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GARDDWRIAETH
HORTICULTURE

REPORT

A climate resilience plan for Welsh horticulture businesses

A discussion of the findings from the research

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1. Overview. *What did we do?*

The purpose of this research was to explore evidence around climate change and to propose the steps that are required for horticulture businesses to build climate resilience.

This report is intended to inform the Wales Climate Adaptation Strategy, that is simultaneously being developed by Welsh Government. It proposes ways forward for climate resilience to become embedded into future and enhanced support provision for horticulture businesses in Wales. These findings will subsequently be summarised for dissemination to the industry through the Farming Connect Horticulture 'industry voice'.

The study was completed between January and March 2024 and is written by Iain Cox of Ecostudio with Dr. David Skidmore commissioned by Sarah Gould, Horticulture Manager, Farming Connect.

A short turnaround time necessitated a 'find out fast' methodology. This was done by drawing on sector expertise and sustainability leadership, a desk review, survey with commercial growers and stakeholder interviews, to address the following research questions:

- what are the key challenges facing commercial growers in Wales?
- how are these businesses currently responding to these challenges?
- which future skills will be needed to support climate resilience of these businesses?

The following report contains an analysis of the research findings and conclusions.

2. Analysis. *What did we find?*

a. The role of the horticulture sector

The Soil Association has noted that horticulture is a highly productive sector per hectare and takes up a relatively small amount of land compared with other forms of agriculture. Figures show that it accounts for less than 2% of farmed land in the UK, but approximately 20% of farm-gate value[1].

The horticulture sector is important to the Welsh economy and crucial to people's well-being, producing ornamental plants and trees for parks, gardens and woodlands. Perhaps most importantly, the sector is integral to Wales food security, as noted by the House of Lords Sector Committee 'as the nation's diets shift towards an increased consumption of fruits and vegetables, the edible sector can improve domestic food security by reducing reliance on imports.[2]

b. International and national perspectives

According to the United Nations, reforming food systems will be key in limiting global temperature rise, whilst on the flip side, food production is highly vulnerable to the effects of climate change. The Intergovernmental Panel on Climate Change describes how crossing the 1.5C threshold risks triggering shocks from extreme weather such as frequent and serious flooding, heatwaves and droughts. It will lead to sea levels rising significantly that will threaten the future of low-lying and coastal regions. Reaching net zero emissions by 2050 is needed to keep global warming to no more than 1.5C.

At COP28, in November 2023, the Food and Agricultural Organisation launched the first of a three parts 'Global roadmap' for providing food and farming while staying within the 1.5C threshold. It advocates a mitigation-first approach that emphases cutting emissions from current production and then moving towards system change. This received mixed reviews with some actors urging for faster change. However, adapting to climate change requires people to be on board with the changes required, if they are to happen. This is the case for farmers and growers involved in supply chains that are seeing first-hand both the effects of climate change and the impacts on their livelihoods of the changes they are required to make.

The Climate Change Committee has identified the priority climate change risks and opportunities to the UK[3], including how weather patterns will be less predictable with more extreme events. It recommends stress testing critical supply chains, specifically towards making food supply chains more resilient to extreme weather, including funding innovative farming approaches, improving data on current disruptions and future risks, and ensuring there are minimum environmental and health standards for determining future trading relationships for food[4].

In September 2023, in its assessment of progress in Wales, the Climate Change Committee concluded that although Prosperity for All: A Climate Conscious Wales, provides good coverage of required research and potential actions, insufficient progress was being made in Wales, citing a lack of data to inform and monitor progress. This emphasises a gap between policy and practice that must be bridged.

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[1] Horticulture Sector Committee Report, House of Lords, 30 March 2023 [accessed:11Mar24]
[2] Sowing the seeds: A blooming English horticultural sector, House of Lords, 2022-2023 [accessed:11Mar24]
[3] Independent Assessment of UK Climate Risk, The Climate Change Committee,16 June 2021 [accessed: 11Mar24]
[4] Resilient Supply Chains, The Climate Change Committee, October 2022 [accessed 11Mar24]

The Agricultural Act (Wales) Act 2023 is the first law of its kind for Wales. It introduces a framework for Sustainable Land Management. This provides consistency with the Welsh Government's obligations under the Well Being of Future Generations (Wales) Act and the Environment (Wales) Act. It places a duty on Welsh Ministers and will involve setting targets and indicators against which to monitor sector progress towards, for example, Net Zero, future well-being and biodiversity net gain.

This, along with the forthcoming Sustainable Farming Scheme, necessitates the collection of farm data to inform an evidence base about the environmental, social, cultural and economic contribution of farmers in Wales, and will be useful to policy makers to track progress and inform future decision making. However, achieving this can't happen without the buy in of farmers and to do so it will need to be both practical and add value to their work.

c. Challenges and opportunities

The impact of climate change will alter the siting of horticulture businesses in Wales. By effecting the crops they produce, the resources they use and the infrastructure they rely on. For many it will be an existential matter.

