Executive summary

This report is part of a series of annual progress reports by the Adaptation Sub-Committee to assess how the country is preparing for the major risks and opportunities from climate change. Together these reports will provide the baseline evidence for the Committee's statutory report to Parliament on preparedness due in 2015.

Our report in July 2012 assessed preparedness for two of the largest risks identified by the UK Climate Change Risk Assessment: flood risk to people and property and availability of water for households and businesses.

This year's report extends the work of the Committee to some of the key ecosystem services provided by the land.[1] Specifically, the report addresses the use of land to continue to deliver essential goods and services in the face of a changing climate – supplying food and timber, providing habitat for wildlife, storing carbon in the soil, and coping with sea level rise on the coast. It explores the extent to which decisions about the land are helping the country to prepare for climate change.

Key messages

- **There are low-regret opportunities to make the natural capital of this country more resilient to climate change.** Ecosystems in good condition are more likely to cope with the additional pressures from climate change. Our analysis identifies early priorities for adaptation, which can yield immediate benefits, including:
  - increasing the efficiency of water use in agriculture and on-farm water storage,
  - managing agricultural soils sustainably,
  - improving the condition and increasing the size of wildlife habitats,
  - restoring carbon-rich peat soils in the uplands, and
  - realigning some flood defences on the coast to create space for habitats that provide natural defences to migrate inland.
- **The Government has set appropriate policy goals in some of these areas, but it is not clear how these goals will be met. In other cases there are policy gaps.**
  - The Government has a policy goal for half of all protected wildlife sites to be in good condition by 2020. The available data point to a decline in the proportion of sites in good condition from 42% to 37% over the last decade, but a large increase in the proportion that now have a management plan in place.
  - Meeting the goal of realigning 10% of the coastline in England by 2030 requires a five-fold increase in the pace of effort from the current level of around 6 km of coastline each year to 30 km each year.
  - There are no explicit policy goals on expanding the area of upland peat under restoration or increasing efficiency in agricultural water use.

1 We focus on England in this report, in line with our statutory duty under the UK Climate Change Act (2008) to report on progress in implementation of the UK Government's National Adaptation Programme. This programme applies only to England for devolved matters, such as the environment. However, we have developed the mode of analysis in such a way that could be used to assess adaptation programmes in the devolved administrations if requested.

- **In order to improve the resilience of ecosystems to climate change, the Government should ensure that current regulations are fully implemented. It should also ensure that the value of ecosystem services is reflected in decision-making.**
  - The Government should press on with its reform of the abstraction regime so that the price of water reflects its scarcity.
  - To improve the condition of wildlife habitats and increase their size, the Government should ensure full implementation of existing regulations for protection of wildlife sites and provide stronger incentives for habitat restoration and creation.
  - To increase the pace of peatland restoration, Government policy should establish an appropriate value for the carbon storage and water regulation services provided.
  - The Environment Agency and local authorities should work together on a clear implementation programme to speed up the pace of realignment along appropriate stretches of coastline.

Advice and key findings

- *Providing food.* **The Government should press on with its reforms of the abstraction regime to incentivise efficient management of water on farms. Advice to farmers should be strengthened and streamlined to ensure they are able to make the most of the latest research findings on preparing for climate change, including on good soil management and pest and disease control.**
  - Higher temperatures and longer growing seasons may provide opportunities for farmers in England to increase productivity and so benefit from potential increases in global food prices. However, farmers will not be able to take advantage of these opportunities if the productive capacity of the land becomes limited because of water scarcity, loss of soil fertility or persistent presence of pests and diseases.
  - Much of the cropland in England is located in areas where water resources are already over-stretched. These pressures are likely to grow from the combined effects of climate change and increased demand from economic and population growth.
  - Our modelling suggests that, if current trends were allowed to continue, a gap could emerge between water supply and demand. In a dry year in the 2020s the gap could be nearly as large as total current agricultural abstraction of 120 billion litres per year.
  - Reform of the abstraction regime must ensure that the price of water reflects its scarcity. This is required to incentivise improved irrigation efficiency and investment in on-farm storage, and contribute to ensuring sufficient water supplies in the future to meet growing agricultural demands.
  - Current farming practices may be depleting the productive capacity of some of the country's richest soils. This is particularly the case in the East Anglian Fens, where some recent estimates suggest that the fertile peat topsoil could largely disappear within a few decades. The uptake of soil conservation techniques, such as reduced ploughing, is increasing in some locations. However, uptake is lower on the highest quality soils, posing a potential risk to long-term productive capacity.

  - Reduced spending on applied research and knowledge transfer may be partly responsible for slower rates of increase in agricultural efficiency in the UK compared with many other European countries. Effective communication to farmers of new knowledge would enable them to respond better to increased weather variability, new pests and diseases, and growing pressures on water and soil resources.

