

Agricultural Reform List of Measures

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Introduction

To deliver the ambitions set out in the Scottish Government's Vision for Agriculture, published in March 2022, Scotland will have a support framework that delivers high quality food production, climate mitigation and adaptation, and nature restoration.

High quality, nutritious food locally and sustainably produced is key to our wellbeing – in economic, environmental, social and health terms. We will support and work with farmers and crofters to meet more of our own food needs sustainably and to farm and croft with nature.

We will support and work with the agriculture industry to meet these shared objectives.

In looking at the potential measures that will best address climate mitigation, adaption and nature restoration, our priority is on those sectors with the highest emissions, including livestock production.

This supporting document for farmers and crofters, is intended to show the measures currently being appraised by Scottish Government. This list of measures has been built on academic research and recommendations of the Farmer Led Climate Change Groups. These measures have undergone initial evaluation of impact and ease of application on farms and crofts and cost and this evaluation process will now continue in order to ensure Scottish Government applies the most effective and applicable measures to the right tier of future support.

Guidance on Measures

We use the following headings to provide a structured description of the measures.

Outcomes

These are the high level outcomes for the sector (livestock) or type of land / habitat (nature and climate) that the enhanced measures are seeking to deliver.

Package

A package defines a group of related and complementary measures that can deliver towards the outcome.

Whereas an individual measure may not lead to significant change on its own, when packaged with other measures it could lead to significant cumulative benefit for climate and biodiversity. Appropriate packaging therefore is essential to drive substantive change. Certain packages contain multiple measures, this doesn't necessarily mean they all have to be undertaken.

Measure

For each measure a short high-level description identifies the plan or course of action to achieve a particular outcome. A measure may relate to one or a series of actions or sub-measures.

Descriptor

The descriptor for each measure provides a more detailed and practical explanation of the measure and how and where it should be implemented on the farm. Where appropriate it considers how the measure interrelates with other measures within the package and how they could be adopted in an integrated way. In this way the descriptors present an accessible view of the measure, its take up and wider use.

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Nature and Climate Measures

The measures are based on well tried and tested nature based actions designed to help reduce greenhouse gas emissions from soils, sequester carbon, help the business and the land adapt to the impacts of a changing climate, and halt the loss of biodiversity. Measures that help deliver multiple outcomes are priority.

Measures are presented in packages according to the outcomes they will help the business support in three broad areas of the farm or croft;

In Field – Cultivated Soils

Measures that maximise soil function and organic matter to sustain productivity, reduce greenhouse gas emissions, maintain water and air quality and support biodiversity in and above the soil.

Field Margins and Uncultivated Features and Uncultivated Permanent Habitats

Measures that maximise habitat condition and function to reduce emissions, increase resilience of the land to climate change impacts, capture carbon, maintain water and air quality and support biodiversity in and around the cropped (including grass cropped) areas of the holding and across the hill and non-cultivated areas of the farm/croft. Measures will help provide places for wildlife to breed, shelter and feed through a connected network of habitats.

Livestock, Climate and Productivity Measures

The livestock measures identify areas where good or improving practice are shown to deliver lower emission production. The measures were derived from academic literature and from the farmer-led group work which detailed how emissions could be reduced in cattle herds and sheep flocks.

These measures broadly identify nutrition, genetics and health as areas of interest. The Scottish Government will work with industry expertise to further develop detailed actions in each of these areas.

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List of Measures

Type of Land: In Field - Cultivated Soils

Habitats: Arable Crops - including fodder crops; Grassland - improved, Grassland – temporary

Outcomes: Reducing Soil Greenhouse Gas (GHG) emissions; Increasing soil carbon/organic matter content; Increasing resilience to weather events; Improving soil nutrient content; Reducing diffuse pollution; Improving water and air quality; Improving soil water retention and flow; Improving soil biodiversity; Removing drivers for biodiversity loss

Package: Continuous Soil Cover

Measure: Winter cover

Descriptor:

Retain stubbles from a combinable crop over the winter. Stubble area to be left ungrazed, unsprayed, and undisturbed before 1 March following harvest. Retaining the stubble helps to protect the soil, retain organic matter, and will improve mitigation and adaptation to the effects of climate change. Leaving

stubble until early spring will also allow a variety of arable plants to develop, providing food and cover for insects, birds and small mammals.

Implementation could be extended by keeping living roots in the soil using cover crops: plant specific species mix after summer harvest to keep living roots in the soil, thus providing soil cover to prevent damage and erosion, taking up excess nitrogen (catch crop function), providing nitrogen for the next crop (vetch, clover, or other legumes), improving soil structure (deeper rooting species such as rye or tillage radish), providing above ground resources for pollinator insects, birds and small mammals (e.g. radish, buckwheat, brassicas) but also root exudates to feed a diverse soil biodiversity.

Measure: Minimum/No Tillage

Descriptor:

Minimise soil disturbance, avoid inversion and avoid deep ploughing (if no major compaction or large weed burden) by using a direct drill, discs, or different machinery. This will keep soil structure and its biodiversity, avoid organic matter oxidation and disruption of soil biodiversity. Minimum / no tillage will not be suitable for all soil types or crops, and may be affected by other constraints such as compaction, weed burden etc.

Package: Efficient / Reduced use of synthetic inputs

Measure: Efficient / Reduced use of inorganic fertilisers and lime

Descriptor:

Use your soil analysis recommendation and crop agronomic advice to apply only where and as little as necessary or extenuating circumstances require a dispensation. Apply inorganic fertilisers and lime as per soil analysis and crop requirement with variable rate using precision spreading based on mapping and crop monitoring where available. Implementation could be extended by increase the use of legumes in the rotation, use green manure, use animal manure or livestock grazing, compost and digestate. To protect soil health and water quality and protect habitat conditions for pollinating insects, wild birds and small mammals.

