

Climate change series Focus on horticulture

Climate plays a significant role in plant growth and productivity. As the effects of climate change become more evident, it is essential that growers develop their businesses to adapt to these changes, maximising the opportunities and minimising the costs and risks.

KEY CONCERNS FOR HORTICULTURAL BUSINESSES

- Water availability
- Waste management
- Energy efficiency
- Changes in pest/disease pressures
- Cultivation and tillage techniques for carbon management

CLIMATE CHANGE OPPORTUNITIES FOR HORTICULTURE

Energy

- Reduced requirement for greenhouse heating and therefore reduced energy costs (heating accounts for 90% of energy used in glasshouses)
- Potentially less CO₂ needed for glasshouses
- Utilising waste heat and CO₂ from other industries

- Using heat or power from biomass boilers

Productivity

- Possible increase in yields due to more carbon dioxide available for growth and canopy development (but the effect will be limited by availability of water and nitrogen)
- Earlier spring growth due to milder winters, shorter seed dormancy periods and subsequent earlier germination
- Earlier and quicker ripening e.g. with a 2°C temperature increase, some apple varieties could bloom and mature up to 3 weeks earlier
- Increased carbon dioxide could increase growth (dependant on other factors) and can reduce need for water, making plants more water efficient. However, increased temperature can cause plants to close their stomata to conserve water, with prolonged high temperatures reducing photosynthesis and ultimately damaging the crop



- Some crops will benefit from increasing temperatures e.g. onions, legumes, carrots and sweetcorn
- Reduced frost damage as frosts become milder and less frequent

Markets

- New areas in the south developing for production of maize, sunflowers, grapes, apricots, wine and peaches
- The global impacts of climate change are likely to affect other countries more severely, enabling English farmers to take advantage of the chance to supply new markets and investigate new crops more suitable to the changing climate
- The developing UK biofuel industry

CLIMATE CHANGE CHALLENGES FOR HORTICULTURISTS

Productivity

- Efficient and accurate irrigation and water use will be crucial to maintain competitive advantages for growers
- Low spring and summer rainfall could reduce yields and increase the need for irrigation
- Increased autumn and winter extreme rainfall incidents could increase soil erosion and soil

saturation, and increase options for winter water storage

- Potentially more inputs (such as water) required for higher yields and canopy cover
- Some crops may be badly damaged by high temperatures particularly brassicas e.g. cauliflower and broccoli
- Fruit mineral production and composition could be affected
- Variability and increasing unreliability of water supplies
- Warmer winters and reduced frosts will weaken vernalisation, potentially reducing yields in some crops
- Variability and increased uncertainty about the number of soil workable days

Pests and diseases

- New pests, diseases and weeds
- Possible increase in mycotoxin risk due to changes in fungal growth
- Temperatures are not cold enough to eliminate/reduce pests, diseases and weeds, leading to larger surviving and breeding populations. This could create more resilient populations and more of a management problem for farmers

Geography

- The south west may lose its competitive advantage as the northern areas climate changes
- Some crops may need to shift geographical location as conditions become unsuitable
- Traditional fruit orchards may be replaced with more exotic species e.g. apricots, olives, citrus in the south

Energy

- Reduced demand for heating but increased demand for ventilation in hot weather and increasing problems with shading for glasshouse crops
- Increased requirement for refrigeration in transport and storage of some crops

Extreme events

- More incidences of flooding and drought and the resultant erosion
- Wind damage to infrastructure (especially glasshouses)
- Increasing unpredictability of weather
- Variability and increased uncertainty of water supply (for irrigators)
- Hailstones and mud splash need to be managed to maintain crop quality

ADAPTATION SUGGESTIONS FOR HORTICULTURISTS

Warmer weather/droughts

- Check irrigation systems for efficiency and repair any leaks
- Apply compost to maintain maximum soil moisture if permitted by crop buyers
- Plant shade/shelter belts for crops
- Consider increased investment in more secure water supplies e.g. on farm reservoirs
- Join or initiate an abstractor group to facilitate liaison with regulators, or look into other collaborative approaches to sharing available water resources.
- Take advantage of wet weather conditions by collecting rainwater for use in dry periods (but be aware of grey water pollution and food contamination issues)

- Amend irrigation systems to reduce water loss through evaporation. Direct saved water to crops using trickle irrigation
- Spray crops at night to reduce evapotranspiration
- Investigate drought resistant varieties

Extreme weather events

- Plant shelter/shade belts to protect crops
- Maintain and manage hedgerows and buffer vegetation strips to provide a barrier against soil reaching roads/water courses and reduce run-off.
- Install hail netting for tree fruit crops
- Ensure buildings are maintained and prepared for more stormy weather
- Potentially adjust growing practices to take account of more soil erosion events
- Improve in field drainage and soil absorption capacity where appropriate, taking seasonality into consideration
- Continue to promote and undertake good soil management

Flooding

- Consider digging more drainage ditches
- Collect/store excess rainwater for use in drought periods
- Sign up for flood alerts with the [Environment Agency](#) or call the Floodline on 0845 988 1188
- Protect wetland habitats which dampen extreme river flows reducing the risk of flooding

Changes in seasonality

- Be flexible and adapt your plans as necessary
- Consider how to take advantage of longer growing seasons by double-cropping
- Plan resources for optimal harvesting/planting periods

Farm management

- Where markets will allow select varieties for resistance to water-logging and heat stress
- Manage groundwater abstraction near coastal areas to reduce risk of saltwater being drawn into aquifers



MITIGATION MEASURES FOR HORTICULTURISTS

- Complete a nutrient budget that includes soil testing and can highlight areas where you can be more efficient
- Find out the [nitrogen content of manure/slurry](#) before spreading to increase efficient soil take up
- Investigate the use of nitrogen fixing cover crops to increase soil structure and reduce nitrogen fertiliser e.g. red clover, vetch and rye

FARMING FUTURES

For news, events, and links to stories about how other farmers are managing climate change on their farms, please visit: www.farmingfutures.org.uk

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