- *Providing habitats for wildlife.* **The condition and extent of wildlife habitats could be improved through fuller implementation of existing regulations and providing stronger incentives for habitat protection and creation. This will give wildlife the best chance of surviving in the face of the uncertain impacts of climate change.**
  - If action is not taken, climate change will add to existing pressures on wildlife, potentially accelerating species loss. Around 60% of species studied in this country show evidence of decline in recent decades.
  - Wildlife habitats are fragmented as a result of decades of habitat loss and degradation. Only around one quarter of the remaining wildlife habitat in England comprises extensive tracts, mostly in the uplands.
  - The proportion of protected wildlife sites that are in good condition has declined from 42% to 37% over the last decade, according to Natural England data. This is despite having some 8,000 km^2 benefiting from restoration through agri-environment schemes under the Common Agricultural Policy and investment by water companies and charities. The majority of sites do now have management plans in place, which if fully implemented should result in them returning to good condition in time.
  - Around 900 km^2 of new habitat (mainly woods and heath) have been created since 1998. However, there have been very few additions to England's protected sites over the last ten years.
  - The Government should strengthen implementation of current regulations to tackle deep-seated and persistent pressures, such as water and air pollution, to restore wildlife sites to good condition, and to expand habitat area. The Government should incentivise further habitat restoration and creation by maintaining funding for agri-environment schemes through reforms to the Common Agricultural Policy and developing effective market mechanisms that place an economic value on nature, such as through biodiversity offsetting and payment for ecosystem services.
- *Storing carbon in upland peat and regulating water flows.* **A tripling of the area of upland peat under restoration could be delivered through enforcing existing regulations and putting a price on the services provided by restored peatlands. This would help secure carbon stores worth billions of pounds against the risk of loss due to climate change and damaging land use practices.**
  - The majority of the 3,550 km^2 of upland peat in England is currently in a degraded condition. The soil is no longer wet enough to allow peat-forming vegetation to develop. In many areas, dried-out peatlands are losing carbon to the atmosphere and into water systems.

- Restored peatlands are more likely to be able to survive climate change, as this gives new peat-forming vegetation the best chance of developing. Climate change could cause current assemblages of peat-forming vegetation to decline in extent by between one-half and two-thirds in England if the habitats remain degraded. This would increase carbon losses further and reduce the water-holding and filtering capacity of peat.
- There is an economic case for peatland restoration. The case becomes even stronger when risks associated with climate change are taken into account. Despite this, around two-thirds of degraded peat in the uplands currently have no clear plans for restoration.
- The Government should strengthen the policy framework to enable further restoration effort across the uplands. Specifically it should: (i) set an explicit policy goal to increase the area under restoration, (ii) review the enforcement of current regulations, and (iii) improve incentives for landowners to invest in restoration.

- ***Enhancing flood protection provided by coastal habitats.*** **Realigning coastal defences in undeveloped locations will help to reduce risks of coastal flooding and habitat loss due to sea level rise. The Environment Agency and local authorities should work together on a clear implementation programme in order to speed up the rate of coastal realignment.**
  - Hard defences currently protect over half the coastline from flooding and erosion. Around half of these defences are buffered against waves and storm surges by coastal habitats. Sea level rise is likely to increase the spending requirement for coastal defence to £200 million each year by 2030, a 60% increase on current spending levels.
  - Our analysis suggests that nearly three-quarters of intertidal habitats are at risk from sea level rise where they are blocked from migrating inland due to the presence of hard defences. This is known as "coastal squeeze".
  - Setting the defence line back from the coastline in selected locations, known as "managed realignment", would help avoid this loss of coastal habitat and reduce the costs of coastal defences. Such action can have net economic benefit where the value of the protected land is relatively low.
  - Local authorities have a goal to realign nearly 10% of the coastline by 2030 and nearly 15% by 2050. To meet this goal, the rate of realignment would need to increase five-fold from the current 6 km each year to 30 km each year. To date only 1% of the coast has been realigned, with plans for a further 0.8% to 2016.
  - Achieving the 10% goal would create around 60 km^2 of additional coastal habitat by 2030 at a cost of between £10 and £15 million each year. Over the long term, this would reduce flood defence costs by between £180 million and £380 million, and deliver environmental benefits worth between £80 million and £280 million. Around one-third of the agricultural land affected is likely to be high-grade, representing around 0.1% of the stock of such land in England. Even without realignment, some of this land may become inviable for conventional agricultural production due to intrusion of saltwater.
  - Improving compensation arrangements to account for the value of ecosystem services provided by coastal habitats would help the Environment Agency and local authorities to meet their policy goals for coastal realignment.