Measure: Efficient / Reduced use of synthetic pesticides

Descriptor:

Using an Integrated Management approach, you will only apply synthetic pesticides if economic threshold of pest/disease is reached or extenuating circumstances require a dispensation. To protect soil health and water quality and protect habitat conditions for pollinating insects, wild birds and small mammals. Implementation could be further extended by use of GPS enabled technology, where available, to apply variable rates.

Measure: Use of N fixing crops

Descriptor:

Add legumes such as peas or field beans into the cropping rotation, and other appropriate catch/cover/green manure/soil improver crops including pasture legumes. To improve soil health and water quality and improve habitat conditions for pollinating insects, wild birds and small mammals.

Package: Crop Diversity - arable

Measure: Diversify crop rotation and break crop rotation period (esp. for root crop)

Descriptor:

Use a number of different crops in an arable rotation depending on soil type and land capability e.g. oilseed rape, peas, beans, vegetables, potatoes, linseed, oats, forage brassica, forage maize, buckwheat. A varied crop rotation can enhance biodiversity, improve soil organic matter and climate impact resilience. Soil erosion is minimised, pest and disease burdens are reduced. Especially, leave a longer break between soil damaging root crops to improve soil recovery (ex: aim for 8 years for potatoes). To improve soil health and water quality and improve habitat conditions for pollinating insects, wild birds and small mammals.

Measure: Inter-cropping, under-cropping and mixed cropping (e.g. peas and barley) and avoid monoculture

Descriptor:

To avoid monocultures and improve within field species diversity, plant several crops together (mixed cropping ex: peas and barley, to improve protein content of silage in winter feed and decrease the need for purchased protein), undersow cash crops with undercrop (ex: using clover for N fixing, pest protection and outcompete weeds or grass for low input winter grazing), inter-crop cash crop with flowering mix for Integrated Pest Management (IPM) or with any companion crop that can create synergies and improve yield. To improve soil health and water quality and improve habitat conditions for pollinating insects, wild birds and small mammals.

Measure: Arable/ley rotations (transition from arable to arable/livestock mix)

Descriptor:

Add grass or fodder crops into the cropping rotation to allow introduction of grazing animals on arable land. Can also include use of livestock to graze winter cereals to reduce reliance on synthetic inputs. To improve soil health and water quality and improve habitat conditions for pollinating insects, wild birds and small mammals.

Measure: Biodiversity cropping and silvo-arable systems

Descriptor:

Provision of Pollinator or Bird friendly crops with beetle banks, bird covers, conservation headlands, and field margins. To improve soil health and water quality and improve habitat conditions for pollinating insects, wild birds and small mammals.

Measure: Silvo-arable systems

Descriptor:

Plant trees at suitable interval for machinery in arable field to create silvo-arable systems, in order to improve carbon sequestration, minimise soil erosion, improve drainage, support more biodiversity. Species for coppicing, fruits, nuts or timber can provide marketable products will also improve profitability. To improve soil health and water quality and improve habitat conditions for pollinating insects, wild birds and small mammals.

Package: Crop Diversity - grassland

Measure: Diverse sward species content (legumes-herb-grass mixtures) and use of herbal leys

Descriptor:

Attain species diversity in existing rotational grass swards by over seeding or reseeding with diverse species grass mix; including drought tolerant or tussock forming grasses, deep rooting species, herbs and legumes. Along with ryegrass, use timothy, fescues, cocksfoot and herbal leys in rotational grassland (including species like chicory, yarrow, plantain, sainfoin, red/white/sweet/alsike clovers, birdfoot trefoil, burnet). To improve soil health and improve habitat conditions for pollinating insects, wild birds and small mammals.

Measure: Regenerative grazing (mob, strip, adaptive multi-paddock grazing) on improved grassland

Descriptor:

Regenerative grazing is the practice of building soil health by managing livestock on grazed areas. It is characterised by: frequent rotation and long resting time/recovery periods for paddocks. Regenerative grazing allows the sward to grow high, to ensure grasses and plants flower and seed. This encourages regrowth and development of strong plant and root systems, which also improves soil microbiology and function. Appropriate management for grazed habitats requires minimum rest periods (at least 30-45 days) depending on type of sward.

Measure: Bird friendly Crop Operations

Descriptor:

Avoiding field operations at key times, will reduce the risk of damage/disturbance to key waders, corn bunting, corncrake, and their nests. Avoiding cultivation operations where target ground nesting birds are present. Cutting hay, silage, or arable crop in a wildlife-friendly manner (avoiding cutting towards the centre) and leaving a 2m margin around the field to reduce the risk of injury to vulnerable bird species such as corncrake, and waders sheltering in the crop. Only for adoption in fields where nesting waders, corncrake and corn bunting identified during biodiversity audit. An appropriate cutting date to preserve nests must be adopted according to the species being targeted. Can be packaged with other Arable and Silage/Hay Crop Margin measures.

Implementation could be extended for corncrake where appropriate to provide suitable early cover by excluding grazing livestock from existing corncrake cover habitat within a whole field during the full growing season and not cutting the sward. From 1 October, the field must be grazed down to remove thatch. Key sites for this measure identified during biodiversity audit within Corncrake target areas.

Measure: Silvo-pastures**Descriptor:**

Aim is to integrate trees and shrubs into an area of grass crop to benefit biodiversity, carbon sequestration, climate change adaptation, soil health, and livestock health. Trees should be planted in a manner that works with intended cropping or grazing management. During the establishment period (five years), trees will need to be protected from grazing by domestic livestock and wild animals. Suitable tree pruning and management will be needed until the trees are established. Maintaining management, including pruning, will enable both tree establishment and pasture sward to thrive together.

