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 FFBC meetings across Scotland to improve farm efficiency and profitability, which in turn could result in fewer emissions per unit of production and a lower farm carbon footprint.

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What's been happening?

We had our annual Focus Farm meeting in Perth in December. Our nine focus farmers got together to review progress and talk about some of the practical measures they have put in place or are considering to help to improve business efficiency and reduce the farm carbon footprint. Discussions ranged from trials on alternative bedding to grassland improvements.

Host Climate Change Focus Farmer Bob Simpson and son Craig at Castlemains, near North Berwick were recognized for their activities by the RSPB Nature of Scotland Awards in November. Bob and Craig picked up a ‘highly commended’ award, reflecting how impressed the judges were with their measures to cut carbon and support biodiversity. Photo shows (from L-R) SAC Farm Facilitator Craig Simpson, host and BBC Presenter Mike Dilger, Bob Simpson and son Craig.

We've been stocking up on big white underpants recently all in the name of science. We explain everything later in the newsletter...

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.

You can find us on Facebook or follow the project on Twitter @SACFarm4Climate.
Cover crops and green manures

Cover crops can have a number of uses, from putting some biomass back into the soil to improving the soil profile. Cover crops have been given a boost of late with the inclusion in Agri-Environment Schemes. Cover crops and their use as green manures was discussed at a Climate Change Focus Farm meeting at Nether Aden in July hosted by farmer David Barron.

Before planning a cover crop, you need to identify what are the main issues a cover crop could help you with, as cover crops can offer so much more than just an environmental payment, said SAC Grassland Specialist David Lawson.

Crops such as mustards and phacelia could help increase organic matter due to their high levels of biomass. Fodder Radish, as well as having a good level of biomass also had a good tap root, ideal to help open up heavier and compacted soils. Oats could help harvest/scavenge Nitrogen, preventing it from leaching. Nitrogen fixing crops such as clovers and vetches could also help build nitrogen and fertility for a following crop. There was also the undoubted boost to biodiversity from introducing these crops, both above and below ground, providing a source of food and cover for a number of insects and birds.

Designed as a green manure, the mix seen at Turfhill clearly served a multitude of roles although David Lawson was quick to point out that the amount of organic matter returning to the soil may be smaller than thought based on experiences of maize growers in England. The group agreed that a measurement of the biomass should be taken for reference and comparison with other mixes grown elsewhere to help build knowledge. For more information, see the meeting notes on our webpage.

Saving money on fertilisers

A carbon audit highlights scope for saving on fertiliser applications.
The group at Nether Aden looked at a field which had been silaged recently; sown with a mix of Perennial Ryegrasses and clover in July 2016.

Normal practice was to apply 100 units/acre (125kg N/Ha) of Urea to silage fields, however this year only 50 units had been applied (62.5kg N/Ha) and the pit had still been filled. This was seen as a terrific saving both financially and for the environment and was a lesson learned from being involved with the project, as an early Carbon Audit revealed that Nether Aden inorganic fertiliser usage was high relative to its peers.

Reseeding the field with newer grass varieties gave a significant boost to production when compared to the old sward. The seed mix contained modern high sugar varieties of ryegrasses resulting in the grass produced being higher in energy for stock. The 30% clover content in a sward (as pictured) would typically fix 60 – 80 units of Nitrogen, helping maintain grass growth and being less reliant on fertiliser from a bag.

There are a number of free tools on the internet to allow you to do your own carbon footprint assessment. We used the free program AgRE Calc; you can also get help with a carbon audit and specialist advice on climate change, as part of an Integrated Land Management Plan (ILMP) as part of the Farm Advisory Service. A carbon audit is also a requirement of the Beef Efficiency Scheme.
#SoilYourUndies

As part of the social media trending #SoilYourUndies or #SoilYourPants campaign, we buried three pairs of 100% cotton pants in different fields at Castlemains farm. The results were seen at a focus farm meeting in October. If you are of a delicate disposition, look away now...

