The Farming for a Better Climate (FFBC) newsletter keeps you up to date with some of the ideas discussed on the Focus Farms and at Farm Advisory Service (FAS) meetings across Scotland which could help you improve farm efficiency and profitability and reduce your farm carbon footprint.

In this edition...

- What's been happening?
- Focus Farm Findings - Part 1
- Castlemains
- Woodhead
- Clynelish
- Auchmore
- Corrimony
- Could you benefit from the Focus Farm findings?
- Earthworms can help supply more nutrients to farm soils
- Has it been one of the warmest years on record?
- Keeping the cash value in slurry
- Taking the time for nutrient budgeting can pay off
- Making the most of on-site energy generation
- Could you cut your fuel bill?
- Farmers on film
- Farming for a Better Climate - improve profit and environmental performance
- Further information and contact details

What's been happening?

Work with our volunteer Climate Change Focus Farmers over the past three (and in some cases four) years, is coming to a close. There have been some great results, from cumulative savings of around £60k and a percentage reduction in the farm carbon footprint, to approaching things differently saving time and hassle, all through reviewing current practice and making some strategic tweaks to routine operations. This newsletter features some of the findings from five of the nine focus farms.

We’ve seen some record breaking weather since our last newsletter. Pleasant as the summer was, the warmer temperatures weren’t always ideal for livestock, grass, cereals and other crops. Lack of rainfall saw previously reliable burns dry up and created an additional headache in terms of irrigation for some. Spring should be just round the corner; however with more variability being seen in our weather, how can you reduce the impact of unseasonal or prolonged weather on your farming business?

We are seeing more interest in emissions from agriculture, and what role farming can play in mitigating climate change. 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 - we’ve found even the most technically efficient could still pick up a few tips and ideas to benefit the farm at home. The FAS events across Scotland feature practical measures to benefit the farm business and cut carbon - take a look at www.fas.scot for details of events coming up near you.

Read on to see how other farmers are tackling the climate change issue head on, cutting their carbon footprint and benefiting the farm business both financially and environmentally.
Focus farm findings - Part 1
Cut carbon and save cash

Over a period of three years, nine farming families volunteered to become a climate change focus farm under the Scottish Government Farming for a Better Climate initiative. Working with an SAC Agricultural Consultant, various specialists and other farmers within the discussion group, the host focus farmers looked at practical measures they could put in place to cut carbon and benefit their farm business. Here are some of their results...

Castlemains
£20k cash savings from small changes in practice and no loss of production

We joined Bob Simpson and the discussion group at Castlemains near Dirleton in East Lothian back in July to hear how Bob has saved around £20k and reduced his farm carbon footprint by 13% during the focus farm project*.

With a mainly arable enterprise comprising 235 hectares growing winter wheat, spring barley, oilseed rape, winter barley, Brussel sprouts and combining peas, savings focused on nutrient budgeting and tillage practices.

Measures considered at Castlemains included:

- **Change in tillage practices** - With soil organic matter levels in mind, Bob wanted to move away from the farms conventional method of establishing oilseed rape by ploughing, and instead try one pass power harrow sowing and rolling. Its estimated Bob saved nearly 19 litres of fuel per hectare. With over 18.44ha of winter oilseed rape sown in 2017, this equated to around 345 litres or £190 in red diesel and a saving of 921 kg CO$_2$.

- **Cutting the fuel bill** - Including min till, replacement of the grain dryer for a more fuel efficient model and the crop conditions over the life of the project, Bob saved over £6.5k in fuel costs.

- **Better use of fertiliser** - By introducing mushroom compost as a source of P & K, and generating individual crop recommendations based on soil analysis and crop yield, Bob saved 26.51 tonnes of fertiliser with no additional P & K requirement for fields receiving hen pen and mushroom composts. Applying hen pen to the winter oilseed rape provided an additional source of N and reduced the need to apply bagged N by 60kgN/ha. This resulted in a financial saving of £7,062 for 2018 cropping and a saving of 94,350 kg of CO$_2$e (carbon dioxide equivalents).