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Type of Land: In Field - Margins and Uncultivated Features

Habitats: Arable crops - including fodder crops; Grassland – improved; Grassland - semi improved; Grassland - Unimproved and Species Rich Grassland; Water; Wetland; Woodland; Scrub; Heath / Moorland; Bog; Coastal dune/marsh

Outcomes: Reducing Soil GHG emissions; Increasing soil carbon/organic matter content and vegetation carbon content; Increasing resilience to weather events; Reducing diffuse pollution; Improving water and air quality; Improving soil water retention and flow; Improving nature networks; Improving habitat connectivity; Improving soil biodiversity; Removing drivers for biodiversity loss

Package: Retain and Enhance Field Margins and Permanent Habitat Margins**Measure: Arable and Silage/Hay Crop Margins****Descriptor:**

Leave uncropped margins (2m minimum). Increasing the width, structure diversity and species diversity while preventing damage (soil damage, spray drift etc) will improve outcome. Aim for connectivity between field margins and with other semi-natural habitats such as patches of woodland, hedges, water margins, unsprayed road verges. Provides breeding, feeding and cover for farmland birds, insects, pollinators. Remove Invasive Non-Native Species where they are invading the habitat.

Measure: Water Margins**Descriptor:**

Manage existing fenced and unfenced water margins and buffer strips. Cut or grazed annually to maintain species and structure diversity. If wider than 6m, grazing is possible. To improve water quality, protect ponds and freshwater habitats to benefit insects, fish, and amphibians and create river corridors.

Implementation could be extended by unfenced water margins fenced off to exclude stock. Min 6m margins depending on water course width (12m adjacent to still water). Manage to increase diversity of species and structure, as well as connectivity. To improve water quality, protect ponds and freshwater habitats to benefit insects, fish, and amphibians and create river corridors.

Measure: Retain and Enhance In Field Biodiversity Cropping and Features

Descriptor:

Reduce tracking, supplementary feed sites rare and temporary. No pesticides, no fertilisers in existing field margins and biodiversity in-field features. Buffer zone around in field trees.

Converting Arable at Risk of Erosion or Flooding to Low-input Grassland

The aim of this measure is to protect water quality and benefit wildlife by converting areas within arable fields which are prone to flooding, run-off and / or soil erosion, to low-input grassland. This will provide year-round cover, which will increase soil organic matter, improve soil structure, reduce surface run-off, and protect against soil erosion and the subsequent risk of water pollution. Flowering plants within the grass will also benefit wildlife. The area is sown with a low productivity grass mix to establish a new sward and the mix must include at least four flowering species to benefit pollinating insects.

Management of Buffer strips adjacent to lowland bog/peatland and wetland

This measure support the management of bogs and wetlands by increasing the water levels, creating an effective buffer area of longer vegetation to intercept runoff, therefore, reducing nutrient inputs on land immediately adjacent to, and into the bog or fen. The buffer strip should be a minimum of 10m wide. It may need to be wider depending on the gradient, soil type and management of the surrounding land. Ideally, it should be created by erecting temporary electric fencing or stock fencing to exclude stock. The buffer area will require a period of grazing each year to manage the habitat.

Create small plots of a range of biodiversity crops and features.

Beetle banks

Beetle banks are grassy mounds of at least 2m wide cutting across an arable field, providing permanent cover for beetles and other beneficial insects. They are typically seeded with native grasses such as fescues and bents and include tussock forming species such as cocksfoot and timothy. The addition of flowering herbs will help support pest predators such as hoverflies and parasitic wasps and other pollinators. They can also prevent soil erosion and run off. They need regular cutting to help establishment the 1st year and prevent weed overtaking but once established only require to be cut on a 3-5 years rotation to keep providing a diversity of structure.

Wild bird cover

Wild bird covers are a mix of specific crops which will provide food and shelter for wild birds and their chicks. They will include a mix of seed bearing crops (linseed, brassica, sunflowers, quinoa), flowering plants to attract insects and their larvae (legumes, phacelia, yarrow, buckwheat), and annual cereals (rye, oats, triticale, barley). Placed near woodlands, tussocky grass patches or hedges, they can provide resources for 2-3 years depending on seed mix. Cannot be sprayed, grazed or cultivated before the 1st March following the year of establishment.

Forage brassica for wild birds

Forage brassicas such as turnips, kale, rape and swedes provide a good habitat for a wide range of wildlife if left unharvested, particularly food and cover for wintering farmland birds. Some weeds will also be beneficial, such as charlock, fat-hen, knot grass and redshank. The patches or strips must be at least 6m and need to be under low input management, and not harvested, grazed, sprayed or ploughed down before the 1st of March.

Pollinator strips and margins

Within-field strips and margins specifically planted to support pollinators will include a wide range of flowering plants, with different colours and shapes, flowering at different time of the year. They will provide nectar and pollen for beneficial invertebrates as well as egg laying sites and feeding sites for their larvae. They can also include some patches of sunny bare ground and will benefit from being located in full sun, and connected to other habitats such as woodland patches, watercourses, hedges, or flowering road verges. They need to be cut to help establishment and maintenance but cannot be sprayed (unless using spot treatment for weeds and INNS).

Species diverse grass strips and margins

Grass strips located within or at the edges and corners of arable fields provide important cover and food for birds and small mammals, as well as flowers for pollinating insects. They can also help improve water

quality by preventing soil erosion, intercepting surface water run-off and improving soil structure. Wet corners and patches, left uncultivated can provide habitat for insects and birds. Grass strips are also important for connecting habitats. 3m wide minimum, they will also have added benefits if located next to a hedge, line of trees, unsprayed road verges, dykes or any other linear feature. Seeded with diverse native grass seeds such as timothy, cocksfoot, fescues and bents, they will require cutting once a year, to maintain species and structure diversities.