Wales may become wetter but with more extreme events such as flooding, heat and drought. For growers, this will disrupt cultivations and crop scheduling. Whilst higher temperatures and CO_2 could mean higher yields of certain varieties, the availability of resources such as water, threats from pests and risks of disease will remain unpredictable.

Horticulture production generates greenhouse gas emissions that directly impact climate change and environmental impacts which affect the state of nature. Through its use of energy and transport, fertilisers and pesticides, water use and discharge, waste production including single use plastic, buildings and structures, soil and peat. Conversely, it can assist in reducing carbon emissions and mitigating the rate of climate change by adapting its processes, increasing efficiency in the inputs it uses and by preventing waste through embedding innovative and circular approaches. It is an industry well placed to provide carbon sequestration and enhance biodiversity through providing an essential function of growing trees and plants.

Consumer interest in the climate agenda has already led to a significant market demand for ethically produced food[5]. Although this has possibly been stymied by the current cost of living crisis, the effects of climate change will only get worse. This suggests that demand for sustainable produce will continue to grow, knowing how and where produce is grown and by whom, carbon labelling, peat free growing and circular waste free processes, will increase market competitiveness, whilst Government legislation in areas such as Net Zero, well-being and biodiversity will drive the agenda forward.

2.1 Stakeholder interviews

Interviews with 4 stakeholders were held online during February 2024. Each interview was semi structured and lasted around 45 minutes.

These interviews were useful to gain a perspective from agricultural policy makers and horticulture business support managers and to add rigour to the research. These stakeholders have a broad and informed insight of the sector, whereby business support managers have regular contact with commercial growers and feed information to policy

[5] UK ethical markets report, 2023 [accessed: 11Mar24]

makers. With more time, it could be useful to interview commercial growers to gain more direct insight than was permitted by our survey.

The interviews with each stakeholder were semi structured and designed to quickly assess the key challenges, opportunities, current activity and future needs for the sector. The findings are summarised below:

a. Changing weather patterns and extremes

The effects of changing weather patterns and how to cope with extremes is perceived to be the highest priority facing commercial growers in relation to climate resilience. Recent examples include; flooding at nurseries located near rivers, high winds and areas exposed to heat. This identifies a need for buildings and structures, such as polytunnels, to be adapted for resistance and heat stress. Effects on supply and delivery logistics is not something that is believed many have considered. This is surprising after the Covid pandemic highlighted the risks involved with relying on complex supply chains and the value of investing in local supply chains.

Currently, some growers keep their own records of weather patterns and many have built up their knowledge through experience. If these records and knowledge could be shared and contribute to localised climate modelling it could be highly valuable to climate adaptation planning. Whereby horticulture businesses will know how susceptible they are likely to be to future weather extremes and what they can do to be prepared.

Adding pest and disease modelling to Data Map Wales is currently being explored with Welsh Government, this could also be a useful mechanism for developing and sharing climate modelling.

b. Water use

Irregular rainfall and prolonged drought mean that a focus on how water is used, managed, irrigated and stored is vital to avoid crop losses, whilst moving away from reliance on fresh mains water is commonplace due to cost.

Over a third of applications for business support received by Farming Connect Horticulture have been about water use. However, finding specialists with the right knowledge and expertise is said to be challenging due to the diverse and specific needs of small companies. Whilst written guides and fact sheets produced under the Tyfu Cymru project could easily be updated and used alongside practical training and form part of the Welsh Governments forthcoming Net Zero Skills policy.

It is worth noting here that water is a global concern. Many horticulture imports come from Spain and Morocco for example, and as the industry in these countries is increasingly impacted by water shortages, this will lead to food supply issues so it becomes vital that Wales looks at self-sufficiency in this regard.

c. Pests and disease

Declining habitats for certain plant species and threats from pests and diseases are areas that are also critical. Over the short term this is impacted through reductions in the permitted use of chemicals, and whilst UK wide pest risk registers are useful and evolving, more is needed to predict what may come next and to provide practical help for growers to prepare. The Wales Plant Health Evidence and Advisory Group is currently exploring this with Welsh Government.

Integrated pest and disease management training is offered through Farming Connect to support growers to deal with pests and disease in different ways. Additional support could add value here by introducing pest and disease mapping and by sharing knowledge and peer learning about ways other growers have dealt with or adapted to new threats posed by climate change.

d. Soil and transitioning to peat free

Soil health and peat reduction are inherent to resilience planning. Improving soil structure to mitigate erosion and improve drainage around fields is a focus area. Transitioning to peat free growing is an area that has met some resistance amongst growers. However, the loss of peat bogs and resulting carbon emissions must be addressed at speed if the sector is to credibly build its climate resilience.

