UK 2012 Climate Change Risk Assessment

Wales

Context

With a population of around 3 million, Wales is typified by extensive mountain ranges, striking coastlines and the location of most major towns and cities on coasts or in river valleys. Nearly 80% of a total land area of 20,800km^2 is used for agriculture (primarily grassland for livestock), while around 30% has some form of recognition or protection for its environmental value.

These features not only give Wales its unique character, they also shape the distinctive nature of its exposure to weather and climate impacts. For example:

- 20% of the population and one in six properties are at risk of coastal, river or some other form of flooding. Flooding is a greater threat in Wales than in the rest of the UK, with flash flooding and landslips a particular concern due to the steepness of much of the Welsh landscape.
- Groundwater resources are very limited, resulting in a reliance on surface water to meet the needs of homes and businesses. Despite relatively high rainfall, Wales experiences significant pressure on its water supplies.

During the 21st century, as detailed in the UK Climate Projections published in 2009 (UKCP09), Wales may experience increasing average temperatures throughout the year, an increase in average rainfall in winter, a decrease in average rainfall in summer and rising sea levels. The Climate Change Risk Assessment (CCRA) has considered the main opportunities and threats for Wales that may result from these changes in climate.

Key Findings

- Grass yields may increase significantly with increased temperatures if water or nutrients do not act as limiting factors, enabling the Welsh landscape to support more livestock and potentially improving incomes of livestock farmers.
- Milder winters may reduce rates of death and illness caused by cold weather.
- 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.
- 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.
- Increased drought and other climate change effects may have a profound impact on biodiversity and important habitats, affecting vital services that the natural environment provides for Wales and its people.

Wales

The results presented here do not take account of changes in society (e.g. population growth, economic growth and developments in new technologies); nor do they take account of responses to climate risks (e.g. future or planned Government policies or private adaptation investment plans).

The assessment of flood risk for the CCRA has assumed that there are no changes in existing flood and coastal erosion risk management measures; the analysis takes account of current flood defences and protection against coastal erosion, but does not include any future changes as a result of adaptation policies or deterioration of existing flood defences and coastal protection measures.

Focus on… the Natural Environment

Climate change is projected to have a far-reaching impact on terrestrial, coastal and marine environments in Wales. Many animal and plant species and many important services (e.g. crop pollination) provided by the natural environment may be affected.

Summertime reductions in soil moisture and river flows are key potential threats interlinked with a projected increase in the frequency and severity of droughts. By the 2050s, an average year may be similar to the dry summer of 2003. Potential consequences include damage to important habitats and to biodiversity, and increased risk of wildfire.

A changing climate may affect locations where different animal and plant species can survive and flourish. Some species may move to higher altitudes, altering landscape and biodiversity in the Welsh uplands. Changes in birds' migration patterns and an increase in pests and diseases may also have a significant impact on biodiversity.

Coastal habitats affected by sea level rise, coastal erosion and increased tidal flooding are projected to experience a net loss in biodiversity, while marine ecosystems may be more vulnerable to invasive species and to harmful viruses and bacteria. Shellfish quality may decline as sea water absorbs higher levels of atmospheric carbon and becomes more acidic.

Confidence

M Reduction in river flows: up to 20% by the 2020s, increasing to between 10% and 50% by the 2080s.

M Increased risk of wildfire (in National Parks): between 30% and 50% by the 2080s (baseline: the 1980s).

Focus on… Agriculture & Forestry

Warmer temperatures may improve wheat yields and allow introduction of new crops (e.g. garlic and rocket). Even more important, however, is the potential boost to livestock farming resulting from a projected rise in grass yields, which could increase the number of livestock that the Welsh landscape can support. But serious threats to agriculture may arise from increased drought, reductions in the availability of water in summer for livestock and for crop irrigation, and an increase in flood risk and coastal erosion which is already high by UK standards.

As temperatures become warmer and rainfall patterns change, drought, fire, and pests and diseases may pose an increasing threat to Welsh forestry.

Confidence

M Increase in grass growth: between 6% and 20% by the 2020s, rising to between 14% and 35% by the 2080s (West Wales figures).

H Increase in agricultural land flooded every 3 years on average: between 300% and 400% by the 2080s.

M Loss of forestry yield due to drought: between 10% and 30% by the 2080s (current figure: 10%).

Focus on… Business

More frequent and more severe flooding (including flash floods) may pose a major risk to businesses in Wales. Increased winter rainfall and rising sea levels, in particular, may lead to greater flood damage to business premises and more disruption to supply chains and essential business support services.

A warming climate may encourage further expansion of Wales's important tourist sector, although rising sea levels may lead to some loss of beaches as well as contributing to erosion of other natural assets and visitor attractions in coastal areas. Wales already faces a relatively high risk of flooding by UK standards and this may increase further.

