

THE MAGAZINE FOR FARMING & FORESTRY IN WALES

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Demonstration Network

Evaluating the effectiveness of
chicory in Welsh sheep systems

Wales Farming Conference

Find out what to expect
1-5 February 2021



W A L E S FARMING CONFERENCE 2021

1 – 5 February 2021

Make sure you don't miss any part of the Wales Farming Conference 2021. This year, the virtual doors will be open round-the-clock for you to listen in and watch, as and when it suits you, from the convenience of your home.

A series of 20 minute 'not to be missed' presentations will inspire and inform as you see and hear keynote speakers discuss a wide range of themes.

Expect to be motivated on both a personal and business level.

HOW TO REGISTER

Visit the Farming Connect website to access the registration form. You only need to register once to receive a link to access all conference sessions. Alternatively, if you have connectivity issues, call us on **08456 000 813** to pre-order a DVD recording.

#walesfarmingconference



Speakers:



LESLEY GRIFFITHS MS,
Minister for Environment, Energy and Rural Affairs
Creating a sustainable agriculture sector for future generations

The Minister thanks our farmers for feeding the nation, keeping rural communities thriving and for safeguarding family businesses for future generations. She also looks to the future and will set out her vision for Wales' new Sustainable Farming Scheme.



OLLIE OLLERTON
The most important project is you!

A former Special Forces operative with both the SAS and SBS, Ollie has undertaken operations in some of the most dangerous and remote locations on the planet and is one of the most highly trained fighters in the world. After 13 years overseas he returned home and started developing a concept that would put his years of training and experience to use and would benefit others. Developed from Special Forces expertise, Ollie's approach to personal development aims to change the way you think, the way you feel and subsequently, the way you perform.



ANDY FOX
Forty tips for turbulent times - when the going gets tough ...it's called life!

Brexit, a pandemic, unpredictable weather and the reality of a financial recession that's apparently the worst for 300 years – it's not surprising that many of us are feeling the pressure! Andy Fox farms a 1,600 hectare beef and sheep farm in Hurunui, New Zealand, which has been in the family for four generations. In the last thirty years, as he witnessed the devastation caused by both numerous droughts and a massive earthquake, he has developed his own amazing coping strategies. In this presentation, Andy will share some of his personal experiences and learnings which he says we can all apply to both work and personal situations. Whatever hard times lie ahead, Andy's practical and often humorous tips will help get us all through!



ALEX THOMAS

#PlantASeedForSafety

Compliance is a dirty word. To be compliant with work health and safety legislation is more often than not associated with policies, penalties and personal protective equipment. It gives the impression of being costly, complicated and time consuming – and yet we forget – that the intent of compliance, is simply: to save lives. With a focus on personal stories, this presentation seeks to change the focus from 'box-ticking' to empowering people, managing risk and ultimately reducing the number of people killed or injured in rural industries.



DR JONATHAN BIRNIE

21 in 21 in 21

In 21 minutes, Nuffield Scholar Dr Jonathan Birnie shares 21 facts on how to do business in 2021.



IORWERTH WILLIAMS

Tea time tax talk

Iorwerth Williams from Dunn & Ellis Accountants tells us all we 'need' to know about tax in the same time it takes to finish a cup of tea!

Born a farmer or born on a farm?

First generation farmers who are running successful businesses share what motivates and drives them forward, while offering some valuable lessons for owner occupiers or next generation farmers taking over from parents.

RHUN WILLIAMS - First generation beef and sheep farmer

MATTHEW JACKSON - First generation dairy farmer

RHIDIAN GLYN - First generation beef and sheep farmer



Photo credit: AHDB



ALEX CARSON-TAYLOR FRGS

Brave new world? The implications of leaving the EU for the agri-food sector

An independent international trade specialist operating across the agri-food sector, Alex Carson-Taylor provides a timely update on the UK-EU trade relationship following the end of the transition period in December 2020, our agreements with other countries and how we can develop future trade opportunities for the sector.



PROF. ALICE STANTON

Have a sit down with science

What's the up-to-date evidence concerning animal sourced foods? Are they harmful or beneficial to human health?

Professor Alice Stanton will discuss recently published data about healthy diets, including the role of animal sourced foods. She will demonstrate the evidence that moderate meat and dairy consumption have important positive health impacts. She will also talk about the need for clear and informative nutritional and sustainability information on package labelling.



SOPHIE COLQUHOUN

The value of Welshness and what shoppers of the future will need

As we say farewell to 2020 and welcome 2021 in a completely new kind of world, Sophie Colquhoun, with insight provided by the Welsh Government's Food and Drink Wales team, talks about how our lives are changing, the needs of the future shopper and what opportunities and challenges this brings.



ANNE VILLEMOTES

Reputation Management – from farm to fork

Are we harvesting hogs or killing pigs? Are we farmers or food-producers? Are we part of the problem – or part of the solution? It all depends on who is asking and, of course, on who is answering. In a world where food plays maybe the most important part in the increasing polarisation between countries, cultures and living standards, the perception often overrules the facts. At the end of the day, reputation and perception decides whether a business is thriving or not.

Demonstration Site: Pentre Farm, Pentrecelyn, Denbighshire

Technical Officer: Non Williams

Project Title: Evaluating the effectiveness of chicory in Welsh sheep systems

Project Introduction:

The adoption of chicory within grazing systems as a forage crop for livestock is increasing in popularity. Previous studies have indicated that the inclusion of chicory within a pasture mix can provide several benefits, such as increased lamb liveweight gain and improved supply of micronutrients. However, information on this in regard to Welsh sheep systems remains relatively limited.

The aim of this project is to determine the effectiveness of the inclusion of chicory in the sward on lamb performance, sward and diet quality, and internal parasite burdens.

