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What's been happening?

Weather aside, we have had some exciting results from Woodhead, our first climate change focus farm to report their carbon footprinting results and financial savings. We take a look at how Woodhead dairy achieved a 6% reduction in their farm carbon footprint and over £60,000 of efficiency savings.

We are currently collating the data for six other farms and should be able to report their results later in the year. Keep an eye on our Facebook and Twitter @SACFarm4Climate pages for updates.

David Barron at Nether Aden is currently trialing the use of new equipment to improve fuel efficiency on his telehandler, and John Mitchell at Rumbletonrig has been considering alternative bedding options. We will take a look at both of these in the newsletter.

Working closely with the Farm Advisory Service (FAS), meetings are well underway across Scotland. Take a look at www.fas.scot for details of events coming up near you. The meetings are free to attend and a good opportunity to discuss topical issues and hear from other farmers about their experiences.

There’s more information on practical, low or no cost ideas to improve farm business efficiency and reduce the farm carbon footprint on our webpages - even the most technically efficient could still pick up a few tips and ideas to benefit the farm at home.
Getting to the finish

Final meeting of the HiFEN group

Working together as the Highland Farming Efficiency Network (HiFEN), three farming families have exchanged ideas and worked towards reducing their farm carbon footprint as part of the climate change focus farm initiative. Soil management, pH, grazing management and livestock performance were all targeted.

At the final meeting, held at Dingwall Mart in March, we heard from Jason and Victoria Ballantyne from Clynelish, Stephen and Sheena MacKenzie from Auchmore and David Girvan from Corrimony about some of their findings and changes they had made over the three years through the initiative.

Although some of the measures may seem small, when you add everything up over the three years, its an impressive amount of work!

We will be able to share cost and carbon savings in the next newsletter.

Carbon efficiency cuts farm costs

Woodhead farm saves over £60,000 and cuts the farm carbon footprint by 6%

Practical measures have saved focus farmers John and Anne Kerr from Woodhead, near Newmilns, £63,000 and reduced the carbon footprint by 6%.

John and Anne’s 180-cow dairy farm is one of nine focus farms across Scotland participating in the Farming for a Better Climate focus farm initiative. Measures John and Anne put in place included:

- Installation of a biomass boiler to produce heat from woodchip. This has reduced electricity use by 32 per cent per year
- Making more use of the smaller tractor on the feed wagon, saving around 4,400 litres of fuel per year
- Nutrient budgeting saving around £5,000 in fertiliser costs
- Improvements to cow housing ventilation and light levels. By removing some of the side sheets from the cubicle shed, lighting can be switched off during the day to save electricity and the cows have well-ventilated accommodation, reducing disease risk.

With support from SAC Consultants Robert Ramsay and Andrew Taylor, John and Anne looked across the business and made a number of changes to the way they have done things in the past. Andrew said: “Some changes can seem quite small on their own, however most are cumulative and continue to save the business money and carbon on an ongoing basis. John and Anne have made a healthy cash saving and reduced carbon footprint with no loss of production”.

John has made a number of short videos about work he has done as part of the project, you can view them via the Woodhead webpage at www.farmingforabetterclimate.org

Pic: From Left to right; back row Jason Ballantyne and David Girvan. Front row Victoria Ballantyne, Sheena MacKenzie and Barbara Girvan.
Hydrogen technology features at Nether Aden

Using new technology to improve farm efficiency

David Barron, focus farmer at Nether Aden, Mintlaw, already has various projects underway on the farm looking at improvements to the efficiency of crop and beef production. David has also been considering ways he can reduce consumption of energy from fossil fuels on the farm. This has led him to explore hydrogen technology.

With fuel a significant cost to his business, David set about looking to see how he could reduce costs and perhaps in doing so, cut emissions. Interested in the use of hydrogen as a fuel, David was able to secure funding through the project to test out a hydrogen electrolyser on his JCB telehandler. The hydrogen electrolyser has now been in operation for several months.