Measure: Enhance existing Hedgerows

Descriptor:

Allow hedge to grow to minimum 1.5m height and width and maintain its 2m GAEC margins, Plant 10% of gaps larger than 5m. Leave hedgerow trees to reach maturity and full height every 50-100m.

Implementation could be extended by allowing hedge to grow beyond 1.5m height and width and leave hedgerows trees to reach maturity every 50-100m. Widen the margin to minimum 4m on one side. Trimmed once every 2 years in winter. Introduce native trees and shrubs and plant all gaps larger than 5m.

Implementation could be further extended by allowing hedge to grow beyond 3m height and width and leave hedgerows trees to reach maturity every 50-100m. Widen the margin to minimum 4m on both sides where practicable. Fence grassland hedge margins. Trimmed once every 3-5 years in winter. Introduce native trees and shrubs and plant all gaps larger than 5m. Connect hedgerows across the farm.

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Type of Land: Uncultivated Permanent Habitats

Habitats: Arable crops - including fodder crops; Grassland – improved; Grassland - semi improved; Grassland - Unimproved and Species Rich Grassland; Water; Wetland; Woodland; Scrub; Heath/Moorland; Bog/Peatland; Coastal dune/marsh.

Outcomes: Reducing Soil GHG emissions; Increasing soil organic matter and carbon content, and vegetation carbon content; Increasing resilience to weather events; Reducing diffuse pollution; Improving water and air quality; Improving soil water retention and flow; Improving nature networks; Improving habitat connectivity; Improving soil biodiversity; Removing drivers for biodiversity loss.

Package: Restore and Manage Existing Nature Rich Habitats

Measure: Manage Grazed Habitats

Descriptor:

Measure covers a range of grazed habitats including, species-rich grassland, wetland, saltmarsh, habitat mosaic, wood pasture, floodplain, heaths, peatland, moorland etc. Delivered through appropriate grazing management assessed in line with Biodiversity Audit condition assessment criteria for individual habitat types.

Improving habitat structure and species diversity and preventing damage will improve outcomes. Improve plant species diversity over time by adopting grazing regimes to promote flowering and seeding of plants with rank vegetation grazed off at the end of the growing season. Overall annual grazing pressure in line with indicative levels for habitat types.

Can include seasonally excluding livestock to avoid damage to some sensitive habitats and ground nesting birds (Key waders, corn bunting and corncrake) during the bird nesting season, achieve habitat structure and allow flowering and seeding. No additional inputs of fertiliser/manure. Supplementary feeding managed to avoid damaging sensitive habitats, particularly species rich or wetland habitats. Control of invasive plants and injurious weeds by spot treatment or manual methods where required. Prevention of damage through poaching, erosion, overgrazing and under-grazing. Allow re-wetting of areas where required. Could be combined with GPS collar managed grazing.

This is a generic measure designed to support grazing to benefit a wide range of species depending on the target habitat and species identified in the biodiversity audit, including Waders, Pollinators, Farmland Birds, Insects/Beetles, Mammals, Protected Geese, Raptors, Corncrake, Bats, Cornbunting, Blackgrouse.

Measure: Retain Traditional Cattle

Descriptor:

Cattle grazing helps support a more diverse range of habitats. Traditional or native breeds are better adapted to graze land with coarser vegetation and wetter conditions. Cattle graze less selectively than sheep and support a more diverse habitat.

Measure: Summer Hill Cattle Grazing**Descriptor:**

The measure will improve the quality of moorlands habitat by grazing with cattle during the summer. Cattle graze less selectively than sheep and support a more diverse habitat. Each bovine grazed on the hill will benefit 20 hectares of moorland. This measure is eligible only when packaged with Manage grazed habitats measure.

Measure: Introduction of Small-Scale Tree and Shrub Planting**Descriptor:**

Aim: Integrate small areas of native trees and shrubs into areas of natural habitat to benefit biodiversity by increasing native species diversity, providing shelter and shade to livestock, carbon sequestration and climate change adaptation. Areas suitable for planting as listed in biodiversity audit may include: unimproved grassland (excluding species rich grassland); semi-improved grassland; species-poor rush pasture; and existing woodland. Further assessment will be required to ensure natural habitats benefit from the additional planting. During the establishment period (five years), trees will need to be protected, weed growth managed and trees protected from grazing by domestic livestock and wild herbivores.

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Sector: Beef**Package: Improving beef cattle nutrition****Measure: Supporting and incentivising improved beef cattle nutrition****Descriptor:**

Evidence shows that improved forage quality and digestibility can improve livestock productivity and therefore lower the GHG emission intensity of livestock production.

Measuring, planning, and nutrition management is proven to lead to positive outcomes for livestock, GHG emissions and wider sustainability issues.

This measure could include actions to require producers to show awareness of diet composition and the nutritional requirements of the herd, or to demonstrate that forage analysis is being undertaken to inform nutrition planning and improving feed quality. Activity in this area will vary across farm type, location, and production system.

Suggested areas of action, where appropriate:

- Nutritional planning and related actions.
- Grazing management planning.
- Sward analysis.
- Implement mineral and trace element supplementation plan for herd.

Package: Improving beef cattle breeding**Measure: Supporting and incentivising genetic improvement of beef cattle****Descriptor:**

Informed breeding decisions can accelerate the genetic gains achievable across each generation of livestock, which can lead to efficiency improvements. An increased uptake of genetic improvement which improve livestock efficiency will lead can lead to reduced GHG emissions intensity.

The industry-led Beef Sector Strategy 2030 cites the ambition of the industry to make the most of breeding decisions in order for the sector to minimise emissions.