Set-up and data collection

Approximately 1.82 hectares (ha) of land was reseeded with a standard ryegrass-based mixture including clover, and another 1.76 hectares reseeded with a grass mixture including chicory. Lambs were grouped to graze both treatments, with a rotational grazing system implemented.

Data collection during the first year of the project included:

- Regular weighing of the lambs to determine their daily liveweight gain (DLWG)
- Blood testing a sample of lambs within each group at the beginning and end of the

grazing period to monitor cobalt, copper and selenium concentrations

- Pasture quality and quantity
- Faecal egg counts (FECs) to monitor internal parasite burden

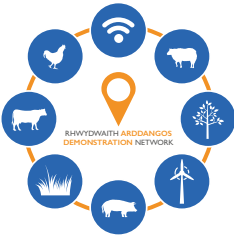
Initial Outcomes

Initial project outcomes (year 1) indicate that the average lamb DLWG for the duration of the grazing period was greater for the lambs grazing the pasture containing chicory (193g/day) compared to those grazing the ryegrass-based pasture (168g/day).

The initial blood test results indicated satisfactory cobalt (vitamin B12), copper and selenium (GSH-Px) concentrations for both treatments at the beginning of the grazing period. Further blood testing at the end of the grazing period recorded elevated copper concentrations for the lambs grazing the pasture containing chicory. Attention will be given to ensure an accumulation of copper does not lead to health issues during the second year of the project.

Objectives for year 2:

- Expand the rotationally grazed system by further plot sub-division.
- Aim to achieve an average DLWG of 300g.



For more information on the work conducted at Pentre Farm demonstration site, please visit: gov.wales/farmingconnectourfarms

Demonstration Site: Graig Olway, Usk

Technical Officer: Gwenan Evans

Project Title: Technical considerations when improving infrastructure

Project Introduction:

The dairy unit at Graig Olway comprises of 160 milking cows running three robots, and 70 sucklers housed on sand-bedded cubicles with youngstock housed on deep straw bedding. Russell Morgan is aiming to increase the herd to around 250 head and install another robot. One of the main barriers identified was the capacity of the slurry lagoon which will not hold the excess slurry, therefore, halting Russell's plan to increase his milking herd.

Having adequate and well-maintained on-farm slurry storage with the capacity to hold six months' worth of slurry will enable farmers to target natural manure applications to match with crop nutrient requirements, rather than when storage reaches its limit. By focusing on application to crop growth needs, nitrogen intake can be increased and dependence on artificial fertiliser diminished.

KPI: Increase milking herd by 50 cows plus replacements

Calculations for a new proposed slurry storage will include the ability to increase the dairy herd to 300 head plus 200 beef cows. Currently, the storage capacity required is 4,231m³ for 5 months storage capacity, a further 599m³ will be needed for 500 cows (extra 140 dairy cows and

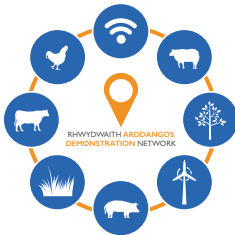
200 beef cows), meaning a future storage requirement of 4,830m³.

Aim:

The key objective of this project is to investigate the options and measures to take into account when increasing slurry storage capacity. ADAS will be making recommendations on improvement works to the current infrastructure which will protect any nearby watercourses and provide a programme of practical economic solutions to the current situation. Eoin Murphy from ADAS will undertake a farm visit to explore how best to achieve improved slurry storage capacity, focusing on:

- Reducing clean water runoff into slurry storage
- Site selection considerations
- Meeting planning and building warrant regulations

This will give an insight to the process of increasing slurry storage capacity, from water management to location suitability. According to DairyCo figures, annual rainfall is approximately 1,059mm in the area, of which approximately 524mm would be expected to fall over the worst five-month winter period. A large quantity of water reaches the current slurry lagoon including water from parlour washdown and dirty yards which is unnecessarily increasing the slurry storage capacity.



For more information on the work conducted at Graig Olway demonstration site, please visit: gov.wales/farmingconnectourfarms

Pendre - Demonstration Site

Focus Site: Pendre, Llanfihangel y Creuddyn, Aberystwyth

Technical Officer: Lisa Roberts

Project Title: Impact of rotational grazing on soil organic matter

Project Introduction:

Soil organic matter (SOM) stores carbon. As organic matter within soils increases, it sequesters carbon from the atmosphere. As well as being a sink for carbon, soil organic matter is also an important driver for fertility as it reduces nutrient losses through leaching and improves the soil's resistance to erosion.

Organic matter accumulates in the soil as dead plant material decomposes. This material can be in the form of decomposing leaves and shoots on the surface of the ground integrating into the soil, decomposing roots within the soil and decomposing ruminant manure.

Rotational grazing is conducive to building SOM due to the following reasons:

- It promotes more grass growth which produces more plant material to be recycled into the soil;
- The grazing rest period that rotational grazing provides allows for the average grass height to be taller. The taller the grass, the deeper the roots which allows for organic matter to build deeper in the soil;
- The grazing density provided by rotational grazing causes more trampling of plant material into the soil;
- The grazing density provided by rotational grazing causes a more even spread of livestock manure.

Ongoing studies are showing favourable results that rotationally grazing cattle can improve soil organic matter content, however, studies are limited for the benefits in rotationally grazing sheep. This project aims to evaluate the benefits of rotationally grazing sheep, in comparison to set stocked grazing, on the soil's organic matter content.

Tom Evans who farms at Pendre has already identified the benefits of rotational grazing on maximising stocking density and grass utilisation, and is involved in the Welsh Pasture Project which monitors grass growth on 41 farms across Wales.

Key Performance Indicators:

- Improve soil organic matter by 0.5% in 0-150mm and 0.2% in 150-400mm over the project duration
- Improve farm productivity (kg/ha) by 25%
- Improve grass growth (kgDM/ha) by 25%



Figure 1. Tom Evans undertaking a visual evaluation of soil structure.