Bob already had a keen eye for detail, but a review of current practices still gave some scope for savings. Analysing the soil not only informed future liming policy, but also highlighted potential to make savings on P & K applications. Bob said “By paying more attention to soil sample results we have made considerable savings on fields that have traditionally grown potatoes or had large applications of FYM. Conversely we can target fields that have low P and K indices where straw has been baled and increase these fields yields.”

*figure adjusted to discount the potato crop - this was only grown in the baseline year and not grown during the life of the focus farm

Woodhead
Dairy unit saves a whopping £63k by making a range of tweaks to routine practices

Through the focus farm project, John and Anne Kerr made a number of small changes and saved around 6% on their carbon footprint and £63k in the process at Woodhead, near Newmilns in Ayrshire.

Measures at Woodhead included:

- **Improving silage** - lifting silage quality from 10.9ME (metabolisable energy) to 11.1 ME (2016) and to 11.9 (2017; 1st cut) resulted in 65 tonnes of straw and 48.6 tonnes of wheat being saved over the 90 autumn block cows. At prices of £130/tonne wheat and £125/tonne straw it would have cost £14,500 to feed the cows to the same level of performance, saving 34,568 kg CO$_2$e.
• Cutting the fuel bill - Following an energy and fuel audit, John put a smaller tractor on the diet feeder, saving around 4,400 litres of fuel annually. With red diesel at 53ppl, this equated to a saving of £2,330 and 11,792 kg CO₂ per year.
• Improving calf accommodation - Two calf igloos were purchased to provide additional calf rearing capacity. Along with a few changes to the calf shed, calf performance improved, allowing John to sell calves for over £200 at 3 weeks old.
• Improved ventilation - Removal of some of the side sheeting on the cow shed has dramatically changed the airflow and light levels in the shed. John plans to remove additional sheets and is going to open the ridge of the shed to improve the air stack effect. Increasing light levels for the cows is estimated to give an extra litre per cow per day (28,800 litres per year) equating to increased income of £8,300. In terms of carbon savings, this increased yield across the herd is expected to reduce the future farm carbon footprint by 1.88%.

You can watch John talking about some of the measures put in place at Woodhead on our climate change focus farm pages here.

Clynelish

Our most northerly focus farm saved £1,000 with potentially more to realise

Clynelish near Brora in Sutherland is run by Jason and Victoria Ballantyne in partnership with Jason’s father Murdoch. The tenanted farm covers 121 hectares of grass and hill supporting 75 suckler cows and around 500 ewes.

Already very technically efficient, The Ballantynes looked across their business and were able to further adapt and streamline some of their current operations. Along with cutting carbon and realising financial and efficiency savings, making the job easier and finding additional time savings were high on their list of objectives.

Measures Jason and Victoria put in place at Clynelish included:
• Investigating soils - GPS soil sampling was carried out in 2015 with further testing in 2017; over the following two years lime was applied accordingly. Additional lime has helped to increase grass production and is an area Jason and Victoria are going to continue to focus on in the future.
• Improving grass growth - With an irregular supply of pot ale from the neighbouring distillery, Jason and Victoria moved to supplement manures with inorganic fertiliser applications. Coupled with liming, this has extended their grazing season on the farm. Fertiliser is applied according to soil analysis results; applications are made early in the season to increase spring growth and later in the summer to ensure continued growth in the autumn where possible. Although applying both lime and fertiliser has increased emissions, it is estimated that applying lime and fertiliser according to soil analysis results has increased grass growth by around 30%.
• Earlier weaning - When weather allows, calves have been weaned earlier at 6 months rather than 7. Once weaned, cows go onto a maintenance diet, making better use of feed, with no impact on daily liveweight gain on the young calves who continue to grow at target rates.
• Sale date - Calves are sold at just under 10 months rather than at a year. Whilst this means a lower liveweight at point of sale, it frees up grass and reduces methane emissions from the farm.

Weather and ground conditions meant that Jason and Victoria had to put some ideas on hold, but these are still in the pipeline for development going forward and will contribute to reducing the farm carbon footprint. You can learn more about Jason and Victoria and some of the other measures they have considered during the project here.
Auchmore

**Upland beef and sheep farm saves £9K and cuts the farm carbon footprint by 7% during the project**

Auchmore Farm, run by Stephen and Sheena Mackenzie in partnership with Stephen's brother Donald, is a hill farm located to the west of Muir of Ord in the central highlands of Scotland.

