with impacts on humans and/or the natural world, both in the present and future. A category of particular interest, which is examined in further detail below, concerns reference by people to flooding as a consequence of climate change.

A less prominent category of responses concerned the causes of climate change. This was often related to notions such as ‘emissions’ or ‘pollution’, or occasionally referred to the wider context of climate change causation, such as the role of industry.

In addition, some responses were of a character that may broadly be termed sceptical. Reference was made here to science controversy, natural causation and the motives of social actors (e.g. government seeking to raise taxation).

A selection of responses from the categories described is given in Table 1. These are included to illustrate the common themes within responses obtained – they do not reflect the frequency with which these themes occurred.

⁵⁹ Image associations have been found to relate to climate change risk perceptions and to be associated with affect (Lorenzoni et al., 2006; Leiserowitz, 2006). The question used here is based on the approach described by Slovic (2000).

Table 1 Common themes in open-ended responses⁶⁰

Theme of open-ended response	Example respondent quote (verbatim)
<i>Consequences</i>	
Changes to weather/ seasons	“Harsher winters” “The wet cold summers and hot winters” “Changes in weather, extreme weather conditions”
Changes to temperature	“Planet getting hotter” “Rising temperatures and future problems stored up” “Freezing cold or boiling hot”
Impacts on icecaps and similar	“Ice melting in polar ice caps” “Melting ice and glaciers. Shrinking ice caps.”
Sea-level rise	“The seas will get high and we will get drowned” “Rising sea levels”
Flooding	“The floods recently and varying weather” “How we have had more flooding these past several years” “All [the] rain and floods we are getting” “Look at the rainfall we are getting and flooding and that’s only Wales”
Human consequences	“Future of my grandchildren” “The Third World will suffer more” “The perishing of the planet”
<i>Causes</i>	
Reference to emissions	“Carbon dioxide emissions”
Reference to ‘pollution’ and similar	“Too much poison going into the air”
Causes contextualised to society	“Excessive use of fossil fuels” “The use of energy, how we get it and how we generate it” “Human causes, industrial effects”
<i>‘Sceptical’ responses</i>	
Natural causation	“It’s a natural progression of the Earth”
Science controversy	“Debate on whether it’s actually happening or not” “More hot air from scientists... I don’t believe they know what they’re talking about.”
Motives of government and others	“Political lever for taxing people” “Self-serving interests” “There are a lot of exaggerated views expressed by liberals”

⁶⁰ In response to the question ‘What is the first thing that comes to mind when you hear the phrase ‘climate change’ or ‘global warming’?’

Section 2

The connection between experience of flooding and perceptions of climate change

Where climate change is seen primarily as a risk affecting other places and times, its salience as an issue may be limited. As shown in Figure 6 above, respondents express more concern about the effects of climate change on Wales, developing countries, and wildlife and the natural world, than they do about the effects on themselves personally.

A number of studies have sought to examine whether people's perceptions might be affected by direct, personal experience of impacts which are associated with climate change – in the UK context, this has been done by looking at people's experience of flooding⁶¹.

Establishing an objective link between flooding events and climate change is extremely difficult to do and even making causal connection is argued to be controversial⁶².

Nevertheless, studies have suggested that climate change contributed to increased risks of flooding in England and Wales when this occurred in the year 2000⁶³. The risks from flooding in the future are also projected to increase further, with Wales particularly vulnerable due to the steepness of many parts of the Welsh landscape⁶⁴.

During the summer preceding the data gathering for the survey, there was flooding in many parts of Wales⁶⁵. Subsequently, as the survey was being administered (November 2012), significant flooding again occurred. Incorporated into the design of the survey were several ways of examining whether people's experience of flooding was associated with their perceptions of climate change⁶⁶.

⁶¹ Whitmarsh (2008); Spence et al. (2011b)

⁶² Trenberth (2012)

⁶³ Based on a climate modelling study, Pall et al. (2011) argue that it is "very likely that global anthropogenic greenhouse gas emissions substantially increased the risk of flood occurrence in England and Wales in autumn 2000".

⁶⁴ Climate Change Risk Assessment for Wales (2012)

⁶⁵ Met Office (2012); the months of April and June 2012 were both the wettest the UK has seen since records began in 1910.

⁶⁶ Survey items relating to flooding experience were placed at the end of the survey, so as to negate the possibility that these might influence responses to questions on climate change perceptions.

2.1 Personal experience of flooding and perceptions of climate change⁶⁷

Several measures were used to distinguish between the ways in which respondents had (or had not) experienced flooding⁶⁸. These ranged from experiencing damage to one's home or other property, to having witnessed the impacts of flooding, to no discernible flooding experience. Respondents were asked to reply yes or no to each item⁶⁹.

- **Six percent of respondents stated they had personally experienced damage to their home or other property from flooding. Over a quarter (27%) stated they had been directly affected (e.g. through travel disruption).**

Close to half (44%) of all respondents stated that other people in their area had experienced property damage from flooding, and 43% stated that they had seen first-hand the effects of flooding. A smaller minority of respondents (37%) stated that they had 'not given much thought' to flooding in the area within five miles of where they live.

- **Differences in levels of concern about the effects of climate change on oneself and the effects of climate change on Wales are observed according to different types of experience of flooding.**

Three-quarters (75%) of respondents who had experienced property damage were 'very' or 'fairly' concerned about the effects of climate change on them personally, versus 56% of those who had not seen or experienced the effects of flooding⁷⁰. In addition, 89% percent of respondents who had experienced property damage were 'very' or 'fairly' concerned about the effects of climate change on Wales, versus 76% of those who had not seen or experienced the effects of flooding.

Figures 8 and 9 illustrate differences between people's level of concern in relation to their experience of flooding⁷¹. In all cases, concern is higher with reported experience of flooding.

⁶⁷ As with the majority of findings in the report, results reported in section 2.1 are for the main sample (n=1001) only. Findings in sections 2.2 and 2.3 incorporate data from an additional oversample (n=100).

⁶⁸ Interviewers were asked to clarify, if necessary, that 'flooding' referred to that from increased levels of surface water, not due to 'household' problems such as a burst pipe.

⁶⁹ The wording used for these items can be found in Appendix A, question 22.

⁷⁰ Those answering 'no' to *all* of the following items: 'My home or other property has been damaged by flooding', 'I have been directly affected by flooding, for example through travel disruption or my ability to work', 'Other people within five miles of where I live have experienced property damage from flooding', 'I have seen first-hand the effects of flooding within 5 miles of where I live'.

⁷¹ The proportions of people answering about other people affected/ not affected do not sum to 100% because 3% of respondents answered 'don't know'.

Figure 8 Difference in levels of concern about the effects of climate change ‘on you personally’ according to types of experience of flooding⁷²

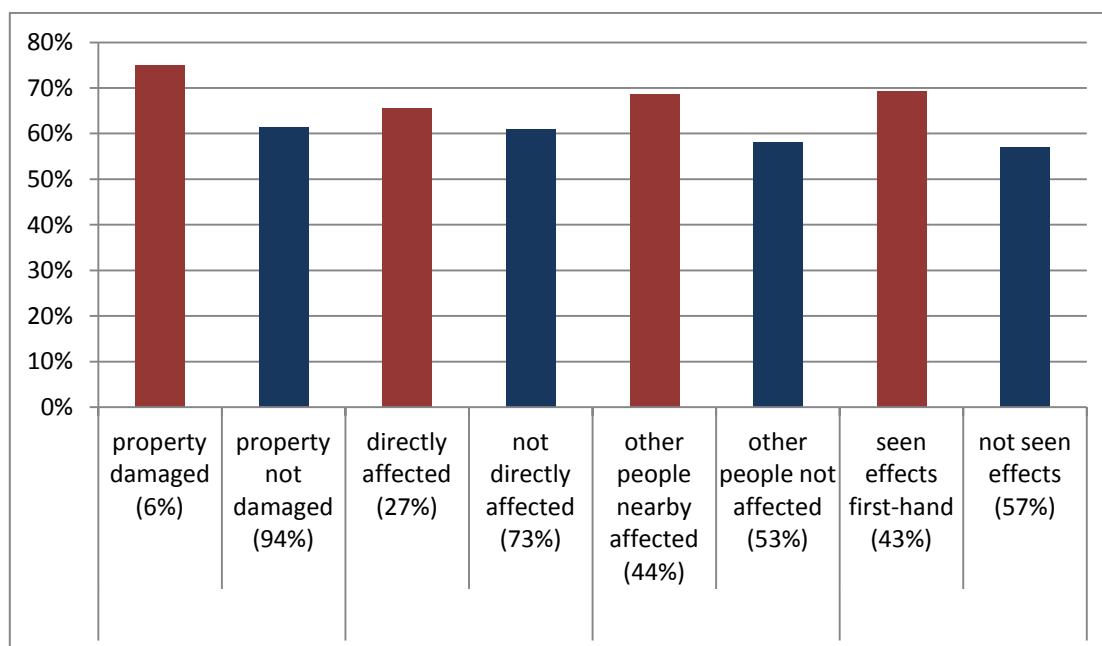
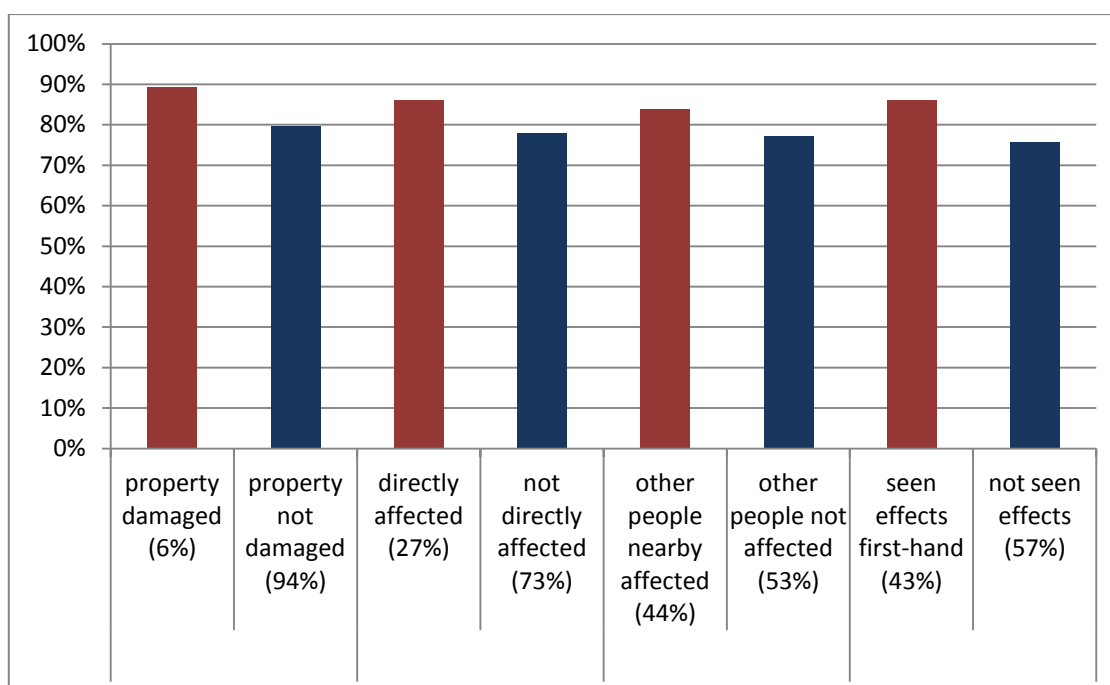


Figure 9 Difference between levels of concern about climate change on Wales according to types of experience of flooding⁷³



⁷² Responses are shown for those answering ‘very concerned’ or ‘fairly concerned’ to the item ‘To what extent are you concerned or unconcerned with the effects of climate change on you personally?’

⁷³ Responses are shown for those answering ‘very concerned’ or ‘fairly concerned’ to the item ‘To what extent are you concerned or unconcerned with the effects of climate change on Wales?’

2.2 Perceptions of climate change in the area around Llandre, Ceredigion, a region of Wales flooded in the summer of 2012

Whilst many places in Wales were affected in 2012, one part of the country which experienced particular difficulties in early June was the area around Llandre in Ceredigion, west Wales, just north of Aberystwyth. Villages in this area including Dol-y-bont, Tal-y-bont, Penrhyncoch and Llandre were affected, leading to evacuations, damage to homes, and loss of crops⁷⁴.

The survey design incorporated an additional oversample confined to this region which was intended to examine whether people's perceptions were affected by living in such a heavily affected part of the country⁷⁵. From a population of approximately 6,000, a sample of 100 respondents was obtained.

On the measures of concern about the effects of climate change as considered above, no substantial difference is found between those in this region and the rest of Wales⁷⁶. Eighty percent of the main sample (n=1001) were concerned ('very concerned' or 'fairly concerned') about the effects of climate change on Wales, versus 82% of the Ceredigion subsample (n=100). Sixty-four percent of the main sample were concerned about the effects of climate change on 'you personally', versus 66% of the Ceredigion subsample.

In terms of the perceived temporal and spatial proximity of climate change, however, there was a pronounced difference between the main sample and subsample.

- **Eighty-one percent of the subsample of the flooded region of Ceredigion considered that their local area is likely to be affected by climate change, versus 66% of the main sample. Seventy-four percent of the subsample considered that 'we are already feeling the effects' of climate change, versus 65% of the main sample.**

The ethics of questioning people who have experienced flooding

Having one's home flooded is a distressing experience. The research aimed to recognise this by asking only a limited number of short yes/no questions about people's experiences. We also sought to oversample in a region which had experienced flooding, but around six months prior to the survey administration. This was so that whilst flooding experience may have been recent, this would not have been too close to actual experiences.