The electrolyser works alongside conventional fossil fuels, it does not replace them. It has been retro-fitted to the engine of the JCB and works by running an electrical current through water, effectively “splitting” the water into hydrogen and oxygen. In this case, the gas is collected as oxyhydrogen which is then injected into the existing diesel engine on the vehicle to supplement the diesel fuel. It is claimed that the system accelerates the combustion process leading to the cleaner and faster burning of the fuel mixture resulting in a more efficient combustion of the fuel. This in turn gives a reduction in fuel use plus lower emissions. Approximately an 80% reduction in emissions is claimed. The system therefore produces hydrogen as its required by the vehicle, with no need for tanks for storage of the hydrogen. Manufacturers claim potential fuel savings by using the electrolyser of between 11% and 29%. Currently at Nether Aden, diesel savings have been calculated at around 20%, but the study has only been running for a short period of time so far. Data will continue to be collected over a longer time period.

“Fuel is one of the main costs for my business” says David, “a fuel that can potentially reduce these financial costs while also reducing harmful emissions must be investigated to find out what benefits it can bring”

An on-farm meeting looked at the Hydrogen kit David had installed. You can read the notes from the meeting via the climate change focus farm pages at www.farmingforabetterclimate.org

Gaining production improvements using genomics and animal health

Livestock genetics was the focus of a recent focus farm discussion group meeting with John Mitchell at Rumbletonrig. With guest speakers SAC Consulting vet Catriona Dykes and SRUC geneticist Prof. Eileen Wall, the group covered topics ranging from BVD testing, the benefits of using individual bull paddocks, to measuring pelvic width in bulling heifers.

The group also had a preview of the SAHPS (Scottish Animal Health Planning System) mobile app that could help to manage cattle data and health records. For more information, contact Rumbletonrig farm facilitator Donald.Dunbar@sac.co.uk
Tips for improving efficiency in dairy systems

Aid farm profitability and reduce carbon emissions

Automatic feeding of calves has gained in popularity over the last couple of decades however old problems are not always solved with new technologies. That was one of the messages at a recent Precision Dairy Day held at The Barony farm and attended by the Hillend discussion group.

Farmers were reminded of the five C’s’ - Control; Calf; Consistency; Calibration; and Cleanliness. Unless the 5 C’s are managed accordingly and to the best of the farmers abilities, any time saving of 10 minutes per calve per day with the new feeding technologies could be wiped out.

A range of other measures to improve profitability within the herd, both available now and those still at the trial stage, were covered on the day. Key points included:

- **Satellite technology for maximising grassland output & herbage** - Research using satellite technology has shown that an increase of 13% in terms of dry matter yield on a three cut silage system can be achieved though using controlled traffic management systems in silage fields.

- **Grass and clover testing** - New technology is being considered to aid the compulsory grass herbage and clover testing that is taking place as part of European requirements in Scotland. As a result, new grass and clover varieties coming on to the market should be capable of increasing grass yields by 0.5% a year. By using varieties which are on the recommended list, farmers are using grass varieties which have been tested for Scottish conditions.

- **Predicting methane emissions & using nutrition to reduce greenhouse gas emissions** - Research at SRUC is looking into different nutritional strategies to try to reduce enteric methane emissions. Currently, the most likely contenders are thought to be the use of lipid (oils and fats) or a nitrate compound like calcium nitrate. Oils and fats are available in Scotland, with already tried and tested safe levels within rations. However using nitrate compounds as a feed is a step on from this and would require careful training, guidelines and management. A cautious approach is being taken in countries where the practice is being adopted.

- **Early warning to detect health issues** - work is underway to identify early warning signs of illness and disease such as mastitis, lameness and pneumonia. The use of thermal imaging is showing promising results in the early identification diseases and infections. Early intervention will reduce discomfort, any long term damage to the cow and minimise costs in terms of loss of milk sales.

Following discussion at the event, a number of the farmers said they were going to review calf husbandry, paying closer attention to calf health at home, and take a second look at soils and the use of GPS.