Selected pairs of unbleached, cotton pants were buried on the 15th September 2017 and dug up on the 25th October 2017 at Castlemains. The idea behind this experiment is that the cotton provides soil organisms with an organic food source. So the less of the pants that are left when you dig them up, the more biological activity there is, indicating a healthy soil.

The pants were buried at a spade depth in a permanent grass field, a stubble field and a growing crop of winter oilseed rape all of which had differing soil types.

The results were surprising. The permanent grass field had no signs of the pants degrading, neither did the pair buried in the stubble field. However the pair buried in the growing crop of oilseed rape (as pictured) showed significant levels of activity. The field has had hen pen applied before sowing, so it is possible that the increased organic matter and nutrients available to the soil and the growing crop has increased the level of biological activity in the soil. The other pants were reburied and we will look again at these in the new year.

Getting control of grass weeds

Dr Paul Gosling, grass weed expert from AHDB attended a recent Ardoch of Gallery event, and shared his experience and research carried out on grass weeds in England and further afield.

Herbicide resistance is becoming an increasing problem faced by farmers. Grass weed species can be similar in nature & looks, but each will have very distinctive individual characteristics. The key to tackling grass weeds is understanding their germination patterns and preferred conditions. Dr Gosling warned that a singular approach to controlling multiple species of grass weeds will not be sufficient.

First, you need to identify which grass weed species you have. This can be done by looking at the seed head, but also at the neck stems of the grass weeds, and identifying their “collars”. This can be used to identify the plants earlier in the life cycle.

Blackgrass is a highly prolific weed capable of producing 100 seeds per head; with each plant having the ability to produce 20 tillers, that plant is then able to produce up to 2000 seeds. Black grass germination peaks in the autumn, and only a small germination rate in the spring, making it very competitive with winter crops.

Combatting blackgrass requires a multi-pronged attack in order to reduce the impact it has in Scotland - the use of break crops will allow farmers to drill out with Blackgrass’s peak germination window. Break crops with varying levels of crop competitiveness, as well as herbicides with different chemical components than those used regularly in cereal crop weed control will all aim to reduce the chances of resistance developing.
Don’t underestimate the importance of pH

Soil sampling, liming and drainage were the focus of a meeting held at Corrimony as part of Farming for a Better Climate in November. Here we look at soil sampling and liming.

Farm Facilitator Derek Hanton of SAC Consulting highlighted the importance soil sampling and using soil pH to guide your liming to reduce losses and improve efficiency, optimizing returns from your crop.

Derek explained the method behind grid sampling your fields. Grid sampling takes between 1 - 4 samples per Ha and 12 sub samples from a grid in a circle about 15cm from the grid centre. This allows for at least one sub sample from every pass of the lime spreader from when it was previously spread with lime no matter which way the spreader passed through the grid.

Grid sampling allows you to get a much truer picture of the range of pH values in various areas of your field. The benefit of this approach is that it allows you to spread lime based on the actual pH results from the lab. Precision application of lime decreases the variability of pH resulting in a more consistent pH level throughout the field.

The table shows availability of nutrients at varying soil pH levels and highlights the importance of maintaining the correct levels. How often you need to apply lime will depend upon soil type and characteristics. Sandy soils will allow lime to leach from them more easily. It is recommended that sandy soils receive a smaller application of lime on ‘little and often’ approach (every 3-4 years).

Lime takes time to work, so in general, for a spring crop, Derek's advice was to apply during the previous autumn before ploughing.

Different types of lime products are available for use. Prilled lime applications will allow a quicker release and result in a faster response for the crop, however it can be a more expensive product to purchase and you will still need to apply the same quantity as you would with a ground product.