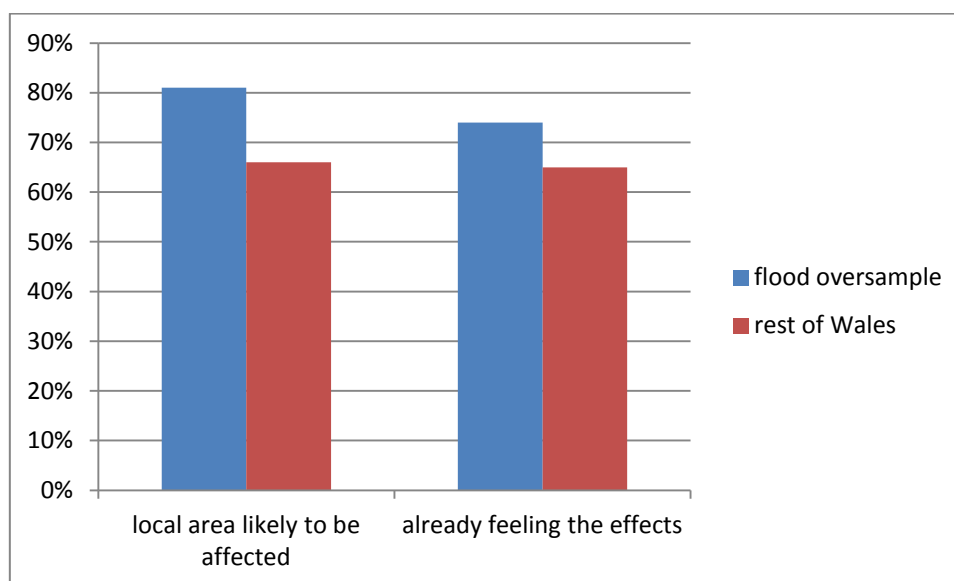
In the event, once data gathering for the survey had commenced in November 2012, Wales then experienced substantial further flooding. It was not possible to plan for this in the survey design, although we recognise that some people contacted in the main sample may have only recently been affected.

⁷⁴ <http://www.bbc.co.uk/news/uk-wales-19427145>

⁷⁵ People were contacted in the UK Census Lower Super Output Areas of Borth1, Borth2, Ceulanamaesmawr, Tirymynach, and Trefeurig.

⁷⁶ Unweighted data are used here. Note that this applies to all analyses in sections 2.2 and 2.3.

Figure 10 Perceived temporal and spatial proximity of climate change: main sample and flood subsample⁷⁷



2.3 Experience of flooding and unprompted associations with climate change

The open-ended survey item asking respondents for the ‘first thing that comes to mind’ (as detailed in section 1.6) was also compared according to respondents’ experience of flooding. This was done by counting the number of times the term ‘flood’ or ‘flooding’ was referred to in response to this question⁷⁸.

There was only a small difference between the subsample and main sample as to whether they referred to flooding. Twelve percent of the subsample mentioned flooding (e.g. “the floods recently”, “severe flooding”) versus 9% of the main sample (e.g. “the floods everywhere”, “bad weather such as flooding”).

There was however a clear difference in the immediate associations with flooding, depending on the extent of experience with flooding, as considered across the whole survey sample (subsample plus main sample, n=1,101).

⁷⁷ Data are compared between the main sample and the flood subsample for items described in section 1.5. Vertical bars correspond to the proportion of respondents answering ‘strongly agree’ or ‘tend to agree’ that their local area is likely to be affected by climate change (left bars), and that ‘we are already feeling the effects’ of climate change (right bars).

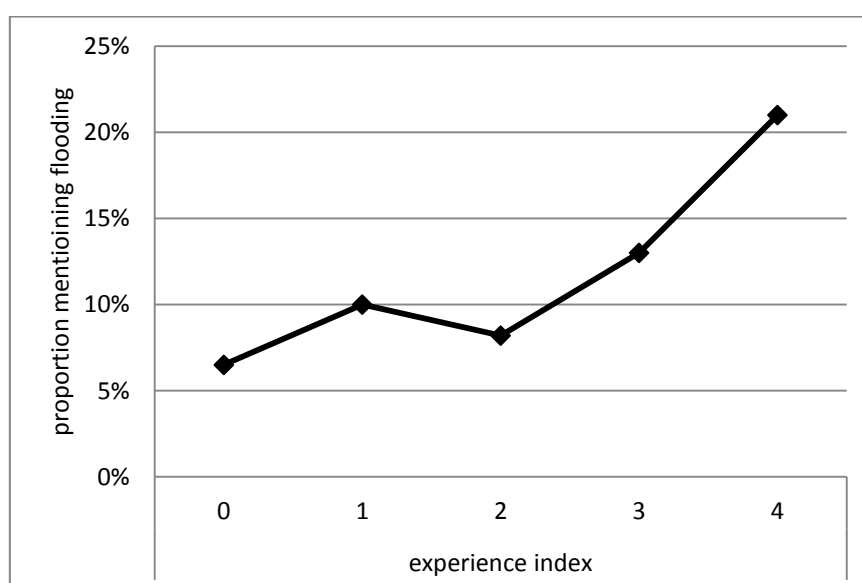
⁷⁸ Further responses which may have been associated in a similar way with respect to changes to the weather (e.g. “rising water levels”) were not included in this count.

Responses to each of the items gauging experience of flooding were combined to produce a flooding experience index⁷⁹. Respondents were assigned a score ranging from zero (no stated experience of flooding) to a score of four (personal and extensive experience of flooding).

- **The extent to which flooding was referred to in the open-ended item⁸⁰ presented close to the start of the survey varied in line with the extent of people's experience of flooding.** Those who had extensive experience referred to flooding in association with climate change in 21% of responses, versus 7% who did not report being affected by flooding on any of the measures.

Figure 11 shows the relationship between unprompted reference to flooding in association with climate change and the extent of people's personal experience with flooding.

Figure 11 Associations of flooding with climate change by flooding experience⁸¹



⁷⁹ Each 'yes' response was assigned the value of 1, and each 'no' response the value of 0, for the following four items: 'My home or other property has been damaged by flooding', 'I have been directly affected by flooding, for example through travel disruption or my ability to work', 'Other people within five miles of where I live have experienced property damage from flooding', and 'I have seen first-hand the effects of flooding within five miles of where I live'. The 'experience index' was derived by summing the values obtained for each respondent, producing a score for each person from 0 to 4. A score of 2, for example, indicates a 'yes' response to any two of these four items.

⁸⁰ 'What is the first thing that comes to mind when you hear the phrase 'climate change' or 'global warming'?'

⁸¹ The y-axis shows the proportion of those directly referring to flooding in the open-ended item asking 'what is the first thing that comes to mind' with respect to climate change. The x-axis shows the extent of people's experience with flooding, based on the sum of scores from four separate items (see preceding footnotes).

Section 3

Public perceptions of climate change adaptation

Little previous work examining public perceptions of climate change adaptation has been carried out. However, with adaptation becoming an increasing priority for societies around the world⁸² and in Welsh and UK Government policy⁸³, the research sought to develop a series of items to examine people's views concerning adaptation.

A challenge for the research is that there is limited public awareness even of the notion of climate change adaptation. Methodologically, it is also difficult to separate the idea of climate change adaptation from measures taken to respond to risks, such as flooding, which may be taken irrespective of any link with climate change (for example, to protect new developments on flood plains). For the purposes of the survey, some information was included to explain adaptation in a succinct manner: the purpose of this was to contextualise adaptation, firstly, as a response to 'the effects of climate change', and secondly to contrast it with mitigation. Research interviewers read out the following text to respondents, prior to the adaptation survey items:

This next section of the survey is concerned with what is termed climate change adaptation. Adaptation refers to actions which are taken to respond to the effects of climate change, such as adjusting to changes in weather and temperature. Examples of adaptation include personal actions like modifying homes to cope with changes to the weather, and larger-scale projects such as building flood barriers. Adaptation is different from action to reduce the causes of climate change, such as using less electricity at home, or building wind farms.

3.1 Perceptions of adaptation approaches in general

In the first instance, respondents were asked to choose which of several general approaches they would most strongly support 'in terms of how we adapt to climate change in Wales'. These ranged from 'no action' through to taking immediate action on the existing and future effects of climate change⁸⁴. The response categories were designed to reflect, very broadly,

⁸² Adger and Barnett (2009)

⁸³ Welsh Government (2010c)

⁸⁴ Respondents were asked 'Which one of the following general approaches would you most strongly support, in terms of how we adapt to climate change in Wales?' Options were 'take no action at this stage', 'monitor how climate change may be affecting Wales, but take no further action at this stage', 'begin preparing for the future effects of climate change', and 'take action now to respond to the existing and future effects of climate change'. Further clarifications were provided for interviewers to be able to explain these options where necessary.

distinctions made in the literature between different adaptation approaches, such as concerning anticipatory/planned adaptation and reactive/responsive adaptation⁸⁵.

- **A small majority of respondents (61%) most strongly supported taking action now ‘to respond to the existing and future effects of climate change’. Just over a fifth (22%) instead supported an anticipatory approach in terms that we ‘begin preparing for the future effects’ of climate change, while a further 14% supported only the monitoring of climate impacts without further action taken. Only 2% responded ‘take no action at this stage’.**

Respondents were also asked to indicate when they felt that Wales would need to adapt to climate change, based on the same timescales as referred to in section 1.5 above⁸⁶.

- **Three-quarters (77%) of respondents considered that ‘we already need to take action to adapt to climate change’.** A further 8% stated ‘10 years from now’, with less than 5% of responses in each of the remaining categories.
- **A higher proportion of people perceived the need to adapt to climate change now (77%), than perceived that Wales is already feeling the effect of climate change (63%, as presented in section 1.5 above).**

That a high proportion of people perceive a need to adapt now, and that more people perceive a need to adapt even than consider Wales is currently feeling the effects of climate change, suggests an emphasis in public perceptions upon both ‘reactive’ and ‘anticipatory’ adaptation. These results taken together suggest that adaptation would generally be seen as a current concern rather than one situated at some future point in time. It may also point to adaptation being conceptualised by people in terms of a precautionary approach towards climate change⁸⁷.

⁸⁵ Smith et al. (2000)

⁸⁶ Respondents were asked ‘When, if at all, do you think Wales will need to take action to adapt to climate change?’ Response options were ‘we already need to take action to adapt to climate change’, ‘10 years from now’, ‘25 years from now’, ‘50 years from now’, ‘100 years from now or longer’, ‘never’.

⁸⁷ Luján and Todt (2007)

3.2 Perceived priorities for adaptation

A number of potential areas of emphasis for adaptation were identified based on the 2012 Climate Change Risk Assessment (CCRA)⁸⁸. Among the risks projected for Wales are increased incidence of flooding, health problems from heat-waves, wildfires in National Parks, and water shortages and droughts. In addition, the CCRA indicates some potential opportunities from climate change, such as an increase in tourism and some agricultural benefits.

Respondents were asked to indicate the extent to which they viewed each of six risks/opportunities as a priority area for Wales over the next two decades⁸⁹. There was substantial variation in the perceived priority of different approaches.

- **Over three-quarters (77%) of respondents considered ‘increased numbers of homes at risk of flooding’ to be either a ‘very high’ or ‘fairly high’ priority.** Only 7% saw this as a fairly or very low priority.
- **Only a third (34%) considered ‘increased risk of people becoming unwell in summer due to higher temperatures’ to be a ‘very high’ or ‘fairly high’ priority.** A larger proportion (39%) saw this as a fairly or very low priority.
- **A higher proportion of respondents considered opportunities to grow new crops to be a priority, than regarded an increase in tourism as a priority area.**

Climate change risks and opportunities for Wales

A wide range of risks and opportunities are identified for Wales as part of the UK Climate Change Risk Assessment (CCRA). These are appraised at different confidence levels, with different scales of consequences, and over different time periods. By necessity, the survey is only able to obtain people’s perspectives on these risks/opportunities in a more general way, however survey items are designed to reflect topics identified as relevant for Wales.

Examples of the CCRA (summary for Wales) key findings are:

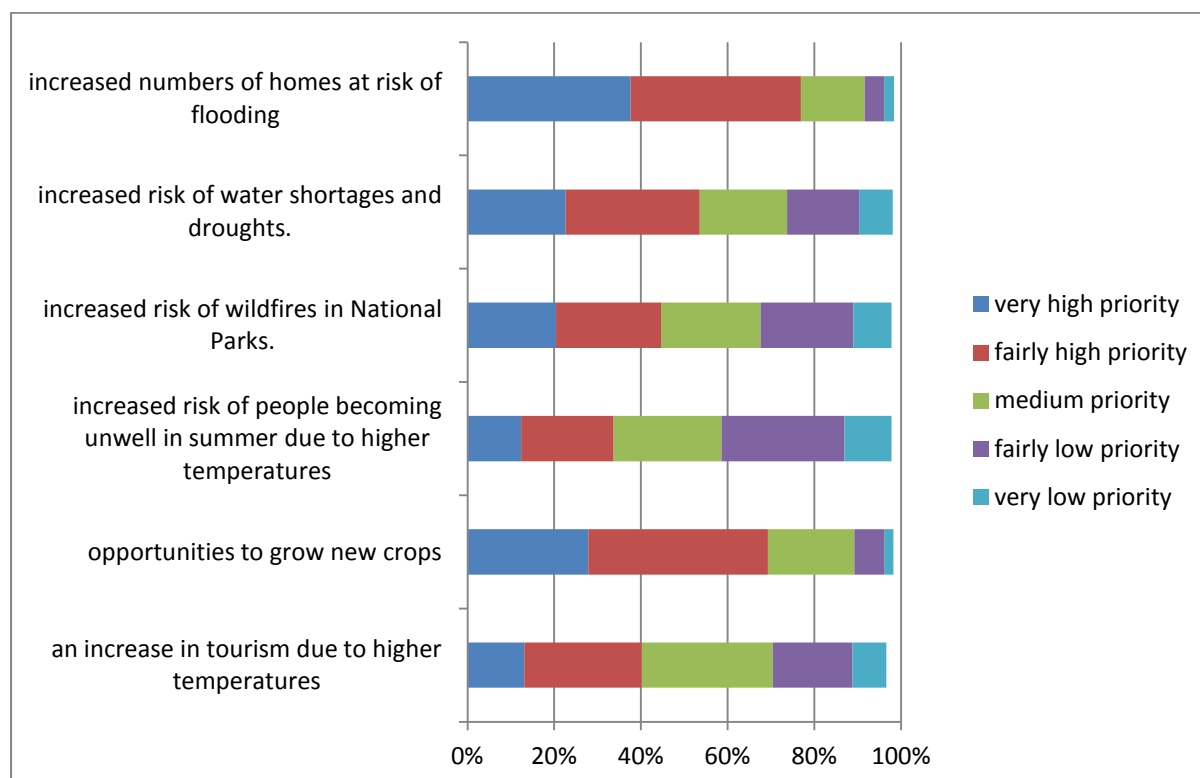
- Hotter summers may lead to a rise in heat-related deaths and hospital admissions.
- Ensuring water availability in summer may pose a growing challenge, with public supplies and the natural environment both potentially affected by water shortages.
- Hotter summers may boost the Welsh tourist industry by attracting larger numbers of visitors from the UK and overseas.
- The existing high level of threat from tidal, river and other forms of flooding may increase further, potentially affecting people, property and critical infrastructure.