Project Update:

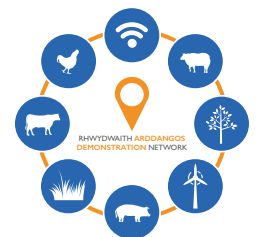
An initial assessment of soil health has been undertaken on two sections of the farm which will undergo contrasting grassland management over the duration of the project. One section will be primarily set stocked while the other section will undergo intensive rotational grazing. The soil health assessment involved a laboratory test of soil nutrients and organic matter content at different depths, a water infiltration test plus a detailed visual assessment which involves an assessment of soil structure, plant root depth, anaerobism and earthworm activity.

When examining soils, colour can give some indication of soil health with rusty mottles or spots an indication of poor drainage. Top soil rich in organic matter will be dark. Roots in a healthy free draining soil should reach depths of over 30cm and around 10-15 earthworms should be found in a cube of soil cut with a standard spade. The soil should have vertical channels between the soil blocks, and horizontal cracks are the compaction zones.

Project specialist Rhys Williams of Precision Grazing Ltd is looking forward to the results.

"As farmers, we have environmental responsibilities which are increasingly becoming highlighted. Our soils are a precious resource. Improving soil health and by doing so, increasing organic matter content has both production and environmental benefits. Here at Pendre, we hope to show that managed grazing can improve soil health and contribute to a carbon negative farming system."

For more information on the work conducted at Pendre demonstration site, please visit gov.wales/farmingconnectourfarms



Growing fodder beet successfully on Welsh farms relies on good agronomy

Achieving the highest root and leaf yield in grazing crops of fodder beet relies on good agronomy, as early as a year before seed is even planted.

Fodder beet thrives at a minimum pH of 6.5 and with good levels of phosphate and potash (P and K) therefore soil testing and correction is needed well in advance of planting, says agronomist Rhys Owen.

"Soil nutrition is key," Mr Owen told farmers at a webinar hosted by Farming Connect in conjunction with Field Options, KWS and Momont.

Crops grown on Welsh farms can yield between 20-30 tonnes of dry matter a hectare but to achieve that all stages of growth, everything from seed bed preparation and seed variety to weed and pest controls and crop nutrition, need to be optimised.

To be utilised successfully at grazing, 45-55% of the bulb must sit above the ground, so choose a seed variety that achieves this.

Promotion of early leaf growth is important too. *"Capture as much sunlight as possible in the summer months to turn into yield,"* advised Mr Owen, of seed specialists Field Options.

"Early root development also allows the plant to access nutrients in the soil."

Mr Owen recommends growing in light and medium bodied, free draining soils – fodder beet does poorly in compacted soils.

Sloping fields near to watercourses should be avoided or managed carefully.

Aim for a fine seed bed with a more open soil structure beneath to allow for good root establishment.

Plant when the soil temperature is 7°C and rising. Visit the Soil Temperature Map on the Farming Connect website to ensure the soils in your region are at a suitable temperature for sowing.

Target a plant population of 90,000 – 105,000 plants/ha. To achieve this, sow seeds at a rate of 100,000 – 124,000 seeds/ha; lower the seed rates for sheep grazing to manipulate more above-ground root.

Seeds should be precision drilled at a row spacing of 45-50cm, with 14-20cm spacing between rows; in New Zealand, the use of narrower row widths has shown yield benefits.

To aid early plant development, apply nitrogen to the seed bed and once rows are established.

Mr Owen said crops can benefit from two later applications also, at full canopy to drive yield development, and in late August, before Nitrate Vulnerable Zone (NVZ) closed periods to further promote yield of both root and leaf; this will also increase the protein content of both which is important to the performance of grazing stock.

This level of nitrogen is higher than what has historically been used for fodder beet.

Fodder beet has a high potash requirement; this can be delivered through a mixture of organic and inorganic manure sources. The potash is required for numerous processes including nitrogen uptake, which affects the protein of the crop, and is also required for the formation of sugars in the plant.

As it is a spring-sown crop, there is a good opportunity to make best use of organic manures. Farmyard manure can supply a good

amount of the P and K requirements and, if available, poultry manure will provide a higher proportion of the crop's nitrogen needs.

"This needs to be balanced with inorganic fertilisers in the seedbed so that the emerging seeds have crop available nutrients from the start," Mr Owen advised.

The crop also has a requirement for sodium, sulphur, manganese, boron and magnesium. Sodium can partly replace potash in the nutrition of beet crops but yield benefits are seen when both are applied, said Mr Owen.

Weed control is essential to prevent yield loss – just one tall weed in every square metre can result in a yield loss of 11%.

Seed bed quality will play a crucial part in optimising weed control.

Planting a break crop ahead of fodder beet can be useful for weed control. Other control methods include a stale seed bed, ploughing to bury weeds, mechanical weeding and pre- and post-emergence herbicides.

"A key to weed control success is to work closely with an experienced agronomist and an experienced sprayer operator – sprayer hygiene and timeliness of application are critical," said Mr Owen.

Prevalent pests include slugs, wireworm, flea beetles, leatherjackets, aphids and beet cyst eelworm. A BASIS accredited agronomist can provide the thresholds of each pest and advise on methods of control, including treated seed.

Yellows Virus vector control is important – monitor crops closely for aphids, especially the Peach Potato Aphid during establishment period; apply an aphicide once the threshold

of one green-wingless aphid per four plants is met. Once a crop has reached the 12th leaf stage it is largely resistant to viruses.

Foliar diseases can reduce green leaf area and result in leaf loss so treat as soon as there are signs of this and follow up with a second application of spray.

Maintaining a healthy leaf going into the winter months not only secures yield but is vital for the nutritional needs of grazing livestock.

