

SUMMARY ARTICLE

Climate Change Resilient Cropping: Arable

Building resilience in arable cropping in light of expected climate changes will be key in safeguarding the future of arable cropping yields. It will help to position the arable sector in an optimal position to realise future opportunities for agricultural development in the future. Taking a proactive stance in the face of climate change and considering implementing adaptations now and integrating them into forward planning will benefit the arable sector.

The majority of arable land in the Cheviot Hills area is located on the fringes of the hills. The main crops grown include wheat, barley, oil seed rape and potatoes. These are grown mainly on the more productive land to the south and east of the Cheviots.

Climate change will affect the Cheviots by impacting on seasonal rainfall patterns with drier summers and wetter winters, increased temperatures and an increase in the number of extreme weather events such as high winds, intense rainfall and dry spells. These climate changes will present challenges for the arable sector in the area.

November 2013



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Impacts of Climate Change on Arable Crops in the Cheviots

The table below summarises the expected impacts that climate change is expected to have on the main arable crops grown in the Cheviots.

Crop	Increase Rainfall	Extreme Rainfall	Drought	Increase Temperature	Storm Events
Cereals	Root and Stem Lodging Failure to establish	Stem Lodging Crop disease	Failure of crop/ poor germination	Improved germination. Increased development rates of crops	Stem Lodging
Oil Seed Rape (Winter)	Poor rooting	Pod shatter and high crop losses pre harvest	Poor Rooting causing poor yield premature crop senescence and reducing the length of the seed filling period	Increase in the severity of phoma stem canker disease. Decrease in infection of the oilseed rape by light leaf spot	Crop losses close to harvesting. Difficult harvesting when crop is flattened by extreme storms.
Potatoes	Difficult planting/harvesting Less need for irrigation, particularly if water retained in soil or reservoirs	Disruption to potato beds at key growth stages. Damage loss to canopy	Soil moisture deficits, lower yields or need for irrigation	More favorable growing conditions, if irrigated potentially 13-16% higher yield. Faster crop maturity.	

Potential Adaptations for the Arable Sector

Extensive research examines the breeding of varieties of arable crops with resilience to different climatic changes. Crops are being bred specifically to respond to these challenges and significant discoveries in genetics are occurring at a rapid pace. Of particular interest to the Cheviots are studies developing varieties with resilience to waterlogging.

ADAPTING TO WET WEATHER TO SAFEGUARD YIELDS

CASE STUDY: Stuart Tower, Stanley, Perthshire

During 2012, this dairy and arable farm saw the lack of sunshine together with underperforming areas of wet compacted headlands chop around 1.5 ton/ha to 2 ton/ha off cereal yields. Consultants from SAC Consulting under the Farming for a Better Climate Project suggested a number of ideas to protect soils from compaction due to the wet weather. This advice centred on correctly selecting remediation techniques to alleviate compaction and ensuring remedial activities were carried out under the correct soil conditions.

In order to build resilience in the arable sector there is a need to respond to these challenges. There is a wealth of completed and on going research that examines steps that can be taken to adapt to these challenges. The potential adaptations include:

1. **Planting different crop varieties suited to the expected climatic conditions of the Cheviots.**
2. **Improve soil structure and increase focus on minimising soil structural damage.** A crop can only make best use of water and nutrients if roots are able to develop. A crop will be most resilient to climate influences if it is planted in soils in optimal condition. Emphasis needs to be placed on soil management.
3. **Alter cropping patterns considering suitability of rotations and sowing and harvesting times.** Warmer summers may bring earlier harvesting in the Cheviots which may allow a catch crop to be planted. However this could lead to issues surrounding harvesting of crops in wet soil conditions or planting crops when soils are dry. Careful consideration will need to be given to the most suitable regime for arable planting.
4. **Improving water management by investing in irrigation systems.** If dry summers are realised or drought conditions become more common there maybe a need to irrigate arable crops in the Cheviots. Investment maybe required in irrigation equipment and into on farm water storage facilities, boreholes and surface water abstractions.
5. **Mixed farming system or taking land out of arable production.** From a business perspective the risks from climate change will be reduced by having a larger range of crops.
6. **Invest in new drainage and maintain existing drainage networks.** Improving drainage or better managing existing drainage may reduce the risks of water logging and flooding on arable land.
7. **Utilise marginal land to diversify crop base and spread risks.**

Research into resilient arable cropping is on going and this work may bring forward new adaptations not yet considered or scientific developments in breeding new crop varieties that maybe applicable for use in the Cheviots.

The next step for the arable sector is to encourage the uptake of the known adaptive measures to prepare the industry for climate change. Uptake maybe encouraged by giving a more local focus to research with local field trials taking place on crop varieties suited to individual localities. Work also needs to take place to ensure that farmers, who will ultimately make the cropping decisions, have the knowledge and understanding of climate projections going forward, how this will impact on individual crops grown and the benefits of taking adaptive steps now and the skills to implement adaptations. There is a key role for organisations such as Cheviot Futures to disseminate knowledge to farmers to facilitate positive steps to resilient arable cropping.