⁸⁸ Climate Change Risk Assessment for Wales (2012)

⁸⁹ Respondents were asked: ‘During the next 20 years in Wales, how much of a priority should be placed upon adapting to the following climate-related risks?’ Response options were ‘very high priority’, ‘fairly high priority’, ‘medium priority’, ‘fairly low priority’, and ‘very low priority’. Respondents were then asked ‘During the next 20 years in Wales, how much of a priority should be placed upon adapting to the following climate-related opportunities?’ with the same response options presented.

Figure 12 shows the response distributions across the four risks and two opportunities presented.

Figure 12 Perceived adaptation priorities for Wales over the next twenty years⁹⁰



Given the flooding occurring in Wales before and during the administration of the survey, it is perhaps not surprising that adaptation in this domain is considered important. It is notable, however, that the risk of water shortages and droughts is also affirmed as a priority area. Given the strong associations often made between climate change and temperature increase or 'heat'⁹¹ conversely it is surprising that the risks of wildfire and health problems arising from higher temperatures are considered to be relatively lower in priority.

⁹⁰ Respondents were asked 'During the next 20 years in Wales, how much of a priority should be placed upon adapting to the following climate-related risks [/opportunities]?' for each of four risks and two opportunities. 'Don't know' responses are not shown.

⁹¹ Whitmarsh (2009); Smith and Leiserowitz (2012)

3.3 Perceptions of specific adaptation approaches

As well as gauging perceived priority areas for adaptation, the survey was designed to obtain people's views concerning more specific approaches for adapting to climate change.

The approaches presented to respondents were intended to be indicative of the types of action which may be taken to enable effective adaptation. For example, the proposition that adaptation may entail 'assisting communities at risk of flooding to move elsewhere' is designed to reflect the emphasis which has been placed upon 'managed realignment' (or 'managed retreat'). This is a controversial approach – with public perception studies finding that people may regard such a measure as 'giving in to the sea'⁹² – however the Countryside Council for Wales has stated that "[t]hreats from flooding mean that people and assets will have to move away from places most at risk... a programme of managed realignment is necessary"⁹³. In terms of protecting biodiversity, one approach that may be adopted is the provision of wildlife 'corridors' to extend habitats and enable migration⁹⁴. This is phrased in the survey in terms of 'extending nature reserves to enable wildlife to adapt to changed conditions'. Items are also used to present measures in terms of adaptations to infrastructure and water storage.

Four approaches for adaptation were presented to respondents, prefaced by text emphasising that costs would be entailed, with respondents asked to indicate their level of support or opposition for each⁹⁵.

- **A large majority (79%) of respondents supported ('strongly' or 'tend to' support) extending nature reserves to enable wildlife to adapt to changed conditions. Majorities also supported building new reservoirs to store water during periods of drought (71%), assisting communities at risk of flooding to move elsewhere (66%) and changing the design of buildings to cope with hot weather (64%).**

⁹² Myatt-Bell et al. (2002)

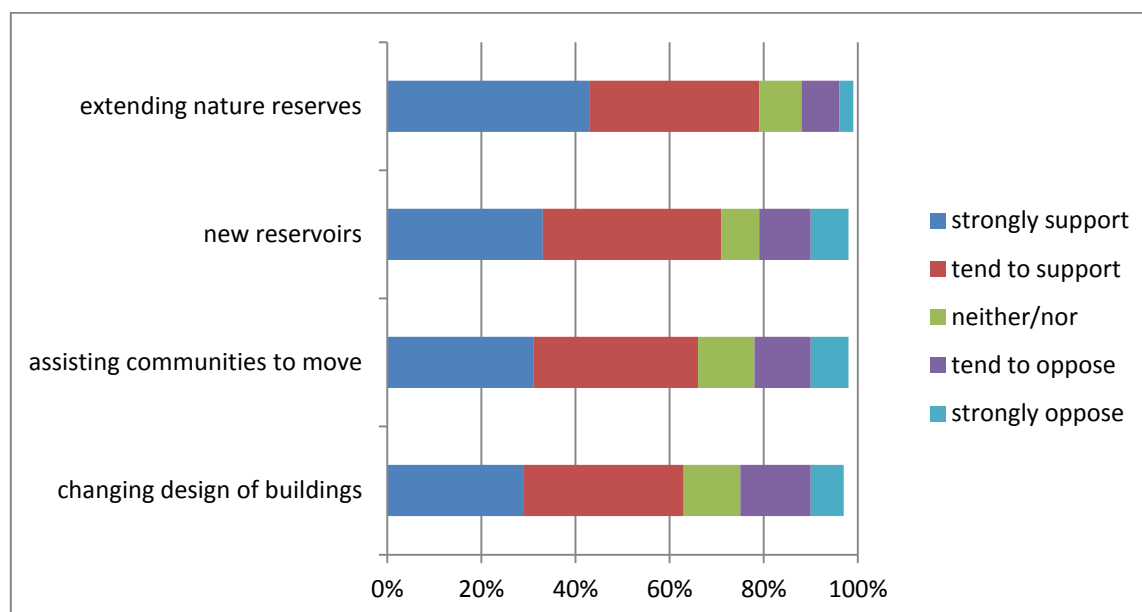
⁹³ <http://www.ccg.gov.uk/landscape--wildlife/habitats--species/marine/impacts/managed-realignment.aspx> ; for simplicity, the present study does not distinguish between managed realignment/retreat whether as a result of sea level rise or inland flooding, although this is an important distinction to be made where considering such approaches in practice.

⁹⁴ Welsh Government (2000)

⁹⁵ Respondents were informed that 'I am going to read out some statements about large-scale investment, which could help Wales adapt to the effects of climate change in certain area' and asked to 'please bear in mind that each of these options would cost money, for example coming from the taxes people pay or meaning money could not be spent elsewhere.' The approaches presented were 'assisting communities at risk of flooding to move elsewhere', 'changing the design of buildings to cope with hot weather', 'building new reservoirs to store water during periods of drought', and 'extending nature reserves to enable wildlife to adapt to changed conditions'. For each approach the response options were 'strongly support', 'tend to support', 'neither support nor oppose', 'tend to oppose' or 'strongly oppose'.

Figure 13 shows the response distributions for level of support and opposition for each of the four approaches presented.

Figure 13 Levels of support for specific adaptation approaches⁹⁶



3.4 Perceptions of responsibility for adaptation

Previous studies have noted that responsibility for addressing climate change tends to be situated primarily at the international and/or national level rather than the local/personal level⁹⁷. Whilst public participants may acknowledge the role of individual behaviour in contributing to climate change, the argument is commonly made that this requires coordination at a large scale to be effective. These findings have, however, been derived from studies whereby ‘addressing’ climate change is framed in terms of mitigation.

Of interest to the present study is whether these notions hold true in the case of climate change adaptation. Given that adaptation entails more localised responses to climate risks, the research aimed to ascertain whether responsibility is characterised accordingly. Alternatively, it may have been the case that responsibility for adaptation would be conceptualised in a similar manner to that of mitigation.

⁹⁶ Respondents were asked the extent to which they supported or opposed each of four adaptation approaches. ‘Don’t know’ responses are not shown.

⁹⁷ Bickerstaff et al. (2008); Lorenzoni and Pidgeon (2006)

The survey asked respondents where they felt responsibility for climate change adaptation rested. Response options ranged from ‘individuals, their families and local communities’ to ‘the international community’⁹⁸.

- **Responsibility for climate change adaptation is situated primarily at the national (UK and Wales) level. Twenty-nine percent of respondents considered that the UK Government should be mainly responsible, and a further 16% that responsibility rested mainly with the Welsh Government.**
- **Only 15% of respondents answered that ‘the international community’ should be responsible for adaptation. This contrasts with previous studies gauging responsibility for mitigation, which have typically obtained a figure of 30% to 32%⁹⁹.**

Local authorities were ascribed primary responsibility by 8% of respondents; again, this contrasts with previous studies which have typically obtained a figure of 2% to 3% in the context of mitigation. Nine percent of respondents considered that ‘individuals, their families and local communities’ should be mainly responsible, a similar figure to that obtained for studies emphasising mitigation.

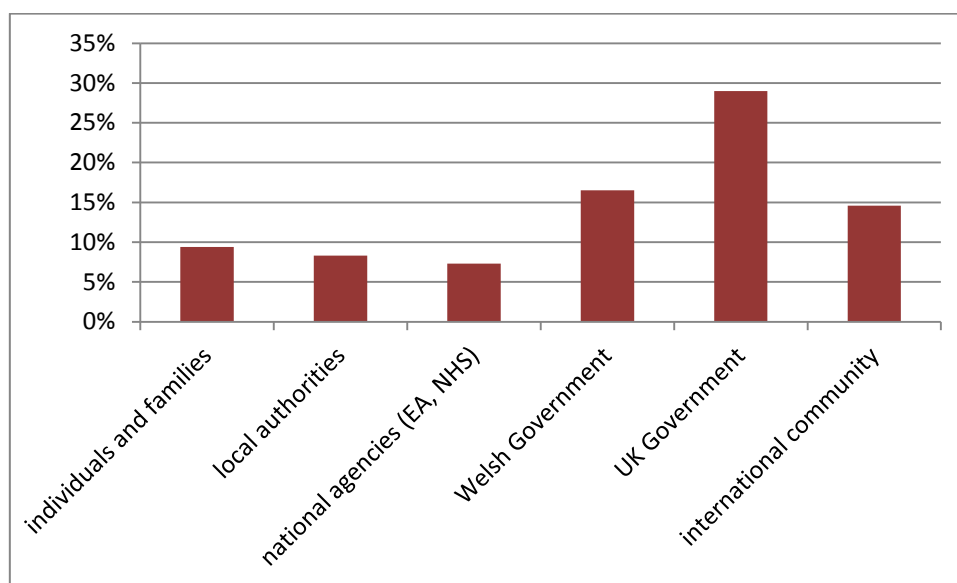
These results, taken together, suggest that responsibility for adaptation is perceived as more of a local/national concern than mitigation is, for which a national/international response has tended to be emphasised. It should be noted, however, that question wording and option choices do vary across studies and so are not directly comparable.

Figure 14 shows how responsibility was ascribed across the responses obtained. A follow-up, open-ended question was also included in the survey, which asked respondents why they had given their answer concerning where responsibility is situated. The findings from this question are not reported here, but will be incorporated in further analyses.

⁹⁸ Responsibility for adaptation was contextualised here using the following text: ‘In the future, extreme weather events, including storm damage and flooding during the winter, and heat-waves and droughts during the summer, are expected to become more severe in Wales due to climate change. In addition, parts of coastal Wales are expected to be affected by rising sea levels’. Respondents were then asked ‘Which one of the following do you think should be mainly responsible for adapting to these impacts?’ Response options were ‘individuals, their families and local communities’, ‘local authorities’, ‘national agencies such as the Environment Agency and the NHS’, ‘the Welsh Government’, ‘the UK Government’, ‘the international community’ or ‘other’.

⁹⁹ Spence et al. (2010); Poortinga et al. (2006)

Figure 14 Perceived responsibility for climate change adaptation¹⁰⁰



3.5 Contrasting attitudes towards adaptation and mitigation

The survey included further measures designed to compare and contrast respondents' perceptions of adaptation, with their perceptions of mitigation. Items were used to gauge whether mitigation or adaptation approaches were more strongly favoured, and to examine under what conditions adaptation was seen as an acceptable approach.

Respondents were asked to contrast the importance of mitigation with that of adaptation. Half the sample was asked their level of agreement with the statement 'It is more important for Wales to focus on adapting to the effects of climate change, than it is trying to reduce the causes of climate change'; the other half of the sample was asked to respond to the statement 'It is more important for Wales to focus on trying to reduce the causes of climate change, than it is on adapting to the effects of climate change'. Results are reported here in aggregate¹⁰¹.

¹⁰⁰ Respondents were asked 'which of the following' they thought should be mainly responsible for adaptation. Responses under the category 'other' (10%) and 'don't know'/ no opinion (5%) are not shown.

¹⁰¹ Results are aggregated between respondents who answered 'strongly agree' or 'tend to agree' that adaptation is more important than mitigation (reducing the causes of climate change), together with those who answered 'strongly disagree' or 'tend to disagree' that mitigation is more important than adaptation – these responses are considered to place an emphasis upon adaptation. Likewise, results are aggregated between respondents who answered 'strongly agree' or 'tend to agree' that mitigation (reducing the causes of climate change) is more important than adaptation, together with those who answered 'strongly disagree' or 'tend to disagree' that adaptation is more important than mitigation.