Mr Owen urged growers to plan-ahead and work with the right people to avoid any of the challenges associated with growing fodder beet.

"Consult those that are already doing it too, to gain from their experiences" he said.



YEN Grain Nutrient Benchmarking

The Yield Enhancement Network (YEN) connects agricultural organisations and farmers who are striving to improve crop yields with the aim of closing the gap between current yields and potential yields.

The need for routine grain analysis has grown increasingly evident with grain testing of over 900 samples from YEN farmers over the last four years revealing that 74% of cereal crops were deficient in at least one nutrient. This indicates that despite the best efforts of many growers, nutrition was commonly inhibiting the full potential of their crops.

While soil analysis can identify availabilities of P, K and Mg, and leaf analysis can reveal immediate nutrient shortages, grain analysis provides information on whether a crop captured enough of each essential nutrient throughout its entire life.

It is for this reason that the AHDB's Nutrient Management Guide (RB209) will now recommend routine analysis of grain and other harvested materials alongside routine analysis of nutrients in soil. This makes the UK the first country to realise that grain analysis not only provides an accurate estimate of nutrient offtakes, but that it also provides a full and final post-mortem of the crop's levels of all 12 essential nutrients.

Equipped with a better understanding of their crop's nutritional uptake abilities, farmers and agronomists could soon target nutrients (especially P and K) more accurately, with the resulting improved outcome for nutrient applications helping to minimise costs and environmental impacts.

In time for harvest 2020, ADAS launched a new YEN initiative called 'YEN Nutrition' to support those seeking to improve the nutrition of arable crops. Available to anyone in the UK or abroad, YEN Nutrition provides comprehensive grain analysis on all 12 essential crop nutrients and allows participants to benchmark their crops' nutritional performance against other growers. Used in conjunction with soil and leaf analysis, YEN Nutrition reveals the final status of the crop, giving members oversight of their crops' ultimate nutritional achievements, and empowering them to make the right choices to enhance their future crop yields, field by field.

Samples of grain were submitted for nutrient analysis at harvest 2020 from six fields at Pantyderi demonstration site. To increase the volume of data and facilitate benchmarking against concurrent crops grown in the locality, six fields were also sampled from a further five cereal growers in the area, known as the Pembrokeshire group.

Grain analysis was carried out to provide levels of all 12 essential nutrients: nitrogen (N), potassium (K), phosphorus (P), sulphur (S), calcium (Ca), magnesium (Mg), manganese (Mn), zinc (Zn), copper (Cu), iron (Fe), boron (B), and molybdenum (Mo).

Results were then benchmarked through the YEN Grain Nutrition tool, initially for the six participating farms, followed by grain samples harvested on a national basis.

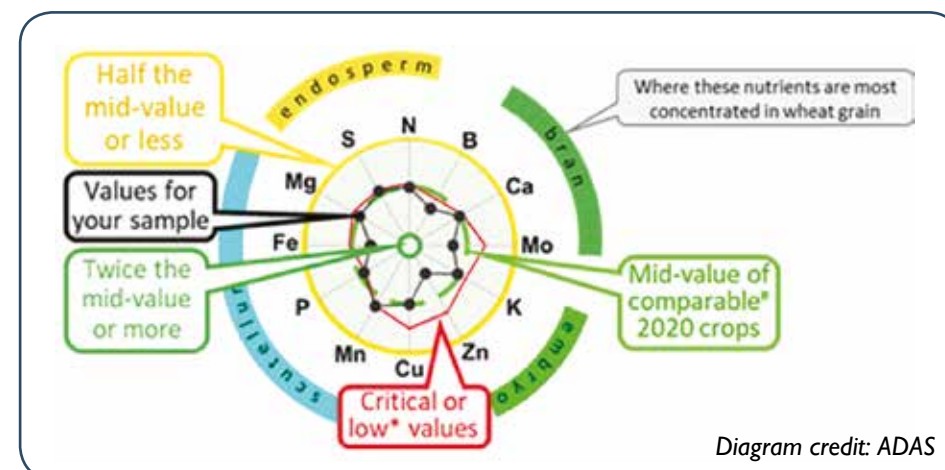
Headline national results for the 2020 harvest show:

- The most common deficiency noted is phosphorus
- Potassium is less commonly deficient than in past years
- Manganese is more commonly deficient than in past years

The Pembrokeshire group results demonstrated that:

- Nitrogen nutrition is generally too generous and occasionally excessive
- One farm showed low sulphur levels across all fields analysed whereas other farms were satisfactory for sulphur
- Manganese also appeared low on most farms growing barley

YEN Nutrition target diagram



Target nutrient levels should be just within the red circle

This information will be invaluable in helping to formulate an appropriate nutrition plan for cereal crops on these farms for the coming season, helping to improve yields, save unnecessary costs and provide for a better environmental outcome.

A full report will be provided on the website with the group's results benchmarked against national figures and compared between farms, and fields on the same farm; this information will then help prescribe improved outcomes for the nutrition of next year's grain crops.

For more information on the work conducted at Pantyderi demonstration site, please visit gov.wales/farmingconnectourfarms



Focus Site: Plas yn Iâl, Llandegla, Denbighshire

Technical Officer: Dafydd Owen

Project Title: Continuous cover forestry (CCF) in farm woodlands

Introduction:

Plas yn Iâl is a 75 hectare (ha) sheep farm that includes a 12.5ha woodland of mainly mixed broadleaf (>90%) and small components of larch and Scots' pine. The woodland is a combination of remnant natural woodland and plantation woodland with beech, sycamore and ash being the predominant species.

The main aim of the project is to integrate income generation whilst improving and enhancing environmental benefits by introducing the silvicultural practice of continuous cover forestry.