Stephen and Sheena had already adopted renewable technology, with a 100kW hydro scheme and two 500kW wind turbines located on the farm supplying power back into the National Grid.

The team at Auchmore explored a number of activities to help them reduce their carbon footprint, these included:

- **Focusing on fuel use** - Small changes, for example by ensuring the machinery is serviced regularly and correct tyre pressures are used, meant fuel use reduced by 1,998 litres. At a price of £0.55 per litre, this equates to a saving of £1,098 and a reduction of 5,338 kg CO$_2$.

- **Improved nutrient use** - Incorporating red and white clovers into the sward meant aging leys had a continual supply of nitrogen. In 2014, Stephen started over-seeding clover into the in-bye grassland fields and went on to reduce nitrogen applications by 2,388kg (2015) and 3,000kg (2016). Based on a value of £0.66/kg N, that is a total saving of £3,556 and 71,173 kg CO$_2$e.

- **Improving daily liveweight gain** - Leaving the cattle entire has resulted in an increase in daily live weight gain of around 15% - 20%. At an average sale weight of 300kgs (up from 250kg), is an increase of 50kgs/head, which at current prices (225p/kg approx) is an increased income of £112.50 per calf sold. Assuming 20 entire are sold per year that is an increase of £2,250 and 2,500kg of extra output, helping to reduce the carbon footprint by 0.9kg CO$_2$e (2.68%).

You can watch Stephen and Sheena talking about Auchmore on our FFBC Focus Farmer pages [here](#).

Corrimony

**The farm produced a £16.6K saving with no loss of production and cut the farm carbon footprint by 10%**

David Girvan and family run Corrimony, covering over 3,035 ha. The farm has beef, sheep and has invested in renewables, including wind turbines, a woodchip district heating scheme for the farm house plus four other cottages and has recently installed a hydro scheme feeding energy into the grid. Here are some of the measures David (pictured on the right with SAC Consultant Derek Hanton) and his family put in place at Corrimony:

- **Reviewed electricity use** - David was able to cut electricity usage by 3,500kWh resulting in savings of 2,078Kg CO$_2$ and £420. David has attributed this reduction in electricity to the use of LED lighting in the farm buildings.

- **Reviewed diesel use** - Key to this was monitoring, revealing exactly what was being used where. David saved around £3,418 through an increased awareness of fuel consumption and use of precision technology.
Rotational grazing (as part of the paddock system) - This meant less concentrates were needed for the ewes saving around £815/annum. In previous years 25/30 kilos per head of concentrate was purchased (30 tonne) which is a huge saving.

Moving to a bull beef system - This has saved significant amounts of feed due to the increased feed conversion and higher growth rates of bulls compared to castrated males. In 2014 the average daily liveweight gain was 1.1kg/day, the change occurred in 2015 at which point growth rates increased to 1.4kg/day and 1.6kg/day in 2017. Selling these calves at a younger age means they are making less of a contribution to the farms emissions.

Finishing cattle - A change in policy from selling cattle store to finishing them has provided a net gain of £100 per head. This eliminates the need for additional haulage and the corresponding CO₂ emissions as a result.

You can learn more about the measures David has considered under the project here.

**Could you benefit from the Focus Farm findings?**

Even technically efficient farms can save money and show that they are taking action to reduce greenhouse gas emissions driving climate change.

There’s no one measure that will work for everyone, but plenty of practical, business-focused ideas have emerged. Many of these are small tweaks to existing tasks, but taken cumulatively, can make a positive contribution to your business, and help you to cut carbon. Based on the findings from the focus farms, some of the key areas regarding energy, soils and nutrients that proved to be worth consideration included:

- Small savings on energy use can add up, especially when these activities are being carried out on a daily basis.
- Don’t underestimate the impact of soil quality on yield. This may seem an obvious statement, but many of our fields revealed compaction on closer inspection. The Valuing your Soils brochure (containing information on Visual Evaluation of Soil Structure—the VESS guide) is a good starting point.
- Get soils tested and put in place a nutrient management plan – make best use of slurry and manures first and then top up with bought in fertiliser.
- Assess soil pH. If you are not at target pH, there is a chance that a good proportion of the nutrients you are applying are not being taken up by the target crop, wasting money.