Success is likely to be achieved when alternatives are available that are proven with different plant species. Alternatives are urgently needed. To improve grower confidence in these alternatives they should be produced consistently and meet quality standards that prevent unintended consequences, such as the outbreak of weeds from imported alternatives. Trade buyers are increasingly seeking suppliers that demonstrate peat free growing practices, so competitive advantage can be gained here.

e. Collecting data and evidence

Another challenge rests with collecting data and evidence to inform policy decisions, to tailor future support and funding in relation to climate resilience. Horticulture doesn't currently have the same profile as other agricultural sectors in Wales where levy bodies exist, and although horticulture trade associations hold data, this is only for their members, so specific data for the sector in Wales is needed.

This lack of data is an issue that is echoed by the Climate Change Committee. Whilst the forthcoming Sustainable Farming Scheme will require data and monitoring, it remains unclear if this scheme will include smaller scale farms below 3ha. Although the proposal that those being able to demonstrate 550 standard labour hours will include many that may otherwise have fallen below the area-based threshold.

Currently the Wales Horticulture Alliance, coordinated by Farming Connect, is a mechanism that shares information on policy and practice. There could be value in extending the role of the Wales Horticulture Alliance, or by coordinating a dedicated industry forum to provide leadership training, peer learning and track progress towards the Sustainable Land Management outcomes. Potentially this could provide feedback to policy regarding how the Sustainable Land Management outcomes can be achieved by the sector as this will likely be very different to other agriculture sectors.

Fundamentally for businesses, knowing where to find the data, how to monitor and set actionable reduction targets is a crucial first step. This is a skills gap that could be bridged through practical training, action planning and environmental auditing.

f. Funding & specialist help

Whilst it is believed that plenty of useful information and help is available to support commercial growers in relation to areas such as water and energy management. Challenges with accessing funding remains an issue, with examples given where a recent grant was open to the under 35s only, or where the lifetime of the award of funding was shorter than that required to get planning permission, making it unworkable. Addressing this in the future could be straightforward and help gear towards opportunities for businesses to get financial support to improve their resilience to climate change.

g. Different species and varieties

Growing different crops varieties that are hardier and more resilient to the changing climate is an area where growers will naturally look towards.

This makes sense from both a commercial and environmental perspective where increased crop yields can be achieved from warmer weather using less inputs. It could open-up opportunities to sell produce that is in season, suited to local conditions and offer better value than imported varieties. Where the carbon impact of the produce itself could be presented as an added incentive to increasingly informed customers and true pricing could ensure Welsh businesses get a fair price for their produce.

Heritage varieties that are bred to local conditions are likely to be most resilient although more difficult to find. Whereas gene edited crops may not provide a panacea as they can be less resilient to variable conditions if they are adapted to withstand single conditions only, such as drought.

h. Growing our own

Food security and producing our own are also areas that are likely to continue to increase in their importance to building resilience to climate change. With the sector made up of many small growers the opportunities to work collectively are high and willingness to do so is increasingly evident. The use of technology, for example online systems for buying and selling local produce, such as a project with Castell Howell Foods about getting Welsh Veg into schools, could be valuable here.

Additionally, this could bring environmental benefits through shared resources, such as delivery vehicles and packaging, and reduce the combined carbon impact when compared with each business working in isolation.

i. Providing leadership and support for climate resilience

There is recognition that commercial growers are dynamic and knowledgeable, and that Farming Connect provides a vital resource to support these businesses along their journey. It is integral that all businesses acknowledge their responsibilities to the climate change agenda and take-action. This requires a balance of leadership, translating complex challenges into practice and responsiveness to the challenges commercial growers face.

In person training has been far more popular than webinars over recent months, where online fatigue maybe a legacy of the restrictions throughout the pandemic. What has proven to work well, and could be extended to provide support to enable climate resilience, is when training is being provided on a certain theme, a session on climate resilience could be integrated into that training day. This would help overcome barriers to uptake that may arise when running separate specific training days that businesses may not see as a priority. Including case studies and hearing from other growers are perceived to be critical success factors.

A strength that Farming Connect brings is their relationships with commercial growers and their connectedness to the challenges they face, alongside the strategic objectives of Welsh Government. This has been built over many years preceding the new Farming Connect Horticulture and must be nurtured.

2.2 Survey analysis

The objective of our survey was to capture information about the current position of growers in relation to their preparedness towards future climate predictions that will impact their ability to operate their businesses and maintain a secure supply of horticulture produce.

A short time frame allowed for this research meant that emphasis was on a straightforward survey design to maximise uptake. Survey questions focus on progress in areas of climate resilience that are practical to growers and draw on our prior work in undertaking sustainability audits, benchmarking and action planning with the sector. The survey was reviewed by Welsh Government officials prior to circulation who added 2 additional questions about emissions offsetting.