CCF is where individual trees are extracted to maintain permanent woodland cover while allowing for the production of commercial timber, hand in hand with bio-diversity. The method of single tree selection or small coupe felling creates an open canopy to increase light levels that can encourage natural regeneration or accommodate enrichment planting of alternative species that can increase the woodland's resilience to climate change.

Project Objectives:

The project will assess historical management and condition and plan the transformation to CCF whilst monitoring progress by:

- Implementing ground and drone surveys of the woodland

- Analysing data using a processing model to produce a CCF management plan
- Determining whether the viability of using a drone at scale will reduce the need for ground surveys
- Grading and valuing felled timber against cost of felling and extraction.

The CCF management plan content will include modelling and future vision for the woodland. This will provide a template for other farmers to embrace the option of CCF management which contributes to the sustainable management of natural resources whilst improving the environmental and economic performance of the farm business.

"We hope to follow the plan and manage the trees sustainably. It is important to appreciate and understand the potential of farm woodlands rather than seeing the trees as a supply of firewood," said Huw Beech who farms at Plas yn Iâl.



Figure 1. Plas yn Iâl woodlands pre-management.

For more information on the work conducted at Plas yn Iâl Focus Site please visit: gov.wales/farmingconnectourfarms

Managing farm woodlands for biodiversity

Geraint Jones, Farming Connect - Forestry Technical Officer

Farm woodlands are a major influence on the character of our landscape and biodiversity provision in Wales. To sustain the benefits of such woods and to secure and strengthen woodland ecosystems to withstand a number of pressures including climate change and emerging pests and diseases, it's important to recognise that a need for an appropriate level of management is required.

There are many ways to improve your woodland habitat for the benefit of biodiversity. But woodland structure should be focussed on as a prime objective comprising of several characteristics with none being dominant. Developing structural diversity within woodlands will produce a mosaic of habitats whilst a diverse mixture of tree species and ages will maximise the range of species the woodland can support, as different species are adapted to different environmental conditions. Therefore, features that should be focussed on include structural diversity accommodating key habitats with the potential to support a huge diversity of plants, animals and fungi. These include:

- Ground layer: grasses, ferns, flowering plants and lichens.
- Shrub layer: the low-growing plants and shrubs that are shade tolerant and reach up to about 5m in height.

- Understorey: this usually consists of low-growing and immature trees.
- Canopy layer: mature trees that are a range of different heights.

Woodland characteristics include:

- Open areas such as glades or rides that have no mature trees.
- Edge habitat which is where woodland meets an open space e.g. tracks, rides or open ground.
- Scrub is an extremely important habitat and an integral element of woodland edge design.
- Wet areas and flushes - preserving existing hydrology by avoiding disturbance and any intervention is essential.
- Deadwood should exist throughout the woodland structure, including snags caught in the canopy, standing and fallen dead and windblown trees.
- Veteran trees are a priority and should be protected as they support a diverse range of flora and fauna including lichens, bryophytes and fungi that carry out the essential ecological processes that allows the woodland ecosystem to thrive.

The value of biodiverse farm woodlands and the multiple ecosystem services they provide, achieved by appropriate management, will safeguard biodiversity and improve woodland resilience.

Remember to book your place on to the "Biodiversity on our farms - what's the story?" webinar on 26 January at 19:30 by visiting the Farming Connect website gov.wales/farmingconnectevents.

Dr Glenda Thomas, FWAG, will be presenting a project to deliver biodiversity audits on three Farming Connect demonstration sites and discuss what will be surveyed and possible options for implementing improvements to enhance the farm's biodiversity status.

SUSTAINABLE SOIL AMENDMENTS

Soil amendments are materials which are added to the soil to improve its structure, provide nutrients and promote healthy plant growth. Many different kinds of soil amendments exist, however, in this two year EIP Wales project, running until June 2022, four experienced farmers/horticultural growers from across mid and south Wales will be trialling three different organic soil amendments to assess the impact on plant growth. The three amendments are:

1. Molinia biochar
2. Animal bedding co-composted with sheep's wool (20% wool, 80% manure)
3. Animal bedding compost with Molinia biochar (20% biochar, 80% manure)

Biochar is produced through a process called pyrolysis, which is the cooking of any organic material at high temperatures and with limited amounts of oxygen. The resulting biochar can be as high as 78% carbon as well as having small amounts of nitrogen, sulphur, phosphorus, potassium and other mineral elements. Tony Davies, one of the four farmers involved in the project, who farms at Henfron in the Elan Valley produces biochar from Molinia grass which covers large areas of the Cambrian mountains. Harvesting overgrown Molinia improves the agricultural productivity of the land whilst improving diversity of habitat which makes it a perfect material for biochar production.

Fresh sheep's tail wool has little use or value to farmers, however, when it decomposes



Tony Davies, Henfron, Elan Valley

it acts as a source of slow release nitrogen, along with other key trace elements such as potassium, phosphorus and iron. This also makes tail wool ideal for composting due to the extra nitrogen in the dirt and faeces.

A variety of different vegetables and plants will be grown in plots on each site using the three different soil amendments to establish their effects on growth, health, yield and quality.