A free carbon audit will help you compare your operations with other similar farms and point you to areas where you might be able to make savings. We will cover the findings from the remaining focus farms and consider some of the key livestock issues in the summer newsletter.

**Earthworms help supply more nutrients to soils**

Do you have enough worms?

Not only can earthworms help you with drainage and improving soil structure, they can also release around 50 to 190 kg/ha/yr mineral N from soils, according to Dr Patrick Forrestal from Teagasc. This could be worth £40-£155/ha/yr at current fertiliser prices. As a rule of thumb, a 20cm x 20cm block of healthy soil should have around 10-15 worms per soil block. How do your soils compare? OPAL have produced a handy identification guide to earth worms which you can download from their website.
Has it been one of the warmest years on record?

Long(ish), hot summer (and are we going to get another one?)

It wasn’t quite our hottest on record, however, 2018 has been ranked as the UK’s seventh warmest year, dating back to 1910. It was also the second sunniest year since 1929, behind only 2003. Worryingly, all 10 of the warmest years on record for the UK have now occurred since 2002, and 2014 is still ranked as the UK’s warmest year, according to the Met Office.

Temperatures were only one or two degrees above long term averages, but is this a taste of things to come, and if so, how did we manage? There were some definite winners and losers – the ladybird and stable fly populations seemed to boom and the kids had a decent school holiday, but getting water to livestock and irrigating crops was becoming a real issue for some. Grass growth suffered in some areas, meaning farms needed to dip into winter rations earlier than normal, making feed budgeting even more important going into winter.

Along with increased temperatures, Scotland experienced its 3rd driest period for 40 years according to SEPA. At time of writing, dry conditions have persisted into winter and we’ve not seen adequate winter rainfall to recharge groundwaters in some areas in the North East. If conditions continue, we could see more water scarcity warnings in 2019. You can download regular updates on current groundwater levels and read more on the SEPA website here.

So what can we do? Sometimes there is no escaping the weather, but there are steps we can put in place to lessen the effects (‘climate change adaptation’). We will shortly be featuring some ideas and information on our webpages to look at how we can be better prepared in the future - please get in touch if you would like to share your ideas and practical experiences with others. Keep an eye on our social media pages for more info.

Should you wish to read more about our weather, past, current and future, there’s more information via the Met Office, see www.metoffice.gov.uk/climate/uk/summaries as a starting point.

Climate Change or weather?

‘Climate is what you expect, weather is what you get’.

We have always had to work with the weather. But how does weather differ from climate? Basically, ‘climate’ is the average of your weather over a set period of time. For example, you can expect snow and ice in January or sunshine and heat in July. When the news reports cite ‘record high (or low) temperatures’, they are comparing it to an average of climate records over a set period of time.

So climate change, is about the changes in long-term averages of our daily weather. Our high temperatures in July were only a couple of degrees higher than the long term averages (1981-2010 data was used for comparison by the Met Office), but it certainly felt a lot warmer. Whilst our weather changes from hour-to-hour and by the season, climate works with a much longer average set of figures.

Keeping the cash value in slurry...

How much slurry do you spread and do you know what its worth?

One 10m³ tanker of dairy slurry can have an equivalent fertiliser value of between £30 to £50.

Using slurry splash plates can lose around 30% of the available nitrogen as ammonia gas in the first 3 hours following application. Within 12 hours, up to 80% of the nitrogen content can be lost. A move to a trailing shoe or slurry injection would help to prevent these losses, leaving you with more N for the growing crop.
Taking the time for nutrient budgeting can pay off

Our column in Farming Scotland Magazine looked at the importance of nutrient budgeting, helping you make most efficient use of dung, slurry and bought in fertilisers.

Over the summer we heard several reports of fertiliser prills being visible in silage aftermaths, writes SAC Senior Consultant Chloe McCulloch. When very dry at application, fertiliser is going to struggle to have any benefit to grass growth. However, even in a good growing year, the crop will only respond to the nutrient it needs, so applying more than this is just wasteful. This applies regardless whether you’ve purchased fertiliser directly (i.e. in bags from a fertiliser company) or indirectly (in every load of feed and bedding that comes onto the farm).