Calculating carbon at Castlemains

Calculating carbon savings

We’ve been working with Bob Simpson at Castlemains to get final figures together to present to the discussion group in July.

So far it looks like improving nutrient use efficiency is one of the measures that has helped Bob save money and cut his farm carbon footprint. We will have more to report in the next newsletter or keep an eye on our Facebook and twitter pages.
Tips and ideas shared at events across Scotland

Under the Scottish Government Farm Advisory Service (FAS), there have been a number of events featuring Farming for a Better Climate, looking at practical ways we can improve farm efficiency and reduce our carbon footprint. You can read more about these events on the Climate Change FAS pages, or see the events calendar at [www.fas.scot](http://www.fas.scot) for events near you. Here is a selection of some of the recent activities across Scotland.

Integrated crop management (ICM)

The ICM roadshow continued into the beginning of 2018 with events in Fife, Aberdeenshire and Moray.

Dr Andy Evans held interesting talks on options for controlling slugs, leather jackets and aphids in the ‘new’ age of using cultural approaches, e.g. soil management, traps and sampling. More information can be found [here](http://www.fas.scot).

The importance of integrated pest management strategies was also discussed by Dr Henry Creisson to show benefits to your farm/business. Here are some of Henry’s top tips:

- Understand the biology of the pests/diseases/weed you are trying to control
- Suitable combinations of control measures need to be selected to tackle specific issues
- Continued monitoring is very important so you can react quickly to change
- An IPM plan will help focus efforts on your farm/business
- Know your soil
- Prevention is better than cure, can you implement new/different practices to reduce soil structure damage and reduced yields?

Other topics discussed the benefits of [drones](http://www.fas.scot) in arable farming and how [GPS soil sampling](http://www.fas.scot) can improve soil and nutrient management, improve yield and save input costs.

Soil and Nutrient Network farms

The last of 3 meetings of the Roxburghshire Soil & Nutrient Network took place at Stichill in February 2018. The group looked at farmgate nutrient balance, using host farm Girrick as an example. The key findings from Stichill include:

- Working out your farmgate nutrient balance offers a way to see if your farm has a surplus or deficit of key nutrients
- Regular organic matter returns and conservation of existing soil organic matter are vital in order to maintain and enhance soil health.
- Growing green manures or cover crops, applying FYM, incorporating crop residues and minimizing intensive cultivations are the main way to maintain or improve soil organic matter levels
- Do you get your fertiliser checked every year? The cost of a professional test can be recouped over a relatively small area in many cases
- Whilst the cost of GPS soil sampling is higher than that of traditional methods, a net saving can often be made when less lime is required to raise pH as application will be more targeted.

For more information on Nutrient Network Farms please visit the [Scottish Farm Advisory Service’s webpage](http://www.fas.scot).
Nutrient Planning

As the NVZ deadline approached, farmers in the Borders were invited to a workshop to revisit NVZ planning and record keeping requirements.

This practical, ‘how to’ session covered: RAMS map; Calculation and record of storage capacity of livestock manures; Calculation and record of 170kg N/ha loading limit for livestock manure (livestock numbers); and an Nmax calculation for each crop type (field records).

Could you benefit from small scale woodland?

Farmers and crofters were invited to the west coast of Lewis for a tour of small woodlands, looking at the opportunities that creating woodlands can offer an exposed crofting landscape.

The tour highlighted planting techniques and discussed how higher density planting and access to ground suitable in depth and nutrient capacity was possible. Moving schemes forward was highlighted by examining the possible funding options open, details can be found here.

Coping with the weather

As a result of the extreme weather experienced in 2017/2018 farm businesses faced tough challenges.

Earlier in the year, before we began this run of summer heat, a series of meetings in southeast Scotland discussed some of the wet weather issues faced and how farm businesses can become more resilient in the future.

Due to the challenges presented this year, ‘mental health awareness’, was top of the list, highlighting support available through RSABI charity, which focuses on ‘Supporting People in Scottish Agriculture’.