- **More respondents favoured an emphasis upon mitigation than upon adaptation. Close to half (47%) considered that it is more important for Wales to focus on reducing the causes of climate change than it is on adapting to the effects of climate change. A smaller minority (36%) considered that it is more important for Wales to focus on adapting to climate change than it is on reducing the causes of climate change¹⁰².**

An additional means by which preference for adaptation or mitigation was gauged was through asking respondents to split a hypothetical monetary amount (£100) between them¹⁰³. Just under half the respondents (44%) assigned a value of £50 to each – suggesting the lack of a strong preference for either (and/or an ambivalence with respect to the particular manner in which the choice is presented). Around one in three (29%) respondents assigned a value above £50 to mitigation, and one in five (21%) assigned a value above £50 to adaptation (remaining responses were ‘don’t know’). This again suggests a preference – although not pronounced – for mitigation over adaptation.

Two further items were used to examine perceptions of adaptation/mitigation. These were designed to gauge to what extent the acceptability of adaptation was conditional upon its taking place in addition to mitigation.

- **Close to three-quarters (71%) of respondents agreed or strongly agreed that ‘adapting to climate change should only be undertaken if it is in addition to trying to reduce the causes of climate change’. Nineteen percent (strongly) disagreed.**
- **More respondents disagreed than agreed (45% vs. 36%) that ‘focusing on adapting to climate change would mean attempts to actually prevent climate change would be forgotten about’.**

These results suggest that whilst most respondents consider that adaptation should only occur alongside efforts at mitigation, there is not a strong sense that undertaking adaptation is seen in itself as undermining mitigation.

¹⁰² Sixteen percent of respondents answered ‘neither agree nor disagree’ or ‘don’t know’.

¹⁰³ Respondents were asked the following: ‘Imagine you have £100 to spend; some of this can be spent on reducing the causes of climate change, and some can be spent on adapting to the effects of climate change. How would you split the £100 between these two options?’ A version of this approach was originally suggested by Adrian Bruegger.

Section 4

Public perceptions of mitigation policies and personal action on climate change

The survey contains several items designed to appraise the extent to which people are willing to undertake actions in order to address climate change, as well as examining support for policy approaches of relevance to Wales.

4.1 Attitudes towards climate policies

There is a unique policy context in Wales concerning climate change and sustainability more generally. The Welsh Government has committed to 3% annual reductions in greenhouse gas emissions from 2006-2010 levels¹⁰⁴. There is additionally a commitment to achieve at least a 40% reduction in greenhouse gas emissions in Wales by 2020 (against a 1990 baseline). Across Wales as a whole, a high proportion of houses now have solar panels in comparison to the rest of Britain. Wrexham County Borough Council, for example, has installed panels on several thousand homes and this area has the highest incidence of their use in the country¹⁰⁵, although there are no Welsh Government grants available at present for the installation of solar panels. Wales also has several approaches in place to support communities overseas affected by climate change. These include partnerships with community organisations in Wales and the United Nations to increase forest cover in Uganda¹⁰⁶.

Survey respondents indicated broad support for policies of emissions reduction targets, to enable the installation of solar panels, and designed to support communities overseas¹⁰⁷.

- **Around half the respondents (53%) strongly supported Welsh Government funding to install solar panels on homes, with a further 31% indicating they would tend to support this. Ten percent strongly opposed or tended to oppose this measure.**
- **Around three-quarters (76%) strongly supported or tended to support a three percent annual reduction in Wales' climate change-causing emissions. Eight percent strongly opposed or tended to oppose this measure.**

¹⁰⁴ This emissions reduction target is for 'carbon reduction-equivalent emissions'. It applies to areas of devolved competence – this means in practice that the target covers approximately 69% of emissions from Wales (the remainder being covered by UK and EU policies) – see Welsh Government (2010a).

¹⁰⁵ <http://wales.gov.uk/docs/desh/case/121107susdevwrexhampven.pdf>;

<http://www.cynnalcyrmru.com/news/parts-wales-revealed-solar-power-hotspots>

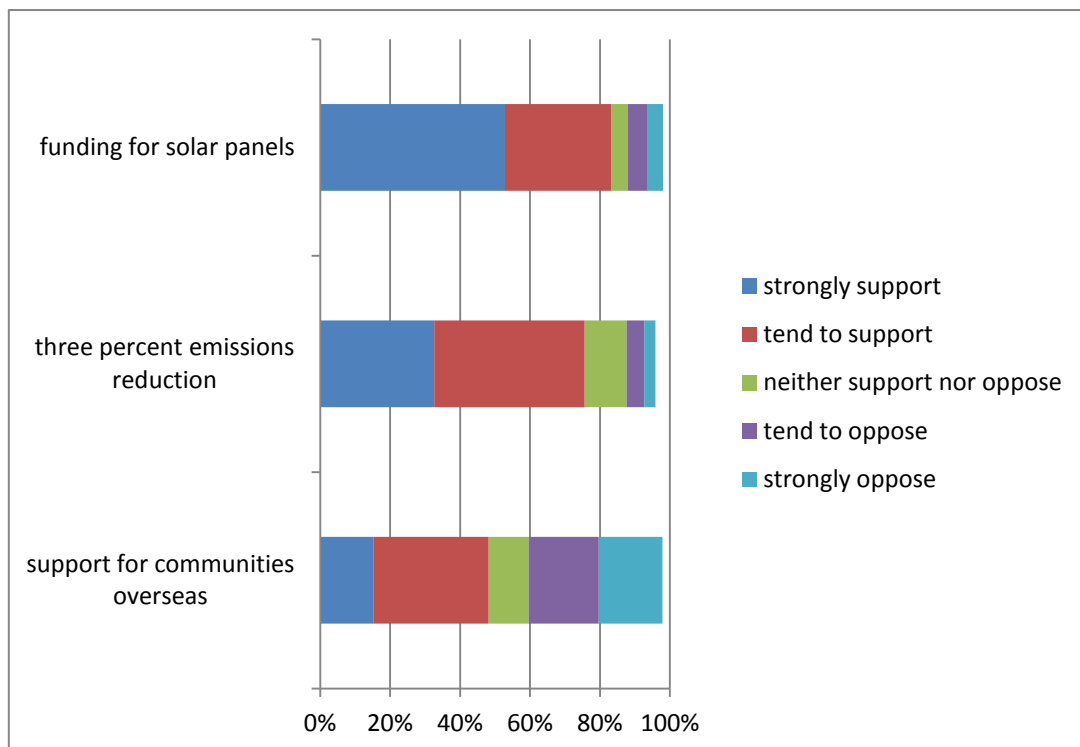
¹⁰⁶ <http://wales.gov.uk/topics/sustainabledevelopment/walesforafrica/tacc/?lang=en>

¹⁰⁷ Respondents were asked the extent to which they support or oppose: 'a three percent annual reduction in Wales' climate change-causing emissions', 'Welsh Government funding to install solar panels on homes' and 'Welsh Government funding to support communities overseas affected by climate change'.

- Around half (48%) supported Welsh Government funding to support communities overseas affected by climate change, with 38% opposing this.

Figure 15 shows the distribution of responses across these policy measures.

Figure 15 Attitudes towards climate policies in Wales¹⁰⁸



4.2 Willingness to change behaviour

In developed countries, close to half of all emissions derive from individual and household energy use¹⁰⁹. Consequently, there has been substantial research attention directed towards understanding and encouraging sustainable lifestyles¹¹⁰. As well as helping to mitigate climate change through behavioural change, citizens' attitudes towards policies designed to address climate change are critical¹¹¹.

¹⁰⁸ Respondents were asked the extent to which they supported or opposed each of three policies for Wales. 'Don't know' responses are not shown.

¹⁰⁹ IEA (2007)

¹¹⁰ Abrahamse et al. (2005); Bamberg and Moser (2007); Dietz et al. (2009)

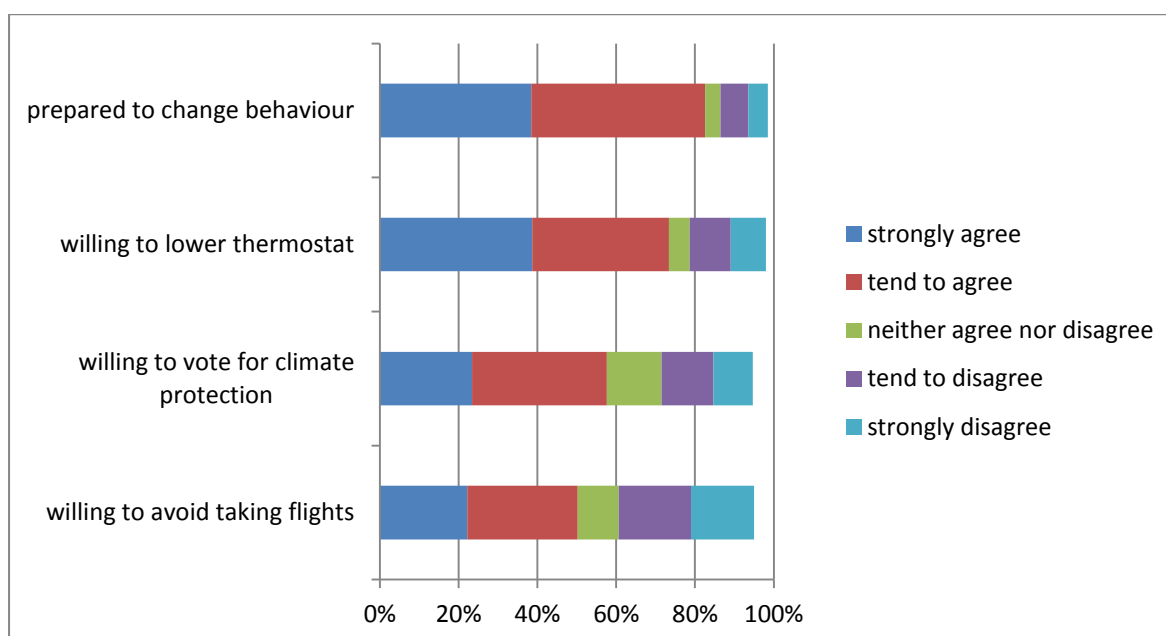
¹¹¹ Lorenzoni et al. (2008); Höppner and Whitmarsh (2011)

Where pro-environmental behaviour change was presented in the survey in the most general terms, stated willingness to act was highest. Where this was contextualised to specific actions, however, willingness to act was lower overall, and depended also upon the type of action proposed.

- **A large majority (83%) answered ‘tend to agree’ or ‘strongly agree’ that ‘I would be prepared to change my behaviour to help limit climate change’.**
- **Around three-quarters of respondents (73%) tended to agree or strongly agreed that they would be willing to ‘set their thermostat lower in winter, to help tackle climate change’.**
- **Smaller proportions of respondents stated that they would be willing to avoid taking flights in future (50% strongly or tend to agree) or would be willing to vote for politicians committed to climate protection (58% strongly or tend to agree).**

Figure 16 shows the distribution of responses across these behavioural measures.

Figure 16 Willingness to change behaviour and vote for climate protection¹¹²



¹¹² Respondents were asked the extent to which they agreed or disagreed that they would be willing to undertake each of several personal actions. ‘Don’t know’ responses are not shown.

4.3 Perceived personal responsibility and efficacy of acting on climate change

A substantial body of evidence has demonstrated that motivation to act on climate change is determined in large part by beliefs about whether that action is deemed to make a difference (so-called ‘response efficacy’ or ‘outcome expectancy’), whether a person feels able to undertake that action (‘self-efficacy’) and a person’s perceived responsibility for acting¹¹³. In addition, more recent research has begun to look at efficacy beliefs at the collective level – for example, considering whether the actions of many people are perceived to make a difference to climate change¹¹⁴.

The survey included a number of measures designed to assess respondents’ perceptions concerning action on climate change at the individual and collective level.

- **A large majority (82%) of respondents perceived a personal responsibility ‘to help to do something about climate change’¹¹⁵. However, a majority (58%) also agreed that ‘it is hard to take action against climate change even if you want to’¹¹⁶**
- **The UK level was perceived to be that at which responding to climate change was most effective. Seventy-five percent of respondents strongly agreed or tended to agree that ‘if most people in the UK changed their lifestyles, this would make a difference to climate change’.**
- **A majority (58%) considered that changes to their own lifestyle would make a difference to climate change, although 35% were not of this view. Slightly higher proportions agreed that lifestyle change would make a difference at the scale of their community and Wales.**

Figure 17 shows the distribution of responses across measures examining response efficacy at the personal, local, and national scale.

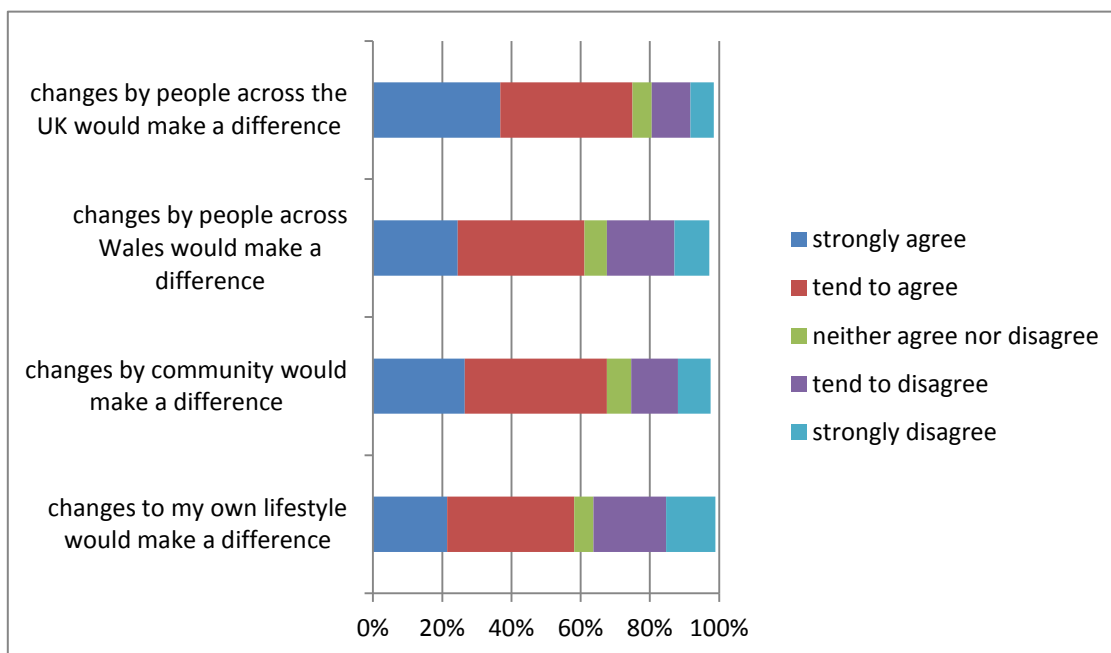
¹¹³ For example see Kellstedt et al. (2008). Note that terminology varies between different theoretical traditions.