Actions could require breeding planning using Estimated Breeding Values as well as potentially supporting the use of more advanced genomic tools. This could include the use breeding indexes which support the sector in moving in the direction of reduced emissions intensity.

Suggested areas of action, where appropriate:

- Herd breeding plan and related actions.
- Cull and replacement policy.
- Herd benchmarking.
- Use of estimated breeding indexes (EBVs).
- Use of advanced practices such as genotype profiling.
- Shifting to lower emissions intensity breeding goals.

Package: Improving beef cattle health

Measure: Support maintaining and improving beef cattle health

Descriptor:

Improving herd health will lead to improvements in production efficiency, together they can lower greenhouse gas emissions per Kg of output. Healthier animals are more productive, require less veterinary intervention and have better welfare than their under-performing counterparts. Actions could range from acting on herd health plans to implementing verifiable control and prevention measures.

Suggested areas of action, where appropriate:

- Herd health planning and related actions.
- Herd health monitoring and diagnosis.
- Implementing biosecurity policy.
- Vaccine use.
- Prevention and control planning, and related actions.

Package: Methane reduction

Measure: Supporting appropriate uptake of feed products which reduce enteric methane emissions in beef cattle

Descriptor:

Methane suppressing feed products are natural or synthetic compounds added to or included in animals' diets which lead to less methane being produced whilst the animal is digesting the feed.

This is an evolving landscape with increasing evidence emerging demonstrating the potential of feed materials in reducing enteric methane emissions, and a range of products being evaluated and developed. In line with emissions reduction ambitions there may be support where appropriate products are being used in livestock production systems.

The Scottish Government recently held a Call for Evidence alongside DEFRA, Northern Ireland Department of Agriculture, Environment and Rural Affairs (DAERA) and Welsh Government and will continue to explore options to incorporate on-farm activity in this area in to future support measures.

Suggested areas of action, where appropriate:

- Uptake of methanogenesis inhibitors.
- Uptake of other appropriate methane reducing feed materials.

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Sector: Dairy

Package: Improving dairy cattle nutrition

Measure: Supporting and incentivising improved dairy cattle nutrition

Descriptor:

Evidence shows that improved forage quality and digestibility can improve livestock productivity and therefore lower the GHG emission intensity of livestock production.

Measuring, planning, and nutrition management is proven to lead to positive outcomes for livestock, GHG emissions and wider sustainability issues.

This measure could include actions to require producers to show awareness of diet composition and the nutritional requirements of the herd, or to demonstrate that forage analysis is being undertaken to inform nutrition planning and improving feed quality.

Suggested areas of action, where appropriate:

- Nutritional planning – housed and grazing
- Grazing management planning.
- Sward analysis.
- Implement mineral and trace element supplementation plan for herd
- Precision feeding.

Package: Improving dairy cattle breeding

Measure: Support and incentivise genetic improvement of dairy cattle

Descriptor:

Informed breeding decisions can accelerate the genetic gains achievable across each generation of livestock, which can lead to efficiency improvements.

The dairy sector has developed genetic indexes which reflect the role of genetic improvement in improving the environmental efficiency of milk production. There is potential for these genetic indexes to be used to demonstrate progress toward greater environmental efficiency on Scottish dairy farms.

The use of sexed semen in dairy cow insemination has also been cited as a practice which can result in greater environmental efficiency.

Actions could require breeding planning which recognises the importance of breeding decisions which improve the environmental efficiency of milk production by incorporating appropriate genetic indexes, and appropriate utilisation of sexed semen on-farm as an action arising from an appropriately implemented breeding plan.

Suggested areas of action, where appropriate:

- Herd breeding plan and related actions.
- Cull and replacement policy.
- Herd benchmarking.
- Use of advanced practices such as genotype profiling.
- Shifting to lower emissions intensity breeding goals.

Package: Improving dairy cattle health

Measure: Support maintaining and improving dairy cattle health

Descriptor:

Improving herd health will lead to improvements in production efficiency, together they can lower greenhouse gas emissions per Kg of output. Healthier animals are more productive, require less veterinary intervention and have better welfare than their under-performing counterparts. Actions could range from acting on herd health plans to implementing verifiable control and prevention measures.

Suggested areas of action, where appropriate:

- Herd health planning and related actions.
- Health herd monitoring and diagnosis.
- Implementing biosecurity policy.
- Vaccine use.
- Prevention and control planning and related actions.

Package: Methane reduction

Measure: Supporting appropriate uptake of feed products with reduce enteric methane emissions in dairy cattle

Descriptor:

Methane suppressing feed products are natural or synthetic compounds added to or included in animals' diets which lead to less methane being produced whilst the animal is digesting the feed.

This is an evolving landscape with increasing evidence emerging demonstrating the potential of feed materials in reducing enteric methane emissions, and a range of products being evaluated and developed. In line with emissions reduction ambitions there may be support where appropriate products are being used in livestock production systems.

The Scottish Government recently held a Call for Evidence alongside DEFRA, NI DAERA and Welsh Government and will continue to explore options to incorporate on-farm activity in this area in to future support measures.

Suggested areas of action, where appropriate:

- Uptake of methanogenesis inhibitors.
- Uptake of other appropriate methane reducing feed materials.

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Sector: Sheep**Package: Improving sheep nutrition****Measure: Supporting and incentivising improved sheep nutrition****Descriptor:**

Evidence shows that improved forage quality and digestibility can improve livestock productivity and therefore lower the GHG emission intensity of livestock production.

Measuring, planning, and nutrition management is proven to lead to positive outcomes for livestock, GHG emissions and wider sustainability issues.