Forage shortage was discussed in detail, looking at feed budgeting, alternative feeds, managing stock and reducing bedding requirement. Speakers stressed we need to be prepared for this and other knock on events from unseasonal or extreme weather in the future. Our weather patterns are changing - farm businesses need to be as prepared as they can be to face the challenges posed by prolonged spells of cold/wet/hot/dry weather. Key messages from the meetings were:

• Make a plan for the coming year, doing this will make you aware of this year’s impact and how best to prepare your farm for future challenges.
• If caught short and don’t have enough feed; minimise mouths or make use of alternative feed from any surrounding resources available.
• Consider alternative grazing strategies, for example paddock grazing utilises a smaller area and has high rewards.
• Clearing and maintaining drainage systems will reduce the volume of surface water in wet weather.
• Drainage in summer months may reduce soil compaction and damage compared to winter months.

Renewables - options still available

In May our team attended the All Energy event, chairing and speaking at the Farming/landowning community sessions looking at new approaches to enhancing income streams through energy.

The informative two day conference suggested other options farmers and land managers could consider to benefit from renewables. Green hydrogen and energy storage were hot topics and will be covered in more detail later this year by our renewables team. Follow Farming for a Better Climate on social media to receive updates.
What’s your livestock slurry actually worth?

Earlier in the year our column in Farming Scotland Magazine looked at the value of slurry, which can often be overlooked.

Livestock slurry and manures have a real cash value in terms of nutrient content, but this can be variable so its worth getting slurry and manures analysed. The amount of available nutrients in slurry and manures will also depend on the volume applied; Table 1 indicates the amount of nutrient applied at various application rates:

Table 1: Nutrients applied at various application rates

<table>
<thead>
<tr>
<th>Cattle Slurry Application rate</th>
<th>Applied Nutrient (kg/ha)</th>
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<tbody>
<tr>
<td>Litres per hectare</td>
<td>(gallons per acre)</td>
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<td>15,000</td>
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However not all the nutrients are available in the year of application, with only around 50% of the Phosphate and 90% of the Potash being accessible. Depending on timing and method of application, between 10% and 65% of the Total Nitrogen is available to the following crop.

The best time to apply slurry is during the spring and summer to obtain the maximum amount of Nitrogen for the following crop. Band spreading or shallow injection methods of application maximise the amount of Nitrogen for plant growth compared to surface spreading.

The value of an application of slurry at the correct time and using the best equipment can be seen in Table 2. The values have been calculated using current costs for Ammonium Nitrate (£243/T), Triple Super Phosphate (£305/T) and Muriate of Potash (£280/T).

Table 2. Potential financial value in slurry and manures

<table>
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As the value of the Sulphate has not been included, the total benefit to the farm could be slightly higher than the value in the table above.

SRUC Technical Note “TN 650 Optimising the application of bulky organic fertilisers” provides additional information, including typical nutrient content of various slurry and manures. The Technical Note is available via the Farm Advisory Service (FAS) at [www.fas.scot/publications/technical-notes/](http://www.fas.scot/publications/technical-notes/).

Thinking of using compost or digestate to boost farm soil fertility?

If so, you might want to take a look at the new FAS Technical Note [TN699 Agricultural use of biosolids, composts and anaerobic digestates and other industrial organic fertilisers](http://www.fas.scot/publications/technical-notes/). They could be a great addition to your business, but make sure you know what you are getting.

NFUS, in collaboration with Zero Waste Scotland, have also put together a handy booklet. You can take a look [here](http://www.fas.scot/publications/technical-notes/).
Creating a buzz around pollinators

Through the FAS programme, we also looked at some ideas to improve farm biodiversity, making you more resilient in the face of a changing climate. There are a number of ways you could help pollinating insects do their work, for ideas take a look at the FAS pages and search for pollinators.

Hints and tips on video

Got a couple of minutes? From how body condition scoring to protecting farm soils from compaction - have a look at some of the videos Farming for a Better Climate has been involved with under the Farm Advisory Service (FAS) at www.fas.scot/climate-change-environment-videos/
Its not just books you get from the library...