The online survey was circulated by Farming Connect to their networks between 5 February and 23 February 2024. In this time, **49 growers completed the survey.** Of whom, **25 requested to be kept informed** about this research.

This is a positive indicator of the level of interest that commercial growers have in this area coupled with their willingness to participate in future studies and further investigations going forward. When, for example, it could be useful to explore how different approaches to adapt to climate change are equally challenging for different growers that operate at different scales, across different supply chains or when growing different varieties and produce types. This could be done with focus groups to ensure GDPR compliance that was outside the scope of this fast turnaround study.

The sample of Welsh horticulture businesses who responded to the survey demonstrated a level of awareness of climate change that is encouraging. However, it can be assumed that there will be businesses who are less aware of the risks they face and are therefore less likely to respond to a survey on this topic.

The survey was broken down into the following headings: current and future effects, resource management, chemical management, waste management, soil health, planning for weather extremes, measuring emissions, future skills needs. The following is a discussion of the key findings under these headings:

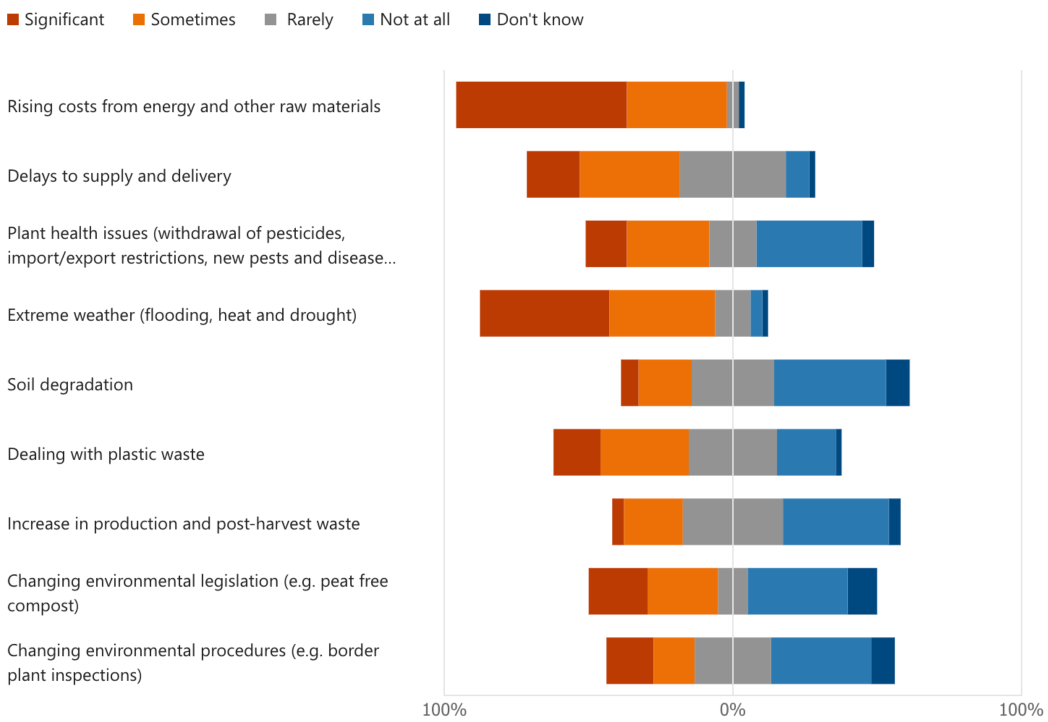
a. Current and future effects

The chart below shows the responses to survey question 1: *In the* <u>*last*</u> *5 years, to what extent has your business been affected by the following?*

Here, the evidence indicates that the businesses surveyed have been affected across all the categories listed. Rising costs from energy and other raw materials was rated the highest, with 59% of businesses stating this has had a *significant* affect and a further 35% stating they have been affected *sometimes*. Extreme weather was next with 45% of businesses stating this has had a *significant* affect and a further 37% stating they have been affected *sometimes*.

1. In the last 5 years, to what extent has your business been affected by the following?

More Details



These results are broadly similar in the response to question 2*: In the next 5 years, how likely will your business be affected by the following?* Small differences are where 43% of businesses expect to be extremely affected by rising costs, this is comparably lower than what they are experiencing currently, and 22% of businesses expect to be extremely affected by plant health issues, this is comparably higher than the 14% that state that they are currently significantly affected in question 1.