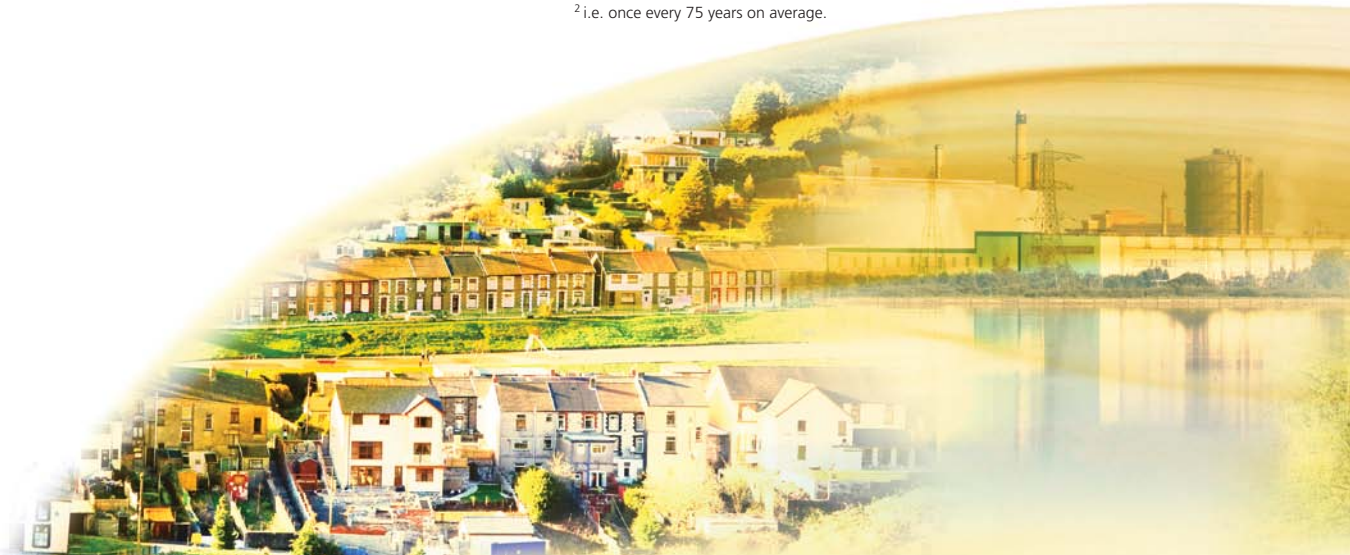
Increased flooding may also impact the financial sector in the event of a significant rise in payouts on home and business insurance policies. A major ripple effect across the economy would also result if the overall performance of the financial sector were compromised by a failure to factor climate change fully into its investment strategies.

Confidence

H Non-residential properties at significant likelihood of river or tidal flooding:[2] between 30,000 and 65,000 by the 2050s (current figure: 24,000).

M Total beach area lost due to increased coastal erosion and sea level rise: between 2% and 8% by the 2080s.

[2] i.e. once every 75 years on average.



Focus on… Buildings & Infrastructure

Flooding represents a major threat to all types of buildings in Wales and one that might be significantly exacerbated by climate change. For some properties, flood insurance and mortgages may become increasingly difficult to obtain.

The effects of hotter summers may increasingly be felt, particularly in major towns and cities. However, because most of these are situated near the coast, the Urban Heat Island effect (where night-time temperatures in urban areas stay appreciably higher than in the surrounding countryside) may be much less evident in Wales than in more populous parts of the UK.

Flooding may pose an increasing threat to energy, transport and other critical infrastructure, while water supplies may also come under increasing pressure due to drier summers. Although there is great uncertainty in the projection, over 90% of the population may be affected by water shortages by the 2080s.

Confidence

H Increase in total number of properties at significant likelihood of flooding: between 40% and 250% by the 2080s.

H Increase in length of road and rail at significant likelihood of flooding: around 20% by the 2080s.

Focus on… Health & Wellbeing

Milder winters may result in a decrease in cold-related deaths and illnesses, and also perhaps in less air pollution at that time of year. Hotter summers, though, may lead to more heat-related deaths and hospital admissions, with vulnerable groups such as the elderly and long-term sick especially susceptible. Increased ground-level ozone in summer may exacerbate existing respiratory conditions.

Warmer, drier summers may encourage more people to participate in outdoor activities. The health benefits of this may outweigh the potential increase in skin cancer cases caused by changes in sunlight, ultraviolet light and cloud cover. Floods may lead to an increasing number of people suffering mental health problems and may also cause significant disruption to healthcare provision.

Confidence

M Reduction in cold-related deaths per year: between 300 and 2000 by the 2050s (current figure: 1800 to 3500 deaths per year).

H Increase in heat-related deaths per year: between 20 and 300 by the 2050s, rising to between 30 and 1000 by the 2080s (current figure: about 40 deaths per year).

M Hospitals at significant likelihood of flooding: between 12% and 18% by the 2080s (current figure: 10%).

A selection of opportunities and threats for Wales

The diagram below provides a selection of potential opportunities and threats for Wales that could arise as a result of climate change, as identified by the CCRA and based on projections for the Medium emissions scenario (central estimate). The full list of opportunities and threats assessed for Wales are given in the full CCRA Report on Wales.