This measure could include actions to require producers to show awareness of diet composition and the nutritional requirements of the flock, or to demonstrate that forage analysis is being undertaken to inform nutrition planning and improving feed quality. Activity in this area will vary across farm type, location, and production system.

Suggested areas of action, where appropriate:

- Nutritional planning and related actions.
- Grazing management planning.
- Sward analysis.
- Implement mineral and trace element supplementation plan for flock.

Package: Improving sheep breeding**Measure: Support and incentivise genetic improvement of sheep****Descriptor:**

Informed breeding decisions can accelerate the genetic gains achievable across each generation of livestock, which can lead to efficiency improvements. An increased uptake of genetic improvement which improve livestock efficiency will lead can lead to reduced GHG emissions intensity.

Actions could require breeding planning and use of tools which support the sector in moving in the direction of reduced emissions intensity breeding.

Suggested areas of action, where appropriate:

- Flock breeding plan and related actions.
- Cull and replacement policy.
- Flock benchmarking.
- Use of estimated breeding indexes (EBVs).
- Use of genomic breeding indexes.

Package: Improving sheep health**Measure: Support maintaining and improving sheep health**

Improving flock health will lead to improvements in production efficiency, together they can lower greenhouse gas emissions per Kg of output. Healthier animals are more productive, require less veterinary intervention and have better welfare than their under-performing counterparts.

Actions could range from acting on flock health plans to implementing verifiable control and prevention measures.

Suggested areas of action, where appropriate:

- Flock health planning and related actions.
- Flock health monitoring and diagnosis.
- Implementing biosecurity policy.
- Vaccine use.
- Disease prevention and control planning, and related actions.

Package: Methane reduction**Measure: Supporting appropriate uptake of feed products with reduce enteric methane emissions in sheep****Descriptor:**

Methane suppressing feed products are natural or synthetic compounds added to or included in animals' diets which lead to less methane being produced whilst the animal is digesting the feed.

This is an evolving landscape with increasing evidence emerging demonstrating the potential of feed materials in reducing enteric methane emissions, and a range of products being evaluated and developed. In line with emissions reduction ambitions there may be support where appropriate products are being used in livestock production systems.

The Scottish Government recently held a Call for Evidence alongside DEFRA, NI DAERA and Welsh Government and will continue to explore options to incorporate on-farm activity in this area in to future support measures.

Suggested areas of action, where appropriate:

- Uptake of methanogenesis inhibitors.
- Uptake of other appropriate methane reducing feed materials.

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Sector: All**Package: Nutrient management****Measure: Efficient nutrient management****Descriptor:**

Organic manures applied to agricultural land are valuable sources of organic matter and plant nutrients. Careful storage, sufficient capacity and precise application to land allows their nutrient value to be used for the benefit of crops and soils, and significant reduction in the use of inorganic fertilisers.

Regular soil tests for pH and nutrient values provide important details for the farm nutrient budget, as does taking into account previous cropping rotations. Equally important is the analysis of slurry, farmyard manures and other organic materials applied to land to know the actual NPK value, rather than relying on standard "book" values. Whilst applying nutrients to match crop requirements helps to improve uptake, consideration to application methods should also be made.

The National Test Programme [Preparing for Sustainable Farming scheme](#) is currently trialling support for soil sampling to enable field mapping and soil carbon measurement.

Suggested areas of action where appropriate, and future measures with potential, include:

- Covered slurry stores
- Anaerobic digestion
- Variable rate nitrogen and lime
- Low emission spreading
- Soil pH management
- Urease and nitrification Inhibitors
- Slurry acidification

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Engagement

The Scottish Government is already engaged with the sector through representative bodies including the Agriculture Rural Development (ARD) stakeholders and ARIOB as well as a cohort of individual farmers. Active industry engagement through user-testing on the measures is due to start in February 2023. We will continue to engage directly with farmers and crofters as we develop the future support package, and would encourage individuals to discuss these issues with their representative bodies.

Comments on the list of measures can be sent to: measures.agreform@gov.scot

Next steps for the measures

Scottish Government will continue to work on this list of measures and as such they are subject to refinement. We will also work to establish where they best fit in the Future Support Framework, what level of effort is required and what level of support would flow from that effort.

Current existing measures that deliver for nature and climate such as Greening, Good Agricultural and Environmental Conditions (GAEC), Statutory Management Requirements (SMRs) and also more targeted measures under the Agri-Environment and Climate Scheme (AECS), along with whole system approaches such as organics, will also be reviewed as part of the considerations of how these fit in the policy framework, alongside the new measures.

You can get more information to help you plan and prepare for the Future Support Framework from the [Agricultural Reform Route Map](#). The route map contains information on key dates and support available to prepare for change. It provides a clear set of programme dates to explain when current schemes will transition or end and when more guidance, support and information will be available.

FAQ

Why publish a list of measures now?

Farmers and crofters want more information about what they will be expected to do in future to receive agriculture support. [The Agricultural Reform Route Map](#), published in February 2023, outlines what information and guidance the sector can expect from 2023-2025 and when it will be available. It is designed to help farmers and crofters plan for changes to the support they receive and contains information on how and when schemes will change and how the new framework will be phased in from 2025.

This guidance is designed to complement the route map by giving farmers and crofters some more information on the measures that are likely to be included and currently being considered.

Publishing this list provides more information on the broad types of actions government will expect from farmers and crofters who wish to receive agricultural support payments in future. Where possible we set out the measures clearly in terms of what they mean at a farm level.

Scottish Government is yet to establish how the measures will be applied within the future framework of support. We are working on which of these, and other measures apply optimally to the four tiers (base, enhanced elective and complimentary) which were set out in [Delivering our vision for Scottish agriculture](#) - proposals for a new Agriculture Bill: consultation.