The finer the lime, the bigger the surface area, therefore the faster it will react in the soil to increase the pH, however very fine limes become difficult to spread accurately. Keep this in mind when choosing lime, depending on the quantity applied and the spreading width of the spreader. For example if you are spreading to 10m in good conditions a very fine lime would be suitable, however if spreading to a larger width, a less fine lime could be used.
Alternative bedding at Rumbletonrig

Bedding cattle on wood fines was one of the main topics covered at the Rumbletonrig Farm event. Poor harvest weather has affected the availability of straw for the bedding of livestock. With the price for a tonne of delivered straw reaching £140, it is little surprise that farmers are looking for alternatives.

One of the alternatives is wood fines, which are made from recycled mixed wood destined for burning in biomass plants. Once chipped, the wood is passed over a grader to remove the smaller wood fines that are unsuitable for burning.

Host John Mitchell agreed to trial wood fines as a bedding alternative at Rumbletonrig. John normally beds his cattle on straw. He has a court of youngstock on the wood fines at a depth of approx. 10cm and will replenish the bedding as and when required, whether this be once a week or fortnight.

John will update us on his experience of using this bedding at the next Rumbletonrig meeting in the Spring. Keep watching our webpage and social media accounts for details of when this will be.

Carbon Auditing; another way to look at your farm?

With initiatives such as the Beef Efficiency Scheme, increasing numbers of farmers are now carrying out a carbon audit for their business. Andrew Baird, SAC Consulting, discussed this at a recent meeting of the Rumbletonrig group. Andrew gave an introduction as to what carbon audits are; the type of information gathered and how farmers can use the report to make more informed management decisions.

Andrew explained how as part of the process, he looked at all aspects of the Rumbletonrig business, breaking it down by enterprise. Data about the area of land farmed, crops, livestock numbers, energy use and waste production was collated. The three main greenhouse gases (GHG) that are examined as part of a carbon audit are carbon dioxide, methane and nitrous oxide. Currently agriculture is the main producer of both methane and nitrous oxide in Scotland. The farm enterprise data is then converted into carbon dioxide equivalents to allow a comparison of overall GHG emissions.

On Rumbletonrig Farm, we have seen a 25% reduction in overall emissions from 2015 & 2017. By analysing the data we can see that this has been achieved not only by a general reduction of emissions across each enterprise, but more effectively on this farm, by an increase in outputs from the same inputs. This can partly be attributed to the recent good grain yielding years. Andrew was quick to clarify that there is often a misconception that the only way to improve carbon outputs is to improve efficiencies by cutting costs, however he stressed that the Rumbletonrig results show that reductions are possible through improved outputs without cutting inputs greatly or loss of production.

For farmers completing a carbon audit as part of the Beef Efficiency Scheme, Andrew highlighted the information that is available from the report that is created. He explained that by drilling down through the information with your adviser, areas of improvement may be found by enterprise to allow improved management decisions. Typically the report will assign ‘inputs’ such as land and energy use by enterprise and this can sometimes point to which enterprises need more attention.

At Farming For A Better Climate, we work on 5 Key Action Areas where farmers can improve their carbon outputs:

<table>
<thead>
<tr>
<th>Locking carbon on the farm</th>
<th>Developing renewable energy</th>
<th>Using energy and fuel efficiently</th>
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<tbody>
<tr>
<td>Optimising livestock performance</td>
<td>Soils, fertilisers and manures</td>
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See our website for Practical Guides and Case Studies of what other farmers have done in these areas to help improve their efficiencies, cut costs and reduce their farm carbon footprint.
Slow and steady doesn't always win

Fuel costs are a major influence on harvest efficiency. Doug Goldie of SRUC addressed several aspects often overlooked during harvest on a visit to Castlemains in July. In most cases, farmers reduce forward speed when trying to reduce losses, which results in higher fuel usage and more labour hours, as well as the machine being exposed to more wear and tear per hectare.

Having a grain loss slightly higher than 0.5% can be beneficial to the efficiency of the operation rather than investing the extra time and money required to achieve a yield loss below 0.5%.

