Water Management on Your Farm: Resilience

Farm Advisory Service

National Advice Hub
T: 0300 323 0161
E: advice@fas.scot
W: www.fas.scot

As climate conditions continue to change the sustainable management of water on farm is of great concern for many land managers around Scotland. From unprecedented wet weather to drought conditions, farms need to become resilient to ensure that they can try to minimise the impact of these changing weather patterns on land.

Changing climate and its impact on farming

With climate patterns in Scotland predicted to change, with warmer drier summers to wetter winters, land managers need to act to protect and enhance their land. With this predicted weather pattern, many farming businesses will suffer from water scarcity, increased erosion and soil loss. Putting in measures now to slow flow, improve soil structure and enhance the ecosystem services on the land could significantly help businesses mitigate against the changing weather patterns.

Focusing on ways and methods to retain water on your land for longer periods throughout the year can lessen the impact of during dry periods. This guide looks at methods to naturally improve water retention on farm and reduce water loss.

Resilient techniques to combat a water scarcity in a changing climate

Reducing compaction

Compacted soil allows little or no water to drain through its pores and cracks, inhibiting the soils' ability to retain and hold water. As a result, water does not remain on the land and reduces the volume of water that can be utilised by vegetation. As winters are set to become wetter, the risk of compaction increases. However, there are methods to reduce compaction risk and retain water on your land for longer. By reducing compaction farmers can experience higher yields, healthier soils and retain water on site for longer, among other benefits. To assess your soils infiltration rate, Farming for a Better Climate have developed a practical guide to show how you can quickly assess your soil. Through knowing your soil you can start to make improvements to help year round.

Buffers/3D buffers

Incorporating multipurpose buffer strips into your farm can offer great additional benefits to your land. Buffer strips can offer a barrier to diffuse pollution, however, they can be a great tool for slowing and aiding water retention on your land. Introducing 3-D buffers your land can offer innovative and beneficial natural process to retain water on your land.

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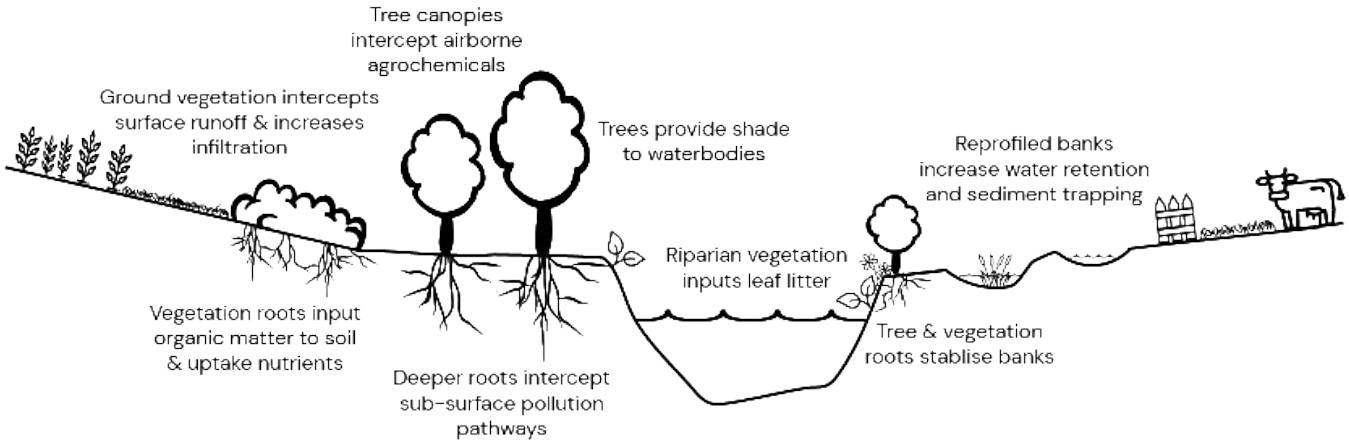

Figure 1: 3D buffer system

As shown in Figure 1, 3D buffers are riparian buffer strips, utilising overland, surface and sub-surface interchange, to strengthen and improve the ecosystem services that buffers can provide. These systems hold the soil together, allowing for an in-depth root system to hold water in the soil, reduce bare soil and runoff pathways. The areas roughness is increased, allowing for longer retention and a stable soil structure to be developed.

You need to ensure that your buffer strips comply with Diffuse General Binding Rules (DP GBRs) and be aware that buffers, depending on where they are situated have various minimum distance, which are required to comply. 3-D buffer stipes are designed to be 6-12 meters, depending on the requirements of the area.

Tree/hedge planting

By planting hedgerows and trees within your land you can enhance your land's ability to retain water and protect the soil. As with buffer strips, hedgerows and trees bind the soil together, allowing for natural buffers to help maintaining soil structure and retain water in the soil and plants. They can be planted as field boundary, but in addition in the correct location, trees can offer great benefit within the land, be it for shelter, forming wildlife corridors, or reducing the impact of flooding.

Cover crops

As winters are predicted to become wetter, it is increasingly important to protect bare soil from erosion and run off. Bare soil is vulnerable to erosion and offers little, or no resistance to surface water runoff. By introducing vegetation to areas, which previously may have been left bare allows for the water to be utilised on the land. The soil is buffered from erosion while reducing the speed of water flow through the land, allowing time for the water to filtrate through the soil, enabling water to remain in the land for longer periods.

Cover crops can offer multiple other benefits to your soil, as can be seen in the Farming for a Better Climate guide. However, you need to ensure that you plant the most relevant crop to your needs. Information can be found here on the different criteria you should look at when deciding what and why to plant.

The cover crop can additionally help improve the microorganisms within your soil, improving soil structure and reducing compaction. Both of these attributes will enable you land to filter water more efficiently and retain water on your land throughout the year for longer. Therefore, helping to mitigate against dry periods.

What's grown in the field

As the future is set to change, with summers predicted to become drier, farmers may want to begin to think about the crops that they grow on their land. In certain areas around Scotland the impact of drier summers is impacting yield. Potentially moving to drought resistant varieties, or crops which require less water may become a viable option for many businesses.

Moving away from a monoculture pattern and allowing different crops, with different water requirement to grow alongside each other may offer solutions for business struggling with water shortages. Crops would not be competing for the identical nutrients and water from the soil, allowing them to grow alongside each other, while offering more biodiversity to the area. This increases robustness and the ecosystem services the crops provide to the land, enhancing the available services.

Ploughing Technique

Modifying ploughing techniques can help retain water on your land. Moving to a system where you follow the natural contours of the land can aid water retention and reduce runoff. In addition looking to minimum, low or no tillage can have great benefit to soil management and retaining water on farm.

Further Information

Scottish Government Rural Payments & Services (2021) Water-Use Efficiency - Irrigation Lagoon

ClimateXChange - NA29 Drought risk to agricultural land

Farm Advisory Service (FAS) - Soil Structure & Compaction

SRUC (2016) Valuing your Soils: Practical Guide for Scottish Farmers

Farm Advisory Service (FAS) - Adapting to Climate Change - Livestock Systems

Farm Advisory Service (FAS) - Adapting to Climate Change - Crop and Soil Management

Farm Advisory Service (FAS) - Constructed Farm Wetlands

Farm Advisory Service (FAS) - Water Margins