This list of measures is focused on suitability for the enhanced tier relating to farming activity. There will be a wider range of measures not currently included in this list that may be supported as part of the other tiers. This work continues to develop with more information on all measures coming in due course.

How was this list of measures selected?

This list has been developed based on actions that both academic research and the farmer led group process have identified as being essential if we are to meet Scotland's climate and biodiversity targets. The baseline plans and audits identified by the Farmer-led Groups (FLGs) provided a starting point for this work, particularly on-farm actions and the information we can collect from them.

Another key source is the [Climate Exchange \(CXC\) report](#). This research provides an updated assessment of the emissions reduction potential of the most effective mitigation measures in Scotland. The well-established research team at Scotland's Rural College (SRUC) has provided previous evidence on these to Scottish Government as well as underpinning work by organisations such as the Climate Change Committee (CCC) and Department for Environment, Food and Rural Affairs (DEFRA). The research identified nearly 200 measures which have been narrowed down to a list of 39 measures based on those suitable for Scotland.

The first stage in developing the measures was to undertake a systematic review of sources and evidence for measures that were appropriate to become part of a Future Support Framework. The sources and reports which provided the basis of the review are contained in Annex A.

During 2022, the Scottish Government consulted with stakeholders including the Agricultural Policy Design Group (APDG), the Agriculture Reform Implementation Oversight Board (ARIOB), and the ARIOB Academic Panel (AAP).

A final draft list of measures was completed in February 2023. This list will continue to be refined as part of the ongoing co-design process.

Why is this list not yet final?

This list of measures focuses on those measures which are most appropriate for the enhanced tier. There is a range of other measures vital for achieving Scotland's nature and climate targets which are under review and are likely to sit in other tiers of the Future Support Framework. Further industry engagement is required before a final list of measures is selected and applied to future support.

What does this list mean to me?

The measures included in any future support framework are being co-designed with the agriculture sector. At this stage the list is intended simply to provide guidance to farmers and crofters on the types of activities they may be expected to do in future to receive agriculture support.

The list of measures should be interpreted as a guide on what to expect from future support rather than a definitive list.

Sharing them in this format is intended to show where Scottish Government is in policy development and together with the [route map](#), will help farmers and crofters start to plan for the future of their businesses.

These draft measures are not a final product and are not an established scheme or agreed legislative activity. It is also important to note:

- If individual measures are adopted into a scheme it is anticipated that farmers would be supported to undertake those measures relevant to their business
- Measures will be refined and adapted as part of policy development
- Some measures may be removed or added
- Many of these measures will likely fall into tier 2 (enhanced) of the Future Support Framework, but some measures could fall into the other respective tiers.

Will I be expected to do everything on this list in future?

These measures are not finalised, nor are the precise requirements of any scheme, so farmers and crofters will not be expected to do everything on this list in future.

Once the list is finalised and applied to a future support framework, every farmer or crofter would not be expected to undertake every measure. This is to allow flexibility and farmer choice. There will be further guidance and information from Scottish Government before the application of measures to the Future Support Framework.

Farmers and crofters will need to gather relevant information to inform which measures are most suitable for their land and enterprise, for example through a carbon/ biodiversity audit or expert advice.

We have set out the full list of measures developed to date including a description of each measure. We have included measures that may not currently be commercially/or legally available (e.g. methane inhibiting animal feeds) where these are important measures for reducing climate impacts during the expected lifespan of the policy, particularly from 2025 to 2030. It is important that the industry is aware of the importance of emergent technologies so these can be implemented quickly when available.

We know that some of the measures are simple to adopt and deliver benefit to the business undertaking them as well as the wider public benefit of reduced emissions, improved outcomes for nature. Others are more costly to adopt and implement and some would incur additional costs to businesses.

We also know that we need flexibility, some farmers, crofters and land managers are already undertaking some of these measures and it is important that actions that are already being done are recognised, alongside providing an opportunity for everyone to do more towards the outcomes. For these reasons government is considering how the measures may be scaled or weighted.

How do I know which measures are appropriate for my farm?

Underpinning all the measures is the principle that farmers and crofters should choose measures that are right for their business and are based on plans, audits and expert advice. Scottish Government is currently exploring ways to inform and direct farmers and crofters towards the best nature and climate measures for their farm or croft.

New policy will seek not to penalise those already achieving a level/threshold. It will make considerations for factors out with the farmer or crofter's control.

Will there be more measures that are more relevant to my business?

Scottish Government recognise that these measures are broad and have a greater emphasis on certain sectors. Subsequent stages of policy development will ensure that all sectors of Scottish agriculture and other land based sectors will have opportunity to contribute towards nature and climate targets.

We recognise that agriculture in Scotland varies significantly in terms of market output (Arable, beef, sheep, dairy, pigs and poultry and mixed enterprises etc) and also in terms of tenure and business structure (including owner occupier, tenancy, joint ventures, graziers, small holders and crofters and estates managing land in hand). Appropriate considerations are being made to ensure, as far as possible, that those involved in Scottish agriculture can undertake the measures relevant to their businesses and benefit from the support available for doing so.

What payment structure will accompany these measures?

Scottish Government is committed to ensuring a smooth transition away from Common Agricultural Policy towards a new Future Support Framework to deliver the Vision for Agriculture. We recognised that a key driver to minimise disruption and ensure stability for the agricultural sector is through financial support payments.

While the payment structure has not yet been developed, the Scottish Government remains committed to supporting active farming and food production with direct payments and have a phased approach for integrating new conditionality. Enhanced conditionality of at least half of all funding for farming and crofting will be integrated by 2025, then through an enhanced payment from 2026 and as part of this conditionality, recipients of support will be expected to deliver on targeted outcomes for biodiversity gain and low emissions production.