¹¹⁴ Koletsou and Mancy (2012)

¹¹⁵ Just under 42% responded ‘strongly agree’ and just under 41% ‘tend to agree’ to the item ‘It is my responsibility to help to do something about climate change’.

¹¹⁶ 22% responded ‘strongly agree’ and 36% ‘tend to agree’ to the item ‘It is hard to take action against climate change even if you want to’.

Figure 17 Perceived response efficacy at different scales¹¹⁷



Two additional items examined whether respondents perceived others to be acting on climate change, and whether action on climate change is still perceived to be meaningful.

- **A large majority (79%) strongly agreed or tended to agree that ‘most people don’t do much in their own lives to help tackle climate change’.**
- **Just under three-quarters (71%) of respondents strongly disagreed or tended to disagree that ‘it is already too late to do anything to prevent climate change’. Less than a fifth (18%) strongly agreed or tended to agree with this statement.**

¹¹⁷ Respondents were asked the extent to which they agreed or disagreed that action at different scales would make a difference to climate change. ‘Don’t know’ responses are not shown.

Section 5

Demographic and socioeconomic variables, and individual values

Previous studies have noted that demographic variables are associated with climate change perceptions. For example, women tend to express more concern about climate change than do men¹¹⁸ and older people tend to be among the most sceptical about climate change¹¹⁹.

The role of age and gender in climate change perceptions is considered in this section. In addition, an overview is given of further measures obtained from the survey, which will be used in future analyses of climate change perceptions.

5.1 Relationship between age and gender, and climate change perceptions

On key indicators, male and female respondents differ in their perceptions about climate change.

- **Eighty-six percent of male respondents and 90% of female respondents accepted the reality of climate change. Only 2% of females considered that the climate is not changing, compared to 7% of males¹²⁰.**
- **Female respondents reported being more concerned about climate change than males. Less than a third (31%) of males were 'very concerned' compared to 42% of females.**

Figure 18 shows the difference between men and women with respect to level of concern about climate change¹²¹.

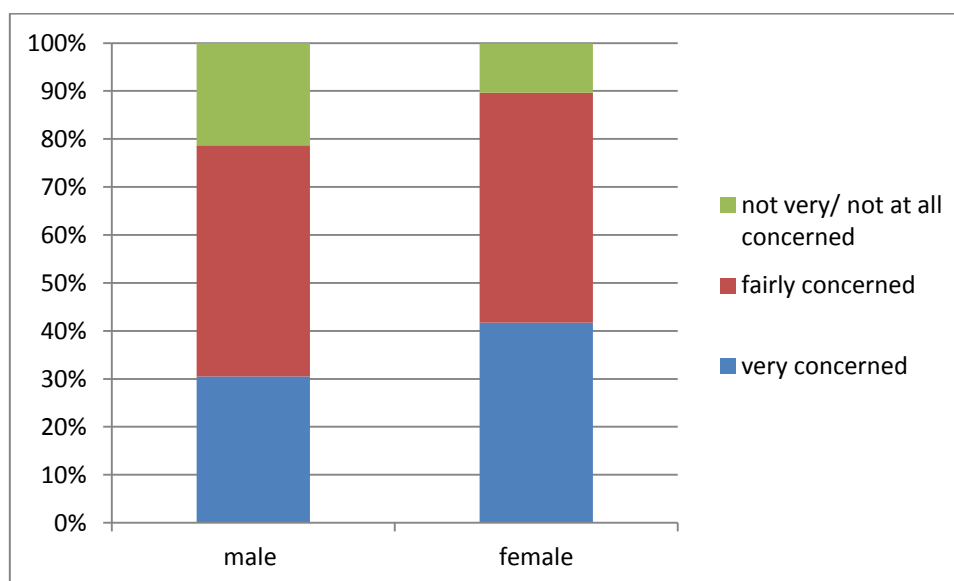
¹¹⁸ McCright (2010)

¹¹⁹ Whitmarsh (2011)

¹²⁰ Data based on the item described in section 1.1

¹²¹ Data based on the item described in section 1.2

Figure 18 Differences between men and women in levels of concern about climate change¹²²



Differences are also observed by age on key indicators of climate change perceptions. Levels of concern and willingness to change behaviour, for example, both vary with age.

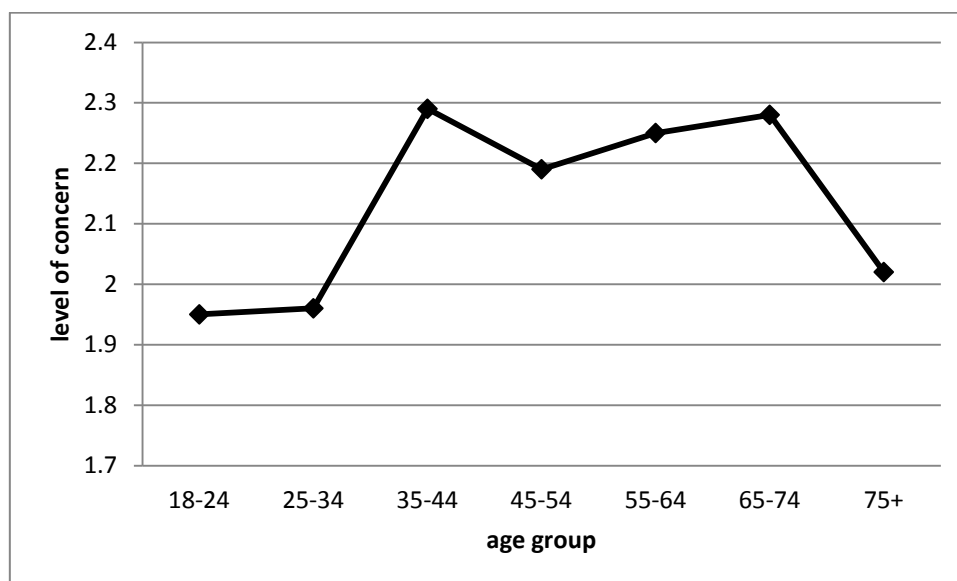
- **Older people aged 75 or over were less likely to consider that the climate is changing (79% of respondents) than were 35-44 year-olds (93% of respondents). People over 75 years of age were also most likely to respond ‘don’t know’ to this question (17% of respondents) compared to only 4% of 35-44 year-olds.**
- **There is a non-linear relationship between levels of concern and age. Whereas 21% of 18-24 year-olds and 38% of over 75 year-olds were ‘very concerned’ about climate change, 42% of 45-54 year-olds expressed this opinion.**
- **Older people were less inclined to state they would be prepared to change their behaviour to help limit climate change than were middle-aged or young people.**

The relationship between age and levels of climate change concern is shown in Figures 19 and 20. Figure 19 shows the relationship between age and level of general concern about climate change, based on the item described in section 1.1. Individual scores are on a four-point scale ranging from zero (‘not at all concerned’) to three (‘very concerned’) and are

¹²² Responses are shown for men and women based on the item described in section 1.2.

aggregated for each age group¹²³. Figure 20 shows the relationship between age and level of concern about the effects of climate change ‘on you personally’, based on the item described in section 1.2. Individual scores here are on a 5-point scale ranging from zero (‘very unconcerned’) to four (‘very concerned’) and are again aggregated¹²⁴.

Figure 19 **Level of general concern about climate change, by age group**¹²⁵

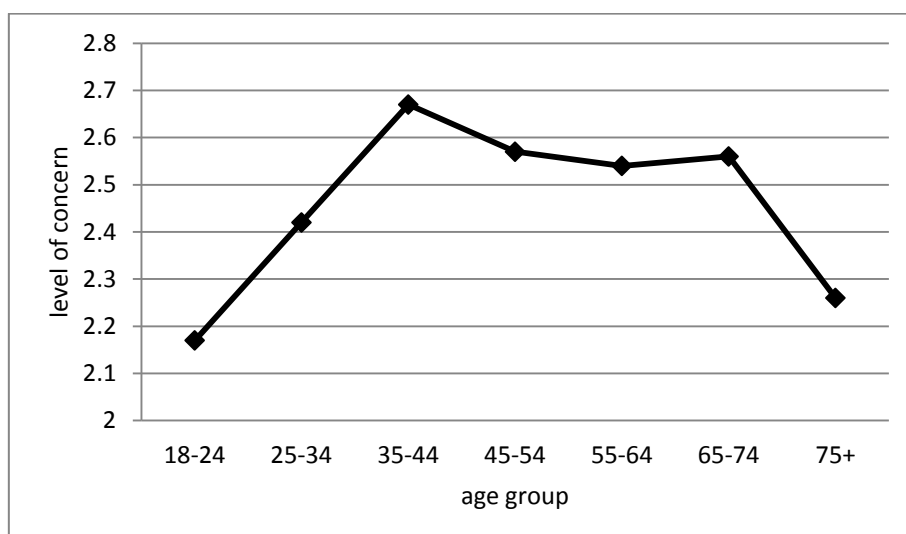


¹²³ Scores in Figure 19 are based on responses to the item ‘How concerned, if at all, are you about climate change, which is sometimes referred to as ‘global warming’?’ Scores between 2 and 3 correspond to age group averages between 2 (‘fairly concerned’) and 3 (‘very concerned’); scores between 1 and 2 correspond to age group averages between 1 (‘not very concerned’) and 2 (‘fairly concerned’).

¹²⁴ Scores in Figure 20 are based on the average level of concern by age group about ‘the potential effects of climate change on you personally’. All scores in Figure 20 are between 2 (neither concerned nor unconcerned) and 3 (fairly concerned).

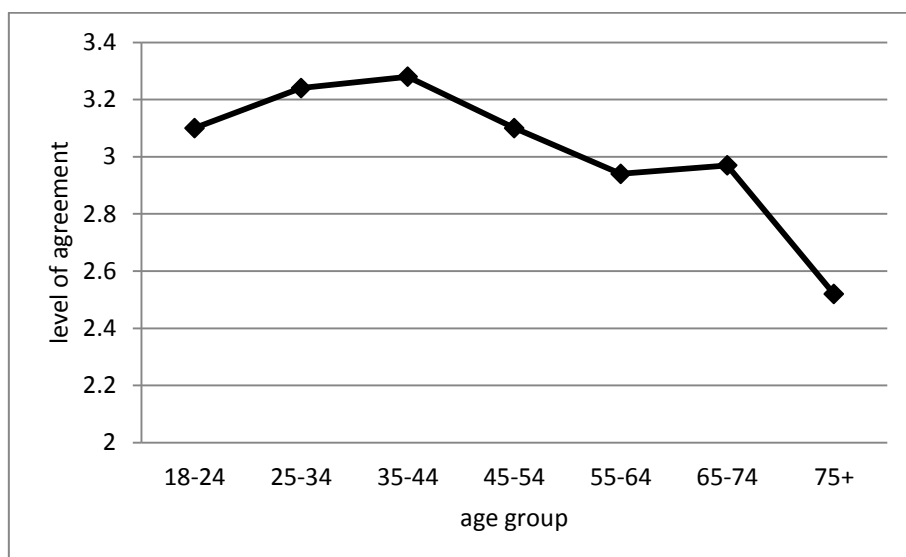
¹²⁵ Age group is shown on the x-axis. The y-axis shows respondents’ level of general concern, based on the item described in section 1.2 (see also footnotes above).

Figure 20 Level of concern about the effects of climate change on ‘you personally’, by age group¹²⁶



The relationship between age and willingness to change behaviour is shown in Figure 21, based on the item described in section 4.2. Individual scores range from zero (‘strongly disagree’) to four (‘strongly agree’) and are aggregated for each age group.

Figure 21 Willingness to change behaviour, by age group¹²⁷



¹²⁶ Age group is shown on the x-axis. The y-axis shows respondents’ level of concern about the effects of climate change on oneself, based on the item described in section 1.2 (see also footnotes above).

¹²⁷ Age group is shown on the x-axis. The y-axis shows respondents’ level of agreement with the item ‘I would be prepared to change my behaviour to help limit climate change’, as described in section 4.2. On this measure, a score of 4 represents ‘strongly agree’, a score of 3 represents ‘tend to agree’ and a score of 2 represents ‘neither agree nor disagree’.

5.2 Socioeconomic indicators and personal values of respondents

The survey included measures of respondents' socioeconomic status (personal and geographical), attitudes towards the area in which they live, and their general values and worldviews.

Analyses using these measures are not reported here as they require the application of more complex inferential statistical techniques. However, these aspects will be the subject of future analyses and publications. An overview of the measures obtained is nevertheless given below and descriptive statistics for respective items provided in Appendix A where appropriate.