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The Challenge of Adaptation

For Wales, many of the potential threats and opportunities presented by climate change are closely interlinked. Responding to them therefore requires an integrated approach, with government, the wider public sector, business and individuals all having a role.

The Welsh Government has already published Parts 1 and 2 of its adaptation guidance document 'Preparing for a changing climate', with Parts 3 to 5 due for publication in 2012. In addition, it is currently implementing a Knowledge Transfer Programme to support organisations in adapting to climate change. Other positive steps taken at policy and government level include the following:

- The Climate Change Strategy for Wales (2010) includes a framework for progressing adaptation with three key pillars: building the evidence base; integrating adaptation into mainstream decision-making; and sharing information and good practice. An Adaptation Delivery Plan published alongside the Strategy details 24 actions to deliver the framework.
- In 2006, all 22 local authorities, the three National Park Authorities and three Fire and Rescue Services committed to work to adapt to the effects of climate change on Welsh communities.

Practical initiatives being implemented also include the following:

- Water companies' 25-year Water Resource Management Plans now take account of the potential impacts of climate change on water supply and demand. In addition, Dŵr Cymru and Dee Valley Water have both voluntarily produced adaptation reports.
- The Glastir agri-environment scheme is expected to lead to better water management, reduced flood risk, and conserved and enhanced biodiversity. It also includes a grant scheme for creation of woodlands that increase resilience to climate change.
- The Heatwave Plan for Wales provides a framework for preparing and responding to heatwaves. It aims to reduce harm from extreme heat and heatwaves, including advice for relevant bodies and organisations on the protection of vulnerable people.

However, the challenge of adaptation is made more demanding by significant uncertainties over the precise scale and nature of many climate impacts, including:

- The effects of drought on water availability and biodiversity.
- Potential changes in storminess and wind speeds in the decades ahead.
- The implications for livestock, crops, forests and ecosystems of a potential increase in pests and diseases.
- The overall vulnerability of different manmade or natural environments, especially those that are unique or particularly valuable in Wales, for example, designated coastal habitats, remote rural communities and mountainous areas.

Where to Get Further Information

For a copy of the full CCRA Report on Wales, the CCRA Evidence Report or the CCRA Sector Reports, please visit www.defra.gov.uk/environment/climate/government/

For details of adaptation planning work now being undertaken in Wales, please visit www.wales.gov.uk/climatechange

How the CCRA was conducted

The CCRA reviewed the evidence for more than 700 potential climate change impacts on the UK economy, society and environment. Over 100 of these impacts across 11 sectors were taken forward for more detailed analysis at UK-wide scale, having been selected on the basis of likelihood, potential consequences and how urgently adaptation action may be needed to address them.

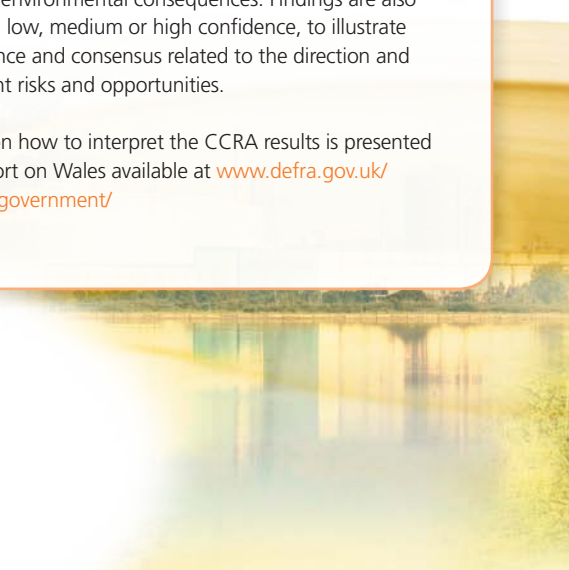
A list of the most important impacts for Wales was subsequently developed through a process of consultation with stakeholders. This took into account the impacts considered to be the most important for the UK as a whole, together with particular features and issues relevant to Wales.

A plausible range of climate change scenarios was used in the analysis. Some aspects of socio-economic change (e.g. population growth) were also taken into consideration. Future adaptation, however, was only included to a limited extent so that underlying risks due to climate change could be compared across all sectors.

The results presented here are based on the UKCP09 Medium emissions scenario for the 2020s (2010-2039) and the Low, Medium and High emissions scenarios for the 2050s (2040-2069) and the 2080s (2070-2099). In all cases, a range of probabilities from 10% to 90% was considered, to provide an indication of the uncertainty associated with these projections.

The CCRA categorised risks as low, medium or high based on their economic, social and environmental consequences. Findings are also categorised as having low, medium or high confidence, to illustrate the strength of evidence and consensus related to the direction and magnitude of different risks and opportunities.

Further information on how to interpret the CCRA results is presented in the full CCRA Report on Wales available at www.defra.gov.uk/environment/climate/government/



Llywodraeth Cymru Welsh Government

DOE Department of the Environment www.doeni.gov.uk

The Scottish Government

defra Department for Environment Food and Rural Affairs