Nutrient budgeting is a practical exercise allowing you to identify the quantity of nutrient required in any given field, and then identify the most appropriate and cost-effective way to deliver this. Normally the first choice is to provide home-produced nutrient, i.e. dung or slurries. An up to date soil analysis will identify where P and K levels in soil are low or very low (and where an economic plant response could be achieved by applying extra) or are already high (in which case you can save money by applying less).

Preparing a nutrient budget for the whole farm will identify exactly how much purchased fertiliser is required, what type of fertiliser-blend would be most appropriate, and when you’ll need it.

Slurries and dung have the potential to replace a significant quantity of purchased fertiliser, however to rely on this form of nutrients you need to have an analysis.

Remember when doing any nutrient budgeting that where available you should always use the Scottish data, i.e. SAC technical notes or PLANET Scotland, as these contain application rates most relevant to the Scottish growing environment and are research-backed.

Making the most of on site energy generation

Renewables have made a great impact on energy production on the farm, both for use at home and selling back to the grid.

As the cost of battery storage drops, this technology will increasingly be used to “time-shift” generation to match demand. However before investing in energy storage technology at an early stage, what can be done to maximize the offset of imported electricity? Our practical guide looks at how demand management can reduce the need to import electricity from the grid, saving you money and reducing the farm carbon footprint. You can read more at www.farmingforabetterclimate.org/?p=1516

We have over 20 practical guides covering topics ranging from renewables to livestock rations, plus case studies to show how other farmers have improved efficiency, saved money and cut carbon.

You can read more via the Downloads page on our website 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.

Notes from previous focus farm meetings and details of upcoming on-farm events are available via our Facebook and Twitter accounts or at [www.farmingforabetterclimate.org/improving-farm-profitability/energy-and-fuel-use/](http://www.farmingforabetterclimate.org/improving-farm-profitability/energy-and-fuel-use/). We still have closing events at Nether Aden, Hillend, Rumbletonrig and Ardoch of Gallery, so there is still time to get involved and see what changes others have made - dates will be posted on our webpages and via social media.
There is more information about the changes on the host farms, along with dates of our remaining meetings on our Facebook and Twitter feeds. You can read more about the focus farms, download practical guides and case studies at www.farmingforabetterclimate.org. The Farm Advisory Service (FAS) also hosts a range of meetings and information which could help you to benefit from reducing the farm carbon footprint see www.fas.scot.

Get in touch - contact one of the team:

- Rebecca Audsley - FFBC Project Manager, SAC Consulting Auchincruive Office
  T: 01292 525 089 E: rebecca.audsley@sac.co.uk

- Craig Bothwell - Focus Farm Facilitator for Castlemains, SAC Consulting Edinburgh Office
  T: 0131 603 7515 E: craig.bothwell@sac.co.uk

- Alan Bruce - Focus Farm Facilitator for Nether Aden, SAC Consulting FBS Turriff Office
  T: 01888 563 333 E: alan.bruce@sac.co.uk

- James Buchanan - Focus Farm Facilitator for Hillend, SAC Consulting Perth Office
  T: 01738 636 611 E: james.buchanan@sac.co.uk

- Donald Dunbar - Focus Farm Facilitator for Rumbletonrig, SAC Consulting St Boswells Office
  T: 01835 823 322 E: donald.dunbar@sac.co.uk

- Derek Hanton - Focus Farm Facilitator for ‘Highland Farming Efficiency Network’ Auchmore, Clynelish and Corrimony, SAC Consulting Inverness Office
  T: 01463 233 266 E: derek.hanton@sac.co.uk

- Sarah Kerr - FFBC Project Officer, SAC Consulting Auchincruive Office
  T: 01292 525 149 E: sarah.kerr@sac.co.uk

- Robert Ramsay - Focus Farm Facilitator for Woodhead, SAC Consulting Auchincruive Office
  T: 01292 525 149 E: robert.ramsay@sac.co.uk

- David Ross - Focus Farm Facilitator for Ardoch of Gallery, SAC Consulting Stonehaven Office
  T: 01596 762 305 E: david.ross@sac.co.uk

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.

The Farming for a Better Climate newsletter is funded by Scotland’s Farm Advisory Service.