Listed below are a selection of insights that provide further context about the key challenges being experienced by growers due to our changing climate. These quotes are extracted from the responses to survey question 3: *Please tell us more about how your business has been affected or expects to be affected by climate change or biodiversity loss:*

"We have struggled with the extremes of wet weather and drought conditions. This means we need to invest in water storage and experiment with drought resistant plants, different growing methods and altering site design to site climatic extremes…moving to growing under plastic to mitigate for the wet conditions…we have had supply issues due to wet weather preventing other people's harvests of nursery trees and seed potatoes for example that we then rely on for our site.

"We don't currently have enough data to predict future weather patterns and climate trends locally.

"The extremes of wet and heat will definitely have an impact however I can change what I grow to an extent to mitigate it and work with conditions. Any further increase in winds will have a bigger impact.

"Climate change is affecting us severely! Principally in the form of low light and excessive and extensive periods of rainfall. Low light reduces growth especially in the colder months of autumn and winter. It has been dramatic in the past year.

These responses indicate that many businesses are experiencing the effects of climate change first hand and expect this to continue. This hints at a need for information and support in this area. It would be interesting to ask where they currently look for this type of help and if it meets their needs.

b. Resource management.

This section of the survey focusses on the common resources used by businesses, namely energy, water and fuel, and the approach being taken by each business to manage their consumption of each.

Most businesses surveyed keep an up-to-date record of their consumption of energy (63%), water (55%) and fuel (74%). Whereas 80% don't know if their suppliers do the same. Far less have a written action plan with annual reduction targets for their consumption of these resources of energy (29%), water (22%) and fuel (22%).

53% have installed on site renewable energy systems to generate their own energy with 6% stating that they don't use energy at all. 63% have installed on-site systems to capture, recycle and reuse water with 1 business stating that they don't use water. 50% of businesses surveyed co-ordinate the deliveries that they make and keep a record of mileage, whereas 24% state that they don't make deliveries.

Whilst resource management could be regarded as most critical to climate mitigation, it is also crucial to building climate resilience when disruptions in supply and the increased risk posed to the continuous availability of these resources is considered.

Looking ahead growers should be encouraged to keep up to date records of their consumption of these resources and to develop reduction plans. This will be useful when calculating their emissions over time and to build their resilience.

c. Chemical management.

This section of the survey focusses on pesticides and fertilisers used by commercial growers, and the approaches being taken to manage outbreaks of pests and diseases.

31% of businesses surveyed keep an up-to-date record of all pesticides and fertilisers they use. 65% don't know if their suppliers do the same. Whereas 61% indicated that they don't use pesticides or fertilisers in their operations.

59% keep an up-to-date record of outbreaks of pests and diseases and how they deal with any incidents that arise. Whereas 33% don't do this.

One area that will be increasingly valuable to record and share concerns the outbreak of pests and diseases as the climate changes and how these can be dealt with, either without, or with limited use of, pesticides. Additionally, it may be useful to ask this question specifically to a group of larger, more conventional growers, to see if there is variation in the results.

d. Waste management.

This section of the survey focusses on the common waste type that arise through the operations of commercial growers, and the steps being taken by each business to manage this.

A minority of businesses surveyed keep an up-to-date record of the amount of different waste types that arises in their operations, plastic waste (18%), waste from edible crops (10%) and plant waste (16%). Whereas 86% don't know if their suppliers do the same. Even less have written action plans with annual reduction targets for plastic waste (6%), waste from edible crops (12%) and plant waste (16%).

However, when asked ‘do you separate the following types of waste for collection or composting’ a high number state ‘Yes to all’; 76% for plastic waste, 71% for waste from edible crops and 78% for plant waste.

This indicates that a good level of waste management happens amongst those surveyed, a greater emphasis towards prevention through circular thinking will lead to an industry without plastic or other forms of waste.

e. Soil health.

This section of the survey asks how businesses are managing soil health, including agro-ecological or regenerative horticulture techniques, and the steps being taken to eliminate peat.

43% of businesses surveyed carry out soil testing and keep up to date records of soil type, structure and composition. 51% don’t do this.

69% state that they don’t use peat. 6% keep an up-to-date record of the amount of peat they use and have a peat reduction target in place that they review annually. 18% don’t do this.

4% of those surveyed use hydroponics or liquid systems, that don’t require soil for growing.

Listed below are a selection of insights that provide further context about soil health. These quotes are extracted from the responses to survey question 25: *Please tell us what other ways your business is managing soil health? e.g agro-ecological or regenerative horticulture techniques such as organic production, no-dig cultivation, permaculture.*

“We are all permaculture trained and we aim to farm regeneratively. We are not quite no-dig due to difficulty controlling certain weeds, but that is the goal.

“We use vermicomposting and traditional composting to revitalise and rebuild our soil organic matter. Where possible (supply permitting) we mulch with organic material produced on site. We run no dig beds where the soil permits. We cover crop all open or unused spaces throughout the year to fix nitrogen and add organic matter back when it is harvested.