The aims of this project are to:

- Demonstrate if vegetable yields can be improved with low carbon footprint alternatives to inorganic fertilisers
- Develop a sustainable market for Molinia to encourage its removal and improve upland biodiversity
- Develop a method to increase the quantity of carbon sequestered in soil
- Provide an alternative to peat based composts/soil conditioners
- Develop a market for tail wool (which currently has no use or value)

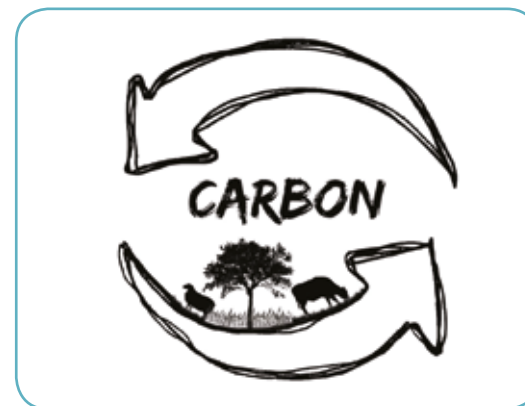
CARBON NEUTRAL FARMING – THE PATH TO 'NET ZERO'

Climate change is an evolving challenge with consumers and those in the supply chain active in the debate. When seeking for solutions, considerable pressure and challenge is being placed upon farmers. Government policies and targets are also changing and greenhouse gas (GHG) reduction targets have now been replaced with a 'net zero' target for the UK by 2050 and the NFU setting a target to reach 'net zero' in agriculture by 2040. But how are we going to get there? What is 'net zero' and what does it mean for farmers in Wales?

This two year project, aims to:

1. Gain more understanding on what 'net zero' is and what it means for farmers in Wales
2. Create a baseline from which action can be taken and measured
3. Improve evidence to generate a clear narrative that describes the valuable role that farming plays in meeting climate challenge and environmental priorities

The six farmers from the Brecon area involved in the project represent a variety of farming systems including crop production, dairy, beef and sheep. They will work closely with Bangor University and Forest Research to assess their GHG emissions and sequestrations to determine the current position (baseline) in relation to 'net zero' targets.



The data collected on farm GHG emissions will include:

- Livestock numbers, management and feed inputs
- Nutrient management information relating to fertiliser and manure application.
- Information relating to other inputs such as fuel, electricity, lime and animal bedding

The data collected on farm GHG sequestration will concentrate on carbon stock above and below ground:

- Soil Organic Carbon (SOC) stocks and stock exchange determined from soil sampling fields
- Above ground carbon stocks such as hedgerows and woodlands
- Assessing the opportunities for woody biomass accumulation such as leaving hedgerows uncut, and also assessing options for managing harvested wood such as chipping for biomass, compost or bedding.

This project will hopefully provide farmers with a more accurate understanding of a commercial farm carbon balance and what can be done within agriculture to contribute towards achieving a net zero target.

Listen to the podcast **'Episode 30 - Carbon neutral farming – the path to 'net zero''** on the Farming Connect website.

The Farming Connect Knowledge Exchange Hub

The Farming Connect Knowledge Exchange Hub (KE Hub) is based at IBERS, Aberystwyth University. Our colleagues there are playing an important role in providing farmers with the latest information from scientific research.

Air pollution from agriculture

Dr Will Stiles from the Knowledge Exchange Hub describes how agriculture, as well as other industries, can contribute to air pollution. In August 2020, Welsh Government published the Clean Air Policy for Wales: Healthy Air, Healthy Wales. Agriculture has an important role in helping to improve air quality but a joint effort from all industries is required as Dr Stiles explains.

Air pollution is currently the single biggest environmental health risk globally. Current levels of air pollution in Wales constitute a major health risk, which is considered by Public Health Wales to be second only to smoking in terms of its impact.

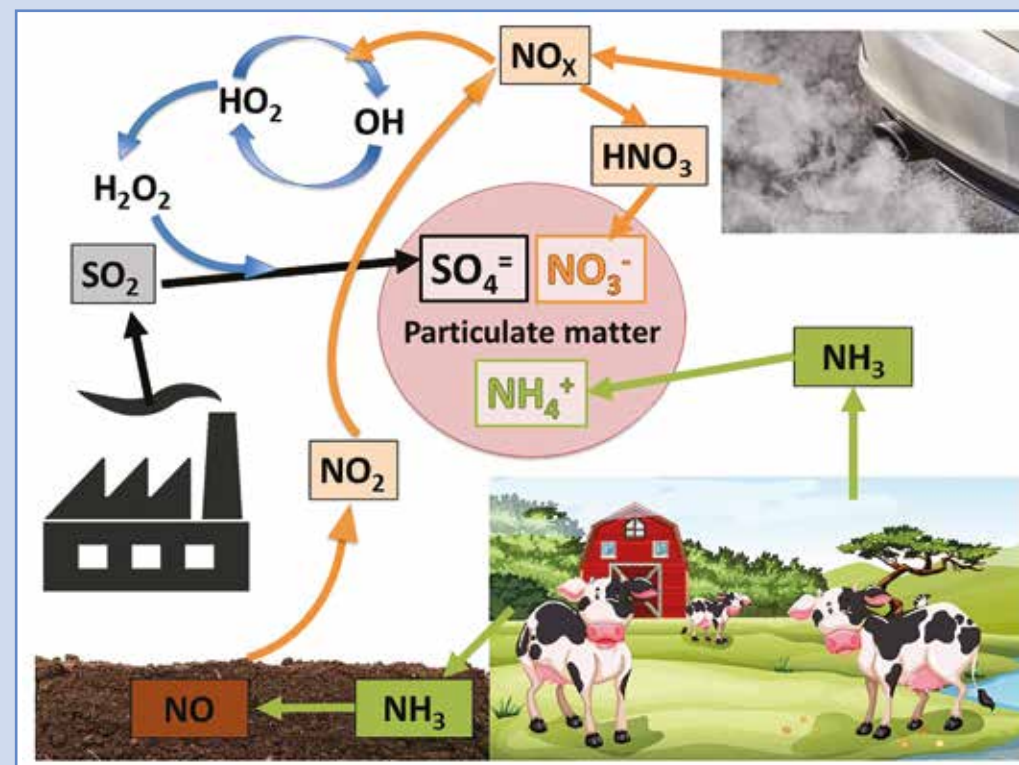
Air pollution is emitted from a range of sources including industry, transport, power generation and agriculture. Materials that contribute to air pollution are varied and can originate from a range of natural and man-made sources. Air pollutants can also be formed in the atmosphere after chemical reaction of other primary pollutant materials to form secondary pollutants, including particulate matter. Natural sources of air pollution include dust or wind-blown soil particles, pollen, salt from the sea and others. Man-made sources are typically emissions resulting from activities such as the burning of fuels. For agriculture, the primary contribution to air pollution is through the emission of ammonia.

