



Growing through Climate Change: Local Responses to Food Security

Potentials for agriculture and food
adaptations in Wales

SHORT SUMMARY

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This research was commissioned by [Seeding our Future](#), a non-profit initiative exploring resilience and adaptation to climate change, directed by Alan Heeks, and by [Our Food 1200](#), which promotes small-scale regenerative farming in Mid Wales.

Foreword

By Alan Heeks - Seeding our Future

Climate change is already impacting food supplies, and is forecast to create much greater disruption in the years ahead. I commissioned this research by Elise Wach to understand both the threats and the scope for positive adaptation, especially in Wales, one of the focus areas for Seeding our Future's work.

Overall, it's clear from this report that producers and consumers in Wales, and in Britain generally, have plenty of opportunities to increase the resilience of local food supplies: but grasping these will need determination, money, and in particular a willingness to innovate *before* the problems get more severe.

Changing crops and cultivation methods requires time, investment and assured markets. Wales is blessed with a good range of progressive independent producers, a growing number of community food schemes, and strong policy support from the Welsh Government, who understand the urgency of raising our food security.

While climate change will pose challenges to production at home and abroad, the report describes concrete ways in which a range of producers in Wales can adapt, from domestic garden scale to arable and livestock farmers.

Professor Tim Lang and many others highlight the growing risk of Multi Breadbasket Failure, i.e. simultaneous failure of global staples like wheat or soya in the handful of countries which produce most of the world's supplies. Moreover, Britain depends heavily on the Mediterranean basin for fruit and vegetables, but output will fall as rainfall here keeps decreasing. However, Wales is expected to remain a viable location for producing food, provided farmers and growers adapt their practices and products.

Currently the UK produces just over half of its overall food, down from 80% in 1984. Wales is even more import-dependent, and increasing our food security is a priority for the Welsh Government. Given the terrain, soil quality and existing land use, this shift will be a major challenge that needs producers, consumers and the public sector to collaborate, and these conversations are already beginning.

Seeding our Future is a small non-profit initiative which I founded in 2017: we aim to support resilience and adaptation to climate change with communities, individuals, and the public sector. On food security, we are supporting Our Food 1200 and other pioneering work in Wales. To follow our progress and access resources from our work, see www.seedingourfuture.org.uk.

The probability of food shortages and inflation in the years ahead means that radical changes in how food is produced, distributed and consumed in Wales are urgently needed. I hope this report will assist this process.

Summary

Climate change is expected to have significant impacts on all areas of life but could particularly affect food production and food security if practices remain unchanged. Some harvests have already been affected by the changing climate and studies have indicated that more failed harvests could affect food security in the future. However, details have been lacking about what can be done locally to improve food security in a changing climate. With a focus on Wales, this report details the adaptive productive practices, crop choices and market models which could help improve local food system resilience.

This report is targeted for horticultural, arable and livestock producers of various scales and for community groups in Wales who wish to work towards greater food security in the context of our changing climate. The report does not cover housed animal farming operations.

In Wales, farming could be disrupted through warmer wetter winters, hotter drier summers, and more frequent extreme weather events such as heavy rainfalls and storms. Further, future climate scenarios are characterised by uncertainty, so there is a chance of any kind of weather at any time in the year. Climate changes are likely to bring changes to pests and diseases, some positive and others negative.

To adapt to increased aridity in summers in Wales, measures are needed to **conserve soil moisture and manage water appropriately** so as not to deplete groundwater reserves while continuing to produce food. Approaches include:

- Rainwater capture during rainier months to reduce pressure on groundwater reserves
- Better irrigation to improve efficiency
- The use of mulching and intercropping to reduce soil evapotranspiration
- The incorporation of more trees to provide needed shade for animals and crops

Warmer, wetter winters bring increased risks of soil erosion, water logging and farm runoff, which are already at unsustainable levels. Techniques to **improve water management** and **improve soil structure** could help to address these challenges. They include:

- Preventing and diverting runoff through swales and ponds
- Planting shrubs and trees along keylines to improve soil structure and reduce runoff
- Cultivating and/or soil ripping along contours or keylines to increase water infiltration
- Intercropping and the use of green manures to improve soil structure
- In some soil types, shallow till or no dig approaches, implemented without the use of harmful herbicides

The overall levels of uncertainty with climatic conditions, pests and diseases indicate that increasing diversity – at genetic, crop and landscape levels, will help increase resilience. When done well, these approaches can minimise pests and disease, support the regeneration of soils and reduce vulnerability to shocks. This can be done through:

- Using population, heritage and open-pollinated varieties
- Practicing intercropping
- Creating more diverse habitats around and within fields and plots.

Increasing the use of polytunnels has been suggested as a means of securing farming in the face of climate change. Some smaller scale producers may benefit from increased **protective cover** in the form of caterpillar or shade tunnels, and stronger polytunnels for improved storm resistance. However, large scale use of protective plastic cover could increase risks of runoff and negatively affect pollinators. The increased use of plastics may also be unsustainable from an ecological or human health point of view.



Figure 1: Increasing diversity can improve resilience in the context of uncertainty. Photo: Helen Clark

While conditions may be challenging at times, Wales is not expected to face the extreme water scarcity of many of the locations such as the Mediterranean Basin, which currently supply us with veg and fruit, nor the flooding which is predicted to affect a significant amount of England's Grade 1 farmland. There is scope for increased food production for local consumption in Wales, though increasing areas under cropping, particularly horticulture, utilising practices that foster greater resilience to changes to weather patterns and shocks, and choosing crops that will be well adapted to climate changes. It is anticipated that some crops, such as certain brassicas (e.g. broccoli, cauliflower) and orchard fruits (e.g. apples) may not be as viable in Wales with the new climate, but other crops such as certain types of squashes could become more viable. If producers adapt their practices and products, production in Wales could remain substantial and even increase. However, to ensure that farming supports local food security, other changes are needed to reorient land use towards local food needs.

To support producers to supply locally and through the challenges of climate change, local action can help **improve the linkages between producers and consumers**. Community organisations, producer cooperatives and Community Supported Agriculture schemes are some approaches which can ensure that the needs of people and the environment do not get side-lined to supply and demand economics. There is also significant scope for improving local storage and processing facilities to buffer shocks, reduce costs for producers and help shorten and decentralise food supply chains.

Farmers and growers are and always have been adaptive to changing situations and there are many examples of this already happening in Wales. However, some adaptations require upfront investments or incur greater costs in the long-term and therefore need **financial support** in the form of grants, donations or crowdfunding.

While the challenges are significant, they are not insurmountable. Innovative action and greater collaboration could turn climate change into an opportunity for growing better foods in better ways in Wales. However, without adapting our practices or our food supply chains, the threats are very real. This report details the feasible actions for producers and consumers which bring few if any risks, and which must be taken now to avoid food failures later.