Tips and ideas shared at events across Scotland

Under the Scottish Government Farm Advisory Service (FAS), there have been a number of events across Scotland 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.

Crofters on Benbecula heard how good grassland management is key to improving the efficiency of our sheep and beef enterprises. Key points, relevant to farmers across Scotland included:

- Target optimum pH; ensure soil is at target level for P and K
- Select seed mix based on location and proposed use of grass
- A short sharp graze followed by a rest period improves grass utilisation, growth and quality.
- A rotational grazing system aims to return to the first paddock around the three leaf stage, e.g. in the Spring, the tiller puts up a new leaf every 5-7 days, therefore most spring rotations are a 21 days.
- Start rotational grazing by moving the animals out of a field when the pasture height is 6-7 cm for cattle and 4-5cm for sheep. For more precise planning, calculate pasture available and divide by the flock/herd

Winter feeding and rations was one of the topics covered at an event in Thurso. Guest speaker Ross Williams from Norvite, gave an overview of winter feeding and the breakdown of how important it is to feed good quality silage. Everyone should have silage analysed and understand what the results actually means to the livestock that it is being fed too. Key take home winter feeding messages included:

- Know your stock – weight and condition (use weigh scales & body condition score animals!)
- Know your feeds -quality of available feeds – be aware of what you are feeding nutritionally
- Set targets and ration accordingly – relative feed budgets; cost your home grown feeds
- Feed margin over live-weight gain

The Woodlands Field trial plots at Craibstone gave farmers and crofters the opportunity to see first hand the impact that pH has on yield. The long term pH and N:P:K fertiliser trials reinforced the importance of growing crops at the optimum pH (pH 6.2) and the sensitivity of crops at other pH’s from pH4.5 – pH7.5. The fertiliser trials also highlighted the importance that each major nutrient plays on the range of different crop types.

David Ross highlighted the importance of visually assessing your soil structure, using the Visual Evaluation of Soil Structure (VESS) handout. David showed the differences between various GPS soil sampling techniques, to raise awareness of the importance of how soils are analysed using GPS technology.
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 help to reduce farm greenhouse gas emissions linked to climate change and demonstrate that farmers are also taking action to tackle climate change.

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.

Farming for a Better Climate - more profitable than you might think

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Notes from focus farm meetings and details of upcoming on-farm events are available via our Facebook and Twitter accounts or at www.farmingforabetterclimate.org

Greenhouse gas emissions

Download the new greenhouse gas emissions practical guide to learn more about greenhouse gases, where they come from on the farm and the effect they have on the environment. It also looks at measures you can put in place to reduce your emissions and the potential benefits to your farm associated with reducing your carbon footprint.

Shelterbelts—are you missing a trick?

Shelter in the lee of a woodland can cover a significant area and can help transform exposed areas of grazing into a calm, less harsh environment for livestock during more vulnerable times.

Check out the new practical guide on shelterbelts, which discusses the benefits that come from incorporating farm woodlands as shelterbelts into your grazing system.

Find these and other Practical Guides via the front page at www.farmingforabetterclimate.org

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
Where are our previous and current focus farmers...

... how can you benefit?

It’s always good to see what others are doing, identify tips and share your ideas about common issues. Each Focus Farm hosts 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 Focus Farms have around 5 meetings or visits each year at times to suit the farming calendar. Meetings are free of charge and all farmers are welcome to attend.

If you farm and would like to come along to the meetings you would be very welcome. You can read notes from previous meetings on the project website at [www.farmingforabetterclimate.org](http://www.farmingforabetterclimate.org) via the individual climate change focus farmer pages. Meetings and events are advertised through our Facebook page or on our Twitter account [@SACFarm4Climate](https://twitter.com/SACFarm4Climate). You can also discuss the programme in more detail with your local farm facilitator.
Further information and contact details

There is more information about what we and farmers across Scotland are doing, 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

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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

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