Ammonia originates from the break down and volatilisation of urea. The majority of ammonia emissions from Welsh agriculture are the result of livestock management or the use of fertiliser. The biggest source in Wales is cattle manure management, which contributes 41% of agricultural emissions. Other key sources of ammonia include manure applied to soils (26.8%), grazing animal excreta (14.5%), and inorganic fertiliser usage (10.2%).

The emissions of ammonia from agricultural activities presents a range of challenges in terms of environmental impact. Emitted as a gas, ammonia can travel large distances and can result in various environmental effects including eutrophication, acidification and direct toxicity. In addition, when in the atmosphere, ammonia can combine with other materials to become secondary particulate matter, which is a major air pollutant with the potential to severely damage human health and wellbeing.

Formation of secondary particulate matter occurs when the emission products from different pollutant sources, such as industry and transport, combine to form inorganic aerosols. As an example, ammonia from agriculture can combine with other materials to form ammonium compounds, including ammonium sulphate ($(\text{NH}_4)_2\text{SO}_4$), ammonium bisulphate (NH_4HSO_4) and ammonium nitrate (NH_4NO_3). Once in this state, this material can penetrate deep into the lungs and cause a range of issues, including respiratory and cardiovascular illness and mortality.

Thus, reducing the emission of ammonia is a key goal for Welsh agriculture in order to reduce air pollution, which will reduce the impact to human health, and environmental degradation.

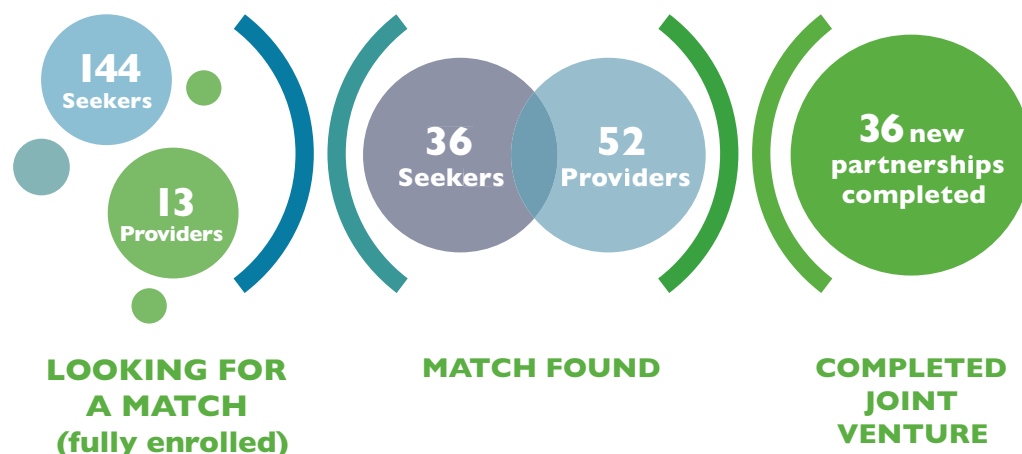


Venture programme celebrates five years of matching future farmers with landowners



617
EXPRESSIONS OF INTEREST
SUBMITTED SINCE THE
START OF VENTURE

245
ACTIVE
PARTICIPANTS



The Venture programme marks its fifth anniversary with a new approach as its farming opportunities are now advertised on the website, becoming more accessible and improving the application process for aspiring new entrants. The opportunities up for grabs are varied and offer something for both the inexperienced newbie and more daring farming entrepreneurs. Opportunity 'Seekers' will no longer need to complete a Venture profile to access the landowner profiles and will now be able to apply for opportunities directly, as they would for a new job.

Since its launch, Venture has established 36 new joint ventures and has a further 88 individuals matched up and ready to develop agreements.

The programme was originally designed to match farmers and landowners who are looking to step back from the industry with new entrants looking for a way into farming. It guides people on both sides through the key steps required to find a potential business partner. The package of support offers a matching service, mentoring, business planning and legal advice to provide guidance at every stage of establishing a joint venture.

In addition to offering that helping hand to get on the farming ladder for aspiring young farmers, the programme can also help address succession dilemmas within family farming businesses and offers funding to develop collaborative farming arrangements to enable a smoother and fairer transition to the next generation.

It can also help recruit staff and secure employment opportunities, which in time address skills gaps, build experience and create stepping stones to bigger opportunities.

The Venture booklet, available both in hardcopy and online provides information on the various options available. It covers employment contracts which allow the landowner to retain control while the young entrant gains experience; shared control arrangements such as share farming which might allow the landowner to take a back seat in the day to day farming duties; through to long term lets and tenancies which offer the young entrant the freedom to develop their own farming system. They are all varieties of joint ventures and can be supported through the Venture programme.

Working with your accredited adviser, business planning advice and legal guidance is fully funded up to 1,500 Euros for each party involved.

Einir Davies, Venture programme manager is pleased with the programme's achievements and says that, "the funding that is available to advise farmers on the most suitable arrangement is providing peace of mind to both parties that their plans are viable, realistic and fair. This helps develop a healthy working relationship and effective communication, which is key".