We had a model farm on display at Ayr Show this year to showcase some of the things John and Anne Kerr had put in place at Woodhead. One of the things we wanted to highlight was the calf housing, and how John had started to use igloos.

Our model farm supplier didn't do igloos. That got Farm Facilitator Andrew Taylor and Project Coordinator Sarah Kerr thinking about how they could make their own (after suggestions from the older generation about building one from papier-mâché were swiftly dismissed). Sarah investigated if and where this could be done using a 3D printer; Andrew put together some scale drawings and South Ayrshire Library was kindly able to 'print one out' for us. Much more professional looking than papier-mâché ...

Focus Farm featured in Scottish Government Climate Change Plan

In 2009, the Scottish Parliament passed what has been recognized as “the most ambitious climate change legislation anywhere in the world”. The act gave us a target of a 42% reduction in emissions by 2020 and an 80% reduction in emissions by 2050.

The plan covers all sectors in Scotland, ranging from electricity and transport to buildings and waste and charts what steps we need to take to cut our emissions. Chapter 7 of the document outlines the proposals and policies relating to the agricultural sector, and how we will can contribute towards achieving Scotland's emission targets.

It's great to see the Farming for a Better Climate initiative featured throughout the Climate Change Plan as one of the ways Scotland is combatting working towards is climate change goals. The plan also includes a case study from Woodhead focus farm, showing practical and profitable measures farmers can consider to reduce greenhouse gas emissions and benefit the farm business.

New look FFBC webpages

We've updated our Climate Change Focus Farms page on our website. You can learn more about ways to cut carbon and benefit the farm business, read notes from the various meetings covering key topics or watch short videos about the work at the host focus farms.

Have a look at www.farmingforabetterclimate.org
Farming for a Better Climate - improve profit and environmental performance

With Scottish Government funding and support from NFUS, SAC Consulting are running the Farming for a Better Climate (FFBC) initiative. With input from working farmers, FFBC considers straightforward and practical ways we can improve business profitability, which will in turn help to reduce farm greenhouse gas emissions linked to climate change and demonstrate that farmers are also taking action to reduce emissions.

There’s no one measure, but instead a whole range of ideas suitable for most farms that could benefit the farm business and help to reduce emissions through improved efficiency. Tips and ideas are grouped under five key action areas:

- Using electricity and fuels efficiently
- Developing renewable energy
- Locking carbon into the farm
- Making the best use of nutrients
- Optimising livestock management

Each Focus Farm has hosted a series of practical, on-farm meetings with farmer speakers, SRUC Consultants and industry specialists to look at practical ways to strengthen and develop the farm business. The map shows the location of both past and present farms involved in the focus farm programme.

Why tackle carbon emissions?
Improved farm efficiencies will result in less waste & more profit for the farm business. Taking action as a sector, to reduce GHG emissions and to adapt to a changing climate, will secure farm viability and could also demonstrate that the sector is taking positive action, removing the need for future regulations.

There’s more information on our [webpage](http://www.fas.scot/carbon-audits/) and at [www.fas.scot/carbon-audits/](http://www.fas.scot/carbon-audits/)

Cutting carbon for cash saving
Carrying out a carbon audit on your farm may help you to take a fresh look at your business, compare your performance with your peers and identify areas for cash savings.

Farms with a low carbon footprint are often also the most efficient. A carbon audit helps quantify the farm’s greenhouse gas emissions. Acting on this information not only helps minimise emissions but can provide significant efficiency & economic benefits at farm level.
Further information and contact details

There’s more information about the changes taking place on the host farms, along with dates of our forthcoming meetings on our Facebook and Twitter feeds. You can read more about the farms, download practical guides and case studies at www.farmingforabetterclimate.org

Get in touch - contact one of the team:

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Thank you for reading the newsletter. If you would like to be notified when the next newsletter is out, email climatechange@sac.co.uk and ask to be included on the mailing list. Your email details won’t be shared with anyone else. You can also keep up to date with the project via Twitter @SACfarm4climate or find us on Facebook

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