Data were obtained concerning scores on the Welsh Index of Multiple Deprivation. This incorporates indicators of various measures of deprivation, combined into a single score and applied at a small-scale, geographical level (Lower Super Output Area). Respondents also self-reported information about their own financial circumstances, ranging from 'very bad' to 'very good'. Both of these measures are useful to ascertain whether there may be a link between people's financial and socioeconomic circumstances and their perceptions of climate change¹²⁸.

Data concerning people's attitudes towards the area in which they live were obtained, including measures of whether they felt able to influence decisions in that area, and perceptions of community belonging. Compared to other parts of Britain, people in Wales have been found to report higher levels of place attachment – tending to see the areas where they live as unique and distinctive, for example¹²⁹. Research in the environmental psychology literature has suggested that place attachment may be important in determining climate change perceptions¹³⁰. These data will therefore be useful in future work examining the relationship between perceptions of place and perceptions of climate change. Given that the consequences of climate change differ by region and urban/rural setting, it is of interest to examine whether public attitudes also vary accordingly. The survey also obtained data, therefore, concerning the population density of the area in which people live.

Data was obtained concerning the Welsh language ability of respondents and as to whether people perceived themselves to have a strong Welsh identity. These may be found to be influential, for example, in determining people's attitudes towards whether Wales should aim to set an example internationally in its climate policies.

¹²⁸ For example, the 'Finite Pool of Worry' hypothesis proposes that where people are concerned about other issues – such as employment or personal finances – then these may replace concern about matters such as climate change (Weber, 2010). Previous research has noted a link between climate change perceptions and income (Whitmarsh, 2011).

¹²⁹ This difference is observed from further analysis of the data reported in Spence et al. (2010).

¹³⁰ Scannell and Gifford (2013)

The survey additionally incorporated measures of people's 'worldview', drawing on a cultural theoretical approach which proposes that risks (such as climate change) are perceived differently depending on a person's preferences for different types of social organisation¹³¹. These have previously been found to be highly influential in predicting climate change perceptions¹³². A measure of pro-environmental self-identity is also included as this too has been found to be important in determining environmentally significant behaviour¹³³.

¹³¹ Wildavsky and Dake (1990)

¹³² Kahan et al. (2011)

¹³³ Whitmarsh and O'Neill (2010)

Summary and conclusions

The levels of belief about the reality of climate change and concern about its effects observed in the survey are among the highest which have been documented in UK samples since the mid-2000's. This may be a reflection, in part, of a 'rebound' in public opinion about climate change – very recent studies in the United States and across Europe have also begun to observe increasing public acceptance of and concern about climate change, following declines which occurred after about 2007/2008¹³⁴. The high levels of general concern expressed by people in the present study encompass particular concerns about the effects of climate change on Wales, developing countries and the natural world.

It is well-established that particular local circumstances affect public perceptions of climate change¹³⁵, and this must also be taken into account in the interpretation of the results. Heavy rain and floods occurred across Wales during the summer months preceding the survey's administration¹³⁶, and then again whilst data gathering was underway. Given that disruption to the weather is one of the most prominent ways in which people conceptualise climate change¹³⁷, it is very plausible that these events contributed to the widespread sense that climate change is a reality, is happening at the present time, and is of relevance to the areas where people live.

This is further supported by the connections observed between personal and geographical experience of flooding, and perceptions of climate change. People's concern about the effects of climate change varied according to their direct experience of flooding; those who had been personally affected were most likely to refer, unprompted, to flooding in association with climate change; and those living in a heavily affected region of the country were especially likely to consider climate change to be an immediate issue in space and time. These findings extend the work of others¹³⁸, particularly by identifying direct connections between experience of flooding and climate change perceptions.

Relatively little previous research has examined public perceptions of climate change adaptation, and the survey incorporated a number of measures to address this gap in the literature. This is considered timely given that adaptation policy and approaches are likely to be of increasing relevance for Wales in future years.

The survey results suggest that adaptation is perceived to be something which needs to be undertaken either at the present time to address existing impacts, or in anticipation of future climate consequences. The results also suggest that precedence is given to those

¹³⁴ Leiserowitz et al. (2012); Borick and Rabe (2012); Eurobarometer (2011)

¹³⁵ Howe et al. (2012)

¹³⁶ Met Office (2012)

¹³⁷ Whitmarsh (2009); Capstick (2012)

¹³⁸ Whitmarsh (2008); Spence et al. (2011b)

aspects which are more salient at the present time – with many more people seeing flooding as a priority area compared to the risk of health problems from heat-waves. This is perhaps to be expected, given that climate risks which can be (or have been) experienced tend to be more salient than those which are based on future projections¹³⁹. One consequence of this disparity, however, may be that future efforts to achieve public engagement with adaptation will need to emphasise some of these less salient impacts alongside that of flooding.

The survey findings suggest that responsibility for adaptation is ascribed primarily at the national and local level¹⁴⁰. This result contrasts with previous studies which have concluded that responsibility for mitigation is seen more in terms of an international or national level concern. Given the importance of how ‘local’ an issue climate change is perceived to be¹⁴¹ in determining attitudes and responses, one implication of this finding may be that people’s thinking about adaptation would occupy a different discursive space to that concerning mitigation. Further research, including more deliberative work with members of the public, would be of value to explore this in more detail.

The survey also sought to examine people’s perception of adaptation in the context of mitigation. Whilst acting to mitigate and adapt to climate change may be considered complementary approaches, this will not necessarily be the case, not least where effort and resources are limited¹⁴². The findings of the survey suggest that mitigation – as a focus on reducing the causes of climate change – is emphasised by people over adapting to the consequences of climate change. This distinction was not pronounced, however, and indeed a substantial minority did favour emphasising adaptation. Overall though, most felt adaptation should only be undertaken if this was in addition to mitigation.

With respect to policies designed to address climate change, broad levels of support were obtained. For example, the Welsh Government’s policy of a three percent annual reduction in greenhouse emissions was supported by most – although it should be noted here that this may partly reflect the framing of this policy in a decontextualised way (e.g. without obvious cost). People were more ambivalent with respect to support for international development in the context of climate change.

At the personal level, the majority of survey respondents expressed both personal responsibility for addressing climate change and a preparedness to change behaviour to this end. However, a majority also were of the opinion that ‘most people’ did not do much in practice. Demographic effects were observed for climate change perceptions and stated willingness to change behaviour: women were overall more concerned than men, and older people (over 75 years) least inclined to say they were prepared to change their behaviour.

¹³⁹ Weber (2010)

¹⁴⁰ See also Butler and Pidgeon (2012)

¹⁴¹ Scannell and Gifford (2013); Ostrom (2010); Spence and Pidgeon (2010)

¹⁴² Laukkonen et al. (2009)

References

- Abrahamse, W., Steg, L., Vlek, C. & Rothengatter, T. (2005). A review of intervention studies aimed at household energy conservation. *Journal of Environmental Psychology*, 25, 273-291.
- Adger, W. N. & Barnett J. (2009). Four reasons for concern about adaptation to climate change. *Environment and Planning A*, 41(12), 2800-2805.
- Anderegg, W., Prall, J., Harold, J. & Schneider, S. (2010). Expert credibility in climate change. *Proceedings of the National Academy of Sciences*, 107(27), 12107-12109.
- Bamberg, S. & Moser, G. (2007). Twenty years after Hines, Hungerford, and Tomera: A new meta-analysis of psycho-social determinants of pro-environmental behaviour. *Journal of Environmental Psychology*, 27(1), 14-25.
- Behavioural Insights Team [with the Departments of Energy and Climate Change and Communities and Local Government] (2011) *Behaviour Change and Energy Use*. Cabinet Office, London.
- Bickerstaff, K., Simmons, P., & Pidgeon, N. (2008). Constructing responsibilities for risk: negotiating citizen-state relationships. *Environment and Planning A*, 40, 1312-1330.
- Borick, C. P. & Rabe, B. (2012). Belief in global warming on the rebound: National survey of American public opinion on climate change. *Issues in Governance Studies*, 44.
- Boykoff, M. T. & Boykoff, J. M. (2004). Balance as bias: global warming and the US prestige press. *Global Environmental Change*, 14, 125-136.
- Bulle, R. J., Carmichael, J. & Jenkins, J. C. (2012). Shifting public opinion on climate change: an empirical assessment of factors influencing concern over climate change in the US, 2002-2010. *Climatic Change*, 114(2), 169-188.
- Butler, C. and Pidgeon, N.F. (2011) From 'flood defence' to 'flood risk management': exploring governance, responsibility and blame. *Environment and Planning: C*, 29(3), 533-547.
- Capstick, S.B. (2012). Climate change discourses in use by the UK public: commonalities and variations over a fifteen year period. Doctoral thesis, Cardiff. <http://orca.cf.ac.uk/24182/>
- Climate Change Risk Assessment for Wales (2012). Defra, London.
- Compston, H. & Bailey, I. (2008). Political strategy and climate policy. In H. Compston., & L. Bailey (Eds.), *Turning Down the Heat: The Politics of Climate Policy in Affluent Democracies*. Palgrave Macmillan, Basingstoke.
- Crompton, T. (2010) *Common Cause: The Case for Working with Our Cultural Values*. WWF, London.
- Dietz, T., Gardner, G., Gilligan, J., Stern, P.C., & Vandenbergh, M.P. (2009). Household actions can provide a behavioral wedge to rapidly reduce US carbon emissions. *Proceedings of the National Academy of Sciences*, 106(44), 18452-18456.
- Doran, P. T., & Zimmerman, M. K. (2009). Examining the scientific consensus on climate change. *Eos, Transactions American Geophysical Union*, 90(3), 22-23.
- Druckman, A., & Jackson, T. (2009). The carbon footprint of UK households 1990–2004: a socio-economically disaggregated, quasi-multi-regional input–output model. *Ecological Economics*, 68(7), 2066-2077.

- Eurobarometer (2008). *Europeans' attitudes towards climate change*. Special Eurobarometer 300. Research report for the European Commission. http://ec.europa.eu/public_opinion/archives/ebs/ebs_300_full_en.pdf
- Eurobarometer (2009). *Europeans' attitudes towards climate change*. Special Eurobarometer 313. Research report for the European Commission. http://ec.europa.eu/public_opinion/archives/ebs/ebs_313_en.pdf
- Eurobarometer. (2011). *Climate Change report*. Special Eurobarometer 372. Research report for the European Commission. http://ec.europa.eu/public_opinion/archives/ebs/ebs_372_en.pdf
- Gallup (2011). Fewer Americans, Europeans View Global Warming as a Threat Worldwide, Gallup online. <http://www.gallup.com/poll/147203/Fewer-Americans-Europeans-View-Global-Warming-Threat.aspx#2>
- Gifford, R., Scannell, L., Kormos, C., Smolova, L., Biel, A., Boncu, S., et al. (2009). Temporal pessimism and spatial optimism in environmental assessments: An 18-nation study. *Journal of Environmental Psychology*, 29, 1-12.
- Höppner, C. & Whitmarsh, L. (2011). Public engagement in climate action: policy and public expectations. In: Whitmarsh, L., O'Neill, S., Lorenzoni, I. (Eds.), *Engaging the Public with Climate Change: Communication and Behaviour Change*. Earthscan, London.
- Howe, P. D., Markowitz, E. M., Lee, T. M., Ko, C. Y., & Leiserowitz, A. (2012). Global perceptions of local temperature change. *Nature Climate Change* (in press, available online).
- Howell, R. A. (2013). It's not (just) "the environment, stupid!" Values, motivations, and routes to engagement of people adopting lower-carbon lifestyles. *Global Environmental Change*, 23(1), 281-290.
- IEA (2007). *Energy use in the new millennium: Trends in IEA countries*. International Energy Agency, Paris.
- IEA (2011). *World Energy Outlook 2011*. International Energy Agency, Paris.
- Kahan, D., Jenkins-Smith, H., & Braman, D. (2011). Cultural cognition of scientific consensus. *Journal of Risk Research*, 14, 147-174.
- Kellstedt, P., Zahran, S., & Vedlitz, A. (2008). Personal Efficacy, the Information Environment, and Attitudes Toward Global Warming and Climate Change in the United States. *Risk Analysis*, 28(1), 113-126.
- Koletsou, A. & Mancy, R. (2012). Which efficacy constructs for large-scale social dilemma problems? Individual and collective forms of efficacy and outcome expectancies in the context of climate change mitigation. *Risk Management*, 13, 184-208.
- Laukkonen, J., Blanco, P. K., Lenhart, J., Keiner, M., Cavric, B., & Kinuthia-Njenga, C. (2009). Combining climate change adaptation and mitigation measures at the local level. *Habitat International*, 33(3), 287-292.
- Le Treut, H., Somerville, R., Cubasch, U., Ding, Y., Mauritzen, C., Peterson, T., & M. Prather, M. (2007): Historical Overview of Climate Change. In: *Climate Change 2007: The Physical Science Basis*. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change.
- Leiserowitz, A. (2006). Climate change risk perception and policy preferences: The role of affect, imagery, and values. *Climatic Change*, 77, 45-72.