“We plan to begin soil testing in the immediate future and will develop a plan. As a mixed farm we intend to adopt regenerative grazing with livestock, no dig cultivation for our vegetable self-sufficiency, and agroecological and permacultural techniques such as coppicing, fruit production, hedge production and so on.

“We are currently at 60% peat reduced. I believe this maximum compromise of peat free/peat compost.

Issues, such as soil degradation is seen as less significant, perhaps because the impacts to horticulture have not yet been widespread. It may also be useful to ask this question specifically to a group of larger, more conventional growers, to see if there is variation in the results.

f. Planning for weather extremes.

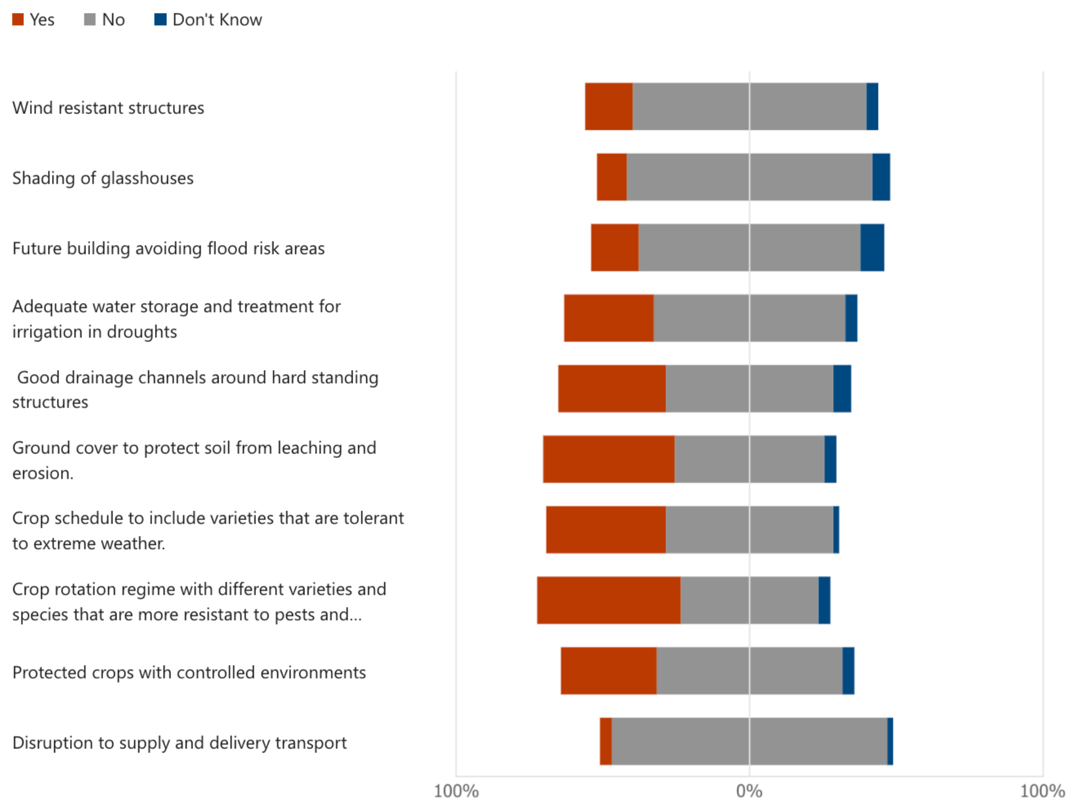
The chart below shows the responses to survey question 27. Whereby businesses surveyed are asked whether they have written plans in place in response to different climate change scenarios that they have been asked about in the survey so far.

Only the category *crop rotation regime with different varieties and species that are more resistant to pests and diseases* had more businesses responding yes (49%) than no (47%).

Whereas very few businesses indicated that they have plans for *wind resistant structures (16%), shading of glasshouses (10%), future building avoiding flood risk areas (16%),* and *disruption to supply and delivery transport (4%).*

27. Do you have written plans in place for any of the following?

More Details



82% of businesses surveyed don't know if their suppliers have plans for weather extremes, with the remaining 18% stating their suppliers either don't have or some do have plans.

Listed below are a selection of insights that provide further context about planning for weather extremes. These quotes are extracted from the responses to survey question 29: *Please tell us what other ways your business is planning for weather extremes:*

"We have planted natural wind barriers and placed our buildings in advantageous positions to not be affected by wind too much. We have completed a sustainable drainage management plan as part of our planning permission.

"Flowers are bit different to veg with regards to crop rotation, with perennials and shrubs remaining insitu for several years, so the considerations for this are very different to edible crops.

"Greater water storage capacity. Altered growing schedule. Continually trialing new crops (that deal with extreme conditions) for production.

