

# Climate Ready Scotland



## Productivity of land and sea

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A warming climate can have both positive and negative impacts on the productivity of Scotland's land and sea. New species and longer growing seasons are opportunities for increased production. Equally this increases the risk of new pests and diseases, and a changing climate means more unpredictable and extreme weather, and a decline in species our forestry and fisheries rely on.

Increasing the diversity of forest tree species grown in Scotland, improving habitat connectivity, alternative systems to clearfell, natural regeneration, preventing excessive browsing pressure and controlling invasive species are some of the strategies for more resilient forestry.

Diversifying crop production can also buffer some of the negative impacts from more extreme and unpredictable weather, and help suppress pest outbreaks and reduce diseases that affect yield and profitability.

Warmer drier summers in the East are expected to increase the risk of heat stress in winter wheat and to cause problems for those crops with high water demands (e.g. potatoes). The quality and supply of barley to the Scottish Whisky industry, a very important Scottish export, could also be affected. Change may result in positive impacts in terms of increased yield and opportunities for new crops. Warmer temperatures should be beneficial for grassland productivity in upland areas.

Scotland's marine environment accounts for over 60% of the UK's total sea area. Diverse and critical habitats within these areas make Scotland's seas among the most biologically productive in the world, supporting an estimated 6,500 species of animals and plants.

We are seeing an increase in average sea surface temperature, and a decline in the numbers and productivity of breeding sea birds.



[www.farmingforabetterclimate.org](http://www.farmingforabetterclimate.org)

## Farming for a better climate

Farmers work with the weather, but a changing climate is making the job much harder to plan for.

By taking steps now, such as securing water supplies or reducing soil erosion, risks from climate change can be reduced.

Balruddery Farm is piloting measures to adapt farming:

- Tied ridges in potato crops help crop and soil management in both dry and wet conditions,
- Avoiding compaction by not working land in poor conditions or with the wrong equipment.
- Better use of water for irrigation using a borehole and a ring main irrigation system to channel water to all of the fields
- Reducing erosion risks by drilling commercial crops across the slope
- Reducing storm damage with new hedgerows and tree lines as natural wind breaks

### Partners



Scottish Government  
Riaghaltas na h-Alba  
gov.scot





[www.scotland.forestry.gov.uk/forest-parks/queen-elizabeth-forest-park](http://www.scotland.forestry.gov.uk/forest-parks/queen-elizabeth-forest-park)

## Queen Elizabeth Forest Park – demonstrating adaptation

At our demonstration site at Queen Elizabeth Forest Park (QEFP) we are integrating adaptation in forest planning and designing resilient forests for recreation, biodiversity and timber production.

Scotland’s forests face threats including pests and diseases, storm damage and changes to growth rates. The impacts span productivity, ecology, economics, amenity value and carbon sequestration.

QEFP Forest Managers are proactively increasing resilience. The demonstration forest promotes collaboration between practitioners, Forestry Commission Scotland policy advisors and Forest Research.

### What we have achieved

- Demonstration resources to support adaptation, including videos & case studies
- Climate Ready Forestry workshops to provide information, resources, case studies and explore adaptation barriers
- Promote resources for resilient forest management planning, including species selection and diversity
- Support collaboration between practitioners, policy advisors, and researchers. Develop research to support adaptation decision making

### Partners



Scotland's centre of expertise connecting climate change research and policy



[www.moredun.org.uk/research/research-%40-moredun/parasitic-worms](http://www.moredun.org.uk/research/research-%40-moredun/parasitic-worms)

## Pests and diseases in Scottish agriculture

Climate affects the timing, distribution and severity of disease outbreaks. This is particularly true for parasitic helminths (worms and fluke), which seriously reduce the productivity of grazing livestock, and in doing so considerably adds to the carbon footprint of animal agriculture.

We already see climate driven changes in parasitic helminth epidemiology. It is important to understand these changes in disease risk, the consequences for productivity, and the feasibility and greenhouse gas abatement potential of targeting particular pathogens.

### What we have achieved

- New methods to identify nematode parasite species directly from sheep and cattle faecal samples and improving diagnostic capabilities
- Predictions of future changes in liver fluke risk across the UK under climate change, informing long-term surveillance and control
- Process-based models of parasite dynamics in livestock systems to explore how climate change can affect disease outbreaks
- Quantified impacts of parasitism on methane emissions from lambs and ewes

### Partners





[www.hutton.ac.uk/research/groups/environmental-and-biochemical-sciences](http://www.hutton.ac.uk/research/groups/environmental-and-biochemical-sciences)

## Future proofing crops

While the world's population is increasing, climate change is posing threats to some of key agricultural crops. We need to increase yield potential without increasing the use of fertiliser and water.

Scotland is at the forefront of research to future proof our crops by developing resilient and sustainable systems for crop production that are economically viable, and environmentally and socially acceptable.

### What we are achieving

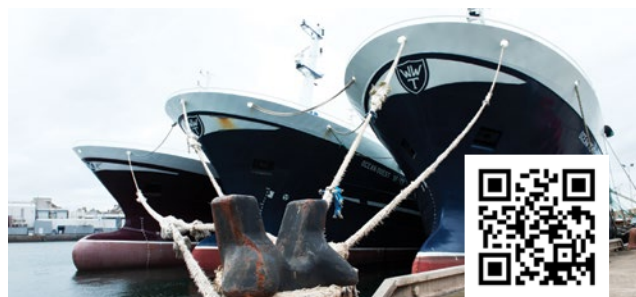
- Exploring Scottish plants for sustainable use in food, drink and non-food sectors
- Recovering lost traits from wild cereal varieties to improve fertiliser use efficiency
- Improving varieties of major Scottish crops to cope with climatic conditions and disease threats through knowledge of their DNA
- Understanding changes in greenhouse gas emissions arising through microbial activity from differing barley varieties
- Developing novel crops that can increase the economic and environmental sustainability of Scottish Agriculture

### Partners



[www.sruc.ac.uk/info/120062/crop\\_and\\_soils\\_systems](http://www.sruc.ac.uk/info/120062/crop_and_soils_systems)

[www.hutton.ac.uk/research/groups/ecological%20sciences](http://www.hutton.ac.uk/research/groups/ecological%20sciences)



[www.seafish.org/media/1476673/climate\\_change\\_report\\_-\\_lr.pdf](http://www.seafish.org/media/1476673/climate_change_report_-_lr.pdf)

## Adapting Scotland's wild capture seafood industry

Climate change challenges the UK seafood industry, both domestically and internationally, through changing catch potential, as well as damages from changing storm and flood frequency and severity.

Concerned with a natural resource, the industry is inherently uncertain and highly adaptable to near term changes. Responding to longer term changes, industry adaptation principles include:

- an adaptation framework
- 'industry demand-led actions'
- links between climate and fisheries science
- 'boundary spanning' support

### Adaptation responses include

- enhancing fishing safety, building port resilience, and developing new markets
- developing a more robust and strategic fisheries knowledge base
- improving scientific advice and data collection
- closer science-industry collaboration
- horizon scanning and communication to combine experience and scientific information, support collaboration and concrete action

### Partners