- Leiserowitz, A., Maibach, E., Roser-Renouf, C., Feinberg, G., & Howe, P. (2012) *Climate change in the American mind: Americans' global warming beliefs and attitudes in September, 2012*. <http://environment.yale.edu/climate/files/Climate-Beliefs-September-2012.pdf>
- Lorenzoni, I., Leiserowitz, A., Doria, M., Poortinga, W., & Pidgeon, N. (2006). Cross national comparisons of image associations with "global warming" and "climate change" among laypeople in the United States of America and Great Britain. *Journal of Risk Research*, 9(3), 265-281.
- Lorenzoni, I., Nicholson-Cole, S. & Whitmarsh, L. (2007). Barriers perceived to engaging with climate change among the UK public and their policy implications. *Global Environmental Change*, 17, 445-459.
- Lorenzoni, I., O'Riordan, T., & Pidgeon, N. F. (2008). Hot air and cold feet: the UK response to climate change. In H. Compston and I Bailey (Eds.). *Turning Down the Heat: The Politics of Climate Policy in Affluent Democracies*. Palgrave Macmillan, Basingstoke.
- Lorenzoni, I. & Pidgeon, N.F. (2006). Public views on climate change: European and USA perspectives. *Climatic Change*, 77, 73-95.
- Luján, J. L., & Todt, O. (2007). Precaution in public: the social perception of the role of science and values in policy making. *Public Understanding of Science*, 16(1), 97-109.
- McCright, A. M. (2010). The effects of gender on climate change knowledge and concern in the American public. *Population & Environment*, 32(1), 66-87.
- Met Office (2012). UK Flooding April to July 2012. http://www.metoffice.gov.uk/media/pdf/e/s/JBA_and_Met_Office_Bulletin_UK_Flooding_April_July_2012.pdf
- Myatt-Bell, L. B., Scrimshaw, M. D., Lester, J. N., & Potts, J. S. (2002). Public perception of managed realignment: Brancaster West Marsh, North Norfolk, UK. *Marine Policy*, 26(1), 45-57.
- New, M., Liverman, D., & Anderson, K. (2009). Mind the gap. *Nature Reports Climate Change* 3, 143-144.
- Ostrom, E. (2010). Polycentric systems for coping with collective action and global environmental change. *Global Environmental Change*, 20(4), 550-557.
- Pall, P., Aina, T., Stone, D. A., Stott, P. A., Nozawa, T., & Allen, M. (2011). Anthropogenic greenhouse gas contribution to flood risk in England and Wales in autumn 2000. *Nature*, 470(7334), 382-385.
- Parry, M.L., Canziani, O.F., Palutikof, J.P., van der Linden, P.J., & Hanson, C.E. (2007). *Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, 2007*. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.
- Pidgeon, N.F. (2012). Public understanding of, and attitudes to, climate change: UK and international perspectives and policy. *Climate Policy*, 12 (Sup01), S85-S106.
- Pidgeon, N.F & Fischhoff, B. (2011) The role of social and decision sciences in communicating uncertain climate risks. *Nature Climate Change*, 1, 35-41.
- Poortinga W., Pidgeon, N.F., & Lorenzoni, I. (2006). *Public Perceptions of Nuclear Power, Climate Change and Energy Options in Britain: Summary Findings of a Survey Conducted during October and November 2005*. Technical Report (Understanding Risk Working Paper 06-02). Norwich: Centre for Environmental Risk.
- Poortinga, W., Spence, A., Whitmarsh, L., Capstick, S., & Pidgeon, N. (2011). Uncertain climate: an investigation of public scepticism about anthropogenic climate change. *Global Environmental Change*, 21(3), 1015-1024.

- Rabinovich, A., Morton, T.A., & Birney, M.E. (2012). Communicating climate science: the role of perceived communicator's motives. *Journal of Environmental Psychology*, 32, 11-18.
- Rahmstorf, S. (2004). *The climate sceptics*. Potsdam: Potsdam Institute for Climate Impact Research. http://www.pik-potsdam.de/~stefan/Publications/Other/rahmstorf_climate_sceptics_2004.pdf
- Scannell, L. & Gifford, R. (2013). Personally Relevant Climate Change: The Role of Place Attachment and Local Versus Global Message Framing in Engagement. *Environment and Behavior*, 45(1), 60-85.
- Schulz, P.W. & Zelezny, A. (1999). Values as predictors of environmental attitudes: evidence for consistency across 14 countries. *Journal of Environmental Psychology*, 19, 255-265.
- Scruggs, L. & Benegal, S. (2012). Declining public concern about climate change: Can we blame the great recession? *Global Environmental Change*, 22(2), 505-515.
- Shuckburgh, E., Robison, R. & Pidgeon, N. F. (2012). *Climate Science, the Public and the News Media*. Living With Environmental Change.
- Shum, R.Y. (2012). Effects of economic recession and local weather on climate change attitudes. *Climate Policy*, 12, 38-49.
- Slovic, P. (2000). *The perception of risk*. London: Earthscan.
- Smith, B., Burton, I., Klein, R. J. & Wandel, J. (2000). An anatomy of adaptation to climate change and variability. *Climatic change*, 45(1), 223-251.
- Smith, N. & Leiserowitz, A. (2012). The Rise of Global Warming Skepticism: Exploring Affective Image Associations in the United States Over Time. *Risk Analysis*, 32, 1021-1032.
- Spence, A. & Pidgeon, N.F. (2010) Framing and communicating climate change: the effects of distance and outcome frame manipulations. *Global Environmental Change*, 20, 656-667.
- Spence, A., Poortinga, W. & Pidgeon, N.F. (2011a). The Psychological Distance of Climate Change. *Risk Analysis*, 32(6), 957-972.
- Spence, A., Poortinga, W., Butler, C. & Pidgeon, N.F. (2011b). Perceptions of climate change and willingness to save energy related to flood experiences. *Nature Climate Change*, 1, 46-49.
- Spence, A., VENABLES, D., Pidgeon, N. F., Poortinga, W. & Demski, C. (2010). Public perceptions of climate change and energy futures in Britain: Summary findings of a survey conducted in January-March 2010. Technical Report (Understanding Risk Working Paper 10-01). Cardiff, School of Psychology.
- Stern, P. (2002). New environmental theories: toward a coherent theory of environmentally significant behavior. *Journal of social issues*, 56(3), 407-424.
- Stern, P. (2011). Contributions of Psychology to Limiting Climate Change. *American Psychologist* May-June 2011.
- Swim, J., Clayton, S., Doherty, T., Gifford, R., Howard, G., et al. (2010). *Psychology and Global Climate Change; Addressing a Multifaceted Problem and Set of Challenges*. American Psychological Association.
- Trenberth, K.E. (2012). Framing the way to relate climate extremes to climate change. *Climatic Change*, 115, 283-290.
- Upham, P., Whitmarsh, L., Poortinga, W., Purdam, K., Darnton, A., et al. (2009). *Public Attitudes to Environmental Change: a selective review of theory and practice. A research synthesis for the Living with Environmental Change Programme, Research Councils UK*. Swindon: Economic and Social Research Council/ Living with Environmental Change Programme.

Weber, E.U. (2010). What shapes perceptions of climate change? *WIREs Climate Change*, 1, 332-342.

Welsh Government (2000). *Wales: Changing Climate, Challenging Choices. The impacts of climate change in Wales from now to 2080.*

http://www.ukcip.org.uk/wordpress/wp-content/PDFs/Wales_summary.pdf

Welsh Government (2010a). *Climate Change Strategy for Wales.*

<http://wales.gov.uk/docs/desh/publications/101006ccstratfinalen.pdf>

Welsh Government (2010b). *Climate Change Strategy for Wales: Summary Version for International Partners.*

<http://wales.gov.uk/topics/environmentcountryside/climatechange/publications/internationalsummary/?lang=en>

Welsh Government (2010c). *Climate Change Strategy for Wales Adaptation Delivery Plan.*

<http://wales.gov.uk/docs/desh/publications/101006ccstratdeliveryadaptationen.pdf>

Welsh Government (2011). *Climate Change Engagement Strategy.*

<http://wales.gov.uk/docs/desh/publications/111102engagementen.pdf>

Whitmarsh, L. (2008). Are flood victims more concerned about climate change than other people? The role of direct experience in risk perception and behavioural response. *Journal of Risk Research*, 11(3), 351-374.

Whitmarsh, L. (2009). What's in a name? Commonalities and differences in public understanding of 'climate change' and 'global warming'. *Public Understanding of Science*, 18, 401-420.

Whitmarsh, L. (2011). Scepticism and uncertainty about climate change: dimensions, determinants and change over time. *Global Environmental Change*, 21, 690-700.

Whitmarsh, L. & O'Neill, S. (2010). Green identity, green living? The role of pro-environmental self-identity in determining consistency across diverse pro-environmental behaviours. *Journal of Environmental Psychology*, 30, 305-314.

Wildavsky, A. & Dake, K. (1990). Theories of Risk Perception: Who Fears What and Why? *Daedalus* 119(4), 41-60.

Details of previous studies' methodologies

The 2005 survey (Poortinga et al., 2006) was carried out by the University of East Anglia during October and November 2005 in Great Britain (Wales, England, Scotland). A nationally representative sample of 1,491 people aged 15 years and over was interviewed face-to-face in their own homes by MORI.

The 2010 survey (Spence et al., 2010) was carried out by Cardiff University during January, February and March 2010 in Great Britain (Wales, England, Scotland). A nationally representative sample of 1,822 people (including 185 people in Wales) aged 15 years and over was interviewed face-to-face in their own homes by Ipsos MORI.

The 2011 survey (Shuckburgh et al., 2011) was carried out by the Living With Environmental Change partnership during March 2011 across the UK (Wales, England, Scotland, Northern Ireland). A nationally representative sample of 1,007 people aged 16 years and over was interviewed face-to-face by GfK-NOP.

Appendix A: Topline results

Topline results for the Public Perceptions of Climate Change Survey 2012

Results are based on 1,001 computer-assisted telephone interviews (CATI) with members of the Welsh public aged 18 or over. Fieldwork was carried out during November and December 2012.

Data are weighted to the profile of the Welsh population. Where results do not sum to 100 percent, this is due to rounding of figures to the nearest integer.

Data from the subsample in Ceredigion are excluded from the overview findings reported here.

Additional text from the CATI (e.g. that used to obtain informed consent and assess eligibility to participate) is not included here but is available from the authors on request.

Question 1

Please can you tell me if you:

- Strongly agree
- Tend to agree
- Neither agree nor disagree
- Tend to disagree
- Strongly disagree

...with each of the following

	Strongly agree %	Tend to agree %	Neither agree nor disagree %	Tend to disagree %	Strongly disagree %	No opinion/ Don't know %
I feel like I belong to the community where I live	36	41	10	9	4	/
The landscape and countryside where I live are very special to me	65	25	3	5	2	/
I can influence decisions that affect this area.	8	26	12	33	20	1
I strongly identify with what it means to be Welsh	48	27	7	7	9	2
The place where I live is unique and distinctive	42	30	7	14	6	1

Question 2

How concerned, if at all, are you about climate change, which is sometimes referred to as 'global warming'?

- Very concerned
- Fairly concerned
- Not very concerned
- Not at all concerned

	%
Very concerned	36
Fairly concerned	48
Not very concerned	9
Not at all concerned	7
No opinion/ don't know	/

Question 3

What is the first thing that comes to mind when you hear the phrase 'climate change'?

Open-ended item – results are not reported here (an illustrative sample of responses is given in section 1.6 of the main report).

Question 4

As far as you know, do you personally think the world's climate is changing or not?

- Yes
- No
- Don't know

	%
Yes	88
No	4
Don't know	7

Question 5

Thinking about the causes of climate change, which, if any, of the following best describes your opinion?¹⁴³

- Climate change is entirely caused by natural processes
- Climate change is mainly caused by natural processes
- Climate change is partly caused by natural processes and partly caused by human activity
- Climate change is mainly caused by human activity
- Climate change is entirely caused by human activity
- I think there is no such thing as climate change

	%
Climate change is entirely caused by natural processes	4
Climate change is mainly caused by natural processes	7
Climate change is partly caused by natural processes and partly caused by human activity	52
Climate change is mainly caused by human activity	29
Climate change is entirely caused by human activity	6
I think there is no such thing as climate change	1
No opinion/ Don't know	1

¹⁴³ Note that half of the survey respondents received the options presented in reverse order (i.e. commencing with 'climate change is entirely caused by human activity'. Results are aggregated here.

Question 6

I am going to ask you some more questions about climate change and I would like you to tell me if you:

- Strongly agree
- Tend to agree
- Neither agree nor disagree
- Tend to disagree
- Strongly disagree

...with each of them

	Strongly agree %	Tend to agree %	Neither agree nor disagree %	Tend to disagree %	Strongly disagree %	No opinion/ Don't know %
Most scientists agree that humans are causing climate change	28	36	9	14	7	5
Wales should aim to set an example to the outside world when it comes to addressing climate change	37	36	9	10	6	2
Climate change is a topic which is important to me personally	35	38	9	12	5	1
My views about climate change are reflected by at least one of the main political parties in Wales	6	18	12	23	20	21
If I made changes to my own lifestyle, this would make a difference to climate change	21	37	6	21	14	1

Question 7

Considering the potential effects of climate change, please can you tell me if you are:

- Very concerned
- Fairly concerned
- Neither concerned or unconcerned
- Fairly unconcerned
- Very unconcerned

....about each of the following

	Very concerned %	Fairly concerned %	Neither concerned nor unconcerned %	Fairly unconcerned %	Very unconcerned %	No opinion/ Don't know %
The potential effects of climate change on <i>you personally</i>	20	42	10	19	8	1
The potential effects of climate change on <i>people in developing countries</i>	43	37	6	9	4	2
The potential effects of climate change on <i>wildlife and the natural world</i>	50	40	3	5	2	1
The potential effects of climate change on <i>Wales</i>	34	46	6	9	3	1

Question 8

I would like you to tell me if you:

- **Strongly agree**
- **Tend to agree**
- **Neither agree nor disagree**
- **Tend to disagree**
- **Strongly disagree**

...with each of the following

	Strongly agree %	Tend to agree %	Neither agree nor disagree %	Tend to disagree %	Strongly disagree %	No opinion/ Don't know %
The recent floods in Wales were due in part to climate change	23	37	11	16	7	6
The seriousness of climate change is exaggerated	12	18	7	27	32	3
It is possible to have a strong economy at the same time as tackling climate change	35	38	9	7	4	8
Climate change is unfair because it affects vulnerable people most of all	23	24	14	19	14	5
Most people don't do much in their own lives to help tackle climate change	35	43	6	10	2	3
If most people in Wales changed their lifestyles, this would make a difference to climate change	25	37	7	20	10	3
Climate change will mostly affect developing countries	19	23	8	28	16	6

Question 9

When, if at all, do you think Wales will start feeling the effects of climate change?