"We do not have formal written plans … our general approach is to increase hedges to provide shelter and windbreaks, trees for shade, regenerative grazing approach to minimise exposed soil and improve soil health and behaviour, capture of rain water for recycling.

g. Measuring emissions.

78% businesses surveyed don't currently have a baseline measure of their scope 1 and 2 emissions. 92% don't currently report progress towards science-based climate targets. 82% don't know if their suppliers measure their carbon emissions.

Regarding offsetting emissions through recognised schemes, 88% state that they don't and we are not aware of any of our suppliers doing so, 6% state that they do but that they are not aware if their suppliers do, 6% state that they don't but some of their suppliers do.

Some schemes and initiatives that are provided by these businesses are quoted below whereas others dismiss offsetting as greenwash:

"Carbon Offset. We purchase trees to plant as well as purchase trees through a zero-carbon offset programme.

"Woodland Carbon Code - sequestration from a 3ha wood planted on our farm in 2019. Monitored / Measured by Coed Cymru

"We don't take part in any scheme but have planted thousands of trees in attempt to offset our emissions.

The responses here indicate that more work is needed in relation to measuring emissions and the impacts that arise from horticulture production. Calculating scope 1 and 2 emissions can be straightforward for those businesses who collect consumption data. Scope 3 is more complex and will require businesses to get data from their suppliers.

h. Future skills needs.

This final section of the survey asks businesses about support, training and practical information they would like to receive.

The responses indicate a good appetite across our 3 categories of *Climate change resilience planning for your business (57% responding 'Yes please'), Measuring emissions / carbon footprint of your business (47% responding 'Yes please'), Action planning for low carbon / Net Zero future (51% responding 'Yes please').*

The following quotes are taken from responses to question 36: Please tell us if you would like support or training in other areas regarding your business and climate change:

"Navigating the planning system so we can legally take the actions we need to take from structures and ground works

"Keen to learn new techniques from regenerative farming / agro-ecology, learning about new equipment, most suitable varieties of crops, root stocks and fruit trees for climate extremes, changes to pruning, crop growing and fruit tree management to mitigate for climate extremes

"Up to date info on the overall peat situation, shared success stories in mitigating temperature extremes on crops.

"We would like support on how to capture data. Templates on how to calculate carbon footprint, water and electricity usage.

"Financial support to install things like irrigation or drainage, alternative energy plans, carbon audit.

3. Conclusion. *How do we progress?*

The horticulture sector in Wales contributes to climate change and conversely it is also well positioned to limit its effects, but achieving this will require access to skilled labour, practical support and funding for climate adaptation.

When compared to other agricultural sectors in Wales the horticulture industry is small in terms of relative farmed land, but it makes a significant contribution towards the sustainable development of Wales. Not least through its role in providing Wales with a secure supply of fresh fruit and vegetables that is produced in season.

Furthermore, it has the potential to extend its positive impacts, including carbon sequestration and biodiversity net gain, to help build resilience as Wales confronts the urgent combined crisis of climate and nature breakdown. The benefits to human health, derived from the consumption of fresh and healthy produce close to its source, will become a vital function and business proposition of commercial growers as they adapt towards climate resilient and circular production models.

However, horticulture production uses resources, including energy, water, fuel, chemicals, single use plastic, land, buildings and peat. Using these resources generates greenhouse gas emissions. Our survey shows that the sample of growers that responded demonstrate a good level of awareness of climate change and positive steps are being taken to reduce emissions, such as learning from agroecology, involving new technology, less intensive growing methods, and peat free growing. However, it can be assumed that there will be businesses who are less aware of the risks they face from climate change and more can be done to progress towards Net Zero and the Sustainable Land Management outcomes.

Additionally, because many commercial growers in Wales are micro sized businesses, with many operating as sole traders, they can often be hard to reach, meaning that data and information to better understand their performance is not available. When combined, their impacts, both positive and negative, are likely to be significant so they should not be ignored.

Engaging small businesses on strategic issues, such as climate adaptation and resilience, is not straightforward. This requires leadership but this must be measured against uncertainties that make it hard for growers to plan ahead and leads to lack of confidence. This requires time, focus and careful management to build capacity and consensus for positive change to happen.

Lantra has built strong and trusted connections with commercial growers in the sector over many years. Their dedicated role appears vital to help these businesses adapt towards climate resilience and will require tailored packages of support specifically for the sector.

The following actions are intended to propose ways forward for climate resilience to become embedded into future advice and enhanced support provision for horticulture in Wales:

a. Performance and impact measurement

Making a balanced contribution towards environmental, social, cultural and economic sustainability will help businesses to build their resilience. The Sustainable Land Management objectives provide a useful framework for this and potentially can be tailored towards the horticulture sector specifically.

