

SUMMARY ARTICLE

Climate Change Resilient Cropping: Grassland

Grass production in the Cheviots will be affected by predicted climate changes. In order to maintain the productive grassland capacity in the Cheviots it is important to explore steps that can be taken to move towards more resilient grassland cropping. Safeguarding grass production will allow the livestock sector in the Cheviots to remain and continue to contribute to the rural economy. It is important to take a proactive stance in the face of climate change and implement and integrate adaptations into forward planning in the livestock sector.

Grassland forms a significant part of the Cheviots Hills mosaic. The hill areas are characterised by semi natural vegetation including blanket bog, moorland and heathland. The marginal upland includes areas of unimproved grassland and semi improved grassland and there are occasional meadows of herb rich grassland. In the valley bottoms permanent pasture exists which provides summer grazing and winter forage.

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 grassland management in the area.

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Impacts of Climate Change Grassland in the Cheviots

The table below summarises the expected impacts that climate change is expected to have on the grassland habitats in the Cheviots.

Crop	Increase Rainfall	Extreme Rainfall	Drought	Increase Temperature	Storm Events
Grassland – productive ryegrass, natural and semi natural grassland.	Grass more sustainable in drier, eastern areas. Favour more productive ryegrass varieties.	High risk of poaching. Need to house stock, supplementary feeding.	Reduced yields. More specialist varieties such as Festolium. More traditional natural mixes less risky.	Longer growing season. More potential for higher yielding grasses	
Heather Moorland	Re-wetting of moorland and restoration of biodiversity.	Loss of peat and Coarse sediment	Potential for peat to retain moisture and slowly release to lower lying watercourses. On areas suitable this can lead to dry heath and improved herbage for grazing.	Drying of peat land reduces vegetation and therefore carbon storage. (Moorland Ass). Filling drains (grips) slows down drainage and retains more moisture. Higher risk of moorland burning becoming uncontrolled.	Very low effects.

Potential Adaptations for the resilient Grassland Management

Resilience to climate change in grassland swards can be enhanced by developing new grass varieties resilient to climate change and by diversifying existing swards to spread the risk of reduction in yields as a result of having a monoculture of grass with a single heading period.

Extensive research examines the breeding of grass varieties with resilience to different climatic changes. With over 11,000 grassland species one view is that resilient swards can be realised from native species. Further research however points to the need to breed new grass varieties and hybrids that are being developed are being called Festulolium. These hybrids are being engineered to have tolerance to temperature extremes and waterlogging.

In order to build resilience in the grassland 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. **Utilise new varieties of grass and use of forage legumes.** In order to build drought tolerance long rooted drought tolerant species could be integrated into the sward composition. Consideration should be given to festulolium varieties and other grass species in order to maintain the palatability and persistence of the sward. Forage legumes such as clover that flourish in warmer weather may become increasingly important part of sward composition.
2. **Improve soil management and grassland management.** This will be a key factor in improving resilience to climate change in the Cheviots. Improving the conditions for roots to develop in the soils will build resilience. Minimising soil structural damage and addressing compaction promptly will be key in management.
3. **Extend grazing season/out wintering.** Predicted warmer temperatures may lead to the earlier arrival of spring and milder autumns resulting in a longer grass growing season in the Cheviots. Earlier spring turnout and out wintering could be an option if conducted with correct thought for the effect on soil structure.
4. **Improve grass utilisation and management.** Correct utilisation of grass will have a large effect on resilience to climate change for example the earlier growing season will result in a need for earlier cutting for silage to maintain quality.
5. **Alter stocking rates.** There will be a greater need for stock management to adjust stock in times of high rainfall to reduce poaching risk and during periods of low grass growth.
6. **Use of cow tracks.** Use of cow tracks in the dairy sector to minimise poaching of grassland and allow extended access to pasture.
7. **Supplementary feeding.** In periods of low grass growth supplementary feeding maybe needed and this should be considered in a farmers forward planning.
8. **Improve the management of forage supply and maintain forage reserves.** To adapt to possible fluctuations in grass yields farmers may need to build up and manage reserves of silage. This requires good planning so that last years silage is used first.
9. **Late summer reseeds and use of overseeding.** In lowland areas a move to late summer reseeds may be an option. Reseeding techniques may need to be adopted aimed at minimising the risk of soil erosion in periods of heavy rainfall. Nurse or cover crops maybe beneficial.
10. **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.
11. **Use of alternative forage crops. The use of spring sown forages such as stubble turnips may help to meet forage requirements. The use of maize silage may increase as new varieties develop more suitable to the northern climate.**
12. **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.

ADAPTING TO CLIMATE CHANGE TO SAFEGUARD FODDER PRODUCTION

A dairy farm at Auchenciarn, involved in the SAC Consulting run “Farming for a Better Climate Project”, has evaluated the impact of climate changes on its grass production. Floods coinciding with silage time will jeopardise the production of good quality home grown fodder which is critical. Wetter soils will also reduce the opportunities for grazing, possibly resulting in the cattle having to be housed for longer. On the other extreme heatwaves during the summer may reduce both crop and grass yields due to drought stress, especially on lighter soils around the farm. This would result in the need to purchase in extra concentrates to compensate for the potential reduction in yields.

In order to minimise the risks from climate change the farm is taking steps to improve soil structure on the farm by digging soil pits to investigate soil structure and taking remedial steps to alleviate soil compaction. Clover is being integrated into reseeds and the drainage system has also been examined. There are still further steps that can be taken on the farm to build resilience such as investigating sward composition.

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

The next step for the grassland sector is to encourage the uptake of the known adaptive measures to prepare the industry for climate change. Currently many of adaptive steps listed are promoted through schemes such as Catchment Sensitive Farming and are primarily promoted according to their potential to address environmental concerns however their ability to build resilience to climate change should also be stressed.

Uptake maybe encouraged by giving a more local focus to research with local field trials taking place on grass varieties suited to individual localities. Work also needs to take place to ensure that farmers have the knowledge and understanding of climate projections going forward, how this will impact on the different grass and legume varieties making up their sward, 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 grass cropping.