- **We are already feeling the effects**
- **10 years from now**
- **25 years from now**
- **50 years from now**
- **100 years from now or longer**
- **Never**

	%
We are already feeling the effects	63
10 years from now	9
25 years from now	9
50 years from now	6
100 years from now	4
Never	4
No opinion/ Don't know	6

Question 10

I am going to read out some Welsh Government policies for Wales and I would like you to tell me if you:

- **Strongly support**
- **Tend to support**
- **Neither support nor oppose**
- **Tend to oppose**
- **Strongly oppose**

... each of them

	Strongly support %	Tend to support %	Neither support nor oppose %	Tend to oppose %	Strongly oppose %	No opinion/ Don't know %
A three percent annual reduction in Wales' climate change-causing emission	33	43	12	5	3	4
Welsh Government funding to install solar panels on homes	53	31	5	6	4	2
Welsh Government funding to support communities overseas affected by climate change	15	33	11	20	18	2

Question 11

I would like you to tell me if you:

- **Strongly agree**
- **Tend to agree**
- **Neither agree nor disagree**
- **Tend to disagree**
- **Strongly disagree**

...with each of the following

	Strongly agree %	Tend to agree %	Neither agree nor disagree %	Tend to disagree %	Strongly disagree %	No opinion/ Don't know %
It is my responsibility to help to do something about climate change	42	41	6	6	5	1
If most people in my local community changed their lifestyles, this would make a difference to climate change	26	41	7	14	9	3
I would be prepared to change my behaviour to help limit climate change	38	44	4	7	5	1
I would be willing to avoid taking flights in the future, to help tackle climate change	22	28	10	18	16	5
I would be willing to set my thermostat lower in winter, to help tackle climate change	39	35	5	10	9	2
In order to prevent climate change, I would be willing to vote for politicians committed to climate change	23	34	14	13	10	5

Question 12

I am going to ask you some more questions about climate change and I would like you to tell me if you:

- Strongly agree
- Tend to agree
- Neither agree nor disagree
- Tend to disagree
- Strongly disagree

...with each of them

	Strongly agree %	Tend to agree %	Neither agree nor disagree %	Tend to disagree %	Strongly disagree %	No opinion/ Don't know %
My local area is likely to be affected by climate change	30	35	7	17	7	4
It is hard to take action against climate change even if you want to	22	36	6	21	14	1
If most people in the UK changed their lifestyles, this would make a difference to climate change	37	38	5	11	7	1
It is already too late to do anything to prevent climate change	7	11	9	32	39	2

Question 13

‘This next section of the survey is concerned with what is termed climate change adaptation. Adaptation refers to actions which are taken to respond to the effects of climate change, such as adjusting to changes in weather and temperature. Examples of adaptation include personal actions like modifying homes to cope with changes to the weather, and larger-scale projects such as building flood barriers. Adaptation is different from action to reduce the causes of climate change, such as using less electricity at home, or building wind farms.’

Which one of the following general approaches would you most strongly support, in terms of how we adapt to climate change in Wales?

- **Take no action at this stage**
- **Monitor how climate change may be affecting Wales, but take no further action at this stage**
- **Begin preparing for the future effects of climate change**
- **Take action now to respond to the existing and future effects of climate change**

	%
Take no action at this stage	2
Monitor how climate change may be affecting Wales, but take no further action at this stage	14
Begin preparing for the future effects of climate change	22
Take action now to respond to the existing and future effects of climate change	61
No opinion/ Don't know	1

Question 14

I am going to read out some statements about large-scale investment, which could help Wales adapt to the effects of climate change in certain areas. For the following, please tell me if you:

- **Strongly support**
- **Tend to support**
- **Neither support nor oppose**
- **Tend to oppose**
- **Strongly oppose**

... with each of them

Please bear in mind that each of these options would cost money, for example coming from the taxes people pay or meaning money could not be spent elsewhere.

	Strongly support %	Tend to support %	Neither support nor oppose %	Tend to oppose %	Strongly oppose %	No opinion/ Don't know %
Assisting communities at risk of flooding to move elsewhere.	31	35	12	12	8	2
Changing the design of buildings to cope with hot weather.	29	34	12	14	7	3
Building new reservoirs to store water during periods of drought	33	38	8	11	8	2
Extending nature reserves to enable wildlife to adapt to changed conditions	43	36	9	8	3	1

Question 15

When, if at all, do you think Wales will need to take action to *adapt* to climate change?

- We already need to take action to adapt to climate change
- 10 years from now
- 25 years from now
- 50 years from now
- 100 years from now or longer
- Never

	%
We already need to take action to adapt to climate change	77
10 years from now	8
25 years from now	4
50 years from now	2
100 years from now	1
Never	3
No opinion/ Don't know	4

Question 16

During the next 20 years in Wales, how much of a priority should be placed upon adapting to the following climate-related risks ...? Please tell me if you feel that the following should be a:

- Very high priority
- Fairly high priority
- Medium priority
- Fairly low priority
- Very low priority

	Very high priority %	Fairly high priority %	Medium priority %	Fairly low priority %	Very low priority %	No opinion/ Don't know %
Adapting to increased numbers of homes at risk of flooding	38	39	15	5	2	2
Increased risk of people becoming unwell in summer due to higher temperatures	12	21	25	28	11	2
Increased risk of wildfires in National Parks	20	24	23	21	9	2
Increased risk of water shortages and droughts	23	31	20	17	8	2

Question 17

During the next 20 years in Wales, how much of a priority should be placed upon adapting to the following climate-related opportunities...? Please tell me if you feel that the following should be a:

- **Very high priority**
- **Fairly high priority**
- **Medium priority**
- **Fairly low priority**
- **Very low priority**

	Very high priority %	Fairly high priority %	Medium priority %	Fairly low priority %	Very low priority %	No opinion/ Don't know %
An increase in tourism due to higher temperatures	13	27	30	18	8	3
Opportunities to grow new crops	28	41	20	7	2	2

Question 18a

‘In the future, extreme weather events, including storm damage and flooding during the winter, and heat-waves and droughts during the summer, are expected to become more severe in Wales due to climate change. In addition, parts of coastal Wales are expected to be affected by rising sea levels.’

Which one of the following do you think should be mainly responsible for adapting to these impacts?

- **Individuals and their families**
- **Local communities**
- **Business and industry**
- **Local authorities**
- **National agencies such as the Environment Agency and the NHS**
- **The Welsh Government**
- **The UK Government**
- **The international community**
- **Other**

	%
Individuals, their families and local communities	9
Local authorities	8
National agencies such as the Environment Agency and the NHS	7
The Welsh Government	16
The UK Government	29
The international community	15
Other	10
No opinion/ Don't know	5

Question 18b

Why do you think that [answer from 18a] should be mainly responsible?

Open-ended item – results are not reported here

Question 19

I am going to read out another set of statements about adapting to climate change and I would like you to tell me if you:

- Strongly agree
- Tend to agree
- Neither agree nor disagree
- Tend to disagree
- Strongly disagree

...with each of them

	Strongly agree %	Tend to agree %	Neither agree nor disagree %	Tend to disagree %	Strongly disagree %	No opinion/ Don't know %
It is more important for Wales to focus on adapting to the effects of climate change, than it is trying to reduce the causes of climate change [half of sample] ¹⁴⁴	15	21	12	29	18	4
Focusing on adapting to climate change would mean attempts to actually prevent climate change would be forgotten about.	10	27	12	30	14	6
Adapting to climate change should only be undertaken if it is in addition to trying to reduce the causes of climate change.	36	35	7	13	6	3

¹⁴⁴ Note that for the first item, half the sample received the question wording with 'causes' preceded by 'adapting' and the other half in the reverse order ('It is more important for Wales to focus on trying to reduce the causes of climate change, than it is on adapting to the effects of climate change'). Results are aggregated here from the perspective of the former wording.

Question 20

Imagine you have £100 to spend; some of this can be spent on reducing the causes of climate change, and some can be spent on adapting to the effects of climate change. How would you split the £100 between these two options?

	Mean amount (£) (all valid responses included, n=936)	Mean amount (£) (not including £50 responses, n=501)
Causes	50.83 (SD=23.6)	51.55 (SD=32.3)
Adapting	49.17 (SD=23.6)	48.45 (SD=32.3)

Question 21

I am now going to ask you some questions about flooding. They apply to the last three years only, in other words from 2010 to the present time.

Have you personally experienced flooding in your local area or not?

	%
Yes	28
No	72

Question 22

Do any of the following statements apply to you? Again, this applies to the last three years only, in other words from 2010 to the present time.

	Yes	No	No opinion/ Don't know
	%	%	%
My home or other property has been damaged by flooding	6	94	/
I have been directly affected by flooding, for example through travel disruption or my ability to work	27	73	/
Other people within five miles of where I live have experienced property damage from flooding	44	53	4
I have seen first-hand the effects of flooding within 5 miles of where I live	43	57	/
I have not given much thought to flooding in the area within five miles of where I live	37	62	1

Question 23

Please can you tell me if you:

- **Strongly agree**
- **Tend to agree**
- **Neither agree nor disagree**
- **Tend to disagree**
- **Strongly disagree**

...with each of the following

	Strongly agree %	Tend to agree %	Neither agree nor disagree %	Tend to disagree %	Strongly disagree %	No opinion/ Don't know %
When I have problems, I try to solve them on my own	53	35	4	6	2	1
People should be allowed to make as much money as they can for themselves, even if others are not able to	18	28	11	20	19	4
If the government spent less time trying to fix everybody's problems, we'd all be a lot better off	23	24	14	21	13	5
The world would be a better place if its wealth were divided equally among nations	33	27	10	15	11	4
Discrimination against minorities is still a very serious problem in our society	36	37	8	12	4	3
In my ideal society, all basic needs (food, housing, education, health care) would be guaranteed by the government for everyone	47	27	9	8	7	2
Being environmentally friendly is an important part of who I am	44	43	7	5	1	1

Question 24

How would you judge the financial situation in your household?

- **Very good**
- **Fairly good**
- **Neither good nor bad**
- **Fairly bad**
- **Very bad**

	%
Very good	7
Fairly good	44
Neither good nor bad	31
Fairly bad	12
Very bad	3
No opinion/ Don't know	3

Question 25

Can you...?

	Yes	No	No opinion/ Don't know
	%	%	%
Understand spoken Welsh	31	69	/
Speak Welsh	25	74	/
Read Welsh	28	71	/
Write Welsh	24	75	/

Appendix B: Respondent characteristics

Characteristic	Unweighted count (n)	Unweighted valid (%)	Weighted valid (%)	Resident population (%)
By age				
18 to 24	76	7.6	13.9	12.0
25 to 34	137	13.7	14.9	14.9
35 to 44	130	13.0	16.4	16.3
45 to 54	231	23.1	17.5	17.4
55 to 64	214	21.4	15.9	16.2
65 to 74	155	15.5	11.6	12.4
75 or over	58	5.8	9.8	10.8
Total valid responses	1,001	100	100	100
By gender				
Male	504	50.3	46.8	48.5
Female	497	49.7	53.2	51.5
Total valid responses	1,001	100	100	100
By working status				
Full-time employee	360	36.0	31.9	31.9
Part-time employee	93	9.3	12.5	12.5
Self-employed	110	11.0	7.7	7.7
Unemployed and available for work	63	6.3	3.9	3.9
Wholly retired from work	269	26.9	24.9	24.9
Otherwise not working	106	10.6	19.2	19.2
Total valid responses	1,001	100	100	100
By tenure				
Owned outright	374	38.4	33.2	35.4
Owned with a mortgage or loan	373	38.3	31.5	32.0
Rented social	113	11.6	16.6	16.5
Rented private or other tenure	114	11.7	18.7	16.1
Total valid responses	974	100	100	100
Not known	27	-	-	-

Characteristic		Unweighted count (n)	Unweighted valid (%)	Weighted valid (%)	Resident population (%)
By Unitary Authority and region					
North and Central Wales	Ynys Môn	27	2.7	2.2	2.3
	Gwynedd	48	4.8	3.7	4.0
	Conwy	48	4.8	4.4	3.9
	Denbighshire	35	3.5	3.4	3.1
	Flintshire	49	4.9	4.9	4.9
	Wrexham	44	4.4	4.2	4.4
	Powys	44	4.4	4.8	4.4
	Sub-total	295	29.5	27.6	27
South West Wales	Ceredigion	33	3.3	3.1	2.5
	Pembrokeshire	58	5.8	3.8	4.0
	Carmarthenshire	77	7.7	5.3	6.0
	Swansea	77	7.7	9.3	7.9
	Neath Port Talbot	48	4.8	5.0	4.6
	Bridgend	45	4.5	4.1	4.6
	Sub-total	338	33.8	30.6	29.6
South East Wales	Vale of Glamorgan	31	3.1	3.5	4.1
	Cardiff	96	9.6	10.7	11.2
	Rhondda Cynon Taf	69	6.9	8.2	7.6
	Caerphilly	47	4.7	5.2	5.7
	Blaenau Gwent	22	2.2	2.1	2.3
	Torfaen	18	1.8	2.5	2.9
	Monmouthshire	33	3.3	2.7	3.0
	Newport	35	3.5	5.3	4.6
	Merthyr Tydfil	17	1.7	1.5	1.9
	Sub-total	368	36.8	41.8	43.4
Total valid responses		1,001	100	100	100
By WIMD decile within each Unitary Authority					
Most deprived =1		87	8.7	10.3	8.8
2		107	10.7	9.6	9.8
3		103	10.3	10.7	10.0
4		89	8.9	9.2	10.0
5		108	10.8	10.8	10.4
6		96	9.6	9.6	10.0
7		112	11.2	10.4	10.0
8		110	11.0	9.9	10.3
9		73	7.3	9.8	9.9
Least deprived =10		116	11.6	9.7	10.8
Total valid responses		1,001	100	100	100