The rising costs of inputs was recognised as the current impact that is most felt by businesses in our survey. This is likely to lead to more efficiency in their use of these inputs to save money whilst cutting emissions. Capturing data about consumption of resources such as energy, water, fuel, chemicals, peat and so on provides the basis for carbon equivalent impact to be calculated.

Equally, impacts including biodiversity net gain, carbon sequestration, benefits to health, well-being and diet should also be factored in and enable horticulture businesses to see the contribution they make in relation to sustainable development and why this makes commercial sense. Knowing how and where produce is grown and by whom, carbon labelling, peat free growing and waste free produce are all opportunities here.

Online tools, templates and training in relation to sustainability auditing and action planning will be valuable here. Fundamentally for businesses, knowing where to find the data and ways to monitor it is crucial. An example of a self-assessment tool that is being developed for Food and Drink Wales to benchmark sustainability performance of that sector is here.

b. Establish an industry network to focus on climate resilience

A good response rate was achieved to our survey. These Welsh growers demonstrate a good level of awareness of climate change. However, we assume that there are many businesses who did not respond that are less aware of the risks they face.

Establishing an industry network through Farming Connect Horticulture may offer a valuable route forward to engage with those businesses on this issue. Whereby regular meetings could be coordinated for commercial growers and facilitated discussions can be held. This has been successfully trialled before under the Tyfu Cymru programme. When consensus was reached amongst the group to begin working towards shared sustainability objectives, and each business received leadership training and support to develop their own action plans that align with these shared sustainability objectives, whilst benefitting from peer learning with others in the group. Transitioning from being a net emitter to a carbon sink will require step change over time and this would seem an ideal way to progress towards climate resilience and take-action towards Sustainable Land Management outcomes where pathways and milestones could be mapped, and could, via feedback to policy, be tailored specifically to the sector.

Additionally, over half of the survey responses have asked to be kept informed about this work and could inform future focussed research where for example, it could be useful to explore how different approaches to adapt to climate change are equally challenging for different growers that operate at different scales, across different supply chains or when growing different varieties, species and produce types. This could be done with focus groups to ensure GDPR compliance that was outside the scope of this fast turnaround study.

c. Get the message right

Climate change can feel overwhelming. Uncertainties perhaps increase when associated with running a profitable horticulture business that works alongside weather and nature. Their participation is critical to building climate resilience in the sector so it seems important that the messaging and how this is communicated is done in a meaningful and supportive way.

The relationship between extreme conditions and the unpredictable nature of climate change must be recognised. This unpredictability must be a central message to horticulture in that weather patterns, including rainfall, wind and temperature cannot be forecasted reliably in the longer term. So, developing overall, multi-factor resilience is much more important than making single, unidirectional changes such as a single change to a drought-tolerant crop.

In our survey, environmental legislation was also seen as having a direct, significant impact. This may be perceived as an additional burden for a business but it is an effective way of changing behaviour and ensuring businesses act.

d. Climate modelling

Knowing how susceptible they are to future weather extremes and what they can do to be prepared will be vital to horticulture businesses.

We understand that The Wales Plant Health Evidence and Advisory Group is currently exploring an approach with Welsh Government that is intended to help growers predict and take-action to prepare for risks posed by new pests and diseases that are affected by the changing climate. Data Map Wales is one tool being looked at and this could also be a useful mechanism for developing and sharing climate modelling and pest and disease modelling. This approach should be developed at speed and ensure the outcomes are accessible and practical for use by businesses.

At the time of writing, Farming Connect e-learning resources are contained on the Welsh Government BOSS system and require pre-registration to be accessed. A series of business guides relating to climate resilience was previously developed for Tyfu Cymru can be found here and could be useful to refer to.

e. Combine support delivery with climate leadership

A clear outcome of the research is that support is required for businesses to become more climate resilient. This can be in the form of training, advice and financial support for capital improvement schemes, for example previous grants for horticulture development and start up proved to be successful. It is hoped that the outcome of the recent Welsh Government consultation on Net Zero Skills may help to address some of this but there will be a time lag between support delivery and tangible action being taken.

A first step is for all Welsh horticulture businesses acknowledge their responsibilities to the climate change agenda and prioritise action. Our survey shows that appetite exists for support in the following areas: climate change resilience planning, measuring emissions, and action planning for Net Zero.

Businesses will often request support in areas where they see an immediate return. Whereas support delivery on this agenda can necessitate long-term thinking and involves translating complex challenges into practical actions. This requires a balance of leadership combined with a responsiveness to the challenges commercial growers face.

Integrate sessions on climate resilience into training sessions on other topics that are planned can be a practical way forward. For example, when delivering training on water use, time could be set aside for a dedicated section on climate resilience. This would help to overcome barriers to uptake for those businesses that may not currently recognise climate resilience as a priority. Whilst using case studies and learning from other grower experiences are likely to be critical success factors.

Iain Cox, 11 March 2024