Before establishing a payment structure to accompany the measures, Scottish Government will engage with industry to gauge industry appetite and support for these measures. Equally government is committed to delivering its climate and nature objectives.

Once industry engagement has concluded Scottish Government will work with expert stakeholder groups to design a proportionate payment structure and policy mechanism that moves us towards ambitious climate and nature targets whilst supporting a sustainable farming industry.

[The Agricultural Reform Route Map](#) provides a clear set of programme dates to explain when current schemes will transition or end and when more guidance, support and information will be available.

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Annexes

Annex A - Sources for List of Measures

- Scottish Government [Rural Payments and Services Scheme Guidance](#) for Land Managers Options 2016, Rural Priorities 2016, AECS 2015-18
- GHG Mitigation Measures from the Marginal Abatement Cost Curve (MACC) for Scottish Agriculture [research conducted by CXC/ SRUC](#)
- Farming for 1.5°C Final Panel [Report](#) : From here to 2045
- [Delivering on Net Zero](#) : Scottish Agriculture, World Wildlife Fund (WWF), November 2019
- Agriculture and Horticulture Development Board ([AHDB](#)) Guidance
- Defra Sustainable Farming Incentive: [Full Guidance](#)
- Naturescot- Piloting and Outcome Based Approach in Scotland ([POBAS](#)) project
- Biodiversity [Strategy to 2045](#) : tackling the nature emergency

This first stage review was supplemented by an analysis of the five [FLG Reports](#) :

- Suckler Beef Climate Scheme Group Final Report, November 2020
- The Dairy Sector Climate Change Group Report, March 2021
- Hill, Upland and Crofting Group Report, March 2021
- A New Blueprint for Scotland's Arable Sector, Arable Climate Change Group Report, March 2021
- Bringing Home the Bacon: Reducing GHG Emissions from the Scottish Pig Sector, June 2021

Annex B - Cross-referencing of Measures to CXC and Farmer Led Groups (FLGs)

FLG Reports: A (Arable); SB (Suckler Beef); D (Dairy); HUC (Hill Upland & Crofting)

CXC Measures cross-referenced by published Mitigation Measure (MM) code.

Table B.1: Cross-referencing of nature and climate measures to CXC and FLG

Type of Land	Package	Measure	CXC	FLG
In Field - Cultivated Soils	Continuous Soil Cover	Winter cover	MM03	A
		Minimum/No Till		
	Efficient / Reduced use of synthetic inputs	Efficient / Reduced use of inorganic fertilisers and lime	MM07	A SB HUC
		Efficient / Reduced use of synthetic pesticides		A HUC
		Use of N fixing crops	MM05	A
	Crop Diversity - arable	Diversify crop rotation and break crop rotation period (esp. for root crop)		A
		Inter-cropping, under-cropping and mixed cropping (e.g. peas and barley) and avoid monoculture		A
		Arable/ley rotations (transition from arable to arable/livestock mix)		A
		Biodiversity cropping and sylvo-arable systems		A
		Sylvo-arable systems	MM15	
	Crop Diversity - grassland	Diverse sward species content (legumes-herb-grass mixtures) and use of herbal leys	MM04	HUC
		Regenerative grazing (mob, strip, adaptive multi-paddock)		

		grazing) on permanent improved grassland		
		Bird friendly Crop Operations		
		Sylvo-pastures	MM15	A
In Field - Margins and Uncultivated Features	Retain and Enhance Field Margins and Permanent Habitat Margins	Arable and Silage/ Hay Crop Margins		A
		Water Margins		A
		Retain and Enhance In Field Biodiversity Cropping and Features		A
		Enhance existing Hedgerows		A
Uncultivated Permanent Habitats	Restore and Manage Existing Nature Rich Habitats	Manage Grazed Habitats		
		Retain Traditional Cattle		
		Summer Hill Cattle Grazing		
		Introduction of Small-Scale Tree and Shrub Planting	MM15	A HUC

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Table B.2: Cross-referencing of livestock, climate and productivity measures to CXC and Farmer Led Groups

Sector	Package/Outcome	Measure	CXC	FLG
Beef	Improving beef cattle nutrition	Supporting and incentivising improved beef cattle nutrition	MM18	SB D
	Improving beef cattle breeding	Supporting and incentivising genetic improvement of beef cattle	MM29 MM30 MM31 MM37 MM39	SB D
	Improving beef cattle health	Support maintaining and improving beef cattle health	MM33	SB D
	Methane reduction	Supporting appropriate uptake of feed products which reduce enteric methane emissions in beef cattle	MM21 MM27 MM24	SB D
Dairy	Improving dairy cattle nutrition	Supporting and incentivising improved dairy cattle nutrition		SB D
	Improving dairy cattle breeding	Support and incentivise genetic improvement of dairy cattle	MM35 MM36 MM38 MM42	SB D
	Improving dairy cattle health	Support maintaining and improving dairy cattle health	MM32	SB D
	Methane reduction	Supporting appropriate uptake of feed products with reduce enteric methane emissions in dairy cattle	MM20 MM23 MM26	SB D

Sheep	Improving sheep nutrition	Supporting and incentivising improved sheep nutrition	MM19	HUC
	Improving sheep breeding	Support and incentivise genetic improvement of sheep		HUC
	Improving sheep health	Support maintaining and improving sheep health	MM34	HUC
	Methane reduction	Supporting appropriate uptake of feed products with reduce enteric methane emissions in sheep	MM22 MM25	
All	Nutrient management	Efficient nutrient management	MM08 MM09 MM13 MM14 MM43 MM44 MM45 MM46 MM47 MM48	SB D

Glossary

Glossary of terms mentioned in the Route Map and List of Measures guidance.

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