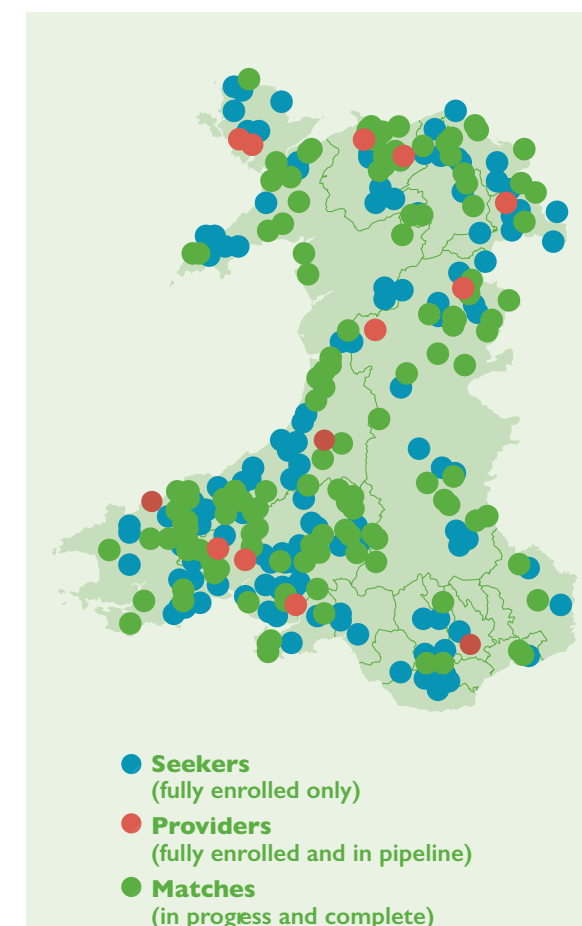
Enthusiastic new entrants looking to get on the farming ladder should visit the Farming Connect website to browse the Venture opportunities and apply. Meanwhile,

landowners who want to discuss their options as they begin stepping back from full time farming should contact the Venture officer for their area –

Gwydion Owen, North Wales Officer -
07498 055 416
gwydion.owen@menterabusnes.co.uk

or

Delyth Jones, South Wales Officer -
07985 155 670
delyth.jones@menterabusnes.co.uk



New year...new skill?

Learn how to reduce the risk of on-farm accidents

Year on year we hear about life-changing and sometimes fatal farm accidents. Each one has devastating consequences for all those involved and their families.

APPLY FOR SUBSIDISED FARM SAFETY TRAINING

Application window open **NOW** until **17:00 Friday, 26 February 2021**

Machinery and equipment courses – **40% funded**

Our training will help you stay safe as you drive or handle...

- Tractors • Rough terrain vehicles including ATVs
- Telescopic handlers • Chainsaws

Health and Safety courses – **80% funded**

Learn how to take better care of yourself, family members and workers.

More than **70 short courses** to choose from including...

- First aid • On-farm risk assessments • Working safely from heights
- Livestock handling • Handling dangerous on-farm substances
- Safe food preparation • Preparing for a health and safety inspection

Please note: To be eligible for subsidised training, you must be registered with Farming Connect. If you are not already registered, you must do so before 17:00 Monday 22 February 2021.



For further information on all Farming Connect training, including a list of all available courses and training providers, visit gov.wales/farmingconnectskillsandtraining.

Alternatively, call the Service Centre on **08456 000 813** or contact your local development officer.

Let's talk business... prepare NOW for 2021

Are you ready to grasp the opportunities and face the challenges ahead? Subsidised, confidential, advice available through the Farming Connect Advisory Service will help you prepare your business for the future. It can help you ensure your business is ready to adapt and achieve optimum efficiency and profit levels across all areas of working.

"Specialist advice you seek today will help you prepare your business for tomorrow," says Eirwen Williams, director of rural programmes with Menter a Busnes, which delivers Farming Connect on behalf of the Welsh Government.

As the farm and forestry industries grapple with the implications of Brexit, Covid-19 and changes to the Basic Payment Scheme, Farming Connect is urging business to apply for the Advisory Service to help them ensure their business is well prepared.

Broadly split into business and technical advice, eligible registered businesses can seek a full-scale review of their business and identify areas to strengthen, or hone into specific areas such as soil and forage analysis, guidance on livestock, biodiversity or farming 'greener'.

"If you cannot be certain you are making best use of all the resources available to you and that your business is sufficiently flexible to adapt quickly to the changes widely expected, apply now," advises Mrs Williams.

"Provided you have a robust, up to date business plan, you'll know what your goals are and what steps you may need to take to ensure your business remains profitable and sustainable whatever changes lie ahead.

"Doing things the way you've always done them may no longer be an option for many businesses as we head into the New Year, new ways of operating and new economic pressures."

To browse the list of approved Advisory Service consultancy firms and categories of advice available, visit www.gov.wales/farmingconnect



Jonathan Scott runs a herd of 270 dairy cows at his 440 acre tenanted holding near Wrexham.

"The business plan gave us clear goals to work towards, we know where we stand, and where we need to be in five years' time. This is still work in progress but we are in a much stronger position to face the future with optimism."

Fully-funded IT training

...need a helping hand?

FOR COMPLETE BEGINNERS:

A six-week training course, provided via a two-hour session per week, designed to give you basic IT skills you can use within your business. Delivered throughout Wales at a level and pace to suit everyone.

Due to the current Covid-19 restrictions, we are also running Computers for Beginners as a fully funded home course, where you can work through a learning booklet from the comfort of your home, at a pace and time to suit you, with telephone support from your local college.

ONE-TO-ONE TUTORING:

Up to two fully-funded two-hour telephone, online or digital tutoring from specialist IT tutors. Training tailored to your requirements, focusing on any problems or gaps in your knowledge.

Do you want to improve your spreadsheet knowledge? If so, we have standalone Microsoft Excel courses available!

For further information, visit
www.gov.wales/farmingconnect or
call the Farming Connect Service Centre
on **08456 000 813**

